

Do demographic and socio-economic factors predict Sense of Coherence among university students?

Guglielmo Bonaccorsi¹, Patrizio Zanobini¹, Claudia Cosma², Primo Buscemi²,
Sonia Paoli², Vieri Lastrucci³, Valerio Ferro Allodola¹, Andrea Moscadelli², Orkan Okan⁴,
Kevin Dadaczynski⁵ and Chiara Lorini¹

¹Dipartimento di Scienze della Salute, Laboratorio sulla Health Literacy, Università degli Studi di Firenze, Florence, Italy

²Scuola di Specializzazione in Igiene e Medicina Preventiva, Università degli Studi di Firenze, Florence, Italy

³Unità di Epidemiologia, Azienda Ospedaliero Universitaria Meyer, Florence, Italy

⁴Department of Sport and Health Sciences, Technical University Munich, Uptown München-Campus D, Munich, Germany

⁵Department of Nursing and Health Science, Fulda University of Applied Sciences, Fulda, Germany

Abstract

Introduction. The COVID-19 pandemic and related containment measures have been threatful for psychological well-being, particularly for young people such as university students. Sense of Coherence (SoC) can help in coping with stressful and anxiety-provoking situations.

Aim. The aim of this study is to describe the levels of SoC and to investigate the socio-economic, and demographic predictors in a sample of students attending Florence University, in the timespan between August, 17th and October, 3rd 2020.

Method and results. The cross-sectional online survey was completed by 2,996 students. Higher levels of SoC have been found among males and for respondents reporting a better socioeconomic condition. Regarding the dimensions of SoC, lower levels were reported for comprehensibility and manageability, higher for meaningfulness.

Conclusions. These results reinforce the need to plan and implement health promotion interventions aimed to support and sustain university students in general and specifically those at higher risk of low level of SoC.

Key words

- university students
- Sense of Coherence
- cluster analysis
- financial situation

INTRODUCTION

In the past two years life and psychological wellbeing has been violently stricken by COVID-19 pandemic [1]. Since the beginning of the pandemic, physical distance represented one of the most effective containment measures and on March 9th, 2020, the stay-at-home order was extended to the entire Italian population [2]. This lockdown forced the closure of schools and universities and the reorganization of lessons and examinations via online meetings, compelling young people to engage with digital communication technologies to maintain relationships with peers and teachers during the Italian curfew [3]. Quarantine, which was adopted to contain the virus spread and new infections, seriously affected behavioral routines and was particularly hard to accept for students who usually spent much of their time in social situations, like in schools or universities [1].

The pandemic and the related containment measures

were, indeed, threatful for psychological well-being and the new living condition strongly affected university students, who showed risks of mental disorders, such as anxiety, depression, and even suicidal ideation [4]. Therefore, pandemic gave new importance to the concept of resilience defined as a characteristic of people which protects themselves from stress and depression and help to adapt to unpleasant circumstances. It is a developable capacity that changes over time [5, 6].

An indicator of resilience in dealing with critical events is the Sense of Coherence (SoC), which has a strong relationship with health [7]. Indeed, it emerges that some people maintain themselves healthy despite their dramatic experiences, thanks to the good view they have of their life and of the essence of their existence [8-11]. Antonovsky theorized that SoC developed during lifetime and that socio economic status, network education, and culture seem to strongly influence indi-

vidual SoC level too. SoC is often considered to be a stable entity that since childhood completely develops around the age of 30 [9-11]. However, recent studies have questioned this stability of SoC: high SoC tends to be more stable than a lower SoC [12] and, under certain conditions (such as mental health promotion efforts, etc.) changes might be possible in adulthood [13].

In summary, SoC could be conceptualized as the extent to which life is understood as more or less comprehensible, meaningful, and manageable by different individuals and lets one mobilize resources to cope with stressors. Individuals having a higher SoC are more capable of facing and handling hard situations, such as the pandemic could be. University students with high SoC usually experience fewer daily unpleasant events than students with low SoC and experience these events as less stressful [14, 15].

Therefore, it appears that, according to the theoretical approaches [9], socio-economic and demographic factors, such as the economic conditions and the social position of the family, play a significant role in the formation of the SoC. These theoretical principles have been also confirmed by the findings of several researchers that have identified the economic wealth as a factor that can, both directly and indirectly, contribute to have a strong SoC [16].

Biennium 2020-2021 represented a real challenge to university students' resilience and SoC even because it has introduced hard financial pressure, changed living conditions and *modus vivendi* [17]. Since Universities face to face lessons were largely replaced by remote teaching those with limited digital resources have been negatively affected at most [18].

Following the radical changes caused by the COVID-19 pandemic, an international group of researchers from all over the world launched the COVID-HL network [19] (see <https://covid-hl.eu/>) which aims to establish an open science and research community to foster research in the field of health literacy, health information, and digital health.

The aim of this study, as part of the COVID-HL University Students Survey, is to describe the level of SoC and to investigate socio-demographic and socio-economic predictors in a sample of students from Florence University, in the timespan between the first and the second Italian wave of COVID-19 pandemic.

MATERIALS AND METHODS

Study design

This cross-sectional study was designed and conducted in accordance with the Helsinki declaration and approved by the Ethics Committee of the University of Florence (n. 108, 2020/07/07).

Data were collected using a questionnaire developed by Dadaczynski *et al.* [20]. In Florence, the COVID-HL University Students Survey was conducted sharing the online questionnaire with the students of all the courses (bachelor, master, PhD, Postgraduate School) through the institutional email. In addition, the survey was advertised on the University of Florence web pages and social networks. There were no exclusion criteria, apart from not being a Florence University student.

In 2020, the students enrolled at the University of Florence were about 50,000 and a convenience sample of 2,996 students filled in the questionnaire. The questionnaires were administered from August 17th to October 3rd, 2020. Filling in the questionnaire was voluntary. In accordance with the European Regulation 2016/679 and the Legislative Decree 101/2018, all the data have been processed anonymously and cannot be attributed to a specific person.

Questionnaire

The questionnaire included either existing validated scales adapted to the COVID-19 pandemic or newly developed scales. In particular, the following data was collected: sociodemographic information; life situation and future anxiety; digital health literacy and information seeking behavior; personal health situation.

The questionnaire, proposed in English language [20] was translated into Italian using a standard procedure: two independent native English speakers translated the questionnaire in Italian language, then two independent native Italian speakers back-translated the two versions into English. The four versions (two in Italian and two in English languages) were assessed and discussed by the research group to verify any discrepancies emerging from the process.

For the purposes of this study, the following sections of the questionnaire were included in the analysis: sociodemographic characteristics (sex, age, country of origin, study course), general economic situation (subjective social status, satisfaction with the financial situation, how they finance their studies), SoC.

Specifically, the socioeconomic status was measured using the MacArthur Scale of Subjective Social Status (SSS), which assesses the person's perceived position in a social hierarchy: it is a ten-point scale (from 1 to 10) with the top (higher points) representing wealthy people, with a prestigious job and high level of education while at the bottom (lower points) were placed poor people with less prestigious job and lower education [21, 22]. According to the score, three categories of SSS were identified: low, medium, and high SSS.

Satisfaction with the financial situation was investigated with the question "How sufficient do you consider the money at your disposal?", with the following response options: not sufficient (score=1), less sufficient (score=2), sufficient (score=3), completely sufficient (score=4).

The source for financing the students' study was assessed through a specific question ("How do you primarily finance your studies?") with 6 possible responses ("support by parents", "students' grant", "employment during the semester", "employment during the semester brake", "scholarship", "other").

To measure the SoC, the work-related SoC instrument developed by Vogt *et al.* [23] was used, adapting the initial question to life in general ("How do you personally find your current life situation in general") instead of working condition. The primary study that used the tool and to which we are referring to as a good internal consistency (Cronbach alpha=0.83) and factorial analyses showed that the scale has a three-factor

structure with the sub-dimensions of comprehensibility, manageability and meaningfulness. Before the pandemic there are studies that used Vogt *et al.* original instrument [23] which present the differences respect the instrument used here regarding a single word of the introduction question that is “work situation” turned in “life situation” so: “How do you personally find your current job and work situation in general?” becomes in our version: “How do you personally find your current life situation in general?”. It included nine bipolar adjectives (items) that could be rated on a seven-point semantic differential scale, with higher values indicating a higher SoC [22]. The nine items refer to the three dimensions of SoC: four items for “comprehensibility” (items n. 1, 3, 6 and 9), two items for “manageability” (items n. 4 and 7), and three items for “meaningfulness” (items n. 2, 5 and 8). The Italian version of the SoC scale presented a good internal consistency (Cronbach's alpha: 0.874). Considering the subscales, two presented a good or acceptable-to-good internal consistency (for “comprehensibility” and “meaningfulness”: Cronbach's alpha >0.71) while for the other one (i.e., “manageability”) the Cronbach's alfa was lower than 0.71. However, as also discussed by Dadaczynski *et al.* [20], it could be considered as sufficient due to the low number of items included in this subscale. A SoC scale score and three subscale scores were then calculated as the mean value of the item scores.

Statistical analyses

Normality of continuous variables was assessed using Kolmogorov-Smirnov test.

Continuous variables were described using mean and standard deviation (SD), or median and interquartile range (IQR) as appropriate. Categorical variables were expressed as percentages.

Since no cut-off values was previously defined to identify different levels of SoC, a hierarchical cluster analysis was conducted using the Ward's minimum variance method to identify groups with different level of SoC. At each step, Ward's minimum variance criterion allows to agglomerate two clusters into one such that the within-class variance of the partition thereby obtained is minimum, and the between-class variance of the partition obtained is to be maximized [24]. The Ward's method was used to identify groups on the basis of the scores obtained on the items of the SoC scale. The optimal number of clusters was selected through the visual examination of the dendrogram. To confirm the goodness of the identified clusters, the association of the distribution of the scores of each subscale of SoC, as well as of those of the entire SoC scale, was assessed using ANOVA test or Kruskal-Wallis, as appropriate.

According with the theoretical models on Salutogenesis [25], bivariate analyses were conducted to investigate the association between the SoC and the following potential predictors: sex (male, female), age (<=median value, >median value), country of origin (Italy, others), SSS (low, medium, high), satisfaction for the financial situation (not sufficient, less sufficient, sufficient, completely sufficient), parents as primary financial support for study (yes, no), employment as primary financial

support for study (yes, no). In particular, ANOVA or Kruskal-Wallis test were used to test association with respect to SoC scores – either as subscales or as total scale – while Fisher's exact test was used with respect to SoC categories according to the results of the cluster analysis.

Then, multivariate analyses were conducted, including – as independent variables – the potential predictors with statistically significant associations with SoC at the univariate analysis (sex, age, country of origin, SSS, satisfaction for the financial situation, employment as primarily financial support for study). In particular:

- four different models of multivariate linear regression were performed, considering respectively the score at comprehensibility (model 1), manageability (model 2), meaningfulness (model 3) subscales, and at the total SoC scale (model 4) as dependent variables;
- a multivariate multinomial logistic regression (an extension of binary logistic regression that allows for more than two categories of the dependent or outcome variable) was performed to assess the predictors of SoC as categorical dependent variable (i.e., the three categories identified using the cluster analysis).

For all the analyses, the alpha level was considered as significant at 0.05. The analyses were performed using IBM SPSS 27.0 and Stata.

RESULTS

Descriptive analysis of the sample

As a whole, a convenience sample of 2,996 university students participated in the study and completed the online survey, of whom 68% were female. The median age was 22 (IQR: 20-24; range: 18-70 years).

Ninety-two percent was born in Italy, 1.7% in Albania, 5.8% in other countries (China, Romania, Poland, Cameroon, Russia). Fifteen percent attended a course of study in the Medical or Health Sciences area, 13% in Engineering, 11% in Humanities, 10% in Economics/Statistics, 9% in Architecture/Urban and Environmental Sciences, 5% in Education Sciences, while the remaining 37% were engaged in other training fields. Most of the students (62%, n=1,862) attended a bachelor's degree program, 37% (n=1,111) attended a master's degree course, 1% a PhD, or a post-doc program.

More than 80% claimed to be financially supported by their parents for their studies, 22% gained resources by working during the semesters, 12% reported to work during the summer and winter holidays (i.e., during the semester brake), 10% obtained funding from a scholarship. The SSS median score was 6 (IQR: 5-7; range: 1-10); 13.6% presented a low SSS, 69.1% a medium SSS and 17.3% a high SSS. About 70% (69.7%, n=2,088) considered their financial resources “completely sufficient” (18.9%, n=567) or “sufficient” (50.8%, n=1,521), while 30.3% (n=908) considered their resources “less sufficient” (24.3%, n=728) or “not sufficient” (6%, n=180).

Descriptive analysis of SoC

Figure a available online as *Supplementary Material*, reported the responses to the items included in the SoC scale, while *Table 1* reported the descriptive statistics of each item, subscales, as well as of the entire SoC scale.

Considering the item responses, the lower values (i.e., lower SoC) were reported for the item 9 (unpredictable vs predictable; 6.7% of score 0, 14.4% of score 1, mean score: 2.8 ± 1.5), followed by the item 7 (unclear vs clear; 6% of score 0, 11.9% of score 1, mean score: 3.7 ± 1.7). On the contrary, the higher values (i.e., higher SoC) were reported for the item 5 (insignificant vs significant; 19.7% of score 6, 27.5% of score 5, mean score: 4.1 ± 1.5), the item 2 (meaningless vs meaningful; 19.1% of score 6, 29.4% of score 5, mean score: 4.2 ± 1.5), and the item 1 (unmanageable vs manageable; 12.8% of score 6, 27.3% of score 5, mean score: 3.9 ± 1.4).

In Figure b available online as *Supplementary Material*, the cluster dendrogram of SoC items is reported. Using visual examination, a three-cluster solution was chosen: cluster A (n=861; 28.7%), B (n=1,398; 46.7%) and C (n=737; 24.6%). The score distribution of each subscale, as well as of the entire scale, significantly differed by cluster (Kruskal-Wallis test <0.001). In particular, the scores were lower for cluster A and higher for cluster C (Figure 1). In detail, cluster A corresponds to a low SoC, cluster B to a medium SoC, cluster C to a high SoC.

Predictors of SoC

At the bivariate analyses, sex, age, country of origin, SSS level, satisfaction with the financial situation and employment as the primary finance of study were statistically significantly associated with SoC ($p < 0.05$), either considering each dimension (comprehensibility, manageability and meaningfulness), the total SoC score, or the cluster classification obtained on the single items (low SoC – cluster A, medium SoC – cluster B, high SoC – cluster C), with the exception of manageability with respect to both sex and employment as the primary finance of study (Table 2 and Table a available online as *Supplementary Material*). In particular, each dimension of SoC (comprehensibility, manageability and meaningfulness), the total SoC score, and the cluster

classification obtained on the single items presented consistent results: SoC was higher among males, students ≤ 22 years old, with higher SSS, higher satisfaction about the financial situation, and no employment as the primary source to finance the study.

Due to the results at the bivariate analysis, the variable “parents as primary financial support” was not included in the multivariate analyses.

Table 3 reported the results at the multivariate linear regression analyses. Considering these results, all the included variables presented statistically significant associations with the outcome variables (i.e., for model 1: score at the Comprehensibility subscale; for model 2: score at the Manageability subscale; for model 3: score at the Meaningfulness subscale; for model 3: total score at SoC scale), at least with one category, with the exclusion of sex and country of origin for model 3. In particular, the scores at each subscale and at the total scale significantly increased among students with medium or high SSS (with respect to those with low SSS), less sufficient, sufficient, or completely sufficient satisfaction with the financial situation (with respect to those who have declared it as not sufficient), and no employment as the primary source to finance the study. Conversely, the score significantly decreased among students older than 22 years (with respect to those younger). Moreover, for models 1, 2 and 4, the scores significantly decreased among female students (with respect to males) and increased among those for whom Italy is the country of origin (with respect to other countries).

Multivariate multinomial logistic regression analysis confirmed the results of linear regression analysis (Table b available online as *Supplementary Material*). In particular, the risk relative ratio (RRR) of presenting medium SoC (cluster B) with respect to low SoC (cluster A) significantly increased with increasing SSS, satisfaction with the financial situation, and among those students not declaring employment as the primary financial source of study. Similar results were observed

Table 1

Sense of Coherence (SoC): descriptive statistics of each item, subscales, total scale

Items, subscales, or scale	Mean	SD	Median	IQ range
Single items				
SoC1. Unmanageable - Manageable	3.9	1.4	4	3 - 5
SoC2. Meaningless - Meaningful	4.17	1.5	4	3 - 5
SoC3. Unstructured - Structured	3.7	1.5	4	3 - 5
SoC4. Impossible to influence - Easy to influence	3.6	1.4	4	3 - 5
SoC5. Insignificant - Significant	4.1	1.5	4	3 - 5
SoC6. Unclear - Clear	3.3	1.6	3	2 - 5
SoC7. Uncontrollable - Controllable	3.7	1.4	4	3 - 5
SoC8. Unrewarding - Rewarding	3.6	1.6	4	3 - 5
SoC9. Unpredictable - Predictable	2.8	1.5	3	2 - 4
Subscales				
Comprehensibility	3.4	1.2	3.5	2.5 - 4.25
Manageability	3.7	1.1	4.5	3 - 4.5
Meaningfulness	4.0	1.4	4	3 - 5
Scale				
SoC	3.7	1.1	3.7	2.9 - 4.4

SD: standard deviation; IQ: interquartile.

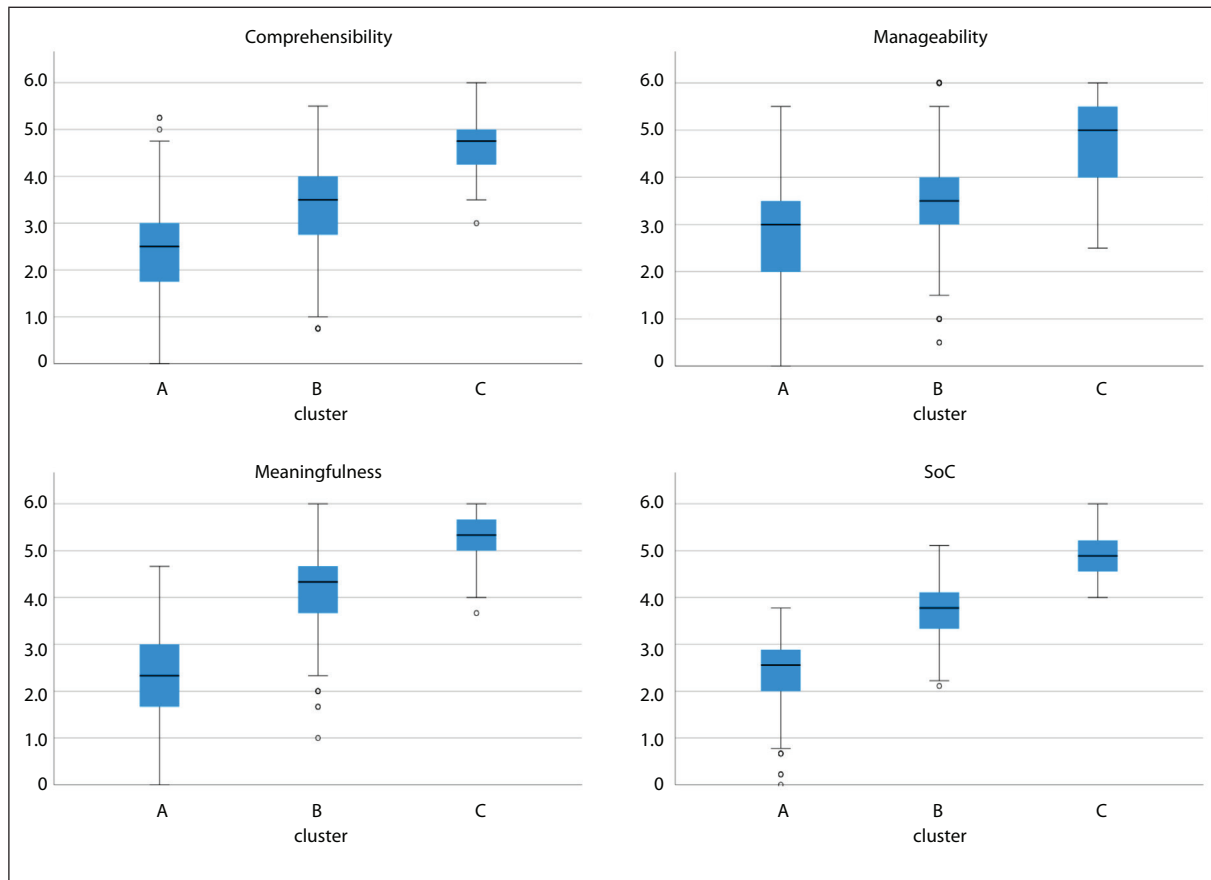


Figure 1

Boxplots of SoC (Sense of Coherence) scores (subscales and total scale) by cluster. Kruskal-Wallis test <0.001 for each subscale, as well as for the total scale.

considering the RRR of presenting high SoC (cluster C) with respect to low SoC (cluster A), although in this case significant associations were observed also for sex and age class (RRR <1 for females and for students older than 22 years old) and the RRR values indicated stronger relationships.

DISCUSSION

Worldwide, the pandemic situation has drastically changed the way of life university students suffered from drastic modifications to their daily life both at university routine as well as at personal level [17-19] and this is particularly alarming if we consider that they represent a group at risk of mental health consequences mainly for the uncertainty of their job perspectives [4] and for their future perspectives. An individual characteristic that could have played a determining role in contrasting negative effect on mental health status during the pandemic is represented by SoC in its three different dimensions [23]. Starting from this point of view, we conducted a cross-sectional study aimed to evaluate the level of SoC of Florentine University students and identify its predictors. From our results emerged that lower levels of SoC were reported for the comprehensibility and manageability subscales, either considering the whole sample or stratifying it by sex and socio-economic indicators. Starting from these results, we can argue that

information about COVID-19 and the management of personal health during the pandemic have played a relevant role in the university students' perception of life situation and have influenced their SoC especially within the domain of comprehensibility and manageability. In fact, Dadaczynski *et al.* [19] highlighted that a significant proportion of university students may not perceive external information as clear and ordered, revealing difficulties in finding information about COVID-19 and evaluating their reliability. This statement calls to mind a huge problem strongly related to COVID-19 pandemic, that is infodemic [26, 27], meant as the large amount and conflicting information about the coronavirus, that has contributed to mental stress caused by the spread of the pandemic [28, 29]. Nonetheless, the absence of data describing SoC of Florentine university students before the COVID-19 pandemic do not allow us to make concluding remarks. Other studies agreed about the relation between SoC level, socio-economic situation, sex, and mental well-being, generally showing that SoC improves with age and it is negatively associated with female sex, and high levels of stress and has socio-economic situation [8, 30-32].

We argue that although students maintained high level of meaningfulness and resilience, at the beginning of the second wave of the pandemic (when the survey has been conducted) they did not exactly know how to

Table 2
SoC (Sense of Coherence): subscale and total scale scores by predictors

Variables (predictors)		Comprehensibility mean \pm SD; median	Manageability mean \pm SD; median	Meaningfulness mean \pm SD; median	SoC mean \pm SD; median
Sex	Males	3.55 \pm 1.17; 3.75	3.81 \pm 1.07; 4	3.95 \pm 1.38; 4	3.74 \pm 10.7; 3.78
	Females	3.36 \pm 1.15; 3.25	3.61 \pm 1.11; 3.5	3.97 \pm 1.34; 4	3.62 \pm 1.05; 3.67
	<i>p-value*</i>	<0.001	<0.001	0.951	0.002
Age	≤ 22	3.52 \pm 1.12; 3.5	3.75 \pm 1.06; 4	4.05 \pm 1.31; 4.33	3.75 \pm 1.02; 3.78
	>22	3.30 \pm 1.19; 3.25	3.58 \pm 1.13; 3.5	3.86 \pm 1.39; 4	3.55 \pm 1.08; 3.55
	<i>p-value*</i>	<0.001	0.009	0.001	<0.001
Country of origin	Italy	3.46 \pm 1.15; 3.5	3.70 \pm 1.10; 3.5	3.99 \pm 1.35; 4.33	3.69 \pm 1.05; 3.78
	Others	2.98 \pm 1.20; 3	3.36 \pm 0.99; 3.5	3.62 \pm 1.36; 3.67	3.28 \pm 1.04; 3.11
	<i>p-value*</i>	<0.001	<0.001	<0.001	<0.001
SSS	Low	2.72 \pm 1.10; 2.75	3.22 \pm 1.06; 3	3.14 \pm 1.41; 3.33	2.98 \pm 1; 3
	Medium	3.43 \pm 1.09; 3.5	3.69 \pm 1.08; 3.5	4.0 \pm 1.29; 4.33	3.67 \pm 0.99; 3.67
	High	3.94 \pm 1.18; 4	3.99 \pm 1.1; 4	4.48 \pm 1.28; 4.67	4.13 \pm 1.05; 4.33
	<i>p-value*</i>	<0.001	<0.001	<0.001	<0.001
Satisfaction with the financial situation	Not sufficient	2.63 \pm 1.08; 2.75	3.23 \pm 1.03; 3.5	3.26 \pm 1.43; 3.33	2.97 \pm 1.01; 3
	Less sufficient	3.00 \pm 1.07; 3	3.47 \pm 1.12; 3.5	3.65 \pm 1.31; 3.67	3.31 \pm 1.00; 3.33
	Sufficient	3.49 \pm 1.08; 3.5	3.70 \pm 1.05; 3.5	4.03 \pm 1.30; 4.33	3.72 \pm 0.99; 3.78
	Completely sufficient	4.04 \pm 1.12; 4.25	4.02 \pm 1.10; 4	4.41 \pm 1.31; 4.67	4.16 \pm 1.03; 4.33
	<i>p-value*</i>	<0.001	<0.001	<0.001	<0.001
Financial support - by parents	Yes	3.44 \pm 1.14; 3.5	3.68 \pm 1.10; 3.5	3.95 \pm 1.36; 4	3.66 \pm 1.05; 3.67
	No	3.33 \pm 1.22; 3.25	3.68 \pm 1.12; 3.5	4.03 \pm 1.33; 4.33	3.64 \pm 1.07; 3.67
	<i>p-value*</i>	0.085	0.865	0.250	0.675
Financial support - employment	Yes	3.29 \pm 1.15; 3.2	3.64 \pm 1.08; 3.5	3.93 \pm 1.34; 4	3.58 \pm 1.03; 3.67
	No	3.47 \pm 1.16; 3.5	3.69 \pm 1.11; 3.5	3.98 \pm 1.36; 4.33	3.69 \pm 1.06; 3.78
	<i>p-value*</i>	<0.001	0.313	0.355	0.015

SSS: MacArthur Scale of Subjective Social Status; *Kruskal-Wallis test.

manage their current life. This probably happened because of the specific context of pandemic in which they were living. Information about limitations rules and related to health management often appeared as unclear or contradictory; moreover, the laws enacted by the states to face the pandemic leave no room for coping an own strategy, so as to let them feeling unable to address everyday life problems [33-35]. In fact, at the beginning of the summer 2020, the COVID-19 pandemic appeared to be under control, and many restrictions had been dropped. But, starting from the middle of August, an increase in the number of new cases was again observed, especially related to holiday places and recreational contexts, which then gave origin, with the end of September 2020, to the second wave. Future similar evaluations could be useful to assess the effects of the other pandemic waves and, more generally, of long-term exposure to the pandemic, with respect to SoC.

From the multivariate analyses of our data, it emerged that SoC was higher among students who were males, younger than 22 years old, with higher SSS, more satisfied with their financial situation, and who do not declare their employment as the primary source of financ-

ing of their study. Our analysis highlighted that the role of socio-economic determinants of SoC are consistent considering the different dimensions of the SoC scale (comprehensibility, manageability, and meaningfulness), the total SoC score, and the cluster classification obtained on the single items.

The economic situation and the link with SoC, female sex and wellbeing have also been investigated in Germany [19], where a low SSS among university students is correlated with low wellbeing, female sex, more health complaints and greater anxiety for the future. The relationship between economic situation and wellbeing appears also in an Australian study [17], after the impact that the pandemic had with students' finances; in fact, since Australian students use to have an employment as a source of money, many of them lost their jobs during 2020 and 2021. A research conduct in Spain showed that the economic status was positively related to SoC, but the relationship between SoC and family support was greater [36].

These data reinforce the idea that SoC is strongly influenced by the context of life and in particular by the socio-economic situation in which an individual was

Table 3
Multivariate linear regression models (n=2,996)

		Model 1 Outcome: comprehensibility			Model 2 Outcome: manageability			Model 3 Outcome: meaningfulness			Model 4 Outcome: SoC		
		coeff	95% CI	p	coeff	95% CI	p	coeff	95% CI	p	coeff	95% CI	p
Sex	Males	ref	-	-	ref	-	-	ref	-	-	ref	-	-
	Females	-0.14	-0.22; -0.06	0.001	-0.17	-0.25; -0.09	<0.001	0.05	-0.05; 0.15	0.343	-0.85	-0.16; -0.01	0.027
Age	≤22	ref	-	-	ref	-	-	ref	-	-	ref	-	-
	>22	-0.11	-0.19; -0.04	0.004	-0.14	-0.22; -0.06	0.001	-0.11	-0.20; -0.01	0.027	-0.12	-0.19; -0.04	0.001
Country of origin	Others	ref	-	-	ref	-	-	ref	-	-	ref	-	-
	Italy	0.18	0.03; 0.33	0.018	0.18	0.03; 0.33	0.018	0.11	-0.07; 0.29	0.228	0.16	0.02; 0.29	0.024
SSS	Low	ref	-	-	ref	-	-	ref	-	-	ref	-	-
	Medium	0.44	0.32; 0.56	<0.001	0.33	0.21; 0.45	<0.001	0.68	0.54; 0.83	<0.001	0.50	0.39; 0.61	<0.001
	High	0.79	0.64; 0.94	<0.001	0.56	0.41; 0.71	<0.001	1.07	0.89; 1.25	<0.001	0.84	0.70; 0.97	<0.001
Satisfaction with the financial situation	Not sufficient	ref	-	-	ref	-	-	ref	-	-	ref	-	-
	Less sufficient	0.28	0.10; 0.45	0.002	0.17	-0.01; 0.34	0.06	0.28	0.06; 0.49	0.011	0.25	0.09; 0.41	0.002
	Sufficient	0.65	0.47; 0.82	<0.001	0.31	0.13; 0.48	<0.001	0.52	0.30; 0.73	<0.001	0.53	0.37; 0.69	<0.001
	Completely sufficient	1.09	0.90; 1.28	<0.001	0.54	0.35; 0.73	<0.001	0.78	0.55; 1.01	<0.001	0.86	0.69; 1.03	<0.001
Financial support - employment	Yes	ref	-	-	ref	-	-	ref	-	-	ref	-	-
	No	0.10	0.01; 0.18	0.030	0.12	0.03; 0.21	0.007	0.18	0.07; 0.29	0.001	0.13	0.05; 0.21	0.002

CI: confidence interval; coeff: coefficient; ref: reference category; SoC: Sense of Coherence; SSS: MacArthur Scale of Subjective Social Status.

born and grows, besides being unequally distributed among students with different social background. Poor social support has a strong influence on the quality of life of young people and these factors can change the way they take risks and make decisions. In fact, it was observed that the scarcity of resources (poor family and social support, waste of money and time) negatively affects people's stress levels: in this sense, a younger adult with poor resources may be pushed to make worse decisions for his own health and wellbeing [37]. Since the SoC construct is mainly formed in young adulthood and adolescence and improves with age [8], it is important to consider that good socioeconomic status at this stage of life is a good starting point and can contribute to higher SoC, lower stress levels, and better quality of life.

Regarding the association between female sex and low level of SoC, some data suggested that females are more scared by COVID-19 than males [14, 17]. On the other hand, it was observed that in general females pay more attention, are more sensitive and critical in the evaluation of the accuracy of digital information on the new coronavirus and the consequences it generates [35, 38, 39]. Probably, female university students perceived the pandemic situation as more dangerous and complex than males, and this affected their level of SoC in general and, above all, the manageability dimension.

Finally, regarding the role of age on individual SoC, our results suggested that younger students showed higher SoC. Despite this association, in the literature there is not agreement about the role of age on the individual SoC. An interesting point of view is proposed by Nilsson *et al.* [8] that investigated how psychologi-

cal well-being changed in relation to age. Regarding the association that we found and that emphasized the positive role of younger age, we supposed that older students who were closer to the end of the university pathway, were more worried and stressed about how they will have to manage their life after degree, especially in the context of COVID-19 pandemic.

Our study presented several limitations. All university students were invited to participate in the study but only about 3,000 students decided to participate in the survey; no data on non-respondents are available, so selection bias cannot be excluded. For this reason, the sample could not be certainly considered as representative of the Florentine university students, which limits the generalizability of the results. Finally, cross sectional study design does not allow to interpret the associations as causal. On the other hand, the strong methodological approach in analyzing SoC (also considering classification according to cluster analysis instead) and its predictors using (with different approaches) constitute a strength.

CONCLUSIONS

Despite the huge impact of the pandemic on university students' lives, there are few studies that have investigated their mental health status and personal characteristics to forefront this critical situation. Investigating university students' SoC during the pandemic could allow to better understand how students live and perceive the current situation, as well as the limits and strengths they use to recover from this situation. Additionally, it appears urgent to identify specific groups of university

students that are more at risk of lower SoC and with fewer personal resources to deal with this situation and maintain a propositional perspective.

The results obtained through the present cross-sectional study conducted in a sample of university students from the University of Florence at the beginning of the second wave of the COVID-19 pandemic highlighted the role of demographic and economic determinants of SoC; in particular, older females with lower socio-economic condition presented worse 'trust in life', with possible negative impact on health and well-being.

These results reinforce the need to plan and implement health promotion interventions aimed to support and sustain university students in general and specifically those at higher risk, favoring the improvement of their SoC. In particular, there is a need to act upon those factors that have been identified as relevant in the promotion of university students' SoC level [40].

Furthermore, recently researchers stated that the creation of an enabling environment for youngsters through financial support promotes general health status, mental health, decisions, and behaviors [40]. In particular, specific examples of financial support for university students could be tax reliefs, such as tax cuts of university rates.

Regarding the group of students at risk of low SoC, specific intervention to sustain them could involve those who are perceived as influential by others. This strategy seems to be efficient taking into account what are the characteristics of an enabling environment during COVID-19 pandemic that have been identified by

the experts [18]. Inviting influential university students to say how they perceive COVID-19 situation and what are the strategy they use to forefront mental stress, and anxiety, and solve problems could be an efficient contribution for others to assume new points of view and perceive the situation differently, less stressful, and more manageable.

In conclusion, this research highlights SoC as another factor affected by the pandemic, critical for health, especially for students in lower SES. It is also another dimension to be considered when planning intervention devoted to university student wellbeing such as EUniWell (<https://www.euniwell.eu/>).

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Ethics

This cross-sectional study was designed and conducted in accordance with the Helsinki declaration and approved by the Ethics Committee of the University of Florence (n. 108, 2020/07/07).

Conflict of interest statement

None.

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