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⬢ Research

▲ Experiences & Tools

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Coping strategies in mild-to-severe OSA patients: The role of job crafting in work-related behaviors

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ABSTRACT. I pazienti con apnea ostruttiva del sonno (OSA) sperimentano deficit neurocognitivi ed eccessiva sonnolenza diurna con conseguenti limitazioni al lavoro. Lo scopo dello studio è approfondire le strategie dei pazienti con OSA alla base del job crafting, un approccio proattivo per migliorare la gestione del lavoro, in un campione di 25 pazienti e 27 partecipanti di controllo. I risultati suggeriscono che le strategie di job crafting sono adottate con uguale frequenza, seppur con differenze di tipologia. Il job crafting potrebbe avere un impatto positivo sulle prestazioni lavorative percepite dai pazienti e tale impatto diventerebbe maggiore in funzione della gravità dell'OSA.

SUMMARY. Patients with obstructive sleep apnea (OSA) constitute an economic burden on most health occupational systems. They, in fact, experience several neurocognitive deficits, excessive daytime sleepiness and fatigue and work-related limitations. Although the clinical relevance, only recently some authors focused on the relationship between OSA and a wider range of work-related variables. The aim of this study is to deepen the OSA's strategies underlying job-crafting, a proactive bottom-up strategy that workers implement to redesign their job tasks to improve their job management. We assessed 25 previously untreated mild to severe OSA patients with a mean age of 52.2 (±9.80 years) and a mean apnea-hypopnea index (AHI) of 43.89 (±19.1). A control group of 27 healthy participants was also enrolled. Data suggest job crafting strategies are adopted with the same frequency in the two groups, although the differences lie on the typology of strategy used. Moreover, job crafting could positively impact self-perceived job performance in OSA patients. The impact of job crafting on performance becomes higher as a function of OSA severity (i.e., AHI), while sleepiness does not moderate the relation between job crafting and self-perceived job performance. OSA patients do not adopt job crafting strategies to cope with their sleepiness, but to balance cognitive failures, mainly related to hypoxia. Results are discussed in terms of possible compensation mechanisms adopted by OSA patients: job crafting strategies may be conceived as a self-determined way to cope with their difficulties and to support their work performances.

Keywords: *Obstructive sleep apnea (OSA), Apnea-hypopnea index (AHI), Occupational outcomes, Job crafting, Job performance*

INTRODUCTION

Obstructive sleep apnea syndrome (OSA) is one of the most frequent (but at the same time underdiagnosed) sleep breathing disorder characterized by repetitive episodes of a partial or complete collapse of the upper airway during sleep, resulting in apnea or hypopnea respectively, that in turn, causes intermittent hypoxia and sleep fragmentation with excessive daytime sleepiness and fatigue (Dempsey et al., 2010). OSA had several and important adverse consequences. OSA literature reports a higher risk of cardiac and cerebrovascular diseases, and mortality (Kendzerska, Gershon, Hawker, Leung & Tomlinson, 2014), structural and functional alterations in several brain regions (e.g. Huang, Tang, Lyu, Yang & Chen, 2019 for meta-analysis) leading to a wide range of cognitive impairment (including attentional and executive deficit, Angelelli et al., 2020; Macchitella et al., 2021; for meta-analysis and meta-review see e.g. Olaithe, Bucks, Hillman & Eastwood, 2018) and also increased risk for motor and work accidents (e.g. Garbarino, Guglielmi, Sanna, Mancardi & Magnavita, 2016; Morsy et al., 2019; Tregear, Reston, Schoelles & Phillips, 2010). Moreover, OSA patients reported decreased quality of life (Bue, Salvaggio, Isidoro, Romano & Insalaco, 2019), suffered from mood and anxiety disorders and poor social interpersonal relationships (Morsy et al., 2019). Note worthily, between neuropsychological sequelae of OSA patients, also sociocognitive deficits were reported (Macchitella et al., 2021). Social cognition and mind-reading skills are essential to every adaptive and appropriate social interaction, from the family to the working context. Finally, the association between OSA and work-related limitations has also been documented (e.g. Mulgrew et al., 2007). It is worth noting that the work consequences of OSA receive an increasing interest since OSA patients constitute an economic burden on most health occupational systems (Morsy et al., 2019). Notably, some studies stressed that OSA treatment reduces daytime consequences and, in turn, their economic and health impact (Balbi et al., 2014; Morsy et al., 2019; Mulgrew et al., 2007; Tregear et al., 2010). However, only recently some authors focused on the relationship between OSA and a wider range of work-related variables. For example, several studies investigated the relationship between OSA and absenteeism, work productivity and performance, job satisfaction, job stress and job burnout (Guglielmi, Jurado-Gàmez, Gude & Buela-Casal, 2014, 2015; Msaad, Kammoun, Hajjaji, Kalle & Bahloul, 2018; Swanson et al., 2011). The impact of OSA on work activity and behaviour has been conceptualized as due to sleepiness, fatigue, mood disorders or neurocognitive deficit associate with OSA (e.g. Guglielmi et al., 2014; Msaad et al., 2018; Mulgrew et al., 2007; Swanson et al., 2011; Stepnowsky et al., 2019). Nevertheless, few studies focused on strategies that OSA could adopt to improve their work performance based on their clinical and psychological situation. In this study, we investigated the OSA's behaviours aimed at using proactive strategies and at crafting autonomously their job (i.e., job crafting; see below for details), reducing stress impact on work-life and improving job performance and, in general, increasing their well-being at work.

Considering that OSA patients are characterized by sleepiness and several neurocognitive dysfunctions, it is possible to hypothesize that OSA patients could manifest difficulties in developing strategies underlying job-crafting. Remarkably, the reverse may also be possible: they could, in fact, "craft their jobs" with the aim of improving their well-being and aligning the work with clinical and psychological needs. Regarding this issue, there is no current literature. OSA patients could use strategies of job crafting such as a compensative way to face the cognitive impairment. Moreover, as stressed above, different studies showed that there is an evident association between job crafting and job performance (Tims, Bakker & Derks, 2015). Thus, the propensity of OSA patients to develop job crafting related strategy could, in turn, influence self-perceived job performance. Therefore, the aim of the present study is to investigate for the first time the job crafting construct, self-perceived job performance and their relationship in mild-to-severe OSA patients. Moreover, a further aim is to explore the moderating role of OSA related factors such as gravity, measured as the number of apnea and hypopnea events (i.e. the apnea-hypopnea index, AHI) and daytime sleepiness in the relationship between job crafting and self-perceived job performance in OSA patients.

Conceptual framework and research hypotheses development
OSA patients as workers: The role of job crafting and job performance

As described above, OSA is a breathing disorder which affects several aspects of own life. Several studies showed

that the symptoms of OSA negatively affect patient's quality of work and private life, social and professional relations; thus, it is evident that OSA may produce a negative impact also on job performance and occupational health (Guglielmi et al., 2015). OSA patients can have difficulties to carry out job tasks, can experience hard situations at work, trying to maintain a performance level as well as healthy colleagues. So, there may be a gradual but progressive decline in job productivity and a worsening of interpersonal relationship in their workplace. From the perspective of occupational health and safety, it is essential to explore coping and proactive strategies which workers with OSA can carry out to redesign their job, considering their limitations, but also their resources. In the Work and Organizational Psychology literature, one of these constructs is job crafting. Job crafting has been defined as a change of proactive bottom-up strategy that workers implement to redesign their job tasks to increase and improve their job management. These changes can involve structural (physical and procedural), social and cognitive aspects. Tims, Bakker, and Derks (2012), extended the concept of job crafting within the theoretical framework of job demands-resources model (hereafter JD-R model) (Bakker & Demerouti, 2017), suggesting that job crafting involves the changes carried out by employees to balance the demands and the resources of their job with their abilities and needs. This model shows how well-being and efficiency in the workplace can be the result of two types of working conditions: requests (job demands) and resources (job resources). The interaction between the two is central to the development of well-being, job performance and burnout. Starting from the JD-R model, Tims et al. (2012) identified four main job crafting dimensions related to resources and to demands. As for job resources, Tims and colleagues (2012) recognised the dimensions of "increasing structural job resources" (e.g. creating opportunities for growth and development, autonomy and variety) and "increasing social job resources" (e.g. active capability in searching support from supervisors and colleagues, or feedback as opportunity of coaching). Within job demands, Tims et al. (2012) identified the dimensions of "increasing challenging job demands" (situations that workers have to overcome to learn and achieve goals) and "decreasing hindering job demands" (cognitive and emotive requests that focus on minimizing work stressors). Job resources play a crucial role in intrinsic motivation because they satisfy essential human needs for autonomy and competence. While research about OSA and work performance is widely developed (Msaad et al., 2018; Swanson et al., 2011), there is a lack of literature about job crafting and job performance in OSA patients. Job crafting, as a proactive and coping strategy in organizational contexts, has been explored mainly from a managerial point of view. In recent years, it has also been examined in the field of occupational health and safety, as a protective factor of stress and as a facilitator of well-being at work. Thus, job crafting leads to positive outcomes for the employee (person-job fit, enhanced meaning, job satisfaction, work engagement) as well as for the organization (commitment, high performance, reduced staff turnover) (Bakker & Demerouti, 2017; Ingusci et al., 2019). It is also interesting to note that beneficial outcomes could originate not from positive changes in job aspects but from being just immersed in job crafting activities, because it may increase employees' own work responsibilities. Moreover, Tims and colleagues (2015) analysed the relation between job crafting and job performance and suggest that employees can increase their own work engagement and job performance through job crafting.

Thus, moving from this theoretical background, our study aimed at answering the following questions: a) there are significant differences between OSA patients and healthy participants for the job crafting dimensions (increasing structural job resources, increasing social job resources, increasing challenging job demands, decreasing hindering job demands); b) job crafting is positively related to job performance in OSA patients compared to a control group.

The role of OSA severity and daytime sleepiness in the workplace

Among the several symptoms that OSA patients suffer from, one of the most detrimental is daytime sleepiness. Excessive sleepiness during the day can have important consequences in the workplace, leading to the loss of productivity and more generally to restricted ability to work (AlGanim, Comondore, Fleetham, Marra & Ayas, 2008). These are all indirect costs of OSA. Basically, most of the studies conducted on OSA patients in work contexts show that the effects of the syndrome mainly refer to the inability to concentrate, to carry out new tasks, to time management skills and to complete repetitive tasks (Accattoli et al., 2008); in general, OSA has negative consequences for job performance (Mulgrew et al., 2007; Omachi, Claman, Blanc

& Eisner, 2009). To determine the severity of OSA, the apnea-hypopnea index is used: it is an objective measurement of apnea-hypopnea events per hour of sleep. Mulgrew (Mulgrew et al., 2007), in his study highlighted how the productivity of OSA patients in work contexts is certainly linked to sleepiness but not to the severity of the syndrome expressed in terms of AHI. Fatigue levels are affected by many interrelated aspects, one of the causes being the lack of sleep. A self-rating method that measures how likely a person is to fall asleep during daytime activities is the *Epworth Sleepiness Scale* (*ESS*). This scale classifies the degree of sleepiness of a person evaluating the probability of falling asleep during many different situations, for example, while reading, listening to a conference, or having a conversation with someone; it also rates the perceived severity of sleepiness (Haghighi et al., 2013). According to Mulgrew (Mulgrew et al., 2007), the relationship between the severity of the syndrome and work limitations can depend on the type of work performed: the severity of OSA seems to greatly affect the limitations in time management and productivity of workers (Accattoli et al., 2008). Recently, Jurado-Gámez et al. (Jurado-Gàmez, Guglielmi, Gude & Buela-Casal, 2015) also showed a high percentage of absenteeism, psychological distress, and low productivity in patients with OSA compared to healthy participants. Considering the above literature, in addition to the previous questions, we were also interested in answering the following queries: c) AHI moderates the relationship between job crafting behaviours and job performance, such that the positive relationship remains when AHI is high but is neutralized when AHI is low; d) EES moderates the relationship between job crafting behaviours and job performance, such that the positive relationship remains when EES is low but is neutralized when EES is low.

METHOD

Participants

A total sample of 52 individuals, 25 suffering from OSA (48%) and 27 control participants (52%) entered the study. Most of the sample was male (96%), while only 4% was female. The mean age of the overall sample was 50.13 years, the mean of OSA patients was 52.2, the control group was 48.2. OSA patients were consecutively admitted to the Department of Otorhinolaryngology and the Respiratory Rehabilitation Care Unit of V. Fazzi Hospital Lecce (Italy) from October 2017 to November 2018. All patients received a diagnosis of OSA in accordance with the International classification of sleep disorders, which was verified with a full night polygraphic recording evaluation (Berry et al., 2012).

All patients underwent a clinical interview about their medical history and their medical records (charts) were carefully examined. To be included, patients had to perform normally on the Mini-Mental State Examination (according to Measso et al., 1993), a widely used instrument to measure the cognitive decline in adults. Patients were excluded from the sample if they: (i) were engaged in current treatment with continuous positive airway pressure (CPAP); (ii) had a significant co-morbid medical condition (e.g. diabetes mellitus, heart disease, or a tumour) or another neurological or sleep disorder (i.e. ictus or epilepsy); (iii) were taking medications that could adversely affect cognitive function (e.g. benzodiazepines or antidepressants), or presented clinically relevant depression according to the *Beck Depression Inventory* (*BDI*; Beck, Ward, Mendelson, Mock & Erbaugh, 1961). Ultimately, none of the patients presented a major depression disorder (BDI score >24 for the 21-item version).

Daytime sleepiness was measured by the *Epworth Sleepiness Scale* (*ESS*; Johns, 1991, 2000), which is the most extensively used questionnaire to estimate subjective daytime sleepiness and concentration disorders because of OSA. There is no uniform system for interpreting the ESS, but a score >10 indicates significant ESS, and a score >15 indicates serious sleepiness (Peppard et al., 2013). The subjects included in our sample showed an ESS mean of 12.3 and 26.1% of them presented a score higher than 15. The body mass index (BMI) was calculated as the ratio of weight/body height (in kilograms per square meter). Obesity was diagnosed at BMI ≥29.9 kg/m.

Ear, nose, and throat (ENT) investigations in the control group did not highlight any otorhinolaryngological disease. Furthermore, the control participants did not present any history of snoring, sleep complaints or related symptoms, or combinations of symptoms of OSA on a 5-point questionnaire investigating habitual snoring, morning fatigue, hypertension, neck size in centimetres (x = 16.64, *SD* = .5, range 15.5-17.5), and body mass index (x = 25.8, *SD* = 2.1, range 22.4-32). The questionnaire was a modified version of the known *STOP-Bang questionnaire* (Chung, Abdullah & Liao, 2016). None of the participants complained of daytime sleepiness on the ESS.

Clinical features of the OSA sample are reported in Table 1. In the OSA group mean BMI index is 32.8, the saturation is 92%, and the mean T90 is 22.8%. Moreover, 28% of the cases reported a mild diagnosis, while 72% severe (see paragraph below for OSA diagnosis and criteria of gravity). Table 2 shows that subjects of both groups did not differ in terms of mean age and Mini-Mental State Examination scores.

This study was approved by the Ethical Committee of V. Fazzi Hospital, Lecce (verbal N. 39, 28 July 2016). All subjects gave their written informed consent in accordance with the Declaration of Helsinki.

Measures

Assessment of patients with sleep-disorder breathing.

AHI is the number of apnea-hypopnea events per hour of sleep. OSA was confirmed by a recorded polygraphic evaluation with an apnea-hypopnea index (AHI) of >5 apneas/hour of sleep according to the diagnostic criteria of the American Academy of Sleep Medicine (Kapur et al., 2017). The definitions of AHI were based on the standard criteria (Berry et al., 2012). AHI scores per hour of sleep were indicative of mild (5≥AHI<15), moderate (15≥AHI<30), or severe (AHI≥30) OSA according to Berry et al. (2012).

Table 1 – Descriptive statistics of clinical features in OSA patients

	AHI Severity	**ESS**	**BMI**	***Mean* SO_2(%)**	**T90 (%)**
OSA	28% mild 72% severe	12.3	32.8	92	22.8
SD	19.1	3.0	5.3	3.1	23.4

Legenda. ESS = *Epworth Sleepiness Scale*; BMI = body mass index.

Table 2 – *t*-test comparisons on age and MMSE scores of OSA and control participants

		Age	Mini Mental State Examination
OSA	***Mean* OSA**	52.2	28.4
	SD	9.80	1.26
Control Group	***Mean* Control group**	48.2	28.2
	SD	6.14	.77
	p	.082 (Student's *t*-test)	.501 (Student's *t*-test)

Note. Welch's test was used in case of inequality of variance.

Portable monitoring (PM) is commonly used as an alternative to polysomnography for OSA diagnosis. For appropriately selected patients, there is evidence that PM is a reasonable substitute for in-laboratory polysomnography (Cooksey & Balachandran, 2016; Corral et al., 2017). Each recording was performed between 23:00 and 06:00. The signals, which were saved in a digital recorder, were then computer analysed and validated by the physician the morning after the recording.

Job crafting and self-perceived job performance.

Measures of job crafting and self-perceived performance were detected as follows.

- *Job crafting*: 21-item from *Job Crafting Dutch Scale* by Tims et al. (2012). Items were translated in Italian and comprised four dimensions: increasing structural job resources (5 items, e.g. "I try to develop my capabilities"); increasing social job resources (5 items, e.g. "I look to my supervisor for inspiration"); increasing challenging job demands (5 items, e.g. "If there are new developments, I am one of the first to learn about them and try them out"); decreasing hindering job demands (6 items, e.g. "I manage my work so that I try to minimize contact with people whose problems affect me emotionally"). The answer-Likert frequency scale is on 7-point.
- *Performance*: 13-item from *Individual Work Performance Questionnaire* by Koopmans et al. (2013). We considered two dimensions from the questionnaire, task performance, which is the competence through which individuals perform technical tasks to job (5 items, e.g. "I kept in mind the results that I had to achieve in my work") and contextual performance, or behaviours and actions supporting the organizational, psychological and social environment in which the technical core operates (8 items, e.g. "I was able to fulfill my responsibilities"). There is a 5-point Likert scale, where 1 is "strongly disagree" and 5 is "strongly agree".

Statistical methods

Moderation is a form of regression technique. Regression is a model which is based on a linear relationship between two quantitative variables. The statistical relationship is a unidirectional and asymmetric one, as the attention is on the dependence of one variable on the other one. Digging into this relationship allows to determine how much the variation of scores in one variable depends on the variation of another. Therefore, in the regression the focus is on the dependence between a variable Y, or dependent variable, from a variable X, called independent. Moderation is a form of regression technique in which the effect of an X independent variable (or more) on one or more Y dependent variables is moderated by a W variable. In this case, in fact, the size, sign or strength of the regression relationship depends on or can be predicted by W. If W is a moderator, then X and W interact in their impact on Y (Hayes, 2017).

Differently from simple regression techniques, moderation is based on the conditionality of X on W. If the effect of X on Y is moderated by a variable, consequently the X effect depends on that variable, or moderator. In simple regression, the situation is different: the effect of X on Y does not depend on other variables. The aim of a moderation analysis is, therefore, to test a linear interaction between X and W in a model of regression dependency with Y. A moderation analysis allows a researcher to describe the conditional nature of the relation whereby X transmits its effect on Y through the moderator W. The moderation process implies three causal paths: the effect of the independent variable (X) to the dependent variable (Y), the effect of the moderator (W) to the dependent variable (Y) and finally the effect of the interaction path (X*W) to the dependent variable. A relevant moderation occurs when the interaction term X*W is statistically significant.

In this study we performed a comparison between OSA and control group in self-perceived job performance. Moreover, to evaluate whether job crafting predict self-perceived job performance, we also assess (through regression analysis) the relationship between job crafting and performance in both OSA and control group. Finally, we performed moderation analysis to evaluate if the number of apnea and hypopnea events (i.e., AHI as measure of OSA severity) and sleepiness moderate the relationship between job crafting and self-perceived job performance.

Data analysis

Analyses were performed through Jamovi, version 1.2.2.0, and R Studio software (Version 1.2.5033) and carried out on a total sample of 52 individuals, 25 from OSA category (48%) and 27 from the control group (52%). Further models were performed by removing missing responses: as the sample was already small, it was decided not to carry out any missing data management operations and to directly remove observations

with missing responses greater than 50%. Thus, final dataset was composed by 22 individuals of OSA (88% of the initial sample) and 26 of control group (96.3% of the initial sample).

As a starting point, we performed a brief descriptive comparison between OSA and control group in the different subdimensions of job crafting, overall job crafting (according to Tims et al., 2012) and self-perceived performance (see Figure 1). The subdimensions of job crafting were, more specifically:

1) increasing structural resources, which define the creation of opportunities for growth and development, autonomy, and variety by the worker (hereafter STR);
2) increasing social resources, or the active capability in searching support from supervisors and colleagues, or feedback as an opportunity of coaching (hereafter SOC);
3) increasing challenging demands, or looking for new tasks at work, looking for more responsibilities (Petrou, Demerouti, Peeters, Schufeli & Hetland, 2012) (hereafter CHAL).
4) decreasing hindering demands, or minimizing the emotionally, mentally, or physically demanding job aspects (Petrou et al., 2012) (hereafter HIND).

RESULTS

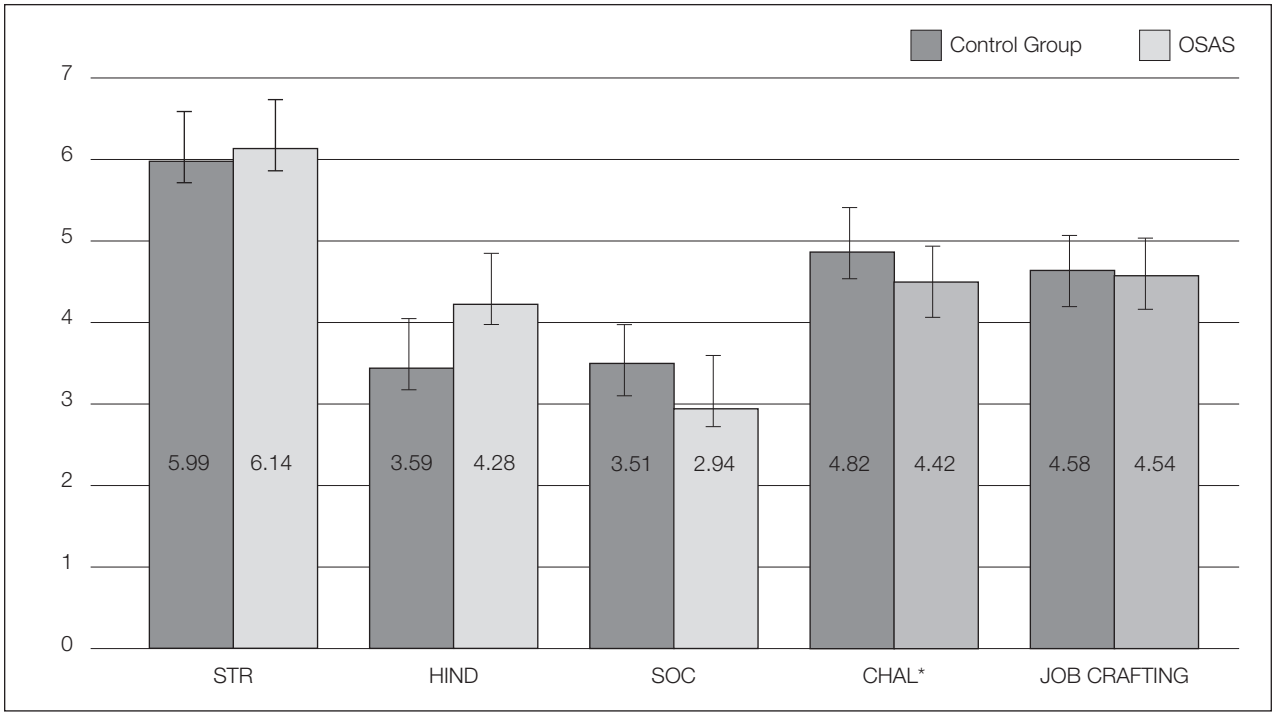
As reported in Table 3, OSA and control group showed significant differences for increasing challenging demands' dimension. At the same time, no significant difference was found between OSA and control group in others job crafting subdimensions.

Different studies (Ingusci et al., 2019; Van Wingerden, Derks & Bakker, 2017) indicated that job crafting could positively impact performance. Accordingly, estimated coefficients confirmed the existing literature about the relationship.

Interestingly, based on the regression model hypothesized, in both groups, job crafting strategies influenced positively and significantly performance, but in OSA patients this path was stronger than the control group ($\beta_{OSA} = .69$, $p<.001$ and $\beta_{CONTROL\ GROUP} = .50$, $p<.05$).

As represented in Table 4, moderation analysis indicates that the influence of sleepiness on the relation between job crafting and self-perceived performance in OSA group is not statistically significant. On the contrary, the apnea-hypopnea index (AHI), effectively moderated the relations

Figure 1 – Comparison between control group and OSA patients in using job crafting strategies



Legenda. STR = structural resources; HIND = hindering demands; SOC = social resources; CHAL = challenging demands.

Table 3 – *t*-test comparison on job crafting strategies and performance: all analysis were performed through Student's *t*-test

		STR	HIND	SOC	CHAL	Job crafting	Self-perceived performance
OSA	***Mean***	6.14	4.28	2.94	4.41	4.53	2.79
	SD	1.05	1.60	1.35	.77	.91	.68
Control group	***Mean***	5.99	3.59	3.51	4.82	4.58	2.89
	SD	.67	1.30	1.01	.52	.69	.53
	p	.559	.092	.092	.027	.809	.580

Legenda. STR = structural resources; HIND = hindering demands; SOC = social resources; CHAL = challenging demands.

Table 4 – Moderation output of the analysis

AHI as moderator in the relationship between job crafting and job performance						
	Estimate	**SE**	**Lower**	**Upper**	**Z**	***p***
Job crafting	.675	.132	.417	.934	5.13	<.001
AHI	−.005	.005	−.015	.005	−1.05	.295
Job x AHI	.016	.007	.002	.030	2.32	<.05
ESS index as moderator in the relationship between job crafting and job performance						
Job crafting	.559	.125	.314	.803	4.48	<.001
ESS index	−.042	.035	−.109	.026	−1.20	.229
Job x ESS index	−.053	.067	−.186	.079	−.79	.431

Legenda. ESS = *Epworth Sleepiness Scale*.

between job crafting (considered as the overall mean of the different subdimensions, or increasing structural resources, increasing social resources, increasing challenging demands and decreasing hindering demands) and self-perceived performance in OSA group. The consequently general consideration is that in OSA group the intensity of the relation between job crafting and performance is conditional to AHI. In order to assess which level of the apnea-hypopnea index allows to make the moderation statistically significant we represented the simple slope estimation graphically by using *medmod* package in R Studio.

Figure 2 and Table 5 show the levels of the variables through which the moderations resulted statistically significant. In the interaction term between job crafting and performance, results show that the moderation effect occurs when the level of apnea-hypopnea index is on the average, low (one *SD* less than average) or high (one *SD* more than the average). This outcome appears interesting since our sample of OSA patients suffered from mild to severe OSA following AHI evaluation ($OSA_{AHIMEAN}$ = 43.89, with 28% and 72% of patients suffering from mild and severe OSA, respectively).

Table 5 highlights that each value of AHI moderates the relation between job crafting and performance. The estimates of the relationship increase as the level of the moderator assume higher values. According to these results, job crafting has an important and significant impact on performance with a higher level of AHI in OSA ($\beta_{AHI\ LOW}$ = .386, $\beta_{AHI\ AVERAGE}$ = .695, $\beta_{AHI\ HIGH}$ = 1.004).

Finally, through Table 6 we can identify the cut-off values of apnea-hypopnea index through which moderation between job crafting and performance became significant. Low AHI values (–1 *SD* than the average) correspond to values near to 25, or a situation of moderate OSA. Average AHI (43.9) and high AHI (64.1) values represent severe OSA situations, as AHI index range considers as tighter cases the ones starting above AHI = 30. Thus, based on our data, we can conclude

Figure 2 – Graphical simple slope estimates of the statistically significant moderations

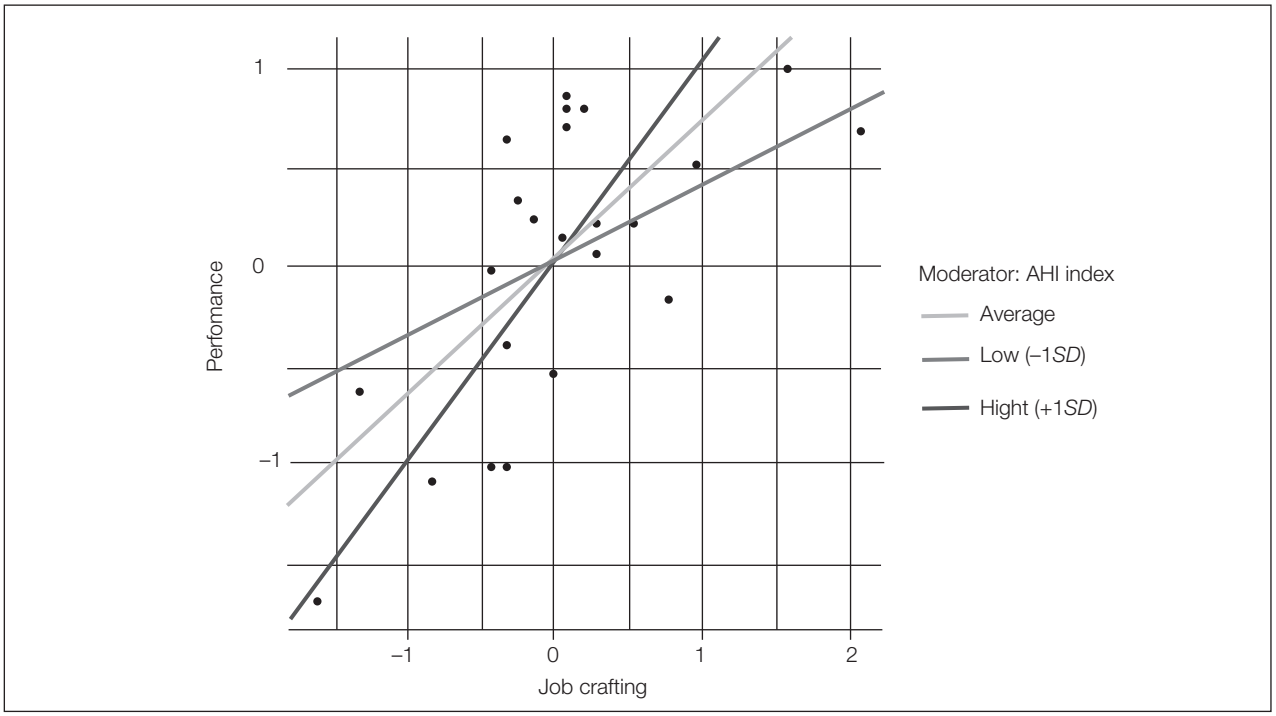


Table 5 – Simple slope estimates of the statistically significant moderations

	Estimate	SE	Lower	Upper	Z	*p*
Low (–1 *SD*)	.386	.173	.046	.726	2.23	<.05
Average	.695	.149	.403	.987	4.67	<.001
High (+ 1 *SD*)	1.004	.233	.548	1.460	4.32	<.001

Table 6 – AHI measure for significant moderation

AHI	Effect	SE	*t*	*p*	Lower	Upper
16.1	.2154	.2353	.9155	.3714	–.2771	.7079
19.01	.2636	.2173	1.213	.24	–.1913	.7184
21.92	.3117	.2004	1.5558	.1363	–.1077	.7311
24.83	.3599	.1848	1.9473	.0664	–.027	.7467
25.8314	.3765	.1799	2.0932	.05	0	.7529
27.74	.408	.171	2.3859	.0276	.0501	.766
30.65	.4562	.1594	2.8612	.01	.1225	.79
33.56	.5044	.1506	3.3493	.0034	.1892	.8196
36.47	.5525	.1449	3.8119	.0012	.2491	.8559
39.38	.6007	.1429	4.2032	.0005	.3015	.8998
42.29	.6488	.1446	4.4862	.0003	.3461	.9516
45.2	.697	.15	4.6474	.0002	.3831	1.0109
48.11	.7452	.1586	4.6989	.0002	.4132	1.0771
51.02	.7933	.17	4.6678	.0002	.4376	1.1491
53.93	.8415	.1836	4.5838	.0002	.4572	1.2257
56.84	.8896	.199	4.4707	.0003	.4731	1.3062
59.75	.9378	.2158	4.3455	.0003	.4861	1.3895
62.66	.986	.2337	4.2183	.0005	.4967	1.4752
65.57	1.0341	.2525	4.0951	.0006	.5055	1.5627
68.48	1.0823	.272	3.9788	.0008	.5129	1.6516
71.39	1.1304	.292	3.8708	.001	.5192	1.7417
74.3	1.1786	.3125	3.7713	.0013	.5244	1.8327

that in the case of more severe impairment, the relation between job crafting and performance is likely to be stronger. Job crafting behaviours could be considered, in this context, a conservative and a coping strategy aimed at facing difficulties due to OSA condition, particularly in severe conditions. In fact, moderation analysis was always significant but the regression relationship between job crafting and performance increased intensity with AHI values ≥25.8.

DISCUSSION AND CONCLUSIONS

Recently, the number of studies concerning work related behaviours in OSA patients is increased. It has been suggested that OSA is associated with job performance and presenteeism (e.g. being physically present at a job but unable to, for example, finish assigned tasks or concentrating or organization), as well as with poor occupational health (e.g. job burnout) (Guglielmi et al., 2015; Swanson et al., 2011). However, the relationship between OSA and impairment in work-related psycho-behaviour variables is not obvious. For example, Guglielmi et al. (2014) failed to find a significant difference between OSA and the control group in job stress, burnout and satisfaction. In the present study, we investigate the job crafting construct in OSA patients, a work-related behaviour that has not been investigated in this peculiar population of workers. The term job crafting refers to the ability to develop strategies to increase and improve job management, and thus job crafting could also improve job-performance. Considering that OSA is associated with low work performance, cognitive impairment, and sleepiness (e.g. Swanson et al., 2011), one might expect that OSA patients could manifest difficulties in developing strategies underlying job-crafting and thus could also be characterized by low levels of self-perceived job performance. Our data indicated no significant difference between OSA's and control's group in both job crafting (except for increasing challenging demands) and self-perceived job performance. However, it is possible to note that, based on a merely descriptive evaluation of the data (as represented in Figure 1), OSA patients, compared with control group participants, tend to use less frequently some job crafting strategies. We are aware that this outcome on the differences between OSA's patient and control group's participants in "social job crafting" is an overinterpretation of non-significant results. Nevertheless, we just want to stress that our result suggests the insight that OSA patients could have low propensity to adopt social strategies, as the subdimension of job crafting. This insight seems to be interesting and meaningful because it is very consistent with the evidence that OSA could suffer from socio-cognitive deficit (Macchitella et al., 2021) and tend to avoid interactions with co-workers (Swanson et al., 2011). Thus, this research is an exploratory one and other studies are necessary to confirm this impairment in social job crafting in OSA patients.

Moreover, we found an association between job crafting and self-perceived job performance in OSA patients. In other words, our data indicate that job crafting could positively impact performance in OSA patients. Crucially, we found also that the impact of job crafting on perceived performance increases whether AHI values become higher. This result indicates that the impact of job crafting on self-perceived job performance becomes higher as OSA severity increases. This evidence strongly suggests that OSA patients could use job crafting strategies as a self-determined way to cope with their OSA related difficulties (e.g. cognitive impairment or sleepiness) and to support their work performances. Notably, our data provided important insights about some work-related issues, as job stress, burnout and satisfaction in OSA (Guglielmi et al., 2014).

The impact of OSA on job performance has been conceptualized due mainly to sleepiness. Sleepiness is one of the main sleep-related factor that may influence cognitive performance and achievements across many contexts (e.g.from school to work contexts) (Accattoli et al., 2008; Macchitella, Marinelli, Signore, Ciavolino & Angelelli, 2020). Accordingly, for example, several studies showed a relationship between sleepiness and work-related behaviours (e.g. Guglielmi et al., 2014; Msaad et al., 2018; Mulgrew et al., 2007; Stepnowsky et al., 2019). However, sleepiness is only one of the psycho-physiological effect of OSA and at the same time, it is only one of the possible factors related to neurocognitive deficits in OSA patients (e.g. Angelelli et al., 2020; Olaithe et al., 2018). OSA could influence work-related behaviours independently by sleepiness. For example, OSA may induce dysfunction in a wide range of brain regions via intermittent hypoxia that, in turn, lead to multiple neuropsychological deficits beyond sleepiness (e.g. Olaithe et al., 2018), each of which could cause (independently or together with drowsiness) work-related problems. Interestingly, our results indicate that the moderation of sleepiness is not significant in the relation between job crafting and self-perceived job

performance. This preliminary evidence suggests that OSA patients adopt job crafting to balance cognitive failures, mainly related to hypoxia.

Our study has several limitations, and some precautions are needed before generalising our conclusions. The relatively small sample size did not lead to a strong conclusion: further studies could benefit from a replication of the results in a larger independent cohort of patients. Moreover, the work-related variables of the study descended from self-reported assessment scales. Further research needs to be corroborated by more objective data. Furthermore, subsequent investigations could adopt a more heterogeneous control group, in terms of age, gender and profession. Finally, the cross-sectional design of the study must be accompanied by in-depth longitudinal analysis to confirm the causal nature of the relationship suggested, considering other neurocognitive variables.

Despite these limitations, the study can provide interesting theoretical and practical implications for the future. From a theoretical view, job crafting seems to be an active coping strategy adopted by OSA patients to normalize their (self-perceived) job-performance. This suggestion is in line with the issue's literature, where job crafting is considered a powerful tool aimed at boosting a worker's performance, irrespective of the condition (Dubbelt, Demereuti & Rispens, 2019); moreover, in line with the Conservation of Resources Theory (COR), the loss and helplessness of the resources can predict anxiety and depression with crucial implications and consequences for working life (Dirik & Karanci, 2010).

Furthermore, recent research showed that job crafting could be considered a fruitful strategy during an emergency (Ingusci et al., 2021) and our outcome confirmed that OSA workers, characterized by some cognitive and psychological impairments, tend to adopt this autonomous approach to improve their performance. The relation between job crafting and performance is widely studied: by balancing job resources and job demands and aligning psychological needs to work requests, job satisfaction could be improved. Job crafting interventions, in fact, are widely studied in association with different positive outcomes linked to motivation and satisfaction processes, as work engagement, performance and job satisfaction (Devotto & Wechsler; 2019; Oprea, Barzin, Vîrgă, Iliescu & Rusu, 2019; Signore et al., 2020). This suggestion could be more useful in subjects with cognitive impairments, as the preliminary evidence from our study suggested that this strategy could be used by OSA, by increasing certain subdimensions, even in situation of cognitive fragility. Job crafting is a proactive bottom-up strategy adopted by workers to optimize person job fit and improve the performance. The empirical realization of it is based on the management of job demands and job resources existing in a job context. OSA workers probably face every day more job demands due to the difficulties of their physical condition. Job crafting interventions are characterised by the opportunity to offer to the workers a different point of view towards their working environment. As job demands-resources model suggests, each job can be considered as a constellation of demands and resources, where the first are all those conditions which cause obstacles to the workers and the latter are working aspects which could balance the difficulty caused by the demands.

In job crafting interventions, as above-mentioned, participants are taught how demands and resources can be related to motivational and well-being processes, emphasising how job crafting is the process by which they can shape and balance their demands and resources. Job crafting behaviours, therefore, can influence the management of demands by using the resources. Participants are facilitated in mapping their tasks, demands and job resources. Subsequent reflection helps to identify those situations at work which would be desirable to improve well-being (Devotto & Wechsler; 2019; Oprea et al., 2019; Signore et al., 2020; Van Wingerden et al., 2017). In view of the above, job crafting interventions could be adopted as coping strategies to reduce negative consequences of cognitive impairments in OSA workers and at the same time to encourage this specific target of population to consider their difficulty as a job demands which can be overcome with bottom-up and proactive individual strategy. Practical implications of the study can also be discussed. For organizations, various problems related to sleep disorders can arise, such as loss of productivity and motivation by the worker, an increase even in the number of days of leave required and in workplace injuries (Nezamodini, Hoseyni, Behzadi & Latifi, 2014). Future research could explore job crafting actions in specific companies, also considering typical target groups. These organizational interventions could provide for a longitudinal design to develop new strategies for risk management, to reduce stress and to help and support OSAS patients in their personal and working life (Van Wingerden et al., 2017), contributing to improving productivity as well as the well-being at work.

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The Meaning in Work Inventory: Validation of the Italian version and its association with sociodemographic variables

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ABSTRACT. L'articolo presenta l'adattamento e la validazione del *Meaning in Work Inventory* (*ME-Work*), un questionario composto per la valutazione di tre moduli indipendenti riguardanti il senso al lavoro, ovvero; il lavoro come fonte di senso nella vita (modulo 1, n. item = 4), l'esperienza di lavoro come sensato e insensato (modulo 2, n. item = 6) e le fonti di senso al lavoro comprendenti le dimensioni di senso di coerenza, contributo, direzione e appartenenza (modulo 3, n. item = 12). Il contributo ne riporta dunque le caratteristiche psicometriche e l'esito della validazione basato su un campione di lavoratori italiani pari a 624 partecipanti. Oltre al processo di validazione, il contributo presenta l'esame delle differenze individuali su base sociodemografiche in riferimento ai tre moduli. L'articolo si conclude discutendo i risultati e i limiti dello studio oltre a presentare le implicazioni pratiche dello strumento.

SUMMARY. This paper introduces the Meaning in Work Inventory (ME-Work), a psychometric scale formed by examining meaning in work theories in analogy with the meaning in life research evidence. The ME-Work is a modular questionnaire aimed to assess three independent aspects of meaning in work, i.e., work as a source meaning (module 1), meaningful and meaningless work (module 2), and facets of meaning in work, namely, coherence, significance, purpose and belonging (module 3). An Italian sample of 624 participants completed a survey regarding personal and organizational characteristics in addition to the ME-Work. Both confirmatory analysis and structural equation modelling have been used to respectively assess psychometric properties of the Italian version of the ME-Work and the associations of the three modules. A series of MANOVAs examined socio-demographic differences in ME-Work dimensions. The contribution ends by discussing the results and limitations of the study. Further avenues for research and practice are presented.

Keywords: *Meaningful work, Meaning in work, Validation*

IINTRODUCTION

Several authors have paid considerable attention to meaningful work which has emerged as a popular, powerful and influential construct within the science and practice of work and organizational studies. In turn, empirical studies dealing with meaningful work have been accumulated and a large amount of knowledge has been prompted by the application of several different approaches. In this respect, meaningful work is intended as a core construct which reflects its importance both at the individual, organizational and societal level (Lysova, Allan, Dik, Duffy & Steger, 2019). On the one side, work occupies a central position in human life, as primary source of meaning (Di Fabio & Blustein, 2016), linked to living one's calling (Duffy, England & Dik, 2019a) and sense of individuation, purpose and contribution (Blustein, 2006; Blustein, Kenny, Di Fabio & Guichard, 2019). On the other side, employers and organizations consider the relevance of meaningful work as a source that serves for employee commitment and well-being (Michaelson, Pratt, Grant & Dunn, 2014).

Recent investigations within the psychology of working framework (Blustein, 2006; Blustein, 2013; Duffy, Blustein, Diemer & Autin, 2016) have largely presented meaningful work as a potential consequence of socioeconomic or cultural issue related to work and an indicator of securing decent work conditions (e.g., Di Fabio & Blustein, 2016; Blustein et al., 2019; Duffy et al., 2019b). In this case, burgeoning number of authors have proposed meaningful work as a eudemonic psychological state and scientific evidence showed how it relates to multiple positive individual and organizational dimensions (Allan, Batz-Barbarich, Sterling & Tay, 2019), such as meaning in life (Allan, Duffy & Douglass, 2015; Steger & Dik, 2013), psychophysical health (Steger, Dik & Duffy, 2012), work volition, career adaptability, social connection, self-determination (Duffy et al., 2016; Duffy et al., 2017), work-life enrichment (Allan, Autin & Duffy, 2016a; Lysova et al., 2019), proactive personality, work engagement (Allan et al., 2019), job performance (Allan, Duffy & Collisson, 2016b), organizational citizenship behaviours (Steger et al., 2012), and withdrawal intentions (Duffy et al., 2016). Therefore, an impetus to critically evaluate and develop empirical tools to assess meaningful work constructs arose within many academic fields (e.g., management studies, positive psychology, business ethics), resulting in the need for understanding about the best way to assess this construct (Bailey et al., 2019a; Bailey, Yeoman, Madden, Thompson & Kerridge, 2019b; Both-Nwabuwe, Dijkstra & Beersma, 2017; Steger & Dik, 2013).

Bailey et al. (2019b) reviewed the current empirical literature about meaningful work which reveals that there are some principal complications in the contemporary measures of this construct. The presence of nonspecific items or items that conflate meaningful work with other constructs raised doubts among scholars about the measures' criterion validity. Besides, in quantitative approaches, some authors neglected factors that can ensure meaningful work experience, i.e., organizational and societal, calling for comprehensive measures of the working conditions for meaningful work (Lepisto & Pratt, 2017; Rosso, Dekas & Wrzesniewski, 2010). In fact, where authors focused solely on the individual experience, questions about sources and processes behind it remain unanswered. Likewise, where the focus is exclusively on the contextual factors, the individual subjective experience is minimized (Rosso et al., 2010). Additionally, meaningful work is intended as a positive experience that responds to the individual's quests for meaning in their work and life. However, empirical evidence of the extent to which work is experienced as meaningless are unclear and not yet examined (Bailey & Madden, 2019; Groeneveld, Leisink, Tummers & Den Dulk, 2011; Lips-Wiersma & Morris, 2009). Likewise, the role of individual differences behind the working conditions is still not clear, since the current empirical examinations have rarely addressed how personal and organizational characteristics might affect meaningful work experiences (Hofmeister, 2019).

By contrast, according to Bailey et al. (2019b), the recent research within the humanistic perspective, has largely tried to consider a comprehensive framework covering both theories on meaning in work in managerial studies (i.e., Rosso et al., 2010) and findings from empirical research on meaning in life (Schnell, 2009; Schnell, Höge & Pollet, 2013). By viewing meaning in work in analogy with meaning in life, the latter model suggests a multidimensional measure of meaningful work and sources of meaning, as operationalised by the *Meaning in Work Inventory* (*ME-Work Inventory;* German name, SIBE; Schnell & Hoffmann, 2020). ME-Work consists of three main modules through which it is possible to evaluate both working conditions for meaning in work, and the experience of meaningful work: (a) *facets of meaning*, or the perceived working conditions for meaning in work; (b) *meaningful and meaningless work* experiences, measured

independently of the facets; (c) if work is a source of meaning per se, i.e., *work as source of meaning*.

Given the extensive application of meaningful work in organizational science and practice, it is pivotal to have a clear conceptualization of this construct, and reliable and valid instrument to measure it. The present contribution intends to introduce the Italian version of the ME-Work Inventory by evaluating its psychometric proprieties with confirmatory factor analysis (CFA) and testing the hypothesized structures proposed by Schnell & Hoffmann (2020); the four facets of meaning serves as an indicator of one latent factor (H1), which successively predict the three dimensions of work as source of meaning (H2), meaningful and meaningless work (H3-4). On this basis, the overall structure (H5) of the three modules is in turn tested in order to provide evidence of the modular structure of the ME-Work.

This approach will be tested by analysing the case of Italian workers and observing the relative impact of personal and organizational characteristics on the dimensions of the ME-Work. Since the ME-Work is intended as a useable tool for researchers and practitioners, it becomes useful to understand its associations with personal and organizational characteristics. Results and implications for research are discussed, further avenues for practical use of the ME-Work as modular questionnaire are presented.

Measures of meaning in work

Meaningful work measures can be classified into two main classes, namely, unidimensional and multidimensional scales – according to the authors' pre-operationalizations. Altogether, these scales have been showing some theoretical limitations (Bailey et al., 2019a; Both-Nwabuwe et al., 2017; Lepisto & Pratt, 2017). Although their large use in different empirical settings and strong psychometrical properties, they do not answer the current call for insights on (a) the associations between meaning in work and meaning in life (Michaelson et al., 2014; Steger & Dik, 2013; Yeoman, Bailey, Madden & Thompson, 2019), (b) the role of other factors that are not taken into account in empirical investigations, e.g., self-connection (Rosso et al., 2010), social identity (Tajfel & Turner, 1986), sense of belonging (Schnell, Höge & Weber, 2019), and personal and organizational characteristics (Rothmann, Weiss & Redelinghuys, 2019). Additionally, despite the positive impacts of meaningful work, work may be experienced as meaningless and individuals may suffer the lack of valuable, worthwhile, and dignified work. However, questions about the extent to which work is experienced as meaningless are vague and not properly explored despite the large literature on meaningless work (Bailey, Madden, Alfes, Shantz & Soane, 2017; Groeneveld et al., 2011; Lips-Wiersma & Morris, 2009; Yeoman et al., 2019).

The unidimensional strand aims at assessing the presence of meaningful work, whatever the sources and attributes of meaning are. In this approach, authors mainly consider the general model of Hackman & Oldham (1976) for a direct measure of the construct concerning its causes and effects. These scales do not distinguish facets and dimensions of meaningful work and use nonspecific items or items that cover other similar constructs (Bailey et al., 2019a; Bailey et al., 2019b; Both-Nwabuwe et al., 2017). Conversely, within the multidimensional strand, authors of different fields of research have engaged efforts to identify and validate measures able to capture both facets of meaning and dimensions of meaningful work experience. The main problem with multidimensional models is that of finding the right combination of measures to evaluate all the different aspects of meaningful work, in terms of facets of meaning and meaningful work features, and meaningful work appraisal.

For example, the *Work and Meaning Inventory* (*WAMI*) is a survey tool developed on the basis of the three-dimensional model by Steger et al. (2012) and aims at measuring meaningful work experience per se. These authors identified three dimensions: positive meaning, meaning making through work, and greater good motivation. These three dimensions are proposed to function together in the pursuit of meaningful work experiences and perceptions. However, although the WAMI has been considered as one of the sufficiently validated measures of meaningful work dimensions, the composed three-factor structure has proved limited replicability (Harzer & Steger, 2012; Puchalska-Kamińska, Czerw & Roczniewska, 2019). Moreover, the WAMI seems to show a lack in the comprehension of the individual and working conditions for meaningful work (Both-Nwabuwe et al., 2017).

By contrast, Lips-Wiersma & Wright (2012) developed the *Comprehensive Meaningful Work Scale* (*CMWS*). This scale focuses on a four-dimensional model comprising *developing* the inner *self*, *expressing full potential, unity with others*, and *service to others* which are based on three existential dimensions: *individual-others, doing* and *being*, and *reality*

and *inspiration*. When balanced, these dimensions could lead to the experience of meaningful work. Although the CMWS aligns with the evaluation of features of work and individual contributions to the fit between the individual and work, it lacks an evaluation of the subjective experience of meaningful work (Both-Nwabuwe et al., 2017).

In the view of a deeper analysis of the meaningful work, the new developed German questionnaire *Meaning in Work Inventory* (*ME-Work*; Schnell & Hoffmann, 2020) captures a broad spectrum of meaning components in the context of work. The ME-Work is an expansion of the already existing *Meaningful Work Scale* (German: *Berufliche Sinnerfüllung*, in Höge & Schnell, 2012; Schnell et al., 2013). In contrast to existing scales, the ME-Work offers both dimensional and direct measures of meaningful work by assessing perceived working conditions for meaningful and meaningless work, as well as the evaluation of the extent to which work is experienced as a source of meaning per se. As noted, it embraces a dual theoretical justification. Firstly, the multidimensional model finds its basis in extensive research on meaning in life in relation to meaning in work. Authors have identified the facets of meaning in work in analogy with the facets of meaning in life and addressed the call for empirical insights on the relation between meaning in work and life satisfaction, life meaning and general health (Schnell & Hoffmann, 2020). Secondly, these facets are posited in reference to widely accepted and adopted theories of meaning in work in managerial studies (i.e., Rosso et al., 2010), thus stressing the theoretical framework underpinning the questionnaire.

The Meaning in Work Inventory

As noted, the ME-Work aims at assessing (a) the presence of four facets of meaning in work, (b) the subjective experience of meaningfulness and meaninglessness in work, and (c) work as source of meaning per se. This questionnaire has been developed with reference to the largely acknowledged theoretical model of Rosso et al. (2010) and the evidence produced in empirical research on meaning in life (Schnell, 2020).

On the one hand, Rosso et al. (2010), in their integrative review, offered a theoretical conception of what meaning in work is and what makes work meaningful, the *mechanisms* and *pathways*. The authors argued that the strikingly different things that work can mean for each worker are rooted in four core sources: self, other persons, the work context, and spiritual life. Accordingly, the authors identified pathways by which work is made and maintained meaningful. As for psychological and social mechanisms underlying the sense of value of one's work, they suggested authenticity, self-efficacy, self-esteem, purpose, belongingness, transcendence, cultural and interpersonal sense-making. Then, Rosso et al. (2010) proposed four central pathways emerging from the encounter of two core dimensions of self-others, and agency-communion. First, the intersection between self and agency reflects the *individuation* path which represents self-efficacy and self-esteem as indicators of a valuable and worthy self. Second, the match between agency and others reflects the pathway named *contribution* which refers to the significance and the perceived impact of workers' actions and to the sense of interconnection or rather doing something in service of something greater than the self-transcendence. Moreover, linking others with communion represents the third pathway, namely *self-connection* or the sense of self created by the coherence between self and work role. The combination of self and communion indicates the last path, namely, *unification* which reflects a sense of belongingness and harmony with other beings and principles.

On the other hand, the literature on meaning in life suggests that the experience of meaning can be further understood by distinguishing several facets. By introducing the *Sources of Meaning and Meaning in Life Questionnaire* (*SoMe*), Schnell (2009, 2014) proposed that the subjective experience of meaningfulness is based on evaluation processes with regards to four criteria: coherence, significance, purpose, and belonging. George and Park (2016) proposed a tripartite view, including comprehension, purpose, and mattering. Both models overlap largely, since mattering and significance as well as purpose and purpose denote similar constructs, and coherence refers to both consistency and comprehensibility (Schnell, 2020). The fourth facet in Schnell's model, belonging, is not part of George and Park's model, but has been identified as a crucial fourth facet in concepts of meaning in work (Bailey et al., 2017; Rosso et al., 2010; Schnell et al., 2013). The experience of meaningful work is thus suggested to result from the perception of one's work as enabling coherence, significance, purpose, and belonging.

More specifically, the facet *coherence* is intended as consistency regarding the individual self-concept and the work role assigned. When both match, there is an

interconnection between one's identity and purpose, and the work-role itself (Lips-Wiersma & Wright, 2012). A sense of *significance* matches the pathway of contribution (Rosso et al., 2010). It refers to the perceived impact of one's actions as well as to transcendence. Moreover, the sense of *purpose* denotes a general sense of orientation, or purpose, which, ideally, is manifest in an organization's mission, vision, and ethos (Beadle & Knight, 2012). The fourth facet, a sense of *belonging*, describes a sense of unification, being part of something greater than the self. It is based on a corporate culture that emphasises cohesion and care for one another (Bailey et al., 2017), also known as socio-moral climate (Weber, Unterrainer & Höge, 2020).

A subjective experience of these four facets contributes to a general sense of work being meaningful. Similarly, when the four facets (or some of them) are perceived as lacking, work is perceived as meaningless (Schnell et al., 2013, 2019). Finally, and beyond the experience of meaningfulness, work can serve as a source of meaning too. The ME-Work also measures this additional dimension. It can be experienced when working conditions not only enable a sense of coherence, significance, purpose, and belonging, but also allow for realising personal potential and values (Schnell, 2020). According to the theoretical model of Rosso et al. (2010), work is a source of meaning when a job corresponds to how individuals view themselves and their orientations to work, regardless to the working condition: Thus, the focus is on the self in reference to a job that provides a sense of self-actualization, self-development, self-connection and social identity (Lepisto & Pratt, 2017; Martela & Pessi, 2018; Michaelson et al., 2014; Pratt & Ashforth, 2003; Rosso et al., 2010).

As noted, only a few contributions have considered both facets of meaning and its subjective experience (Bailey et al., 2019b; Both-Nwabuwe et al., 2017). While some authors included specific measures of meaningful work mapping comprehensive facets, others focused on the degree of experienced meaning in work, and relationships with behavioural and organizational outcomes. The ME-Work, in contrast, is characterized by a modular nature. The three modules, i.e., module 1 – coherence, significance, purpose and belonging – named facets of meaning, module 2 – experience of meaningful and meaningless work –, and module 3 – work as source of meaning – allow to capture both conditions of meaning and subjective experiences. Accordingly, the modular nature has been tested via CFA to empirically confirm the theoretical differentiation which has shown good fit indices, $\chi^2_{(223)} = 452.58$, $p<.001$ CFI = .950, RMSEA = .061, SRMR = .050. Moreover, by a psychometrical point of view, Schnell and Hoffmann (2020) study on ME-Work has largely presented evidence of its use by examining both linked construct and incremental validity. On the one hand, convergent validity examinations reported significant correlations at $p<.01$, between ME-Work scales and related measures, precisely; life meaningfulness (r = .53), job satisfaction (r = .44), socio-moral climate scales (r = .32), WAMI (r = .79) and professional efficacy (r = .44). Likewise, during discriminant validity examinations, substantial negative correlations at $p<.01$ were found between ME-Work scales and crisis of meaning (r = –.38), general mental distress (r = –.37), emotional exhaustion (–.31) and cynicism (–.53). On the other hand, Schnell and Hoffmann (2020) examined the incremental validity by analysing the predictive power of ME-Work of general mental distress and professional efficacy in addition to the work-related characteristics. They found that ME-Work modules substantially further explained the variance of the outcome variables. Besides, the predictive power of the ME-Work was compared with the WAMI. Here, the authors found that the ME-Work scales of meaningful work, work as a source of meaning, significance purpose and belonging dimensions highly overlapped with WAMI total score. According to Schnell and Hoffmann, this is mostly due to the fact that the WAMI comprehends similar dimensions to ME-Work's meaningful work, work as source of meaning and significance although they are not easily distinguishable in structural analysis while the ME-Work shows a higher degree of differentiation.

The present contribution

The present contribution reports the Italian adapted version of the ME-Work Inventory, showing its psychometric properties on a large sample of N = 624 participants of different jobs. The ME-Work consists of 22 items and two parallel versions are available; one for employees (version A) and one for freelancers (version B). In version B, the total number of items is reduced to N = 16, as for people who are self-employed, they may have a different experience of *belonging* and *purpose* which cannot be applied here. As first step, the factor structure and reliability of the ME-Work are determined. The second part of the study provides evidence of the theoretical framework scale by testing the factorial model

of the ME-Work. According to the theoretical framework (Schnell & Hoffmann, 2020), the three modules are connected as follows: facets of meaning in work serve as indicators of a latent construct (H1) which predicts the dimension of work as source of meaning (H2), meaningful work (H3), and meaningless work (H4). After testing each model individually, the all-comprehensive model is tested (H5).

As noted above, Schnell & Hoffmann's study (2020) provided evidence of the construct and incremental validity of the ME-Work Inventory. However, although the main interest in meaningful work is in how it influences individuals' work behaviour, and proximal and distal outcomes (Allan et al., 2019), a few studies have considered other potential aspects related such as individual and organizational characteristics that contribute to meaningful work and its components (Duffy et al., 2016; Lysova et al., 2019; Tommasi, Ceschi & Sartori, 2020). As Bailey et al. (2019b) argued, there is a relative paucity of research on the relationship between meaningful work and sociodemographic variables such as personal and organizational characteristics. These refer to demographic differences like gender, age, and religious orientation, and to work and organizational differences, such as work orientation (job, career and calling), tenure, and professional role (Yeoman et al., 2019). Therefore, evidence of appropriate psychometric properties allows to test associations between ME-Work and personal and organizational characteristics. In fact, the ME-Work approach was tested by analysing the Italian case with the examination of how the ME-Work dimensions and scales resemble or differ based on personal and organizational characteristics. Then, the preliminary results of both exploratory and inferential studies are discussed. These provide initial insights on the applications of the ME-Work Inventory offering significant contributions for theoretical reflections, research-building, and practical implications.

METHOD

Participants and procedure

Participants are 624 Italian workers (62.3% females, average age 39.84, *SD* = 12.44, 19-71 years, average of years of work 13.75, *SD* = 12.83, 0-48). They were invited via emails to voluntary fill in the online questionnaire. In the email text, they were informed about the study and asked to contribute. A link to access the online survey was reported allowing participation at a time convenient to them. After reading the description of the study, and privacy rules, they were asked to sign the informed consent in order to use the data for the purpose of the study. Completion of the questionnaire took about five minutes. Lastly, participants reported whether they were interested in completing the questionnaire a second time after four weeks. Altogether, 11.22% (*N* = 70) filled in the questionnaire a second time. All data were anonymized right after collection and a unique numerical ID was assigned to each completed questionnaire.

The study has been evaluated and approved by the ethical committee of the Department of Human Sciences of Verona University (n. 201930) in accordance to the declaration of Helsinki.

Instruments

Personal and organizational characteristics.

In addition to common demographic variables (e.g., gender, age, education, and nationality), participants were asked to report also specific socio-demographic characteristics. These included religion (1 = atheist, 2 = agnostic, 3 = believer, and 4 = religion indifferent; cf. Steger, 2019), generational cohorts (born 1946-1964 = baby boomers, born 1965-1981 = generation X, and born 1982-2002 = generation Y; cf. Lips-Wiersma et al., 2019; Twenge, 2010; Weeks & Schaffert, 2019) psycho-physical health (1 = bad health to 5 = excellent; cf. Allan et al., 2019).

For organizational characteristics, after indicating their contract, weekly working hours, and years of work, they reported their perceived remuneration (1 = adequate, 2 = inadequate) and information about their specific job (i.e., type of job, job activities and job sector). Finally, respondents were asked to report their work orientation. By using the scale by Bellah, Madsen, Sullivan, Swidle & Tipton (1986), three descriptions of work orientation were presented, i.e., job, career and calling. This classification was included according to the large discussed role played by individual work orientation for meaningful work experiences (Steger et al., 2012). Participants indicated on a 4-point scale the extent to which each orientation represented them (1 = not at all like me, 4 = very much). The scores were obtained with the method proposed by Wrzesniewski et al. (Wrzesniewski, McCauley, Rozin & Schwartz, 1997). Following these guidelines, after

deleting the data of participants who misunderstood the instructions and rated only one paragraph, the presence of the three groups was assessed statistically by the *k*-means cluster analysis, i.e., job, career, and calling.

Meaning in Work Inventory.

The ME-Work for employees consists of 22 items to measure seven scales altogether. Thirteen items operationalize the four facets identified in the theoretical model previously proposed: *coherence* (e.g., "My job corresponds to my interests"), *significance* (e.g., "My work makes the world a little bit better"), *purpose* (e.g., "My employer cares about the welfare of society"), and *belonging* (e.g., "We are a great team at work"). The remaining ten items make up the scales to measure *meaningful work* (3-items, e.g., "My work seems meaningful to me"), *meaningless work* (3-items, e.g., "My professional activities seem meaningless to me"), and *work as source of meaning* (4-items, e.g., "My work activity gives meaning to my life"). As noted above, the original scale involves a unique version for freelancers that includes only two facets of meaning, i.e., coherence and significance (16 items).

Responses are given on a 6-point Likert scale (0 = strongly disagree to 5 = strongly agree). However, in the Italian data collection responses were given on 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). In contrast to the original instructions, and in line with another early investigation on meaning in work in Italy (Di Fabio et al., 2016), this decision was made in order to allow participants to have a neutral option. In fact, a midpoint can indicate indifference, ambivalence and many other positions (Yorke, 2001). During a preliminary assessment it is important to establish whether participant have a formal way to indicate when an item cannot be applied to them via odd-points Likert scale. By contrast, adding an even-points Likert scale could have produced a biased opinion due to a general acquiescence bias for the willingness to be on the positive side rather than accurate (Brancato et al., 2006).

According to the modular nature of the ME-Work, the first module assesses the four facets of meaningful work; module two assesses the degree of experienced meaningful and meaningless work. Work as source of meaning constitutes the third module. These three modules cover different facets of meaning in work and can be used independently. Module 1 and module 2 can be combined to assess the experience of work as meaningful and meaningless. Work as source of meaning, module 3, assesses an additional aspect, i.e. the degree to which work contributes to a person's meaning in life.

Since the ME-Work has originally been developed in German, it has been translated by back-translation into Italian for the current ME-Work validation study.

Data analysis

The validation of the scale involved both assessment of consistency and confirmatory factor analyses (CFA). The factorial structures have been evaluated based on χ^2 and fit indices, i.e. Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Parsimony unbiased Goodness-of-fit Index (PGFI), Parsimony Normed-fit Index (PNFI) and Root Mean Square Error of Approximation (RMSEA) (Hu & Bentler, 1998). For a structural evaluation of the ME-Work inventory, a structural equation model (SEM) was used to test the degree to which the four facets of meaning relate to the three scales of work as source of meaning, meaningful work and meaningless work, namely, the overall theoretical model. As a first step the associations between facets of meaning (H1) and, work as source of meaning (H2), meaningful work (H3), and meaningless work (H4) were tested. Then, four models were involved during the model testing procedure of the theoretical model underpinning the ME-Work (H5). Model 1 included the paths from facets of meaning in work to work as source of meaning and meaningful work. Model 2 tested the paths from facets of meaning in work to work as source of meaning and meaningless work. Model 3 comprised all the paths included in models 1 and 2. This model tested whether facets of meaning in work positively predicted work as source of meaning and meaningful work, but negatively meaningless work. Model 4 included meaningful work as a mediator between facets and work as source of meaning as a possible explanation of the relation between working conditions for meaningful appraisals and work as source of meaning in life. Moreover, a χ^2 difference test and established fit indices, including RMSEA, SRMR, CFI, and the Tucker-Lewis Index (TLI), were used to evaluate and compare the different models.). 2000 bootstrap resamples have been used to obtain *p*-values and confidence intervals for indirect effects.

Finally, the associations between dimensions and personal and organizational characteristics have been tested with multivariate analyses of variance (MANOVA). The factor means for the seven dimensions have been considered in separate MANOVA for each characteristic, controlling for the effects of the other characteristics.

Analyses have been conducted using SPSS (version 22) and the additional module for analysis of moment structure (AMOS).

RESULTS

ME-Work structural models and consistency

As a preliminary step, descriptive statistics of the ME-Work Inventory were calculated. The skewness (range: –1.24-1.22) and kurtosis (range: –.978-3.146) values for each item were tested to not exceed +/–2, thus supporting normality assumptions (Trochim & Donnelly, 2010).

As a second step, confirmatory factor analyses have been carried out to test the theoretical models. Firstly, the module of the hypothesized (H1) second-order structure of the four facets of meaning was tested with three comparative models (see Table 1); a one-factor model (A.1), a four-factors model treating all the facets of meaning in work as separate factors (A.2), and one model with a second order factor and four first-order factors (A.3). During the CFA, by the examination of item loadings, no items were discarded except one of the items in the purpose dimension, i.e., "At my workplace, profit comes before humanity" showed that be loaded too weakly on the factor purpose as in the others. After discarding this item, the latter CFA showed acceptable fit indices. Then, the three models were tested. Model A.1 did not show acceptable fit indexes, while fit indices of both model A.2 and A.3 were acceptable. According to the range of indices, model A.2 was considered as the final model for facets of meaning.

Regarding the scales of meaningful and meaningless work, a 2-factor model has been tested (see Table 1, model B.1). The model was acceptable with a negative covariance between the scales ($\beta = -.59$). Likewise, the 1-factor model for the scale of work of source meaning showed good fit (model C.1 in Table 1). Then, internal consistency of each dimension was calculated with the Cronbach's alpha test showing a good level of reliability; work as source of meaning $\alpha = .86$; meaningful work $\alpha = .88$; meaningless work $\alpha = .89$; coherence $\alpha = .79$; significance $\alpha = .86$; purpose $\alpha = .77$;

Table 1 – Model testing of ME-Work dimensions and scales

Model	χ^2	*df*	CFI	PGFI	PNFI	RMSEA	SRMR
Facets of meaning							
A.1	1652.26	65	.505	–	.37	.20	.14
A.2	162.70	48	.963	.59	.70	.06	.047
A.3	219.16	61	.951	.61	.71	.07	.059
Meaningful and meaningless work							
B.1	55.26	19	.989	.38	.53	.06	.02
Work as source of meaning							
C.1	22.104	2	.983	.20	.19	.13	.03

Note. Model A.1, 1-factor solution, model A.2, 4-factor solution, model A.3, second-order factor solution.
Legenda. df = degree of freedom; CFI = Comparative Fit Index; PGFI = Parsimony unbiased Goodness-of-fit Index; PNFI = Parsimony Normed-fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual.

belonging α = .78. Besides, scales and dimensions showed a high short-term stability (4-weeks test-retest stability coefficients average .55 for the scales, .58 for dimensions).

Associations between facets of meaning and work as source of meaning

With the purpose of testing the associations between the four facets of meaning and work as source of meaning (H2), the initial phase of the analysis evaluated the covariance of the latent factors. Given the affirmative evidence of the structures, the analysis of a unique model revealed that each facet of meaning was positively related with work as source of meaning (see Table 2) which led to test the predictive model of the dimension of work as source of meaning. According to the model, taken together into a single second-order factor, the four dimensions positively predicted work as source of meaning, ($\chi^2_{(99)}$ = 328.511; CFI = .953, RMSEA = .061, TLI = .943, SRMR = .059, β = .97).

Associations between facets of meaning and meaningful and meaningless work

Following the predicted model, the latter's associations (H3-4) were tested. Firstly, each path was considered separately in order to test if facets of meaning positively predicted meaningful work (path 1), negatively predicted meaningless work (path 2). Following the previous analysis, after testing the covariance between meaningful work and facets of meaning (see Table 2), the path from the second order factor of the four facets also predicted meaningful work; $\chi^2_{(85)}$ = 276.136; CFI = .957, RMSEA = .060, TLI = .943, SRMR = .057, β = .79. Likewise, meaningless work showed to have a strong negative covariance with the four facets (see Table 2),

Table 2 – Mean of item factor loadings of ME-Work dimensions, reliabilities and latent factor covariances

Personal variables	Work as source of meaning	Meaningful work	Meaningless work	Coherence	Significance	Purpose	Belonging
			Factor loadings				
N. items	4	3	3	3	3	3	3
M (*SD*)	.78(.10)	.80(.03)	.81(.06)	.78(.10)	.74(.22)	.71(.16)	.70(.09)
			Latent factor covariance				
2. Meaningful work	.65***						
3. Meaningless work	−.54***	−.60***					
4. Coherence	.82***	.63***	−.55***				
5. Significance	.63***	.53***	−.37***	.52***			
6. Purpose	.48***	.38***	−.36***	.36***	.42***		
7. Belonging	.35***	.31***	−.34***	.34***	.21***	.35***	

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

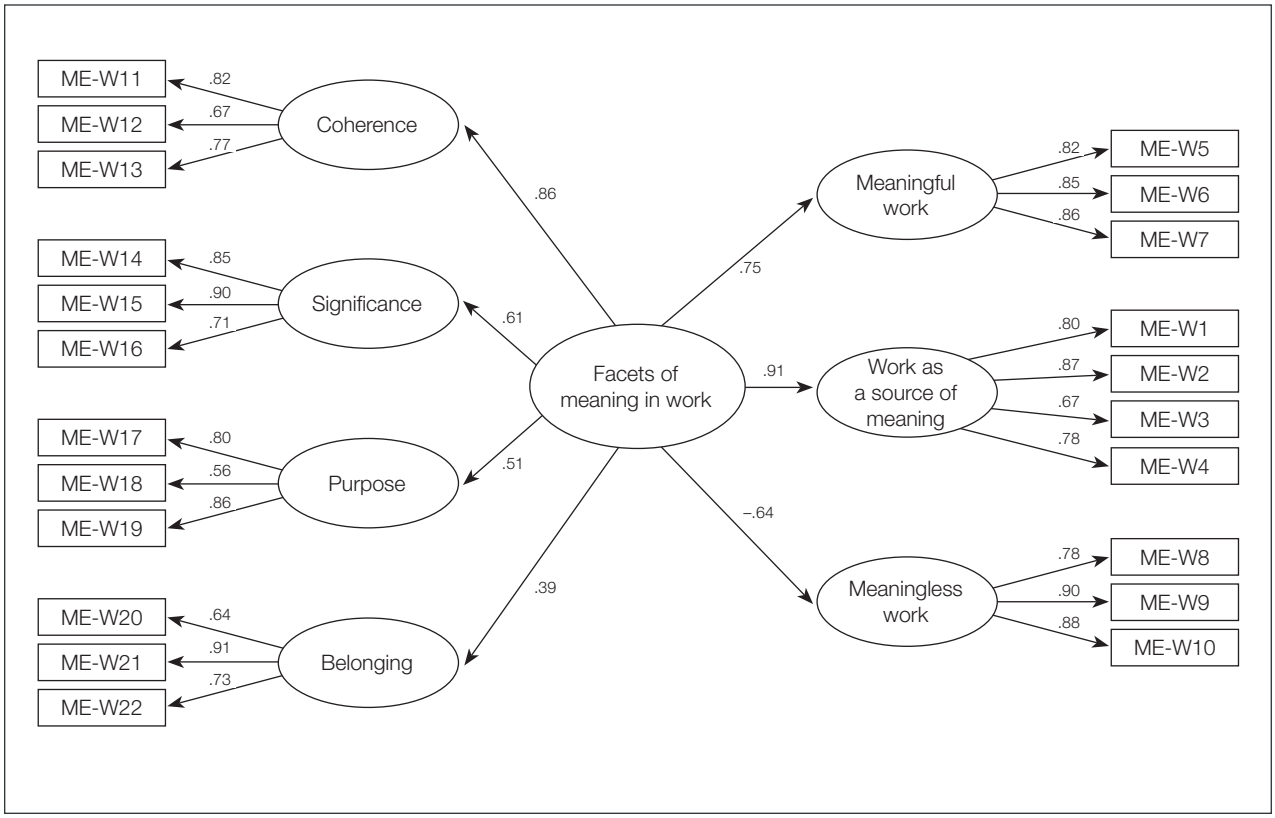
as shown by a significant predictive path model from facets to meaningless work: $\chi^2_{(85)}$ = 254.244; CFI = .962, RMSEA = .057, TLI = .953, SRMR = .056, β = −.67.

Model testing

At the third stage, the degree to which the facets of meaning in work predicted the overall experiences of meaningful work and meaningless work as well as the degree of work as source of meaning (H5, see Figure 1) were assessed. During the model testing, covariates, i.e., gender and age were considered but no significant effects have been found. Thus, covariates were not included during the final model testing.

Firstly, a model with meaningful work and work as source of meaning (1) was tested separately from the model with meaningless work and work as source of meaning (2). Both models were acceptable; model 1: $\chi^2_{(146)}$ = 455.255; CFI = .951, RMSEA = .058, TLI = .943, SRMR = .056, $\beta_{work\ as\ source\ of\ meaning}$ = .94, $\beta_{meaningful\ work}$ = .72; model 2: $\chi^2_{(146)}$ = 433.66; CFI = .954, RMSEA = .056, TLI = .946, SRMR = .059, $\beta_{work\ as\ source\ of\ meaning}$ = .94, $\beta_{meaningless\ work}$ = −.60. In order to test the hypothesis of possible mediation, meaningful work was included as a mediator in model 1. Coefficients suggested multicollinearity between the second order factor of the facets of meaning and work as source of meaning (β = 1.19), as also indicated by an ensuing negative association between meaningful work and work as source of meaning (β = −.27). Therefore, and following the theoretical model (see Figure 1), model 1 and 2 were combined to test the

Figure 1 – Final path model with latent factors with the second order factor of the four sources predicting work as source of meaning, meaningful work and meaningless work



Note. $\chi^2_{(202)}$ = 591.38; CFI = .950, RMSEA = .056, TLI = .942, SRMR = .056.

modular character of the ME-Work Inventory that resulted to be significant with acceptable fit indices.

Associations of ME-Work Inventory with personal and organizational characteristics

Table 3 reports the 6 panels of the associations between mean scores of the ME-Work and the subgroups of gender, generational cohorts, marital status, religion, and education. At the top panels, this table shows that for gender and generational cohorts there were not significant differences. For marital status, those who reported to be divorced or widowed, showed respectively lower and higher levels for work as source of meaning, meaningful work, meaningless work, coherence, purpose and significance, while partnered participants had the highest score in the dimension of belonging. For religious orientation, the group of believers yielded the highest levels on each dimension and scale, except for meaningless work. Agnostics reported the highest score in meaningless work, by contrast, and significantly lower levels in the other mean scores. The fifth panel reports the significant differences for education. Those who reported high school diploma degree or less, significantly differed from other participants concerning their levels of work as source of meaning and coherence. By contrast, despite the higher level for work as source of meaning, participants with a PhD showed the highest level of meaningless work experience, and the lowest level of meaningful work, significance, purpose, and belonging. All in all, participants with a master's degree reported to have the highest levels in the ME-Work mean scores.

Moreover, associations between ME-Work and organizational characteristics were considered (see Table 4). The top panel reports the significant differences for collar in which pink-collars showed significant higher levels for each dimension and scale, except for meaningless work that was significantly lower, and belonging, where the highest level was reported by blue collars. Conversely, blue collars had lower levels for work as source of meaning, meaningful work, and coherence. Regarding job contract, only one significant difference was established: meaningless work was higher for short-term contract employees. Besides, regarding differences in perceived remuneration, participants who perceived their remuneration as high showed significant lower levels of work as source of meaning and meaningful work, and higher levels of meaningless work. Regarding the facets of meaning, they showed significant lower levels for purpose and belonging in comparison with respondents with low perceived remuneration. The fourth panel reports differences pertaining to work orientations (i.e., job, career, calling). Respondents who saw their work as a calling had significantly higher levels in all scales apart from meaningless work, which was significantly lower. Participants who reported a job orientation, conversely, had the highest levels of meaningless work and significantly lower levels in all other ME-Work dimensions.

DISCUSSION

The current study aimed at providing and presenting support for the use of the Italian version of the *Meaning in Work Inventory*. Based on an extensive theoretical background, the ME-Work is a modular questionnaire relevant both for research and practice, consisting of three different modules: facets of meaning (1), meaningful and meaningless work (2), and work as source of meaning (3). Module 1 considers four different facets of meaning; coherence, significance, purpose and belonging. When supported by work and organizational context, these facets are assumed to contribute to the experience of meaningful work; their non-fulfilment is assumed to create a sense of work being meaningless. Module 2 measures meaningful work and meaningless work as the subjective perception of both qualities. In line with the underlying assumptions, modules 1 and 2 were highly correlated. Regardless of facets and perception of meaning, module 3 measures the experience of work as a source of meaning per se. It operationalizes the personal experience of work providing a sense of self-actualization, self-development, and social identity.

Results of the hypotheses testing via the CFA offered extensive evidence of the multidimensional structure of the four facets of meaning in work module. The model with a second order factor and treating all the facets of meaning in work as four first-order factors was supported by testing the first hypothesis. Indeed, this model describes a module that measures facets of meaning in work as defined by coherence, significance, purpose and belonging. At the same time, these four facets of meaning in work showed to have higher correlations. Moreover, assumed factor structures of

Table 3 – Mean of the seven dimensions of the ME-Work Inventory in subgroups of gender, generational cohorts, marital status, religion and education

Personal variables	Work as source of meaning	Meaningful work	Meaningless work	Coherence	Significance	Purpose	Belonging	Wilks λ
Gender (F)	.03	.53	.54	1.09	.38	.42	.06	
Female (*n* = 389)	3.43	3.97	2.06	3.43	3.51	3.27	3.85	L = 995 F = .401
Male (*n* = 235)	3.42	3.93	2.11	3.35	3.47	3.23	3.87	
Generational cohorts (F)	1.14	.82	2.13	.82	.81	.82	.17	
1946-1964 (*n* = 73)	3.49	3.99	2.16	3.45	3.50	3.29	3.87	L = .964 F = 1.590
1965-1981 (*n* = 230)	3.38	3.93	2.01	3.35	3.47	3.21	3.84	
1982-2002 (*n* = 304)	3.38	3.90	1.99	3.38	3.62	3.33	3.83	
Marital status (F)	2.85**	1.88**	1.39**	3.69**	1.59**	1.96**	1.85**	
Single (*n* = 295)	3.42	3.93	2.15	3.34	3.45	3.21	3.85	
Partnered (*n* = 261)	3.49	4.00	2.03	3.50	3.55	3.32	3.91_{a}	L = .943 F = 1.73
Divorced (*n* = 50)	3.10_{b}	3.79_{b}	1.91_{b}	3.10_{b}	3.35_{b}	3.07_{b}	3.66_{b}	
Widower (*n* = 18)	3.60_{a}	4.13_{a}	2.17_{a}	3.63_{a}	3.80_{a}	3.50_{a}	3.74	
Religion (F)	.77	1.292*	3.070*	1.238	4.427**	.482	4.322***	
Atheist (*n* = 137)	3.40	3.96	2.12	3.40	3.42	3.21	3.83	L = .961 F = 1.501
Agnostic (*n* = 77)	3.35	3.79_{b}	2.30_{a}	3.26	3.32_{b}	3.20	3.65_{b}	
Believer (*n* = 312)	3.48	4.00_{a}	2.01_{b}	3.43	3.60_{a}	3.28	3.91_{a}	
Education (F)	4.816***	1.341	5.065***	5.026***	3.146**	2.079	5.429***	
Secondary school (*n* = 64)	3.27_{b}	3.95	2.09	3.29_{c}	3.61	3.29	3.90	
High school (*n* = 284)	3.28_{c}	3.91	2.05_{c}	3.23_{b}	3.32_{b}	3.23	3.89	
Bachelor (*n* = 74)	3.57	4.09_{a}	2.07	3.57	3.73	3.21	3.86	L = .824 F = 3.432
Master (*n* = 86)	3.76_{a}	4.05	1.91	3.66_{a}	3.74_{a}	3.45	3.94	
PhD (*n* = 69)	3.53	3.83_{b}	2.47_{a}	3.60	3.54	3.10	3.48_{b}	
Other (*n* = 40)	3.58	4.08	1.94_{b}	3.49	3.55	3.24	4.03_{a}	

Note. Total amount of participants N = 624. Each cell reports the mean of the subgroup per each of the ME-Work inventory dimension. Mean with subscripts indicate a significant difference that is labelled in alphabetic order to indicate the highest score.
**p<.05, **p<.01, ***p<.001.*

Table 4 – Mean of the seven dimensions of the ME-Work Inventory in subgroups of collar, contract, perceived remuneration, and work orientation

Personal variables	Work as source of meaning	Meaningful work	Meaningless work	Coherence	Significance	Purpose	Belonging	Wilks λ
Collar (F)	11.103***	7.387***	4.462**	12.134***	26.847***	1.35	2.17	
White (*n* = 246)	3.42_a	3.93	2.19	3.49	3.33_b	3.21	3.78	L = .856 F = 7.122
Blue (*n* = 245)	3.28_b	3.87	2.07	3.19_b	3.40	3.25	3.92	
Pink (*n* = 133)	3.72	4.14_a	1.89_a	3.60_a	3.97_a	3.36	3.87	
Contract (F)	2.82	1.82	4.889*	1.20	.00	1.78	3.30	
Long term (*n* =453)	3.39	3.97	2.03	3.37	3.49	3.23	3.89	L = .958 F = 3.903
Short term (*n* = 171)	3.52	3.89	2.21_a	3.46	3.50	3.33	3.77	
Perceived remuneration (F)	12.340***	1.926*	17.421***	3.403	.855	44.420***	8.727**	
Low (*n* = 256)	3.55_a	4.02_a	1.89	3.48	3.55	3.50_a	3.96_a	L = .910 F = 7.998
High (*n* = 319)	3.29	3.90	2.21_a	3.34	3.48	3.03	3.78	
Work orientation (F)	37.889***	10.624***	22.458***	25.204***	8.798***	7.420***	5.933**	
Calling (n = 112)	3.94_a	4.27_a	1.54_b	3.93_a	3.88_a	3.49_a	4.02_a	L = .651 F = 7.68
Career (n = 226)	3.40	3.87	2.05	3.27_b	3.50	3.20	3.86	
Job (n = 71)	2.65_b	3.61_b	2.74_a	2.03_c	3.06_b	2.90_b	3.53_b	

Note. Total amount of participants *N* = 624. Each cell reports the mean of the subgroup per each of the ME-Work inventory dimension. Mean with subscripts indicate a significant difference that is labelled in alphabetic order to indicate the highest score.
**p<.05, **p<.01, ***p<.001.*

the scales were supported. Then, affirmative answers of the CFA allowed to test the hypothesized associations (H2, H3-4, H5) between the ME-Work modules. The overall model of the ME-Work inventory (see Figure 1) was tested according to the fifth hypothesis, and after having considered each predictive model separately, i.e., facets of meaning to work as source of meaning (H2), meaningful work (H3) and meaningless work (H4). The results were consistent with the literature and the original German validation (Schnell & Hoffmann, 2020). Firstly, the subjective appraisals of work as meaningful or meaningless were highly correlated with the perception of certain work and organizational conditions, namely, coherence, significance, purpose and belonging. The regression path from the second order factor of facets of meaning positively predicted the dimension of meaningful work, supporting the conceptualization of work as meaningful when it provides a sense of individuation, contribution, purpose and belongingness (Rosso et al., 2010). Likewise, meaningless work was negatively predicted by the four facets. This indicates that workers report their work to be meaningless when they perceive a lack of coherence, significance, purpose, or belonging. Work then turns into a frustratingly empty and pointless occupation (Schnell et al., 2019).

Moreover, the affirmative results of the overall model have shown how the four facets of meaning in work play an important role in the experience of work as source of meaning. When a person acknowledged their job as sustaining their needs for personal growth and self-actualization, the four facets of meaning were also marked. This finding suggested an alternative path to work as source of meaning with a potential mediation by meaningful work. Therefore, a mediation was tested but discarded due to issues of multicollinearity.

Associations between ME-Work and personal and organizational characteristics

A series of MANOVA were carried out with the aim to explicitly address individual differences with regard to gender and other demographic variables. Gender and generational differences did not show significant differences, which is consistent with the current literature on meaning in work. For example, within the literature on generational-cohorts and meaningful work, Weeks & Schaffert (2019) have made a significant effort to comprehend the different prioritization of the facets of meaning in work among generational cohorts. Their results indicated that the only significant differences were found within the cohorts and not between cohorts. Thus, the present results confirm previous research by indicating that meaning in work represents something that is common to workers of all ages and genders (Lips-Wiersma, Wright & Dik, 2016; Weeks & Schaffert, 2019). Notwithstanding this, several other personal characteristics have shown substantial associations with meaning in work scores. We established significant differences for marital status and religious orientation, which demonstrated the linkage between work and non-work domains (Tommasi et al., 2020). To begin with, partnered participants reported higher levels of belonging at work. Likewise, widowed or divorced participants reported lower levels in facets of meaning and meaningful work and higher levels in meaningless work (Oelberger, 2019). These findings tie in with studies that established higher degrees of meaning in life among married individuals, and higher crises of meaning among people living without a partner (Schnell, 2014, 2020). In religious orientation, agnostics reported lower levels in each dimension except for the meaningless work scale. Several studies have shown a closeness between meaning in work and religion, where work is discussed as something more than a mere survival wish for people with a religious orientation (Lips-Wiersma & Morris, 2009; Martela & Pessi, 2018; Ward & King, 2017). In line with this, the agnostic orientation might be considered as a tendency of being highly sceptical or perhaps even indifferent (Schnell & Keenan, 2011) which might affect the appraisal of meaning in work.

When comparing levels of education, participants with lower education levels reported lower scores of work as source of meaning and coherence. These results seem to confirm that lower educated individuals tend to have an instrumental orientation to work (Mottaz, 1981). Respondents with higher education reported lower levels of meaningful work and higher levels of meaningless work. This is in contrast with previous studies on meaningful work. For most part of the literature, higher education is associated with high economic success which is assumed to positively influence the experience of work as meaningful (Rothmann et al., 2019).

Analyses of organizational characteristics established differences between white, blue- and pink-collar workers confirming previous literature (Lips-Wiersma et al., 2016).

In the current sample, pink-collars were those who reported higher levels in all scales. When compared with the pink-collars, the blue-collars were those with lower levels in work as source of meaning, meaningful work and coherence. Additionally, within the contract subgroups there were no significant difference despite for meaningless work, which was higher in short-term workers. Not surprisingly, this result suggests that adverse and uncertain working conditions due to temporal limitations of work might curb positive experiences of work. Additionally, significant differences have been found for remuneration. Those who perceived their work as less remunerated reported high levels of significance for each of the variables included in the ME-Work. This seems to reverberate the claim of several research studies on low-paid jobs where individuals may find a meaning beyond financial reward (Hu & Hirsh, 2017; Wrzesniewski, 2003). Further analyses on work orientation also confirmed the previous literature (Steger et al., 2012; Wrzesniewski et al., 1997). In fact, people who viewed their work as a calling reported the highest levels in each ME-Work scale, while job orientation had the highest level in meaningless work and the lowest level in the other scales.

Limitations and implications for research and practice

The current study has provided support for a use of the Italian version (see Appendix) of the ME-Work Inventory. However, some limitations must be acknowledged.

Firstly, the original validation of study of the ME-Work by Schnell & Hoffman (2020) employed several measures for construct validation and only the work orientation scale was included as an additional measure in the present study. This is mostly due to the interest in the associations between meaningful work dimensions and personal and organizational variables. Moreover, because of time fatigue concerns in the primary evaluation of the meaning in work construct in the Italian context, a shorter questionnaire has been preferred to reduce the risk of fake responses. Moreover, in work and organizational studies, it is interesting to note the associations with specific behavioural and organizational outcomes. For further studies, it would be interesting to replicate the study by the application of a longitudinal design with the intention to assess ME-Work relations and its associations with these outcomes. Besides, the current classification of work orientations is turning under a renovate contestation by the scientific community. A support for two more classes of working orientation is advanced, namely: social embeddedness (belongingness), and busyness (filling idle time with activities) (Willner, Lipshits-Braziler & Gati, 2020). This is to say that singular patterns in the data collected were noted. In fact, respondents in some cases categorized themselves as both career and calling orientated, thus suggesting a fourth class of orientation. In other cases, respondents showed to be surprisingly indifferent by classifying themselves as little interested in job, career and calling. Therefore, further investigation might include a different categorization for work orientation for comparison with ME-Work.

Secondly, the current study initially aimed at validating the parallel ME-Work version for freelancers, however, only $N = 68$ freelancers participated in the study which is in contrast with the convention for sample size requirements for CFA (Wolf, Harrington, Clark & Miller, 2013). Therefore, the collected freelancers' sample was not included in the analysis. Further evaluation of the ME-Work could address this issue in order to assess the factorial structure and the personal and organizational variables that might have a relevance for this kind of workers. Finally, the current study has used a 5-point Likert scale to avoid uncertainty in respondents. In the future it is suggested to consider the use of a 6-point Likert scale as recommended by the scale authors (Schnell et al., 2013; Schnell & Hoffmann, 2020).

As research on meaningful work progresses in the light of many disruptive challenges within the labour market, according to the psychology of working theory (Di Fabio & Blustein, 2016; Duffy et al., 2016; Duffy et al., 2019b) numerous authors are trying to heighten attention on practices to help individuals yearn meaning and connection in their work. This is the case for the long burgeoning amount of studies interested in constructing decent work and decent lives (Blustein et al., 2019). Therefore, in view of the rapidly work changes, scholars' efforts are needed to foster new developments for the pursuit of meaningful work (Lysova et al., 2019) by the employment of valid and useful assessment tools. It is in this context that the ME-Work has been proposed stressing the importance on meaningful work and deriving such a measure from findings on meaning in life (Schnell, 2020) and meaning in work (Rosso et al., 2010; Schnell & Hoffmann, 2020). Therefore, beside the limitations and implications for further studies, a variety of possible

applications of the ME-Work in research and practice can be presented (Schnell & Hoffmann, 2020). When compared with other measures, the ME-Work stands out as offering both economical as well as differentiated modules, by capturing four dimensions facets of meaning as they are discussed in several theoretical contributions. Its applications in organizational and managerial settings can lead to richer interpretations and descriptions about how and to what extent workers of an organization perceive a meaning in their job. Firstly, insights from individual scores of coherence, significance, purpose and belonging can lead to practical implications as the creation of conditions for meaningful work provision. Although meaning cannot be supplied and managed by top-down practice, and normative conditions could not reflect a subjective experience of meaning in work (Bailey et al., 2019a; Lips-Wiersma & Morris, 2009; Michaelson et al., 2014), it can be supposed that meeting certain objective characteristics may lead to higher levels of meaningful work. For instance, assessment of the facets of meaning could inform career guidance in the work setting. Person-job fit, and contextual factors conditions could thus be promoted, as well as the strengthening of individual professional profiles, competences, and empowerment (Duffy et al., 2019; Schnell et al., 2013). Moreover, significance or the sense of contribution may be fostered by sustaining task varieties and the overall significance of working activities (Allan et al., 2016b), promoting their effects of prosocial impact (Martela & Riekki, 2018). Likewise, belonging represents a significant concern in organizational setting. As for purpose, managerial and organizational policies might promote a socio-moral climate, prosocial activities and practices and facilitate relatedness, trust and a sense of community (Weber et al., 2020). Finally, practitioners might use the ME-Work to assess the distribution of the four facets and their absolute values in the organizational context and professional job sectors. On this basis, they could be able to devise training interventions by the adoption or adaptation of specific approaches following the evidence of facets' distribution and prevalence.

Due to its modular nature, the ME-Work Inventory is likely to be a useful tool for personnel assessment and selection, human resources managerial practice and project training development. For instance, the work as source of meaning scale might help in career assessment and in personnel selection to have a rich comprehension of the subjective pursuit of meaning and the personal meaning attributed to one's work of workers. Likewise, in devising a training project, the use of meaningful work and/or meaningless work scales can offer an examination of the risk of the existential erosion of workers as well as the workers' interests in meaning (Bailey et al., 2017).

CONCLUSION

As with all the literature on meaningful work, the present contribution hopes that appropriate research would help to improve job quality and support individual lives and wellbeing. It is apparent that the constant labour and economic transformation will increase in the future impacting on the individual quest for meaning in work. Since the beginning of 2020, the SARS-COV 2 pandemic has been putting all the job sectors and workers (employees, employers, freelancers) in a sudden, renovated and uncertain working state. Thus, a new avenue of questions on meaning in work will be opened for research and practice. Besides the theoretical grounds, the ME-Work is thought as a feasible and versatile assessment tool focused on the personal experience of work and organizational provisions for meaning in work. The contribution has shown its relevance for the comprehension of several conditions of work and workers in the pursuit of meaningfulness. Then, the ME-Work might be used for investigating separated aims of the research and practice, overcoming potential barriers of mobility limitations, and involving different ways of research on the psychology of workers and job quality.

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APPENDIX

ME-Work Inventory Italian version

1. Mi posso realizzare attraverso il mio lavoro.
2. Il mio lavoro mi riempie di significato.
3. Nel mio lavoro ci sono possibilità di crescita personale.
4. La mia attività lavorativa dà un senso alla mia vita.
5. Le attività che svolgo a lavoro mi appaiono significative.
6. Vedo un senso nel mio lavoro.
7. Il mio lavoro mi appare sensato.
8. Per quanto concerne il mio lavoro, mi trovo in una crisi di senso.
9. Quando penso alla mia attività lavorativa, sento un senso di vuoto.
10. Soffro del fatto di non riuscire a trovare un senso nel mio lavoro.
11. La mia attività lavorativa corrisponde ai miei interessi.
12. Il ruolo che ricopro a lavoro si adatta alle mie qualità.
13. Le mie attività lavorative si adattano a ciò che mi sono prefisso di fare nella mia vita.
14. Il mio lavoro rende un po' migliore il mondo.
15. Attraverso la mia attività lavorativa do un prezioso contributo alla società.
16. Il mio lavoro arricchisce la vita di altre persone.
17. Il mio datore di lavoro fa qualcosa per risolvere problemi sociali.
18. Per il mio datore di lavoro è più importante che i compiti vengano svolti accuratamente piuttosto che nel minor tempo possibile.
19. Il mio datore di lavoro pensa al bene della società.
20. Sono ben inserito nella comunità lavorativa.
21. In compagnia dei miei colleghi mi sento bene.
22. Faccio parte di un team lavorativo eccezionale.

Note. Work as source of meaning: 1, 2, 3, 4; Meaningful work: 5, 6, 7; Meaningless work: 8, 9, 10; Coherence: 11,12,13; Significance: 14, 15, 16; Purpose: 17, 18, 19; Belonging: 20, 21, 22.

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Relationship between academic achievement and personal protective factors against school violence

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ABSTRACT. L'obiettivo di questa indagine era quello di determinare la relazione tra i risultati accademici in Matematica e Lingua e comunicazione e i fattori protettivi personali contro la violenza nella scuola secondaria di secondo grado. La metodologia utilizzata è stata non sperimentale, quantitativa e correlazionale, con un campione di 4822 studenti messicani. Una tecnica di modellazione di equazioni strutturali è stata applicata per validare empiricamente un modello teorico che associa le variabili studiate (la violenza scolastica, il tipo di violenza scolastica, i fattori protettivi personali e il rendimento scolastico). Questa analisi è stata condotta utilizzando il database Achievement Evaluation del National Educational System (ELSEN) corrispondente al Piano Nazionale di Valutazione della Conoscenza (PLANEA) 2017. È stata applicata una tecnica di modellazione con equazioni strutturali per verificare empiricamente il modello proposto. I risultati hanno mostrato che il rendimento scolastico è direttamente e negativamente correlato alla violenza a scuola. Inoltre, il fattore protettivo personale è correlato alla violenza: quando il primo aumenta, la violenza diminuisce. Questi risultati hanno permesso di costruire e suggerire strategie di prevenzione e intervento che promuovono l'empatia, l'autoregolazione, oltre a un sistema di decisioni che aiuterà a ridurre il fenomeno della violenza negli studenti della scuola secondaria di secondo grado.

SUMMARY. The objective of this investigation was to determine the relationship between academic achievement in Mathematics, and Language & Communication and the personal protective factors against violence at the high school level. The methodology used was non-experimental, quantitative, and correlational, with a sample of 4822 Mexican high school students. A structural equation modeling technique was applied to empirically validate a theoretical model that associates the studied variables (school violence, the type of school violence, personal protective factors, and academic achievement). To make this analysis, the database used was Achievement Evaluation from the National Educational System (ELSEN) corresponding to the National Plan for Evaluating Knowledge (PLANEA) 2017. Statistical analyses were conducted using SPSS 25 and AMOS 25 software. A modeling technique with structural equations was applied to verify the proposed model empirically. The results showed that academic achievement is directly and negatively related to violence at school. Also, the personal protective factor is related to violence: when the former increases, violence decreases. These results allowed to build and suggest strategies for prevention and intervention that promotes empathy, self-regulation, in addition to a system of decisions that will help reduce this violence phenomenon in high-school students.

Keywords: *Violence, Academic achievement, Protective factors*

INTRODUCTION

School violence reaches many young people, especially in Mexico. According to OECD (2019), 23% of Mexican students have suffered some type of violence at school. Violence is understood as the situation that threatens the physical, moral, psychological, or social integrity of members of the school community, causing a certain level of physical or psychological pain, to the person who experiences it. Usually taking place within a social relationship developed in school or within the physical limits of the institution (Cárdenas, 2009; Varela, Ávila & Martínez, 2013).

When comparing the index of school violence between Mexico and OECD countries, the average school violence in Mexico is higher than in the rest of the OECD countries. Students are suffering different types of violence, such as: verbal (insults and nicknames); physical (hitting and pushing); psychological (threats, rumors, exclusion and isolation); institutional (insecurity perceived by the students in their school and the reflection of the teachers' attitudes and/or authorities' laziness); and digital (threatening the person's integrity using electronic tools) (Del Tronco, Ramírez, Sota, Baggini & Cervantes, 2013; Garaigordobil, 2015; García-Fernández & Giménez-Mas, 2010; Muñoz, 2008).

School violence is a phenomenon that generates many negative consequences in students such as psychological damage, low academic achievement and school dropout. Psychological damage is one of the effects of school violence. Cava, Buelga, Musitu and Murgui (2010) found that adolescents who are victims of violence, experience a poorer psychosocial adjustment.

Violence also has a negative impact on the academic achievement. It has been found that there is a negative and significant relationship between suffering violence and success in the areas of Language and Mathematics (González & Treviño, 2018). School dropout has been related to school violence too. It has been proven that when violence is manifested, there is a more significant impact on the students' decision regarding dropping out of school (Del Tronco et al., 2013).

The negative consequences of school violence have been a concern for many administrators, parents and teachers, which makes school violence an issue that needs to be investigated since there are still very few studies that reveal the magnitude of the problem (Roman & Murillo, 2011). Most studies entail how to protect students from school violence, specifically taking into consideration the individual factors that could act as a buffer for bullied adolescents (Quintana-Orts & Rey, 2018). Some studies indicate that there are personal protective factors that help improve a person's response to school violence, generating an adaptive result and positively impacting their school performance (Ttofi, Bowes, Farrington & Lösel, 2014; Uriarte, 2006). However there are still many gaps in knowledge regarding protective factors and possible interventions (Larson et al., 2020; Patel, Kieling, Maulik & Divan, 2013; Zych, Farrington & Ttofi, 2018).

Theorical background

It should be noted that school violence is a complex and multidimensional phenomenon in multiple levels; thus, there is a need to investigate more about school violence and its relationship between educational achievement and personal protective factors (Cicchetti, 2013; Sabina & Banyard, 2015). This study focuses on deepening on these variables by considering the Santrock's theory about academic performance in adolescence (Santrock, 2019) and the humanistic theory on the importance of the person discovering their unique human potential and how to relate to their environment in a harmonious way (Scholl, McGowan & Hansen, 2012; Soutter, O'Steen & Gilmore, 2014; Stanley, Small, Owen & Burke, 2013).

Santrock's theory on academic performance in adolescence explains the importance of educational achievement during adolescence, since this is the age when students have to assume more responsibilities that make them feel the game of life they have to play is real. Academic success and failure during teenage years serve as predictors of how their life will go as adults (Santrock, 2019). Focusing on the interest of teenagers reaching their academic goals has a more serious commitment. This research considers the academic achievement in various areas of knowledge, such as Mathematics, and Language & Communication.

Although academic success is a main issue during adolescence according to Santrock's theory, the probability of low academic achievements increases in students who have been victims of school violence (Glew, Fan, Katon, Rivara & Kernic, 2005; Roman & Murillo, 2011). An international study estimated school violence's effect, and it was negatively associated with low Math achievement scores (Rutkowski, Rutkowski & Engel, 2013); meanwhile, other authors found

that a positive school environment and students with personal protective factors were positively associated with high grades in different areas (Laurent, Barnard, Janse, Reddy, Frempong & Winnaar, 2015; Wang et al., 2018).

From the humanistic theory on addressing school violence, the school should offer students opportunities to learn proactively in a safe environment. This is possible throughout creating and maintaining an environment that meets individual needs and enables them to develop personal protective factors (Causton, Tracy-Bronson & MacLeod, 2015; Sabina & Banyard, 2015; Stanley et al., 2013; Zych et al., 2018). The personal protective factors are those personal, institutional and social resources that buffer the risk factors and promote personal and academic development (Jessor, 1993).

The humanistic approach related to academic achievement focuses on managing personal protective factors for avoiding being a bully-victim. This approach leads students to become self-regulated, empathic and good decision-makers to assume prosocial behavior and to face adverse situations (Arastaman & Balci, 2013; Gutiérrez, Sánchez, Alberola & Montañés, 2009; Lapponi, 2013; Petrucci, Borsa, Damasio & Koller, 2016; Stanley et al., 2013; Sun, Xie & Anderman, 2018; Torrano, Fuentes & Soria, 2017).

In this research, a personal protective factor is self-regulation which is understood as the ability to identify cognitive and emotional processes, regulate them and transform them into positive experiences. This helps the students supervise their own learning and makes them responsible for their own active participation in their life decisions (García-Fernández & Giménez-Mas, 2010; Santrock, 2019). Another personal protective factor is empathy, which is the ability to put oneself in another person's shoes. It generates prosocial and moral behavior (Sánchez-Queija, Oliva & Parra, 2006; Sánchez, Ortega & Meneghini, 2012; Schoon, 2021). Finally, the exercise of decision-making is considered as a protective factor because it helps people analyze the consequences of their actions (Gibbons & Rossi, 2015).

AIM

In the light of previous theory, this research aims to determine the relationship between school violence, personal protective factors, and educational achievement in Mathematics, and Language & Communication at the high school level. Based on the stated objective, the research question is the following: What is the relationship between school violence, personal protective factors, and the educational achievement in Mathematics, and Language & Communication in high school? The information obtained from this research will serve as a reference to other regions and countries interested in understanding and intervening in this phenomenon. It will also help build up intervention and prevention strategies derived from a scientific study. Additionally, this study's empirical information will allow national and international researchers to deepen more on school violence and how to prevent it.

METHOD

The present study is non-experimental, quantitative and correlational. The database used was the ELSEN, corresponding to PLANEA. This database is available to the general public on the website of the National Institute for the Evaluation of Education (Spanish acronym: INEE).

Instrument

The Mexican Department of Public Education (Spanish acronym: SEP), the INEE and the educational authorities of the different states of the Mexican Republic, within the framework of the PLANEA, agreed to apply an instrument that would allow identify the mastery of the required learning in high school in the areas of Mathematics, and Language & Communication. The instrument PLANEA is characterized by an objective and standardized test aligned to the common curricular framework (SEP, 2017).

Participants

The database used was obtained from the test PLANEA 2017 applied to a sample of 4822 senior high school students belonging to public and private schools granted by the SEP of Nuevo León, Mexico, on April 4 and 5, 2017. This study followed the ethical principles that protect the participants, as suggested by Aguilar, Darroman, Perera and Benitez (2008).

Procedure

After making an exhaustive review of the corresponding literature, a theoretical model of three components was proposed: 1) school violence, 2) personal protective factors, and 3) educational achievement. The latter was measured with the student's result in the areas of Mathematics (MAT), and Language & Communication (LYC).

The reliability of each construct is shown, by the means of Cronbach's alpha (α) coefficient. In addition, to determine the construct validity of the factors school violence and personal protection factors, an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed. The results of the rotated matrix of the EFA are shown in Table 1, in addition, the Kaiser-Meyer-Olkin = .855, and the *p*-value of the Bartlett sphericity test is less than .001 and the percentage of variation explained is 82.1%. Regarding Figure 1, it shows the results of the CFA. Based on the results of the alpha coefficient, the EFA and the AFC, it can be said that the questions to measure School violence and Personal protection factors are reliable and valid. Together with their respective variables and questions, the two remaining components are presented in Table 2 and in Table 3. Also, Figure 2 shows the theoretical model in which the relationships proposed between the three components are reflected.

Both violence variables (Institutional, Physical, Economic, Digital and Psychological) and the personal protective factors (Empathy, Self-regulation and Decision-making) were constructed by applying the principal component analysis technique and the components that had an eigenvalue more significant than one (Kaiser, 1974).

The multivariate modeling technique with structural equations was applied to analyze the relationships proposed in the theoretical model and answer the research question. It was determined that the statistics of the goodness of fit and parsimony met the minimum values established for the findings to be statistically valid (Acock, 2013). Plus, the results were significant for a $p<.05$. The corresponding statistical analyzes were carried out in the SPSS 25 software and AMOS 25 (see Figure 1).

RESULTS

The sample size was composed of 4822 students in the last year of high school in the state of Nuevo León, Mexico, of which 2435 (50.5%) were women with an average age of 17.82 and 2386 (49.5%) men whose average age was 18.01 years. Regarding school funding, 4165 students (86.4%) were from public schools and 657 (13.6%) from private schools.

The empirical model was built with three dimensions, eight indicators, and three measurable variables. The criteria for selecting each principal component (indicator) were to take all those that had a characteristic value greater than one unit (Kaiser, 1974). Once the main components were determined, the modeling technique with structural equations was applied to determine the relationships between personal protective factors and educational achievement with school violence. Some goodness of fit and parsimony statistics were verified. The results shown in Figure 2, prove that educational achievement is directly and negatively related to school violence. In other words, when educational attainment increases by one standard deviation, school violence decreases by .25 deviations. That is, as violence grows, achievement reduces significantly.

Meanwhile, personal protection factors are also related to school violence, which, in other words, means that when personal protection factors increase by one standard deviation, violence decreases by .45 deviations. The results show that the increase in school violence is associated with a decreased personal protection factor. The analysis determined a positive and significant correlation of .38 between educational achievement and the personal protection factor, meaning an increase in the personal protection factor indicators is related to better results in Mathematics, and Language & Communication. On the other hand, for each standardized unit that increases in psychological violence, school violence increases by .81. In other words, it has been observed that as long as students have a behavior of exclusion, ignorance, rejection, force, insult, offense or ridicule to their peers, school violence increases significantly. Likewise, for each standardized unit that the physical variable increases, violence increases by .75 (see Figure 2).

To summarize, Figure 2 shows that when students hit, kick, slap, or physically mistreat each other, violence increases significantly. The results obtained from this research, represented in the empirical model, show how personal protection factors (Empathy, Self-regulation, and Decision-making system) are positively related to educational achievement. This research offers evidence that some characteristics of students who achieve higher educational

Table 1 – Results of the exploratory factor analysis

Question	Component/factor	
	School violence	*Personal protective factors*
Indicate how often students at your school offend you with insults, curses, or hurtful nicknames.	.865	.111
Do you consider your school a safe place?	.801	.210
Indicate how often students in your school destroy furniture or damage facilities.	.791	.250
When problems exist (arguments, fights, etc.) between your classmates, how often do teachers intervene to solve them?	.780	.260
Indicate how often students at your school hit, kick, slap, or physically abuse you.	.762	.200
Indicate how often students in your school do the following:		
– Hit or push other students.	.760	.340
– Hurt or injure other students.	.754	.333
Indicate how often students at your school steal other students' belongings	.701	.336
Indicate the frequency with which your classmates bother you through social media (Instagram, Facebook, Twitter), email, or text messages on the cell phone.	.623	.350
Indicate how often the students at your school:		
– Exclude, ignore, or reject you.	.611	.356
– Force you to do things you don't want to.	.600	.369
– Insult, offend or ridicule their peers.	.578	.371
Indicate your degree of agreement with the following statements:		
– I can easily pick up if another person wants to participate in a conversation.	.210	.824
– I can easily identify if a person says one thing when they really mean another.	.201	.820
– I can easily predict how someone else will feel.	.198	.818
– I can tell when I'm being nosy, even if the other person doesn't tell me.	.190	.815
– I can tell if another person is hiding her/his true emotions.	.188	.801
– I find it easy to put myself in someone else's shoes.	.180	.798
– My friends often tell me about their problems because they say I really understand them	.179	.781
Indicate how much the following describes you:		
– I finish everything I start.	.177	.772
– I am a hard-working person.	.176	.768
When you have to make a decision, how often do you apply the following?		
– I consider all my options when making decisions.	.170	.750
– In a decision, I try to find what are the disadvantages of each option.	.166	.745
– Before making the decision, I try to collect a lot of information.	.160	.738
– I try to be clear about my objectives before deciding.	.158	.730

Note. Source: own elaboration with information from PLANEA 2017.

Figure 1 – Confirmatory factor analysis

Table 2 – Components, variables, and questions of the theoretical model

Component	Variable	Question
School violence (α = .891)	Verbal violence	Indicate how often students at your school offend you with insults, curses, or hurtful nicknames.
	Institutional violence	Do you consider your school a safe place? Indicate how often students in your school destroy furniture or damage facilities. When problems exist (arguments, fights, etc.) between your classmates, how often do teachers intervene to solve them?
	Physical violence	Indicate how often students at your school hit, kick, slap, or physically abuse you. Indicate how often students in your school do the following: Hit or push other students. Hurt or injure other students.
	Economic violence	Indicate how often students at your school steal other students' belongings
	Digital violence	Indicate the frequency with which your school classmates bother you through social media (Instagram, Facebook, Twitter), email, or text messages on the cell phone.
	Psychological violence	Indicate how often the students at your school: Exclude, ignore, or reject you. Force you to do things you don't want to. Insult, offend or ridicule their peers.

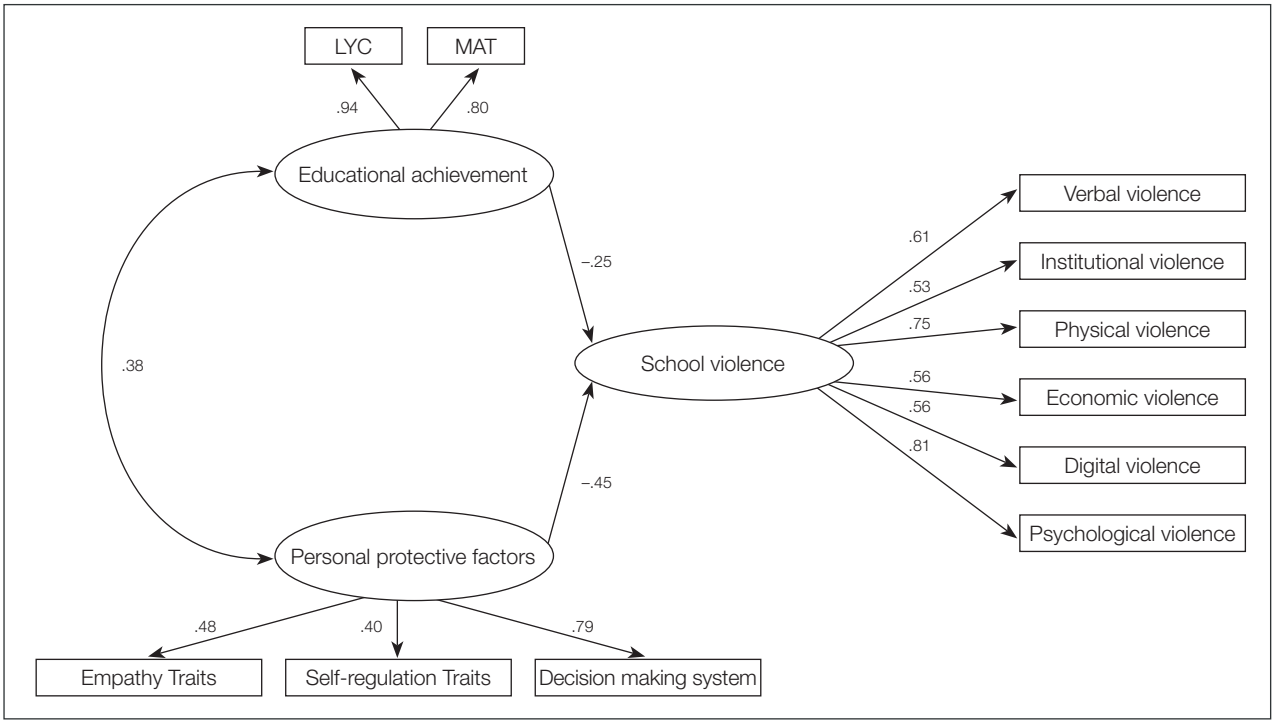
Note. Source: own elaboration with information from PLANEA 2017.

Table 3 – Personal protective factors

Factor	Variable	Question
Personal protective factors (α = .886)	Empathy traits	Indicate your degree of agreement with the following statements: I can easily pick up if another person wants to participate in a conversation. I can easily identify if a person says one thing when they really mean another. I can easily predict how someone else will feel. I can tell when I'm being nosy, even if the other person doesn't tell me. I can tell if another person is hiding her/his true emotions. I find it easy to put myself in someone else's shoes. My friends often tell me about their problems because they say I really understand them.
	Self-regulation traits	Indicate how much the following describes you: I finish everything I start. I am a hard-working person.
	Decision-making system	When you have to make a decision, how often do you apply the following? I consider all my options when making decisions. In a decision, I try to find what are the disadvantages of each option. Before making the decision, I try to collect a lot of information. I try to be clear about my objectives before deciding.

Note. Source: own elaboration with information from PLANEA 2017.

Figure 2 – Statistical analyzes and associations



achievement are those who can put themselves in other person's shoes, acknowledge the feelings of others, complete what they start, fulfill school responsibilities, use a system to make decisions, consider all options before deciding, analyze the consequences of decisions and seek to be clear about their objectives before making any decisions.

Limitation

Although the present study represents an advance in the field of introducing the relationship between academic performance and personal protection factors against school violence, it is important to point out a limitation. Although the validation was done by construct and it was verified that the reliability for each factor, it was not possible to carry out the validation by experts to the instrument used. Therefore, for future research, it is proposed to carry out this type of validation.

DISCUSSION

This study shows relevant results proving the relationship between school violence and educational achievement in Mexico.

Relationship between school violence and educational achievement

The results presented show that those who are insulted, offended, are victims of robberies, and live in an unsafe school environment, beaten, hurt, harassed through social media, excluded, and even forced to do things against their will, are the most affected in terms of educational achievement. Previous authors (González & Treviño, 2018; Pérez-Fuentes, Álvarez-Bermejo, del Mar Molero, Gázquez & Vicente, 2015) have concluded that the actions corresponding to school violence affects school performance, decreasing in this way, educational achievement and students' grades.

These findings denote the importance of intervening promptly in the face of the phenomenon of school violence since the school climate is positively associated with students' performance and grades. With an emphasis on the relationship between low academic achievement and school violence, the probability of obtaining low academic achievements increases in students who have been victims of school violence increases (Glew et al., 2005; Murtin et al., 2015; Roman & Murillo, 2011). Instead, Wang et al. (2018) found that a positive school environment was positively associated with grades.

From a humanistic approach, the students should be involved in a safe environment in order to meet individual student needs. This means that safe schools need to minimize risks, but they also need to maximize the student's skills to survive and thrive (Jessor, 1993), in order for them to be able to focus on their academic performance (Osuna & Díaz, 2020).

These findings denote the importance of intervening promply in the face of the phenomenon of school violence.

Relationship between personal protective factors and educational achievement

Regarding personal protective factors, the findings of this research reflect the importance of students having empathy, self-regulation, and a decision-making system to obtain better academic achievements. These factors are considered personal protection because they contribute to violence prevention, and as their levels get higher, educational achievement increases. Moreover, these skills are included as fundamental for transversal formation (Osuna & Díaz, 2020).

The results of this research reveal the significant relationship between personal protective factors and educational achievement. Similar results were presented by Zych et al., 2018), who pointed out the existence of a positive relationship between personal protective factors, such as self-regulation and empathic social skills, with academic achievement. Some of the research reviewed (Garaigordóbil, 2015; Mitrović et al., 2020; Sánchez et al., 2012) shows coincidence with the results obtained in this research, particularly regarding the importance of recognition and management of their emotions in order to assume prosocial behaviors.

Considering this study's findings, the need to take action against school violence is clear, relying on personal protection factors to obtain better educational achievement. Some actions could be aimed at the inclusion of coexistence

guarantors (Del Tronco et al., 2013; Ortega-Ruiz, Del Rey & Casas, 2013; Ruiz & Alcaide, 2017).

Shaking hands workshop: An intervention proposal

Considering the positive relationship between personal protective factors and educational achievement, a proposal for an intervention and prevention workshop aimed at high school students is presented focusing on personal protective factors such as empathy, self-regulation, and a system of decision-making facilitated by a tutor. This workshop looks forward to going beyond crossing our arms or being a passive witness of school violence and make a difference by taking actions. This proposal also intends to become a hint to school administrators engaged in school violence in Mexico and other countries.

The intervention and prevention proposal called "Shaking Hands Workshop" aims to develop high school students personal protective skills. The workshop is designed to work in formative synergy with the academic community, under the humanistic approach and positive psychology, since it has been found that it favors academic performance and optimizes development of students (Alford & White, 2015).

Tutors play an essential role in the proposed workshop because it has been found they can improve the school climate by establishing rules for a healthy coexistence as well as by teaching of the adequate expression of emotions and coexistence (Belonogova & Sviridova, 2020; Duggins, Kuperminc, Henrich, Smalls-Glover & Perilla, 2016; Peñalva-Vélez, López-Goñi, Vega-Osés & Satrústegui-Azpíroz, 2015; Tomas, Rodriguez-Pichardo, Ariso & Fernández, 2020).

The proposal for intervention and prevention, "Shaking Hands Workshop", is described as follows: the workshop has a duration of 16 weeks, grouped by topics corresponding to personal protective factors, with a weekly periodic frequency of five hours. Modules are organized for four weeks; 3 weeks are addressed to the students, while one week is allocated to their trainers, like parents and teachers.

It is suggested for the selection of tutors of "Shaking Hands Workshop" to consider candidates who are trained in positive psychology. More specifically, (Julio-Maturana, 2017; Seligman & Csikszentmihalyi, 2000) it is suggested to consider tutors who can explain the benefits in student development when using the model of positive psychology called PERMA for its acronym in English (Positive emotion, Engagement, Relationships, Meaning, Achievement) which brings about benefits such as: improving students' academic and personal performance, respect for autonomy, and the production of joy, respect, and hope.

The composition of the groups will be based on the database ELSEN, corresponding to PLANEA in order to identify those from the participant school who have been victims of violence.

Module 1. Emotional management. This module seeks to develop emotional competencies through active and experiential learning. The theoretical-conceptual foundations are related to emotional intelligence and the RULER methodology: Recognizing, Understanding, Labeling, Expressing, and Regulating emotions (Bisquerra, Pérez-González & García Navarro 2015; Brackett et al., 2011). Also, some theoretical foundation from Limber & Olweus (2017) was considered for Module 1.

Module 1 addresses topics that could help emotional management, such as:

- Emotional awareness
- Emotional regulation
- Emotional autonomy
- Emotional management and educational achievement.

In Module 1, the students should work under the leadership of a tutor or mentor who encourages them to share their feelings and concerns, and to develop the habit of finding alternative solutions or improvements.

Module 2. Empathy. The objective is to develop the skill of empathy and peaceful coexistence, and to generate a support network among equals. Based on other authors' positive experiences (Cowie & Fernández, 2006; Sánchez et al., 2012; Stanley et al., 2013; Zych et al., 2018), the module will help students to develop networks among their peers, so that they value coexistence in their school as positive, as well as under a system of relationships between peers and an emotional and moral connection.

The module 2 addresses topics such as:

- The ABCs of interpersonal relationships
- Builders of peaceful coexistence
- Peace culture
- Empathy and educational achievement.

In Module 2, the student will work with a shared leadership between a tutor and volunteering peers, trained in interpersonal skills to offer support.

Module 3. Self-regulation. The module seeks to develop

self-regulation aimed at educational achievement. The module follows the guidelines established by some authors (Nacimiento & Mora-Merchán, 2014; Rodríguez & Merchán, 2014; Velasco, 2013) who provide guidance on achieving self-regulation through a process of analysis of what they do, how they do it, and what they do it for in order to focus on self-improvement. The module 3 addresses topics such as:

- Psycho-affective thermometer
- Coping techniques
- Positive reassessment
- Self-regulation and educational achievement.

Module 3 is developed under the leadership of a mentor who facilitates emotional confrontation, positive reframing processes, and motivates self-regulation skills.

Module 4. Decision-making system. This module seeks to develop decision-making skills through active and experiential learning. The theoretical-conceptual foundations are related to emotional education and Rational Emotive Therapy (Bisquerra et al., 2015; Lapponi, 2013). This module addresses topics such as:

- From the irrational to the rational
- Decision-making system
- Empowerment
- Decision-making system and educational achievement.

In Module 4, the students might work under the leadership of a tutor or mentor who encourages them to identify irrational thoughts and proposes responsible alternatives that contribute to an environment of respect and coexistence.

Due to the results obtained regarding digital abuse that is negatively affecting educational achievement, it would be appropriate to include technology in these modules in order to prevent digital abuse and create a peaceful digital culture. The generation of online games could promote healthy coexistence and enable students to cope emotionally and socially.

CONCLUSION

The relationship between school violence, personal protection factors, and academic achievement in Mathematics, and Language & Communication in high school was determined. Educational achievement was directly and negatively related to school violence. In contrast, personal protective factors were negatively correlated with school violence, but they were positively and significantly correlated with personal protective factors.

Based on the results obtained in this research, the following recommendations are made:

1. Review school policies so that they function as establishments for safe environments
2. Generate training synergy in which the school, society, and families collaborate in forming healthy environments
3. Invite educational and social leaders to take an active role in supporting prevention and regulation initiatives against school violence and strengthening values of inclusive societies, such as solidarity and tolerance
4. Carry out more research focused on the prevention and intervention of school violence, including contextual, family, and personal variables
5. Promulgate campaigns focused on motivating students to feel responsible for a healthy coexistence. For example, campaigns on the exercise of human rights, empowerment or interpersonal skills training
6. Use technology to create safe environments. Open educational resources can be generated to help prevent digital bullying and digital escape rooms may be used as emotional training
7. Contribute to the training of social skills in cyberspace
8. Create a culture of coexistence where rights are highlighted, as well as the importance of creating healthy, tolerant, safe learning environments free of discrimination, harassment, and violence
9. Reinforce the areas of Mathematics, and Language & Communication with tutors and volunteer peers' academic support.

Overall, this research may serve as a reference for those interested in further understanding the phenomenon of school violence, and as an invitation for more people to take responsibility to create safe and peaceful school environments.

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Development and validation of Psychological Reactance Scale for married women of Pakistan

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ABSTRACT. La reattanza psicologica, una reazione emotiva di angoscia in risposta a una minaccia alla libertà, è un importante costrutto che influenza la salute mentale delle donne sposate. Questo studio è stato condotto per sviluppare una misura valida e affidabile della reattanza psicologica nelle donne sposate e che vivono in culture collettiviste come quella pakistana. L'insieme degli item è stato creato attraverso l'opinione di esperti, una revisione della letteratura e la somministrazione di interviste semistrutturate a donne sposate. Al fine di esplorare la struttura dei fattori, è stata condotta un'analisi fattoriale esplorativa (EFA) su un campione di donne (N = 566). I risultati hanno rivelato una struttura a due fattori comprendenti l'Espressione Interna (dominio cognitivo-emotivo) e l'Espressione Esterna (dominio aggressivo-comportamentale). I valori alfa della Scala (α = .90), dell'Espressione Interna (α = .81) e del fattore Espressione Esterna (α = .81) hanno fornito la prova dell'eccellente affidabilità della Psychological Reactance Scale. Al fine di confermare la struttura dei fattori, è stata effettuata l'analisi fattoriale confermativa su un campione indipendente di donne sposate (N = 150). L'analisi fattoriale confermativa ha fornito per la struttura a due fattori ottenuta tramite EFA, indici eccellenti di adattamento al modello (CFI = .93, RMR = .04). La validità convergente della Psychological Reactance Scale è stata accertata attraverso la sua correlazione con la Depression Anxiety and Stress Scale. Sono discusse le implicazioni pratiche dello studio.

SUMMARY. Psychological reactance, an emotional reaction of distress in response to threatened freedom, is an important construct that influences the mental health of married women. The current study was carried out to develop a valid and reliable measure of psychological reactance for married women living in collectivistic cultures such as the Pakistani culture. Item pool was generated through expert opinion, literature review and semistructured interviews with married women. In order to explore the factor structure, exploratory factor analysis was carried out on a sample of women (N = 566). Results revealed a two factors structure comprising Internal Expression (cognitive-emotional domain) and External Expression (aggressive-behavioral domain). Alpha values of scale (α = .90) and Internal Expression (α = .81) and External Expression factor (α = .81) provided evidence of the excellent reliability of Psychological Reactance Scale. In order to confirm the factor structure, confirmatory factor analysis was carried out on an independent sample of married women (N = 150). Confirmatory factor analysis provided excellent model fit indices (CFI = .93, RMR = .04) for the two factors structure obtained through EFA. Convergent validity of the Psychological Reactance Scale was ascertained through its correlation with Depression Anxiety and Stress Scale. Practical implications of the study are discussed.

Keywords: *Psychological reactance, Married women, Restricted freedom, Psychometric properties*

INTRODUCTION

Psychological reactance, is a motivational reaction in response to threatened, eliminated or reduced freedom, either actual or perceived in nature (Brehm & Brehm, 1981). It is said that threats to freedom can be explicit as well as implied in nature (Miron & Brehm, 2006). Experience of freedom helps in engendering the individual's self-identity and sense of control over the environment (Worchel, 2004). Threat to freedom results in an increased attractiveness and motivation for the forbidden act (Brehm & Self, 1989). The term reactance refers to the restoration of threatened or eliminated freedoms and it can be expressed in various ways (Brehm & Brehm, 1981). Individuals may directly engage in the prohibited behavior, receive gratification by observing others engage in the behavior, or may engage in aggression against the individual reducing or eliminating the freedom. (Miron & Brehm, 2006). Initially this construct was conceptualized as a state (Brehm, 1966) but later on it was conceptualized as trait (Shoham, Trost & Rohrbaugh, 2004).

Clinical features of psychological reactance

Psychological reactance as trait has received substantial attention in the field of clinical psychology (Miron & Brehm, 2006). Keeping in view the role of psychological reactance in the field of clinical psychology, researchers tried to explore its role in the clinical features of patients. Researchers proved that having high level of psychological reactance increase the vulnerability for psychological disturbances and decrease the chances of prognosis among patients (Beutler, Moleiro & Talebi, 2002; Cautilli, Riley-Tillman, Axelrod & Hineline, 2005). It is also reported that psychological reactance of clients plays a significant role in the treatment process, particularly among depressed and anxious patients (Arnold & Vakhrusheva, 2016; Beutler et al., 2002; De las Cuevas, Peñate & Sanz, 2014; Shoham et al., 2004).

Researchers also found that psychological reactance shares overlap and found to be positively correlated with various clinical constructs. For instance Lienemann and Siegel (2016) reported the positive relationship of psychological construct with the depression. Quick and Stephenson (2007) elaborated the relationship of sensation seeking with psychological reactance. It is also reported that psychological reactance is marked with high level of anger and evoke negative emotions (Shah, Friedman & Kruglanski, 2002)

Measurement of psychological reactance

Initially it was considered that measurement of psychological reactance is difficult as Brehm (1966) defined it as a hypothetical variable which cannot be measured directly. Miron and Brehm (2006) argued that psychological reactance can be indirectly measured by assessing the subjective experience underlying the phenomenon, that is, "feelings". Dillard and Shen (2005) stated that the construct of reactance can directly be measured and came up with their intertwined model which posited that reactance can be best measured as a combination of anger and negative cognition. Steindl and colleagues (Steindl, Jonas, Sittenthaler, Mattausch & Greenberg, 2015) criticized intertwined model on the basis of its scarce validation evidence.

There are three widely used measures of trait reactance; the *Questionnaire for the Measurement of Psychological Reactance* (*QMPR*; Merz, 1983), the *Hong Psychological Reactance Scale* (*HPRS*; Hong, 1992; Hong & Faedda, 1996; Hong & Page, 1989) and the *Therapeutic Reactance Scale* (*TRS*: Dowd, Milne & Wise, 1991). Several studies showed QMPR as unstable and unsuitable for usage (Donnell, Thomas & Buboltz, 2001). Therefore, the HPRS and TRS were developed. TRS was intended to be used in therapy (Dowd et al., 1991). HPRS was constructed for usage with the non clinical population. It has been used in different studies and its psychometric indices are also very good (Dillard & Shen, 2005). But the main limitation of the scale is that it was developed and validated using college population in western culture by Hong and colleagues (Hong, 1992; Hong & Faedda, 1996; Hong & Page, 1989) in Australia, and Thomas et al. (Thomas, Donnell & Buboltz, 2001) and Dillard & Shen (2005) in the United States. So, it cannot be used worldwide and across cultures. Another limitation associated with the HPRS is that currently it is available in 11-items and 14-items versions. Dual versions of the scale also cause confusion for test users and constitute a potential limitation of HPRS. So, there was a need of developing such a measure of psychological reactance which can be used widely for non clinical population.

Reactance, cultural diversity and marriage

Miron and Brehm (2006) concluded that different cultures react differently to certain situations in order to defend their freedom. Individualistic and collectivistic cultures vary in their choices, preferences and concept regarding oneself (Iyengar & Lepper, 1999). Analyzing people's exposure to reactance, Jonas et al. (2009) explained that individuals with self-centered approaches are less threatened by their personal freedom. People belonging to collectivistic culture are more concerned and threatened by the group, as they follow group think approach.

The role and importance of culture cannot be denied in marriage and marital relationships. Beels (2002) argued that culture is responsible for shaping the behavioral rituals and world view of its members. Stressing the importance of culture in one's life, Christiansen et al. (2011) considered multiculturalism to be the fourth force in psychology. Studies have explored families and marriage relationships according to different cultures i.e. individualistic and collectivist (Fang, 2018). Both cultures have different familial obligations, norms and values (Hofstede, 2001). In both cultures, the criterion of marital satisfaction also varies greatly (Dillon & Beechler, 2010).

Bian and Logan (2001) argued that people in collectivist culture (i.e. Pakistani culture) are used to maintaining frequent contact with their relatives, so, marriage is not a matter of husband and wife only. On the other hand, nuclear families of individualistic cultures are found to be more psychologically and geographically isolated (Georgas, 2003). The evidence suggests that the nature, source of problems, and the criteria of satisfaction and dissatisfaction of marital relationships differ across these cultures. There are also cultural differences in defining the role of women which determines the place and respect given to them in a particular society (Akhter & Akbar, 2016). These ground realities strengthened the need for indigenous measures of reactance to assess the phenomenon according to the cultures' unique dynamics.

Freedom of speech which is a basic right of human beings, is defined as an exclusive authority of action and expression of thoughts and feelings as per persons' will; its meant for self-ownership or self-control (Ramzan, Javaid, Iqbal, Buksh & Javed, 2019). When this freedom is restricted, a force called reactance comes into action. Pakistan mainly is male dominant society (Ali & Bustamanate, 2008), therefore, the chances of expression of freedom or of so called free behavior are limited for women (particularly in marital relationships) (Ramzan et al., 2019). Although the constitution of Pakistan guarantees the right to speech to its citizens regardless of gender, women go through the suppression of freedom of speech in almost every aspect of life and are coerced into living according to the rules and regulations made by male members of society (Ramzan et al., 2019). Common examples of this include restrictions imposed on studies after marriage, choosing a profession of choice, going to desired places to meet friends and a long list of other familial and societal constraints. Pakistani collectivistic culture (Islam, 2004) demands limits expression of freedom by taking away self-ownership (Ramzan et al., 2019). All these conditions put a psychological burden and evoke reactance responses.

Mental and physical health of women is put at risk by violence faced at different stages in life (Akhter, 2011). Zahidie and Jamali (2013) identified that the common factors behind the development of mental health issues among married Pakistani women include verbal and physical abuse by in laws and stressful life events and other familial conflicts. The implication of psychological reactance in clinical settings (Arnold & Vakhrusheva, 2016; Beutler et al., 2002; Shoham et al., 2004) can be helpful to uncover the reactance antecedents of married women and to deal with their growing mental health issues effectively.

Rationale

Restriction of freedom and its reactions are threat to the mental health of married women living in any culture (De las Cuevas et al., 2014). Keeping in view the risk of mental health issues it is important to focus attention of the construct of psychological reactance. Researchers paid attention on the construct in general context. Earlier measures of trait reactance (QMPR, Merz, 1983; HPRS, Hong, 1992; Hong & Faedda, 1996; Hong & Page, 1989; TRS, Dowd et al., 1991) cannot be used to measure the psychological reactance of married women. Keeping in view the unique cultural values and issues of married women (Dillon & Beechler, 2010; Fang, 2018; Hofstede, 2001) and varied nature of reactance responses by the members of different cultures (Jonas et al., 2009; Miron & Brehm, 2006; Iyengar & Lepper, 1999), the current

study was planned to construct *Psychological Reactance Scale* (*PRS*). The newly developed scale is a reactance measure for married women of Pakistan, a collectivist culture with its own unique values. It is hoped that the present scale will be fruitful in filling this gap.

In order to meet the main objective, current research was divided into three studies. Study 1 aimed at development of item pool and exploration of factor structure. Study 2 was carried out to confirm the factor structure through confirmatory factor analysis. Study 3 was meant to provide the evidence of construct validity for the meant developed scale of psychological reactance.

STUDY 1: DEVELOPMENT OF PSYCHOLOGICAL REACTANCE SCALE (PRS)

Study 1: Method

Study 1 comprised three phases.

– *Phase I: Exploring the construct and generating initial item pool*. Phase I was carried out to operationalize the construct "psychological reactance for married women". Semistructured interviews were conducted with 30 married women, to explore the domains of psychological reactance among married women of Pakistan.

  Incorporating expert opinion, participants' responses, literature review and already developed measures of the construct, a 46-item scale of psychological reactance was developed. Five-point Likert scale response format ranging from 1 = strongly disagree to 5 = strongly agree was used for PRS.

  After generating the item pool, a committee approach was used to review the item pool comprised of 46-item. Committee was comprised of three Lecturers and three Assistant Professors of University of Sargodha. On the recommendation of committee few of the items were rephrased and some new items were added. Items of the scale were assessed by experts in terms of their conformity to the construct, grammatical appropriateness, phrasing and response format. Finally, a 52-item indigenous measure of PRS was developed. This newly developed scale was used in the subsequent phases of the study.

– *Phase II: Pilot study*. Pilot study was carried out to get an initial picture of psychometric properties of the scale being developed. Secondly it was meant to take the feedback of the participants about the suitability and understandability of the items.

  Sample. A purposive sample of 125 married women was taken from different rural and urban regions of Punjab, Pakistan. Sample was divided into 5 subgroups in terms of marriage duration each having 25 participants. Category 1 consisted of early years of marriage; 0-2 years, Category 2 consisted of 3-5 years, Category 3 consisted of 6-10 years, Category 4 consisted of 11-20 years and Category 5 consisted of late adulthood period of married life, that is, above 20 years. Minimum education of the participants was matriculation.

  Instrument. The newly developed 52-items measure with 5-point Likert scale response format was administered at this stage to gather data from participants. There were 4 reverse scored items in the scale at this stage.

  Procedure. Topic of the research was approved by the internal review board of department of Psychology University of Sargodha (letter no. Psy56/2020). Keeping in view the ethical considerations, IRB reviewed the details of research and allowed to conduct the research. Participants were approached individually and the 52-item *Psychological Reactance* Scale was administered. Participants were told about the nature and objectives of the study. They were also ensured that their identity will not be disclosed and the given information will be used only for research purposes.

  Results. Psychometric properties of the items and feedback of the participants were reviewed. Few of the items were found to be uncorrelated with other items and participants pointed out some items that were emotionally loaded, biased and irrelevant to some participants. As a result of pilot analysis, some items were removed with the help of experts. After ensuring the content validity, 32 items were retained.

– *Phase III: Exploratory factor analysis*. Phase III aimed to explore the domains of psychological reactance among married women of Pakistan and to assess the reliability indices of the scale.

  Sample. An independent sample of 566 participants was recruited from rural and urban areas of Punjab, Pakistan. Age range of the sample was between 20 to 65 years (M = 40.1, SD = 9.67). Sample was divided into 5 subgroups in terms of marriage duration. Category 1 consisted of early years of marriage; 0-2 years (n = 120), Category 2 consisted of 3-5 years (n = 127), Category 3 consisted of 6-10 years

(n = 130), Category 4 consisted of 11-20 years (n = 110) and Category 5 consisted of late adulthood period of married life, that is, above 20 years (n = 79). Minimum education of the participants was matriculation.

Instrument. Factor analysis was carried out on 32-items retained after pilot study. Likert type response format (strongly agree = 5 to strongly disagree = 1) was used. Higher score on PRS meant higher level of reactance and lower score meant lower level of reactance.

Procedure. Participants were approached individually. They were informed about the objectives of the study and confidentiality of the information was ensured. They were highly appreciated and thanked for their kind cooperation in the study.

Results. Exploratory factor analysis was carried out to explore the factor structure of PRS.

KMO and Bertlett test of sphericity were checked to test the suitability of data for running factor analysis. KMO = .86 indicated excellent sampling sufficiency (Hutcheson & Sofroniou, 1999). Bartlett's test of sphericity (Snedecor & Cochran, 1989) results were significant which indicated appropriateness of correlation between items for factor analysis. Appropriateness of matrix for factor analysis was also confirmed by examination of correlation matrix. The values of all the items were above .35.

Factor structure of construct was obtained by principal axis factoring. EFA was carried out by direct oblimin method of rotation on the data of 566 participants. Keeping in view the assumption that our retained factors would be correlated with each other, direct oblimin rotation method was found most suitable rotation method. Two well defined and clear factors were obtained. Scree plot also provided the evidence of two factor structure. All items loaded independently on the two factors namely Internal Expression and External Expression. 18 out of 32 items were retained. Remaining 14 items were discarded because some items had cross-loadings on more than one factors; some items had very low factor loadings (below .30); while some had very low communalities after extraction (below .20). Hence, only 18 items were not cross-loaded on more than one factors; they had very good factor loadings. Moreover, their communalities were also appropriate. A significant amount of variance (41.28%) was accounted for retained factors.

Table 1 represents the standardized factor loadings and factor structure obtained EFA on a sample of 566 participants.

Factor-1 Internal Expression. This factor of PRS includes the expression of reactance in which it is not outwardly expressed rather the responses to threatened freedom are internalized and are mostly cognitive in nature. 9 items are included in this factor. The factor explains 29.44% variance in the scale.

Factor-2 External Expression: This factor of PRS includes the expression of reactance in which it is expressed outwardly. Unlike the Internal Expression of psychological reactance, here, the responses are mostly emotional and aggressive in nature. 9 items are included in this factor as well. The factor explains 11.83% variance in the scale.

Study 1: Reliability analysis

Reliability analysis was carried out on the data of 566 participants in order to establish the internal consistency of PRS and its factors.

Table 2 shows the values of mean, standard deviation, range, and alpha reability of all variables. The v alues o f skewness were less than 1.96, which suggested that total score on PRS and its components do not deviate from symmetrical distribution.

Table 3 illustrates the patterns of relationship between PRS and its factors. Factors were significantly and positively correlated with one another as well as with the total score of PRS.

STUDY 2: CONFIRMATORY FACTOR ANALYSIS

Study 2 was carried out to confirm the factor structure through confirmatory factor analysis.

Study 2: Sample

Sample of study consisted of 150 married women. Equal representation (n = 30) was given to all five categories o f marriage duration in the sample. Minimum education of the participants was matriculation. Age range of the sample was 28 to 61 (M = 39.8, SD = 8.7)

Table 1 – Standardized factor loadings of factors of PRS (N = 566)

		Factor loadings		
Serial No.	**Item No.**	**F1**	**F2**	**h^2**
1	1	**.53**	.27	.30
2	3	**.58**	.09	.35
3	5	**.59**	.08	.33
4	7	**.71**	.33	.51
5	9	**.69**	.32	.49
6	10	**.79**	.21	.63
7	29	**.57**	.32	.35
8	35	**.61**	.21	.38
9	36	**.54**	.34	.32
10	6	.28	**.52**	.38
11	19	.13	**.56**	.38
12	27	.18	**.65**	.42
13	28	.17	**.68**	.46
14	40	.15	**.63**	.41
15	42	.29	**.67**	.45
16	43	.19	**.69**	.49
17	51	.28	**.57**	.41
18	52	.25	**.60**	.36
	Eigenvalues	5.30	2.13	
	% of variance	29.44	11.83	
	Cumulative %	41.28		

Table 2 – Means, standard deviations, alpha reliability and descriptive statistics of Psychological Reactance Scale and its factors (N = 566)

Variables	*M*	*SD*	*a*	Range	
				Actual	Potential
Total score PRS	50.37	12.99	.90	18-87	18-90
INT	29.24	7.73	.81	9-45	9-45
EXT	21.13	7.47	.81	9-44	9-45

Legenda. PRS = *Psychological Reactance Scale*; INT = *Internal Expression*; EXT = *External Expression*.

Table 3 – Correlations of Psychological Reactance Scale and its factors (N = 566)

Scales	INT	EXT	Total score PRS
INT	–	.45**	.86**
EXT	–	–	.84**

Legenda. INT = Internal Expression; EXT = External Expression; PRS = *Psychological Reactance Scale.*
***p*<.01

Study 2: Instrument

In this study, newly developed PRS (18-items) with 5-point Likert response format (1 = strongly disagree to 5 = strongly agree) was used. The scale consists of two factors namely Internal Expression (9-items) and External Expression (9-items).

Study 2: Procedure

Participants were approached individually. They were informed about the objectives of the study and confidentiality of their information was assured. They were highly appreciated and thanked for their participation in the study.

Study 2: Results

On the basis of initial criteria (i.e item loading>.30), the model obtained through EFA was examined in CFA. Maximum likelihood estimation method was used to run CFA. A model with chi square/*df* less than 3 is considered good (Gable & Wolf, 1993; Hatcher, 1994). The final model obtained consisted of 18 items presenting a good model fit. There were 9 items in both Internal and External Expression

(factors of PRS). Factor loadings ranged from .47 to .78. After CFA, the same 18 items were retained. Results of CFA indicated that model is good and replicable on the new sample (see Table 4 and Figure 1).

STUDY 3: VALIDATION OF PSYCHOLOGICAL REACTANCE SCALE (PRS)

Study 3: Method

Study III aimed to determine the construct validity of *Psychological Reactance Scale* for married women of Pakistan.

Study 3: Sample

A sample of married women (N = 100) was taken from the rural and urban areas of Punjab, Pakistan to assess the construct validity of the scale. Age range of the sample was 25 to 55 (M = 35.7, SD = 9.2). Education of the participants was minimum matriculation.

Study 3: Instruments

To determine the construct validity of the scale, the newly developed PRS was correlated with DASS.

– *Depression Anxiety Stress Scales* (*DASS*). It is a 42-item self-report measure of depression, anxiety and stress originally developed by Lovibond and Lovibond (1995). Each factor contains 14-items. DASS Urdu version was used in the present study to verify the construct validity of the newly developed scale. DASS-21 Urdu translation was carried out by Aslam (2007). The scale consists of 21 items with each factor having 7 items. The resulting score is multiplied with 2 to get equivalent results as DASS 42-items version. Response format consists of 4-point Likert scale (not at all = 0, seldom = 1, most of the time = 2, all time = 3). The scale has been validated using Pakistani population.

Study 3: Procedure

Informed consent of participants was taken and they were assured that their information will be kept confidential. They were also given appropriate instructions to ensure genuine responses. Participants were approached individually and online; and questionnaires were administered.

Study 3: Results

Table 5 show that total score on PRS has significant positive correlation with Depression subscale of DASS (r = .34, p<.01), Anxiety subscale of DASS (r = .24, p<.05) and Stress subscale of DASS (r = .33, p<.01).

Results of Study 3 provided the evidence of the construct validity (convergent of PRS).

Table 4 – Model fix indices of CFA for PRS (N = 150)

Indexes	Chi square	*df*	*Chi square/df*	CFI	RMSEA	RMR	GFI	TLI
Model	220.28	134	1.6	.93	.04	.04	.92	.91

Legenda. df = degree of freedom; CFI = Comparative Fix Index; RMSEA = Root Mean Square Error of Approximation; RMR = Root Mean Residual; GFI = Goodness of Fix Index; TLI = Tucker Lewis Index.

Figure 1 – Confirmatory factor analysis of Psychological Reactance Scale for married women of Pakistan

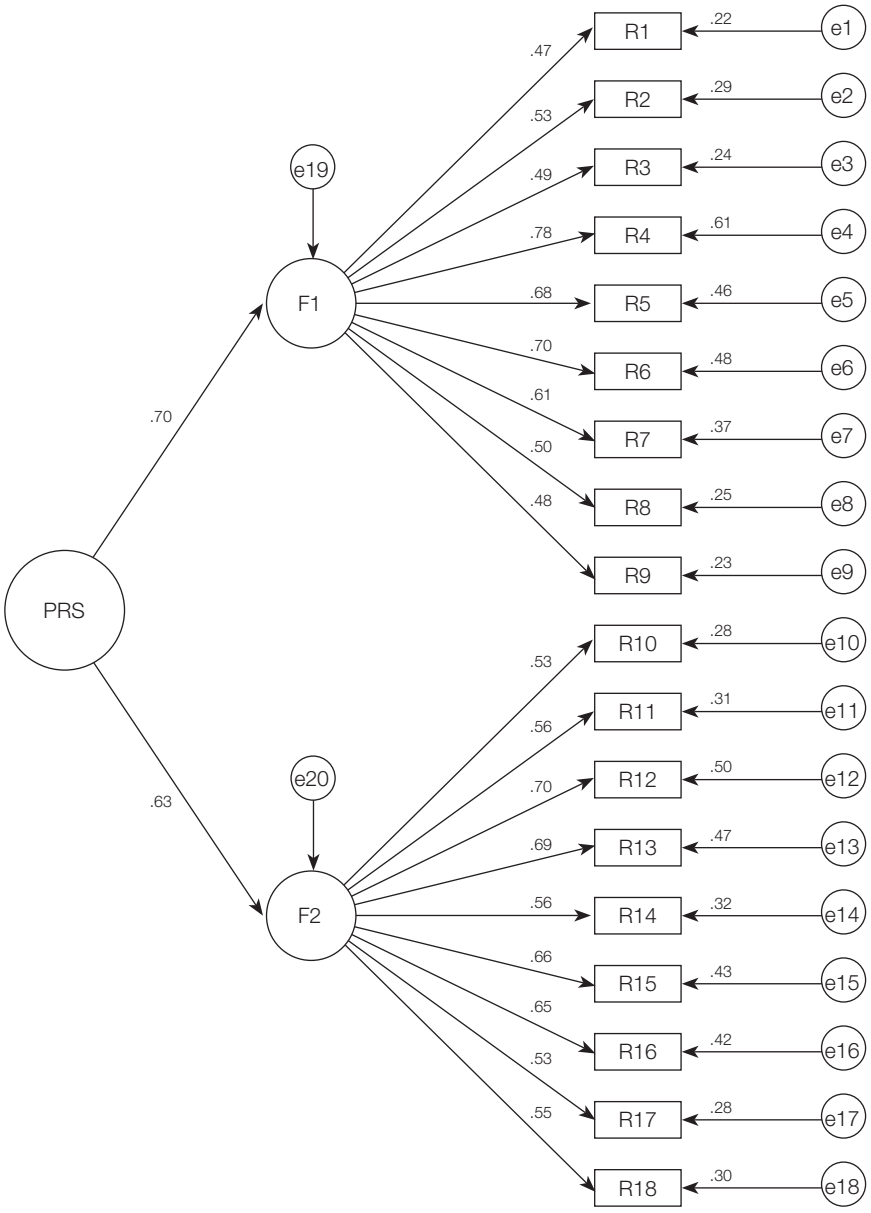

Table 5 – Correlation of total score PRS (Psychological Reactance Scale) with Depression, Anxiety, Stress Scale (DASS-21 factors) (N = 100)

VAR	PRS	DEP	ANX	STR
PRS	–	.34**	.24*	.33**
DEP		–	.58**	.71**
ANX			–	.43**

Legenda. VAR = Variables; PRS = Total score of Psychological Reactance Scale; DEP = DASS-21, Depression; ANX = DASS-21, Anxiety; STR = DASS-21, Stress.
**p<.01, *p<.05

DISCUSSION

The present study was carried out to develop an indigenous measure of psychological reactance according to the requirements of a collectivist Pakistani culture. Exploratory factor analysis revealed two well-defined factors. Factors were named as Internal Expression and External Expression (see Table 1).

Internal Expression of PRS measure the cognitive domain and this is a potent factor in predicting the development of mental health issues (depression, anxiety, stress etc.) among married women. This factor of PRS includes negative thinking pattern, inferiority complex, distress and inclination to adopt reckless or rebellious attitude in the future by threatened women. The results are in line with the study of Quick and Stephenson (2007) who identified psychological reactance as a latent variable having negative cognitions and state anger.

Primarily, Internal Expression of PRS is concerned with Miron and Brehm's notion (2006) of assessing the feeling component if one is experiencing threats to freedom. This is subjective in nature and so cannot be measured through outward expression of reactance. Further, the authors suggested that through the assessment of this aspect (feelings), measurement of the phenomenon is possible (Miron & Brehm, 2006) unlike the previous notion of considering it a hypothetical variable (Miron & Brehm, 1981).

External Expression of PRS includes emotional outbursts and aversive, motivational, behavioral outcomes. This aspect of reactance is more intense in nature as here the discomfort associated with threatened/eliminated freedom is not limited to one's own personality rather, gets extended against persons, values and customs etc. which are the actual cause of threat. Here, the measurement of the practical manifestation of rebelliousness (emerging during internal expression) is made. One is ready to take risk and acts out against the sources of threat. So, the aggressive behavioral outcomes and defiant acts, are evident at this stage. The findings are consistent with the previous line of research which provides evidence of relationship of psychological reactance with aggression, defensiveness, dominance, being autonomous (Dowd & Wallbrown, 1993), anger (Hong & Giannakopoulos, 1994) and being non-compliant (Brown & Finney, 2011). So, in External Expression of psychological reactance, social influence is rejected (Brehm, 1989) and the same is measured through this factor of PRS.

To assess the internal consistency of PRS and its factors, reliability analysis was carried out. Results indicated that PRS and its factors are highly reliable with alpha coefficients above .90 and .81 (see Table 2).

Correlation of PRS total score and its factors was also carried out to identify the nature of relationship between PRS and its factors. There was a significant positive correlation

between PRS and its factors as well as between factors at .01 significance level (see Table 3).

Confirmatory factor analysis was carried out to confirm the factor structure of PRS obtained through EFA. CFA indices confirmed the factor structure and provided good model fit of the data. Results of CFA confirmed that PRS is highly reliable for married women of Pakistan and replicable on an independent sample (see Figure 1; Table 4).

To provide validity evidence, newly developed PRS was correlated with DASS-21 (Urdu version). Psychological reactance among married women of Pakistan manifested as feelings of pessimism, inclination to resist pre-set rules and regulations of in laws, inclination to rebel and to perform defiant acts, emotional and behavioral outbursts etc. which shows that they are at risk for development of mental health issues. This is consistent with previous research on Pakistani women which has demonstrated that common factors behind the development of mental health issues include verbal and physical abuse by in laws and stressful life events and other familial conflicts (Zahidie & Jamali, 2013). Significant positive correlation of PRS with these constructs (i.e. depression, anxiety, stress) provides evidence for the convergent validity of the newly developed scale (see Table 5).

CONCLUSION

Psychological Reactance Scale is a trait based scale. Keeping in view the Pakistani collective culture where all married women are experiencing threats to their freedom at certain level which lead to psychological reactance, either internalized and/or expressed externally. This has important repercussions for their mental health. The scale is a valid and reliable measure of psychological reactance among married Pakistani women and taps the unique way it manifests in the Pakistani culture.

Limitations and recommendations

The scale is developed and validated using participants from Punjab, Pakistan so, it does not assess the issues of married women in other provinces. For better representation of the women of Pakistan, data should be collected from the other provinces as well. The unique way in which the geographical environment contributes to the development of reactance should also be addressed. Factors affecting the emergence and persistence of reactance such as the employment status of women and cross-sect and cross-cultural marriages, should also be considered in future studies. Convergent validity of External Expression factor was not tested in the current study. On the basis of these limitations it is suggested that future researches should be conducted to provide more evidences for the convergent and discriminant validity of PRS and its factors.

Practical implications of the study

Psychological Reactance Scale measures trait reactance and the measurement of psychological reactance in clinical and counseling settings will help psychologists to structure appropriate strategies for the married female clients which will lead toward better treatment outcomes. As it is already proved in previous researches that psychological reactance is a great hindrance in therapeutic process therefore this scale can be used to assess the level of psychological reactance of patients so that they may be treated and handled accordingly. Moreover, various researches can be conducted to measure consequences of psychological reactance among Pakistani married women. Results of studies will help out policy makers to devise strategies and plans to protect and facilitate the freedom and rights of married women and it will ultimately help in increasing the mental health of women.

Conflict of interest: The authors declare that they have no conflict of interest.

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Covid-19 outbreak: What impact of the lockdown on college students' academic path and attitudes toward studying?

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ABSTRACT. Questo studio ha analizzato l'impatto che il *lockdown*, come conseguenza della pandemia da Covid-19, ha avuto sul percorso accademico e sugli atteggiamenti nei confronti dello studio negli studenti universitari italiani. I risultati hanno evidenziato un incremento nei livelli di *studyholism* (ossessione per lo studio), una diminuzione nell'intenzione di abbandonare gli studi e nessun cambiamento statisticamente significativo nei livelli di *study engagement* (motivazione/piacere nei confronti dello studio). Inoltre, è aumentato il tempo dedicato allo studio giornalmente, ma è diminuito il numero di giorni di studio settimanale. Infine, l'intolleranza per l'incertezza è emersa come predittore di *studyholism*, fornendo supporto alla sua concettualizzazione come disturbo internalizzante.

SUMMARY. Many countries imposed the lockdown to contain the Covid-19 pandemic, with the consequent closure of schools and a great uncertainty concerning the health, economic, and academic situation. We aim to analyze the impact of the lockdown on college students' academic path and attitudes toward studying, including studyholism (or obsession toward studying), study engagement, and dropout intention. We gathered 6075 Italian college students. We performed one-sample t-tests (with students gathered before the pandemic as the reference group), paired-samples t-tests, and a path analysis model. During the lockdown, students experienced higher levels of studyholism, lower intention to dropout, and no change in their study engagement levels. Also, they increased their time spent studying daily but decreased the days per week of studying. Finally, we found that intolerance for uncertainty is a good predictor of studyholism, which in turn is a positive predictor of the impairment in study quality and motivation. Universities should provide students with psychological interventions to reduce their studyholism and increase their tolerance for uncertainty, aiming to increase their resilience, also in case of another pandemic or a new wave of Covid-19. From a theoretical perspective, the definition of problematic overstudying as an internalizing disorder is further supported.

Keywords: *COVID-19, OCD, Student, Study, Study addiction, Studyholism*

INTRODUCTION

In December, at the end of 2019, a novel Coronavirus arose in China (Wuhan, Hubei province), causing a new type of pneumonia (Ryu & Chun, 2020; Wang, Horby, Hayden & Gao, 2020). Due to the person-to-person transmission, including transmission from asymptomatic people (Chan et al., 2020; Rothe et al., 2020), the virus rapidly spread worldwide and became a global public health emergency. In Italy, a little city in North Italy registered the first case on February 20, 2020 (Gagliano et al., 2020). On November 5, 2020 (at 10.36 a.m.), Italy counted 759,829 confirmed cases and 39,412 deaths linked to Covid-19 (WHO, 2020).

To contain the spread of the virus, the Italian government adopted various measures, including the limitation of movements. However, in March 2020, it finally decided on a prolonged lockdown. Therefore, schools – including universities – were closed and great uncertainty concerning when and how they would have been re-opened arisen. Moreover, lessons, exams, traineeships, and graduations have been moved to an online format, even if some teachers and students could not have been well prepared, also from a technological point of view (e.g., proper internet connection and equipment). Moreover, since universities provided information gradually based on the epidemiologic developments, there was great vagueness concerning the format of the exams (some changed from written to oral, and vice versa) and of the graduations, the possibility of doing the planned traineeships, and even the format of the lessons and exams in September. Also, jointly to the academic path's worries, health anxiety symptoms could have increased in students – at least in the ones with pre-existing health anxiety – due to the life threat posed by the Covid-19, with possible negative consequences for the quality of the study and motivation.

Hence, we supposed that college students could have experienced negative academic outcomes during the lockdown, especially if characterized by a lack of tolerance for uncertainty since they could have increased their levels of studyholism (or obsession toward study; Loscalzo & Giannini, 2017). Studyholism, in turn, could have led to an impairment in study quality and motivation during the lockdown, in contrast with study engagement (or intrinsic motivation toward study) that could have played a protective role against academic impairment.

Studyholism is a new potential clinical condition conceptualized as being more similar to an obsessive-compulsive related disorder than a behavioral addiction (i.e. study addiction; Atroszko, Andreassen, Griffiths & Pallesen, 2015). More specifically, Loscalzo and Giannini (e.g., 2017, 2018a, 2018b) defined studyholism as an obsessive-compulsive related disorder (OCD-related disorder) made up of two components: i) obsessive-compulsive symptoms related to study; ii) high or low study engagement (including inner motivation toward study). In fact, Loscalzo and Giannini (2017) theorized two types of studyholics: engaged studyholics and disengaged studyholics. They are both characterized by high levels of studyholism; however, while the first type also has high levels of study engagement, the other type has a low level of this positive attitude towards study.

It should be noted that the conceptualization of studyholism as an OCD-related disorder is based on both theoretical considerations and empirical findings – including psychometric analyses. However, Loscalzo and Giannini (e.g., 2018a, 2018b, 2018c) point out that the literature about the specific features of problematic overstudying is still too scant to reach any firm conclusion about its internalizing and/or externalizing nature, and other studies going beyond the addiction conceptualization should be performed to shed light on its real nature. From a theoretical perspective, Loscalzo and Giannini (2018a) made a critical comparison between the DSM-5 diagnostic criteria for OCD and substance use disorders. Moreover, the psychometric analyses conducted on the Studyholism Inventory (SI-10; Loscalzo & Giannini, 2017, 2020a; Loscalzo, Giannini & Golonka, 2018) provided preliminary support for the conceptualization of problematic overstudying as being better conceptualized as an internalizing rather than an externalizing disorder. Next, Loscalzo and Giannini (2019) and Loscalzo (2021) conducted a study – respectively, on college and adolescent students – to test some of their suggested antecedents and outcomes of studyholism. Among their main findings, the results supported the conceptualization of studyholism as an OCD-related disorder since worry, which is an internalizing feature contributing to OCD (Comer, Kendall, Franklin, Hudson & Pimentel, 2004), is a strong predictor of studyholism. Moreover, they found support for the conceptualization of both disengaged and engaged studyholics as clinical types of studyholism that differ for their level of study engagement, but also for the area (academic, social, academic and social functioning) in which they are most impaired. Finally,

Loscalzo and Giannini (2020b) suggested a tentative proposal for studyholism DSM-like criteria based on their OCD-related disorder conceptualization.

On studyholism prevalence, Loscalzo and Giannini (2020a) and Loscalzo (2019) found a considerable prevalence of high studyholism in Italian college students, hence suggesting the need to address this new potential clinical condition, especially considering that it is associated with a higher dropout intention (Loscalzo, 2021; Loscalzo & Giannini, 2019). Moreover, regarding the Covid-19 pandemic specifically, Loscalzo, Ramazzotti, and Giannini (2021) found through a quali-quantitative pilot study that students who reported negative consequences for their study due to the pandemic have higher levels of studyholism than students who did not report this negative effect. In line with this, students who did not report positive effects on their study reported higher studyholism than students acknowledging this type of effect.

There is increasing literature concerning the psychological correlates of the Covid-19 pandemic, also on students. For example, Ma et al. (2020), on a large sample of Chinese college students, showed that about half of the participants had mental health problems, such as acute stress, anxiety, and depressive symptoms. Moreover, the longitudinal study by Li, Cao, Leung and Mak (2020) highlighted that, after two weeks of confinement, students experienced an increase in negative affect, anxiety and depressive symptoms. In the Italian context, Nania, Dellafiore, Caruso and Barello (2020) highlighted that university students' mental health is affected in the face of public health emergencies like the Covid-19 outbreak. In line with this, Romeo, Benfante, Castelli and Di Tella (2021), by comparing university students and general workers on psychological variables, showed that students experienced higher levels of anxiety and depression than workers. Though, to the best of our knowledge, there are no studies that analyzed the effect of the lockdown on college students' attitudes toward studying, including their obsessive thinking about the study (or studyholism), study engagement, time spent studying, and dropout intention. Hence, we aim to explore these aspects in a broad sample of Italian college students gathered during the lockdown. This study could provide valuable insights for university-based interventions to manage the negative academic outcomes caused by the lockdown. Moreover, we aim to analyze if intolerance for uncertainty is a good predictor of studyholism. It is a feature of internalizing disorders, including OCD (e.g., Baldwin, Whitford & Grisham, 2017; Carleton, Collimore & Asmundson, 2010; Gentes & Ruscio, 2011; Lind & Boschen, 2009; McEvoy & Mahoney, 2012); hence, this could provide further evidence for the conceptualization of problematic overstudying as an internalizing disorder (or as an OCD-related disorder).

METHOD

Participants

We got the participation of 6075 Italian college students aged between 18 and 68 years (*M* age = 23.60±5.02, 74.6% females). The participants lived across all Italy; though, most of them live in Tuscany (80.3%). Moreover, all the years of study are represented: first year, 19.4%; second year, 17.1%; third year, 29.0%; fourth year, 14.3%; fifth year, 18.9% (1.3% is missing). About the area of study, most of the main courses are represented; among the most spread there are: Educational studies, 9.8%; Economics, 9.5%; Engineering, 8.4%; Psychology, 7.8%; Social Sciences, 6.6%; Medical Studies, 6.5%; Architecture and Design, 6.1%; and Law, 5.2%. In this study, we used the sample for different analyses compared to other papers (Loscalzo & Giannini, 2021a, 2021b; Loscalzo et al., 2021) that are grounded on the same data.

Materials

Ad hoc questions about the quarantine measures and the impact on the didactic. We designed a questionnaire including ad hoc questions aiming at evaluating: i) the characteristics of the home (e.g., people living with the students); ii) the agreement with and the respect for the quarantine measures established by the Italian government; iii) Covid-19 symptoms (e.g., having experienced symptoms) and beliefs about the virus (e.g., it is a natural virus); iv) impact of the quarantine on the didactic (e.g., satisfaction with the online didactic); v) impact on the study (e.g., traineeship interrupted, hours of studying per day). For this study, we used the questions gathered from sections iv and v.

S*tudyholism Inventory* (Loscalzo et al., 2018). It is a 10-item self-report scale made up of two scales, each one comprehending five items (one of which is a filler):

studyholism and study engagement. The response format is a 5-point Likert scale ranging between 1 (*Strongly disagree*) and 5 (*Strongly agree*). The SI-10 also has a head-sheet for collecting questions about study habits (e.g., GPA, time spent studying generally and before exams). Currently, the SI-10 is available in Italian, English, Polish, Spanish, and Croatian languages. In this study, we administered the Italian version, which has good psychometric properties (Loscalzo et al., 2018; Loscalzo & Giannini, 2020a). In the current sample, the reliability of the SI-10 is good for both studyholism ($\alpha = .84$) and study engagement ($\alpha = .82$).

Health Anxiety Questionnaire (*HAQ*; Lucock & Morley, 1996). We administered the Italian version (Melli, Coradeschi & Smurra, 2007) of the HAQ. It is a 21-item self-report scale whose response format is a 4-point Likert scale ranging between 1 (*Never or rarely*) and 4 (*Almost ever*). It allows evaluating, through four scales, the fear of diseases and death, interference with daily life, concern about one's health, and seeking reassurance. It is also possible to calculate a total score. In the current sample, the reliability for the HAQ total score is good ($\alpha = .93$).

Intolerance of Uncertainty Scale – Revised (*IUS-R*; Carleton, Norton & Asmundson, 2007). It is a 12-item self-report scale whose response format is a 5-point Likert scale ranging between 1 (*Completely disagree*) to 5 (*Completely agree*). Its total score allows evaluating the intolerance for uncertainty. We administered the Italian version (Bottesi, Noventa, Freeston & Ghisi, 2019). In the current sample, the reliability for the IUS-R total score is good ($\alpha = .89$).

Procedure

The first page of the online questionnaire presented the information required by the informed consent, and participants were asked to check a box to confirm that they agreed to take part in the research by filling out the questionnaire. On the following pages, we asked for some demographic data (e.g., gender, age), and we next presented the ad-hoc questions and the scales described in the previous section, as well as other instruments that we did not use in this paper.

To gather participants, thanks to our university office's collaboration, Florentine students received an invite (including the link to the questionnaire) to their institutional email addresses. Moreover, we spread the link on Facebook university groups aiming to reach students from other Italian cities.

The approval from the Ethical Committee of the University of Florence was obtained.

Data analysis

We performed the analyses using SPPS.26 (Chicago, IL, USA) and AMOS.22.

First, we analyzed the descriptive statistics and frequencies for the ad-hoc questions concerning the impact of the Covid-19 pandemic on the didactic and on students' academic careers. Moreover, through ANOVAs, we investigated differences between the students who refused to take exams in the online format and the ones who take their planned exams anyway on studyholism, study engagement, health anxiety, and tolerance for uncertainty.

Next, to evaluate if the levels of studyholism, study engagement, and dropout intention changed during the Covid-19 outbreak, we performed three one-sample *t*-tests. The *Mean* reference values for these analyses are reported in Loscalzo's (2019) prevalence study about studyholism and study engagement in Italian college students and, for dropout intention, in Loscalzo and Giannini (2019). Then, to evaluate if there has been an increase/decrease in the time spent studying, we performed two paired-sample *t*-tests using the ad-hoc questions included in the questionnaire. We used a parametric test since the ad-hoc questions proved to be normally distributed. More specifically, for each variable, the values of skewness and kurtosis are, respectively: .59 and .40 (hours per day of study during Covid-19), .60 and .61 (hours per day of study before Covid-19), –.58 and .09 (days per week of study before Covid-19), –1.04 and .58 (days per week of study during Covid-19).

Finally, we tested a path analysis model (Maximum Likelihood estimate method) aimed at evaluating the effect of health anxiety and intolerance for uncertainty on studyholism and study engagement, as well as the effect of studyholism and study engagement on some study-related variables (i.e., impairment of the quality of studying, impairment of concentration in studying, decrease in the desire for studying, decrease in the motivation for studying). To evaluate the model fit, we referred to the values provided by Byrne (2001), Hu and Bentler (1999), and Reeve et al. (2007).

RESULTS

Covid-19 impact on didactic and studying behaviors

First, we analyzed the descriptive statistics and the frequencies for the ad-hoc questions concerning the impact of the Covid-19 outbreak on the didactics and the students' academic careers (see Table 1). The results highlighted that most teachers promptly adopted online lessons during the first month of the lockdown (82.4%). Also, even if a few provided just PowerPoint presentations (3.6%) or audio recordings (5.7%), almost all teachers tried to reach their students using simultaneously written and audio supplies,

Table 1 – Covid-19 outbreak impact on didactics and students' academic career (n = 6075)

Question	Option	%
After teaching's suspension, your teachers have provided you with online lessons?	Yes	82.4
	No	1.1
	Just a few	16.5
If your teachers have done online lessons, which typology was mainly used?	PowerPoint presentations	3.6
	Audio recordings	5.7
	PowerPoint presentations + Audio files	16.2
	PowerPoint presentations with audio included	42.6
	Streaming lessons without uploading on website	42.6
	Streaming lessons with uploading on website	15.1
	Not applicable	10.3
Are your teachers generally available when requesting clarifications?	Yes	65.1
	No	4.2
	I have not contacted any professor	30.7
Have your teachers activated alternative ways for students' meetings?	Yes	55.2
	No	5.9
	Don't know	39.0
Did you have exams scheduled for March or April?	Yes	53.9
	No	46.1
If you had scheduled exams, will you still take/have you taken your exam even if online?	Yes	29.4
	No	24.1
	Not applicable	46.5
Were you planning your degree thesis for March or April?	Yes	4.2
	No	95.8
Are you planning your degree thesis (bachelor's or master's) by 2020?	Yes	31.6
	No	68.4
If you had planned your degree, do you think the health emergency will cause a delay in the graduation date?	Yes	25.1
	No	9.9
	Not applicable	65.1
Do you have a pre-graduate or post-graduate internship that has not started due to the health emergency?	Yes	16.7
	No	83.3
Do you have a pre-graduate or post-graduate internship that was interrupted due to the health emergency?	Yes	12.0
	No	88.0

including streaming lessons; moreover, they have been generally available to students' requests for clarifications. However, the students reported having had just an average level of satisfaction with those lessons (M = 4.65±1.58; the response format was a Likert scale ranging between 1 and 7). Moreover, teachers have generally been available for clarifications, and they have activated online meetings for students willing to ask for clarifications.

Universities, besides lessons, foresee exams, internships, and graduations. Among our participants, more than half of the sample scheduled exams for April and May before the Covid-19 outbreak; though, many of them decided not to take the exams in the online format. Moreover, the Covid-19 pandemic impacted internships: 16.7% of the participants reported not having started a planned internship, while 12.0% reported having had to interrupt it. Finally, even if 4.2% of students planned to get their degree by 2020, most of them believe that the Covid-19 pandemic will have caused a delay in their graduation. Among the few whose degree was established for March or April 2020, the satisfaction with the method used for their graduation was not high (M = 3.97±1.90; the response format was a Likert scale ranging between 1 and 7). About this data, it should be noted that graduation generally regards just third- and fifth-year students. Moreover, an internship is required just for some courses, and there are also differences concerning the year(s) in which it must be performed. Hence, this explains why the questions about graduation and internship apply just to a minority of the sample. In the same line, a spring examination session is present just for some courses. This explains why almost half of the participants stated that they did not have exams scheduled for April and May 2020. However, we deepened the analysis concerning the exams by comparing the students who refused to take exams online with those who take their planned exams on the variables analyzed in this study. The ANOVA analyses showed that who take exams has lower levels of studyholism [M = 14.21±3.98; $F_{(1, 3250)} = 18.94$, $p<.001$; $\eta^2 = .006$], higher levels of study engagement [M = 14.68±3.46; $F_{(1, 3250)} = 23.75$, $p<.001$; $\eta^2 = .007$], lower health anxiety [M = 41.59±12.57; $F_{(1, 3250)} = 4.42$, $p = .036$; $\eta^2 = .001$] and lower tolerance for uncertainty [M = 33.32±9.85; $F_{(1, 3250)} = 5.71$, $p = .017$; $\eta^2 = .002$] than students who refused to take the planned exams during the lockdown (*Mean* values are, respectively, 14.80±3.73, M = 14.08±3.54, M = 42.52±12.53, and M = 34.16±10.16). Though, the effect size is small, especially for health anxiety and tolerance for uncertainty.

In sum, even if teachers have provided the required online lessons avoiding the courses' interruption, many students experienced a negative impact on their curriculum since many did not take the planned exams, could not start or complete the internships, and expected a delay in their graduation day.

The impact of the Covid-19 pandemic on studying behaviors and attitudes toward the study

To evaluate if the levels of studyholism and study engagement changed during the Covid-19 outbreak, we performed two one-sample *t*-tests. *Mean* reference values are the ones reported by Loscalzo (2019) in her study about studyholism prevalence in a sample of 5159 Italian college students. The results (see Table 2) highlighted that Italian students, during the Covid-19 pandemic, reported higher levels of studyholism and no change in their study engagement. Next, to evaluate if there has been a change in dropout intention, we performed an additional one-sample *t*-test, using as reference value the Mean reported by Loscalzo and Giannini (2019), and we found that it has decreased during the Covid-19 pandemic (see Table 2).

Finally, to evaluate if there has been a change in the time spent studying, we performed two paired-sample *t*-tests using the ad-hoc questions included in the questionnaire. The results (see Table 3) showed that, during the lockdown, students increased the hours of studying per day while decreased the number of days of studying per week.

Psychological variables as predictors of study-related behaviors

Finally, we tested a path analysis model to analyze if health anxiety and intolerance for uncertainty predict studyholism and study engagement, and if studyholism and study engagement predict study quality and motivation during the lockdown. As a preliminary step, we analyzed the correlation between studyholism and study engagement ($r = .09$, $p<.001$).

The model has a good fit: $\chi^2/df = 6.04$, $p<.001$; GFI = .998; CFI = .998; RMSEA = .029, 90% CI = .021-.037. Moreover,

Table 2 – One-sample *t*-tests

		n	*M (SD)*	*t*	*df*	*p*
Studyholism	before Covid-19 *	5159	14.04(3.98)	2.96	6074	.003
	during Covid-19	6075	14.19(3.94)			
Study engagement	before Covid-19 *	5159	14.50(3.54)	.55	6074	.583
	during Covid-19	6075	14.52(3.54)			
Dropout intention	before Covid-19 #	1958	6.43(3.58)	−12.76	6074	<.001
	during Covid-19	6075	5.92(3.11)			

Legenda. df = degree of freedom; * = *Mean* reference value from Loscalzo (2019); # = *Mean* reference value from Loscalzo and Giannini (2019).

Table 3 – Paired-sample *t*-tests

		n	*M (SD)*	*t*	*df*	*p*	η^2
Hours/studying day*	before Covid-19 *	6059	4.55(2.15)	5.52	6058	<.001	.005
	during Covid-19	6059	4.36(2.49)				
Days/studying week#	before Covid-19 *	6017	5.00(1.39)	−8.70	6016	<.001	.01
	during Covid-19	6017	5.22(1.74)				

Legenda. df = degree of freedom; * = Hours of studying per day; # = Days of studying per week.

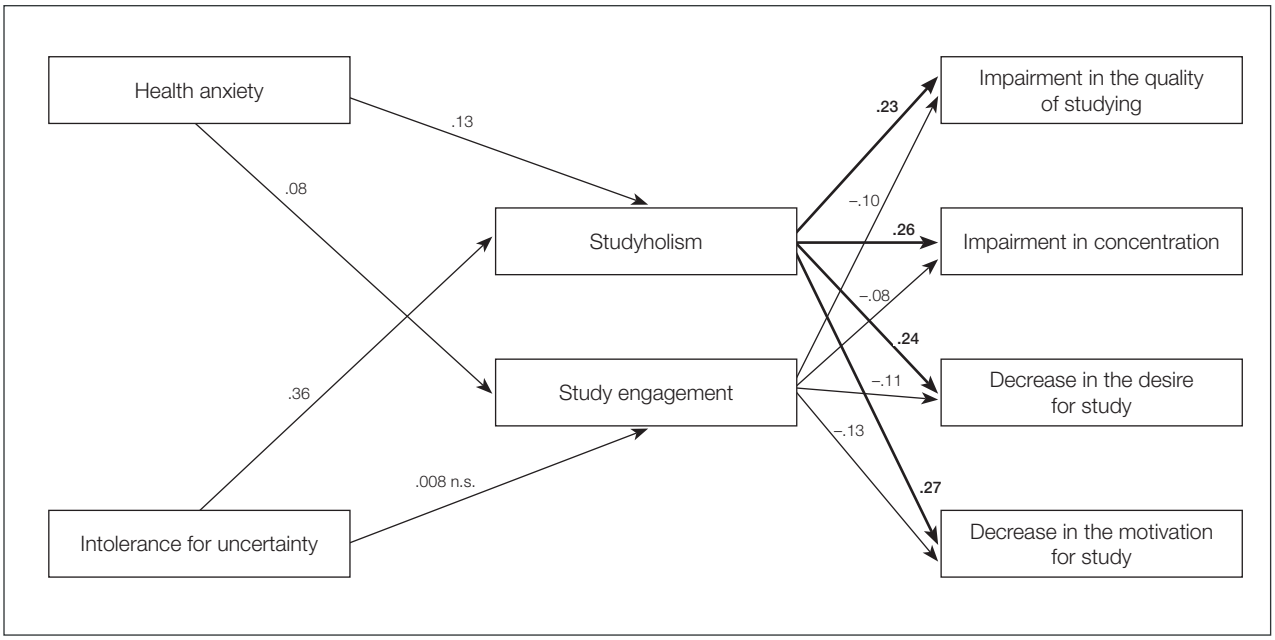
18.5% of the variance in studyholism is explained by its predictors (for study engagement, the variance explained is instead very low: .7%). The study-related variables are predicted at a good level, too; those are the percentages for their explained variance: decrease in study motivation, 8.1%; concentration impairment, 7%; decrease in the desire for studying, 6.4%; impairment in the quality of the study, 5.9%. More specifically, while studyholism predicts the impairment in studying (quality, concentration, desire for studying, motivation for studying), study engagement is a negative predictor of these variables. Figure 1 shows the standardized path values.

DISCUSSION

This study aimed to shed light on the impact that the Covid-19 outbreak had on college students' attitudes toward studying and their academic careers.

First, we found support for teachers' engagement in online activities: students reported that most of their teachers promptly used online lessons and have been available for clarifications upon request. Though, even if students recognized that teachers did their best to provide lessons, they reported just an average level of satisfaction with these lessons. Moreover, they experienced several downsides on

Figure 1 – Structural model with standardized path estimate (n = 6075)



Note. All the beta values have $p<.001$.

their academic career: many students decided not to take the exams they planned for April and May, even if they could have done them in the online format; the internships have been interrupted or even not started for some students; most of the students who planned to discuss their thesis by 2020 reported to expect a delay in their graduation.

Moreover, this study highlighted that, compared to normative values identified in previous studies conducted before the Covid-19 outbreak, students reported higher levels of studyholism (i.e., obsession toward study), lower intention to dropout, and no change in their study engagement levels during the lockdown. Regarding the time spent studying, they reported a higher number of hours of studying per day but a lower number of days per week. Though, the effect sizes are small. Hence, students experienced both positive and negative consequences on their studying attitudes during the lockdown. On the positive side, they increased their time spent studying daily but decreased the days per week of studying. This might suggest that they devoted more hours to study thanks to the lack of many other daily duties that could reduce their time available for study. However, it seems that students also allowed themselves to have some days in which they did not study (and maybe did something relaxing/funny for themselves). Therefore, we speculate that during the lockdown, students optimized their management of time devoted to study. In line with this, their dropout intention decreased, probably also because of a decline in their stress and psychopathology symptoms, as previously found in our study on youths' psychological well-being during the lockdown (Loscalzo & Giannini, 2021a). Though, it should be specified that Loscalzo and Giannini (2021a)'s findings are not in contrast with previous studies highlighting high levels of distress in students (e.g., Ma et al., 2020; Romeo et al., 2021). In fact, that study did not show that Italian students did not experience psychological symptoms during the lockdown. Referring to the cut-off values of the self-report used for evaluating depression, anxiety, and stress, we found that (on average) Italian college students reported moderate symptoms of depression and stress and between mild and moderate symptoms of anxiety during the lockdown. However, compared to Italian students who filled the same instrument before the pandemic, they found (on average) an

ameliorating in their physical and psychological well-being, which we suggest might also explain the lower dropout intention we found in the current study.

Finally, it is interesting to note that study engagement levels did not change, suggesting that this positive attitude toward study is not affected by environmental stressors that could negatively influence the academic curriculum.

Though, on the negative side, studyholism increased during the lockdown. We speculate that obsessive thinking about studying has been fueled by the uncertainty concerning the format for exams and dissertations, as well as for the traineeships, which in turn could have increased the worries about the academic path and an expected delay in graduation. In fact, Loscalzo and Giannini (2019) and Loscalzo (2021) previously showed that worry is a strong predictor of studyholism. In line with this, our path analysis showed that the intolerance for uncertainty is a good predictor of studyholism. Health anxiety, which could have been increased during the Covid-19 outbreak due to the heightened attention to somatic symptoms, predicts it instead with a low beta value. Hence, in general, students characterized by a high intolerance for uncertainty might have experienced high distress during the lockdown since there has been great uncertainty concerning the health, economic, and academic situation. Therefore, they might have increased their obsessive thinking about studying due to the great uncertainty concerning their academic path.

The results about the predictive power of intolerance for uncertainty on studyholism also provide additional support to Loscalzo and Giannini's (e.g., 2017, 2018a, 2020b) conceptualization of problematic overstudying as an internalizing disorder, or as an obsessive-compulsive related disorder, since it is a feature of internalizing disorders, including OCD (e.g., Baldwin et al., 2017; McEvoy & Mahoney, 2012). In fact, the new potential clinical condition associated with problematic overstudying has been conceptualized by different authors as a condition more similar to an OCD-related disorder (i.e., an internalizing disorder; Loscalzo & Giannini, 2017, 2020b) or as a behavioral addiction (i.e., an externalizing disorder; Atroszko et al., 2015). Though, Loscalzo and Giannini (e.g., 2017, 2018a, 2018c) suggest going beyond the addiction framework to shed light on the internalizing and/or externalizing nature of problematic overstudying, since the literature about this topic is still too scant to reach any firm conclusion. Hence, they are analyzing studyholism correlates through some studies, aiming to understand if it might actually be defined as an OCD-related disorder. Among their published studies, Loscalzo and Giannini (2019) and Loscalzo (2021) showed that worry (an internalizing feature contributing to OCD; Comer et al., 2004) is a very strong predictor of studyholism, providing support to their OCD-related disorder conceptualization. The current study provides additional evidence to Loscalzo and Giannini's conceptualization, as it highlights that tolerance for uncertainty, that is another psychological variable representing a feature of OCD (and other internalizing disorders; e.g., Baldwin et al., 2017; McEvoy & Mahoney, 2012), is a good predictor of Studyholism.

Finally, we found that studyholism predicts an impairment in the study's concentration and quality and a decrease in the desire and motivation for study during the lockdown, highlighting that it has been a risk factor for a higher impairment in study during the quarantine. Instead, study engagement played a protective factor since it is a negative predictor of these study-related variables. However, its beta values are low, suggesting that to prevent academic impairment in college students, we should primarily target studyholism, as it has a more substantial role. Therefore, in case of another lockdown, interventions addressed to college students should be implemented to increase their tolerance for uncertainty, allowing them to cope better with the academic uncertainty and maintain a fruitful study behavior. Moreover, considering the self-reported impairment in the study experienced by studyholics during the lockdown, it is critical to provide students – especially the ones with high studyholism – with interventions aimed at reducing their obsession with studying. These interventions should give them the possibility to forgive themselves for the delays they could have had in their academic path during the lockdown, to accept this delay, and hence move forward their graduation with higher study engagement and lower studyholism and, therefore, with a better physical and mental health (Loscalzo, 2021; Loscalzo & Giannini, 2019).

Among the main limitations of this study there is the female prevalence of the sample and a higher prevalence of students from Central Italy. About the higher female prevalence, we speculate that this might be because gender could affect the response rate to online surveys. In fact, Saleh and Bista (2017) suggested that male participants are more likely to respond to surveys if they received a reminder. We did not send a reminder; hence, we suggest that adopting such a strategy could help to increase the male response rate, for

future studies. Finally, we did not include other psychological variables, such as personality traits, that could have influenced the results of our analyses. However, among the merits, we have used a wide sample that is heterogeneous concerning the year and the study area. Moreover, we provided evidence for the negative impact of the Covid-19 outbreak on college students' academic path: some students did not take their exams, did not do their traineeships, and expected a delay in their graduation. Also, they have not been very satisfied with the online lessons. Also, this study highlighted that students characterized by high levels of intolerance for uncertainty experienced higher studyholism, which in turn lead to a decrease in concentration, in the quality of the study, and in the desire and motivation for studying. However, it should also be noted that, generally, study engagement levels have not been impacted by the pandemic, and that dropout intention decreased, probably because of a decline in the stress and psychopathology they experienced (Loscalzo & Giannini, 2021a) and because of better time management for studying. Finally, it provided further support to the definition of problematic overstudying as an OCD-related disorder instead of a behavioral addiction (Loscalzo, 2021; Loscalzo & Giannini, 2017, 2018a, 2018b, 2019, 2020a, 2020b).

In conclusion, we urge universities to promptly provide students with psychological interventions to reduce their studyholism levels to facilitate a better recovery of the academic path despite some delays they might have experienced. They should also increase their tolerance for uncertainty to increase their resilience in the case of another pandemic (or a new wave of Covid-19). These interventions, considering the ongoing health emergency, might be implemented online. Moreover, we suggest that a group counseling session would be more appropriate than individual counseling, as it might help students feel that they are not alone in experiencing psychological symptoms due to the pandemic, a negative impact on their academic path, or high levels of studyholism and intolerance for uncertainty. An intervention grounded on the self-help group format, with a psychologist as moderator, might be effective in allowing students to discuss their difficulties and collaboratively find solutions. Also, more resilient students might provide a model for those students who faced more significant adverse consequences and provide them with some solutions they used to cope well with the pandemic and its impact on their study. About targeting more specifically studyholism and intolerance for uncertainty, we suggest organizing counseling group sessions in which students fill the SI-10 and the IUS-R, that is, the instruments for evaluating studyholism, study engagement, and intolerance for uncertainty. Next, their scores might be used to prompt a discussion about their attitudes towards study and tolerance for uncertainty and help them acquire self-knowledge about these characteristics. Then, soft skill training would help reduce studyholism and intolerance for uncertainty and increasing study engagement. For example, the training might increase assertiveness, time management skills, and effective stress coping strategies.

Finally, since students recognized the teachers' effort in providing lessons, but they did not report high satisfaction with these lessons, we strongly recommend universities to work on the maximization of the quality for online lessons to be provided in case of other crisis requiring lockdown, but also as an additional option that could be given to students who also work and cannot attend "regular" lessons. For example, it would be helpful to organize focus groups aimed at discussing those aspects that the students found positive (and negative) in the online lessons, aiming to elicit ideas for the implementation of changes in the organization of the university lessons which might next be reported to the rector for his/her consideration and application. For example, if the students found it useful to have available recorded lessons to watch on-demand, it might be suggested to record lessons when all the courses will be held again at university. Also, if the students found that online lessons were not useful to increase their competencies, it might be suggested to organize some courses that might teach teachers to settle lessons that are more effective in spreading knowledge and competencies.

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