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Perduring COVID-19 pandemic, perceived well-being, and non-suicidal self-injury behaviors (NSSI) in emerging adults

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Abstract

Introduction. Covid-19 pandemic negatively influenced daily life and psychological well-being on global population. Since conditions of emotional distress appear to underlie non-suicidal self-injury (NSSI) episodes, particularly for individuals with difficulties in emotion regulation, the study explored the relationship between low psychological well-being and the occurrence of NSSI during COVID-19 pandemic.

Methods. The study involved two community samples of Italian young adults (18-30 y.o.) recruited in post-lockdown (T_1, *N*=159) or perduring COVID-19 period (T_2, *N*=143). Participants completed online self-report questionnaires on reported NSSI episodes (DSHI), psychological well-being (PWB), and emotion dysregulation (DERS).

Results. NSSI occurrence resulted higher in T_1 (31.4%) than in T_2 period (17.5%). No differences emerged in perceived well-being between T_1 and T_2, and participants with NSSI (*vs.* without) reported lower psychological well-being and more emotion dysregulation.

Conclusion. Results are discussed according to an eudaimonic perspective that places self-realization and positive functioning as core characteristics of individual's well-being and resilience to stressful life circumstances.

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1. Introduction

The expression Non-Suicidal Self-Injury (NSSI) refers to a series of deliberate and direct behaviors that damage one's own body tissues without conscious intent to end one's own life (Favazza & Conterio, 1989). NSSI is a multifaceted phenomenon among clinical and non-clinical populations. It involves behaviors such as cutting, scratching or carving, burning, and self-hitting (Cipriano et al., 2017; Nock et al., 2014).

Since NSSI is a widespread phenomenon, the estimated diffusion changes considerably according to the definition used and across samples. Several studies report that the onset of self-injurious behaviors usually occurs during early to middle adolescence (Nock & Prinstein, 2004; Nock et al., 2014), with prevalence rates between 13-17% of non-clinical and 40-60% of clinical samples (Cerutti et al., 2014; Swannell et al., 2014). The prevalence of NSSI is extremely heterogeneous even among young people and adults, with an estimate occurrence between 9-38% in community samples (O'Connor et al., 2018; Wester et al., 2018). Furthermore, no univocal results emerge about the spreading of NSSI between sexes: some studies report no significant differences (e.g., Kirchner et al., 2011), while others report higher incidence of self-injurious behaviors in women than in men (e.g., Bresin & Schoenleber, 2015). However, skin cuts and incisions are most common among women, while cigarettes, lighters, or matches-related burnings were found preferentially in men (Cipriano et al., 2017).

Klonsky (2011), exploring self-injurious behaviors on a large number of young and adult people (19-92 years old), found a negative correlation between age and deliberate self-harm behaviors with suicide intent, while the rates of non-suicidal self-harm behaviors (NSSI) were considerably higher among people aged 30 or younger. Suicidal and non-suicidal self-harm behaviors have different functions, characteristics, and etiologies (Samari et al., 2020), therefore they are distinct phenomena. However**,** diffusion of the NSSI should not be underestimated. In fact, NSSI in association with other disorders, including severe depression, post-traumatic stress disorder, borderline and other personality disorders (Pompili et al., 2015) is closely linked to a risk of later suicide (Klonsky et al., 2013) and the transition from suicidal thought to a suicide attempt is four times more likely in people who engaged in NSSI (Ribeiro et al., 2016). Understanding the onset, the manifestations, and the risk factors associated with persistent NSSI is crucial for treatment and prevention.

Conditions of significant emotional distress appear to underlie NSSI episodes, particularly for individuals who have difficulties in managing overwhelming negative emotions (Midkiff et al., 2018). Emotion dysregulation, intended as maladaptive coping with negative emotions, includes six aspects (Gratz & Roemer, 2008): non-acceptance of specific emotional responses; difficulties in engaging in goal-directed behavior; low impulse control; lack of emotional awareness; limited access to emotional regulation strategies; lack of emotional clarity. The last two dimensions seem to assume particular relevance in NSSI (Gratz & Roemer, 2008), so that dysregulation is considered a key mechanism underlying NSSI (Midkiff et al., 2018). The trigger of self-injurious behaviors assumes the function of a dysfunctional coping strategy allowing to manage negative emotions and cognitions (Nock et al., 2009). Studies report that individuals generally feel "overwhelmed by negative feelings", such as anger, anxiety, depression, and loneliness that occur before the NSSI episode, whereas they experience a decrease in negative emotions and

an increase in positive emotions (i.e., a relaxed state) after the NSSI. Therefore, as described by Nock and Prinstein (2004) in their theoretical model, automatic negative reinforcement (reduction of aversive internal states) and automatic positive reinforcement (getting relief and control) become functional processes for the maintenance of the NSSI.

Along with this affect-regulation function, NSSI behaviors assume also some interpersonal/social functions (Nock & Prinstein, 2004). The emotion regulation is the most common function (Klonsky, 2011), but other interpersonal reinforcement process can intervene such as avoiding unpleasant situations or getting peer bonding, social attention, communication, and comfort (for example, wanting someone to notice their distress; Muehlenkamp et al., 2013). It has been observed that following NSSI episodes people perceived increased support, whereas high levels of interpersonal conflict were associated with more frequent NSSI episodes (Turner et al., 2017).

The current global COVID-19 pandemic has generated unexpected stressful life circumstances for people and communities. The fear of contagion, the physical distancing, and the limitations in daily life have had a significant impact on the well-being of the population, exacerbating worries and psychological suffering. During COVID-19 pandemic people experienced social changes, such as family tensions, loneliness, and reduced support from friends (Kovacs et al., 2021). Psychological consequences were also found including fluctuations in mood, insomnia, alcohol abuse, anxiety, and depressive feelings (Vindegaard & Benros, 2020). Particularly, increased feelings of sadness, nervousness, ruminations, difficulty concentrating, sleep disturbances, eating disorders, and tendency to cry were observed among Italian college students (Commodari et al., 2021).

Although imposed home-confinement, physical distancing, and interruption of work, education or recreative activities were necessary life-saving measures, they have adverse effects on the psychological well-being (Brooks et al., 2020; Sturman 2020). Literature addressing the immediate effects of COVID-19 emergency on population shows that in the first months of lockdown (early 2020) the fear of infection, loneliness, and economic problems leaded to increased stress, anxious and depressive symptoms, self-injurious behaviors, and suicide (Holmes et al., 2020). Particularly, in people already vulnerable due to mental health problems suicidal thoughts were often linked to COVID-19 experience (Ammerman et al., 2021).

1.1 Aim and study design

Aim of the current study was to explore in a community sample of emerging adults the relationship between low psychological well-being and the occurrence of NSSI behaviors during the COVID-19 pandemic in Italy. In line with international studies, negative effects on the well-being of Italian population have been reported (Rossi et al., 2020), particularly increased anxiety,

depression and psychological distress as *immediate* response to lockdown (Bonati et al., 2021; Mazza et al., 2020). In this study data were collected in two different phases involving two independent community samples. The survey started immediately after the epidemic peak of COVID-19 in the months 2020 May-June (T_1, post-lockdown phase), when the Italian population had spent about two months in total lockdown. After the Wuhan region in China, Italy was the first country in Europe to impose severe measures of lockdown (March 9th), with strict actions by Italian government to contain infection (home-confinement, closure of schools/university, non-essential shops, recreational and sporting places; Sanfelici, 2020).

From June 2020 less stringent containment measures were adopted, with the reopening of almost all public activities (shops, restaurants, etc.) and minor restrictions (i.e., obligation of protection mask, gathering of people prohibited). From autumn the Italian government, following the recommendations by the Minister of Health (2020), planned new containment measures based on risk areas and different local limitations, from less restrictive (e.g., transfers between municipalities allowed, opening restaurants for lunch, etc.) to most strict rules (i.e., travel ban, closure of schools, university, and shops). The prohibition of leaving home from 10pm to 6am and the social gathering remained constant. These measures (applied in autumn-winter 2020-2021) allowed more activities than the total lockdown, but they led to sudden changes in restrictions (every 1-2 weeks) with a continuous adaptation of the population as a function of the local risk. Therefore, for the continuing of COVID-19 emergency and its psychological impact on daily life, it was decided to continue the study with a second phase of data collection between 2020 November and 2021 January (T_2, perduring COVID-19).

Consistent with previous studies linking NSSI to psychological distress (Holmes et al., 2020), we expected that people engaging in NSSI report low psychological well-being levels. In this study, we assumed the theoretical model by Ryff (1989; Ryff & Singer, 2008) who poses positive factors – self-acceptance, personal growth, purpose of life, environmental mastery, and satisfaction for relationships – as core components of well-being. According this eudaimonic perspective, psychological well-being differs from subjective happiness (hedonic perspective), and it describes the degree to which an individual experiences self-realization and positive functioning in his/her life circumstances. These components are relevant for adults' perspective of life (Arnett & Tanner, 2016; Melendro et al., 2020), and are associated to lower distress, adaptive coping and resilience to adversity (Ryff & Keyes, 1995; Ruini et al., 2003b). Secondly, under the assumption that NSSI works as a dysfunctional coping strategy (Wolff et al., 2019), we expected more emotion dysregulation in people with NSSI. Finally, the open question was whether participants differed between T_1 and T_2 phases in perceived psychological well-being and reported incidence of NSSI.

2. Methods

2.1 Participants

Initially, the study involved 403 Italian young adults aged between 18-30 years old (*M*=23.98; *DS*=3.24), who submitted the survey at T_1 or at T_2. Based on Lie scale scores (*see* Measures section), the final sample was composed of 159 participants at T_1 and 143 at T_2, of which 58 males (*M*=24.93, *DS*=3.15) and 244 females (*M*=23.67, *DS*=3.00). In agreement with the average age of the samples, most respondents were unmarried, students or employers, and declared to keep their activities in using online smart-working tools due the COVID-19 emergency (Table 1).

Table 1. Characteristics of participants of the two independent samples.

Variables	T1 -Post-lockdown (*n*=159)	T2 – Perduring COVID-19 (*n*=143)
Sex		
Male	32 (20.1%)	26 (18.2%)
Female	127 (79.9%)	117 (81.8%)
Age (18-30)		
Average	24.02	23.79
SD	2.38	3.68
Education		
1st grade Secondary School	6 (3.8%)	3 (2.1%)
2nd grade Secondary School	81 (50.9%)	82 (57.3%)
Graduation	66 (41.5%)	53 (37.1%)
Post Graduate Specialization	6 (3.8%)	5 (3.5%)
Occupation		
Student	91 (57.2%)	81 (56.6%)
Employee	37 (23.3%)	38 (26.6%)
Self-Employment	6 (3.8%)	5 (3.5%)
Unemployed	19 (11.9%)	14 (9.8%)
Other	6 (3.8%)	5 (3.5%)
Marital Status		
Unmarried	137 (86.2%)	124 (86.7%)
Married	13 (8.2%)	8 (5.6%)
Cohabitant	8 (5.0%)	10 (7.0%)
Separate	1 (0.6%)	1 (0.7%)
Smart/Tele Working		
Yes	101 (63.5%)	97 (67.8%)

COVID-19 related experiences (T2, n =143)	
No	77 (53.8%)
Yes	*Personal COVID-19 positivity* 3 (2.1%)
	Family/friend COVID-19 positivity 63 (44.1%)
	COVID-19 family/friend hospitalization 13 (9.1%)
	Covid-19 related experience index
	1 experience 54 (37.8%)
	2 experiences 11(7.7%)
	3 experiences 1(0.7%)

2.2 Procedure

Participants were volunteers invited to participate in the study via multiple communication and social media networks (WhatsApp, Facebook, Instagram, etc.). An online survey platform was disseminated starting with an information sheet with the scope of the study. Participants who signed the informed consent could access to the online questionnaire. At the end, the answers of each participant were aggregated to the database and stored without any personal identification code.

Approval by the Ethical Committee of the Psychological Research and Intervention Center (CeRIP) of the University of Messina was obtained (prot. nr. 125445, 2020).

2.3 Measures

Section A: Demographics.

Requested data were age, sex, marital status, instructional level, profession, activity in tele/smart working (yes/no) during COVID-19.

Section B: COVID-19 related experiences.

Three questions (yes/no answer) evaluated if: *a*) the participant has ever tested positive for COVID-19, *b*) someone among his/her family members or friends had contracted the virus, and *c*) someone among his/her family members or friends was hospitalized because COVID-19. Scores range from 0 (participants were classified as "no experience with COVID-19") to 3 (from 1 to 3 experiences). These items were introduced only in T_2.

Section C: Psychological well-being and emotion regulation.

The *Psychological Well-Being Scales* (PWB; It. ad. by Ruini et al., 2003a) is a self-report questionnaire (54 items) assessing six areas (Ryff & Keyes, 1995): *Self-acceptance* (e.g. "For the most part, I am proud of who I am and the life I lead"), *Autonomy* ("I have confidence in my opinions even if they are contrary to the general consensus", reversed), *Environmental mastery* ("I am good at juggling my time so that I can fit everything in that needs to get done"), *Personal growth* ("In

general, I feel that I continue to learn more about myself as time goes by"), *Purpose in life* ("I am an active person in carrying out the plans I set for myself"), and *Positive relations* ("Most people see me as loving and affectionate"). Responses are expressed on a 6-point Likert scale (from 1=*I do not agree* to 6=*I completely agree*), and high scores indicate perceived satisfaction and mastery in that area of personal life. PSW scores negatively relate with psychological distress (Ruini et al., 2003b). In this study, Cronbach's coefficients resulted .95 for total scale and ranged from .82 (Environmental mastery and Autonomy scales) to .88 (Self-acceptance).

Social desirability. In order to assess the respondent's tendency to alter and fake his/her own responses, 12 items (*Lie Scale*) from the *Big-Five Questionnaire* (BFQ; Caprara et al., 1993) were entered (in this study Cronbach's coefficient .74).

The *Difficulty in Emotion Regulation Strategies* (DERS; Gratz & Roemer, 2004; It. ad. Sighinolfi et al., 2010) is a 36-item questionnaire with six subscales: *Awareness* (e.g., "I am attentive to my feelings", reversed), *Clarity* ("I have no idea how I am feeling"), *Non acceptance* (e.g., "When I'm upset, I feel guilty for feeling that way"), *Impulse* ("When I'm upset, I lose control over my behaviors"), *Strategies* ("When I'm upset, I know that I can find a way to eventually feel better", reversed), *Goals* ("When I am upset, I believe I will remain in that state for a long time"). Responses are expressed on a 5-point Likert scale (from 1=*almost never* to 5=*almost always*), with higher scores reflecting more dysregulation. DERS measures revealed good predictive validity with behavioral problems associated with emotion dysregulation, such as self-harm (Gratz & Roemer, 2004). In this study, Cronbach reliability index resulted .90 for DERS total score and ranged from .80 (Awareness) to .90 (Non acceptance) for subscales.

Section E: Self-harm behaviors.

The *Deliberate Self-Harm Inventory* (DSHI; Gratz, 2001) is a self-assessment questionnaire that follows the definition of self-harm as "the deliberate destruction or alteration of body tissue without conscious suicidal intent" (Favazza, 1989). It presents a list of 17 items starting with the sentence "Have you ever intentionally or deliberately …" followed by a specific self-harm behavior (e.g., "cut your wrist, arms, or other areas of your body -without intending to kill yourself?" Yes/No). Other self-injurious behaviors are skin cutting and burning, self-hitting and scratching, interfering with the healing of wounds, hair pulling and bone breaking. The Italian validation (Monti & D'Agostino, 2010) was used for this research, but some minor changes were made to make administration faster. Some similar items have been unified. The original Item 4 (carving words into skin), and Item 5 (carving pictures, designs, or other marks into skin) have been unified in "Have you ever intentionally, or deliberately, carved words, drawings or other marks into your skin?". Similarly, Item 11-12 becomes: "Have you ever intentionally or deliberately driven sharp objects such as needles, glass, pins, paper clips, etc. into your skin?

(tattoos and piercings are excluded for the ear or the body)". Therefore, the edited questionnaires include 15 items with unchanged answer method.

For descriptive purpose in this study participants who answered "Yes" to at least one of the 15 items were classified as "previous self-harm". The number of forms of self-injurious behaviors was counted. For participants who responded affirmatively, each item is followed by additional open questions investigating: *a*) age of onset; *b*) date of most recent episode ("When was the last time you did this?"): based on the criterion A of the DSM-5 for NSSI, participants who declared at least a self-injurious episode (among the 15 item) over the last year were classified as NSSI; an NSSI overall score was obtained by summing the number of forms in the last year (range 1-15); *c*) severity and health consequences ("Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment?", Yes/No).

2.4 Statistical analysis

Data were processed with IBM SPSS Statistics for Windows 19.0. Preliminarily, based on Lie scale only questionnaires with scores ranged within 35> T> 65 (where T is the standard score, M=50 and SD=10) entered the analysis, because they were considered reliable. In the Italian population, these inferior/superior T limits correspond to 21-39 for females and 20-40 for male, respectively (Caprara et al., 1993). Thus, a database of N=302 resulted, and number of participants with NSSI in T_1 *vs.* T_2 were counted. Demographics (sex, educational level, occupation, marital status, smart/tele working) were compared as a function of phases (T_1 *vs.* T_2) by chi-square tests. Secondly, differences (F test by MANOVA or ANOVA) for PWB and DERS measures (both subscale and total scores) as a function of phase (T_1 *vs.* T_2) and NSSI (with *vs.* without) were estimated. Finally, measure associations by Pearson's r coefficients were evaluated.

3. Results

Characteristics of NSSI

None of the detected socio-personal characteristics (Table 1) revealed significant proportion differences (all ps > .05) between T_1 and T_2 phases. Among all participants (N=302), the prevalence of NSSI was 24.8%. However, participants declaring NSSI at T_1 were double (50/149 [31.4%]) than T_2 (25/143 [17.5%]): a Chi-square test applied to a 2 (Covid-19: T_1 *vs.* T_2) x 2 (NSSI: With *vs.* Without) contingency table revealed non-independence of the factors: $\chi^2(1, N=302)=7.87$, $p=.005$. The number of self-harm forms did not differ in T_1 *vs.* T_2 (M_1=2.26, SD_1=2.02, *vs.* M_2=1.92, SD_2=1.26; $F(1, 73)=0.59$, $p=.44$).

Table 2. Frequencies of NSSI forms grouped for phase (T1 vs. T2) and gender.

Forms of NSSI	T1 – Post lockdown			T2 – Perduring Covid-19		
	Total (*n*=50)	Males (*n*=10)	Females (*n*=40)	Total (*n*=25)	Males (*n*=3)	Females (*n*=22)
1. Cutting	6 (12.0%)	1 (10.0%)	5 (12.5%)	6 (24.0%)	1 (33.3%)	5 (22.7%)
2. Burning with cigarette	2 (4.0%)	2 (20.0%)	0 (0.0%)	2 (8.0%)	1 (33.3%)	1 (4.5%)
3. Burning with lighter or match	1 (2.0%)	0 (0.0%)	1 (2.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
4. Carving words or pictures into skin	10 (20.0%)	0 (0.0%)	10 (25.0%)	3 (12.0%)	0 (0.0%)	3 (13.6%)
5. Severe scratching	11 (22.0%)	2 (20.0%)	9 (22.5%)	4 (16.0%)	0 (0.0%)	4 (18.2%)
6. Biting	2 (4.0%)	0 (0.0%)	2 (5.0%)	2 (8.0%)	0 (0.0%)	2 (9.1%)
7. Rubbing sandpaper on skin	1 (2.0%)	0 (0.0%)	1 (2.5%)	1 (4.0%)	0 (0.0%)	1 (4.5%)
8. Dripping acid on skin	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
9. Using bleach or oven cleaner to scrub skin	1 (2.0%)	0 (0.0%)	1 (2.5%)	4 (16.0%)	2 (66.7%)	2 (9.1%)
10. Sticking pins, glass, needles, staples into skin	2 (4.0%)	0 (0.0%)	2 (5.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
11. Breaking bones	1 (2.0%)	0 (0.0%)	1 (2.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
12. Banging head	2 (4.0%)	1 (10.0%)	1 (2.5%)	1 (4.0%)	0 (0.0%)	1 (4.5%)
13. Punching self	6 (12.0%)	2 (20.0%)	4 (10.0%)	3 (12.0%)	0 (0.0%)	3 (13.6%)
14. Interference with wound healing	5 (10.0%)	1 (10.0%)	4 (10.0%)	5 (20.0%)	0 (0.0%)	5 (22.7%)
15. Other forms of self-harm	4 (8.0%)	2 (20.0%)	2 (5.0%)	7 (28.0%)	1 (33.3%)	6 (27.3%)

Table 2 reports the participants' *n*s and percentages differentiated by phases and gender. *Severe scratching*, *Carving words or pictures into skin*, and *Cutting* were the more frequent forms with a female prevalence. Only one behavior among the 15 self-harm behaviors is completely absent (*Dripping acid on skin*). However, globally, no gender differences emerged neither by number of forms [M_m=1.85, DS_m=1.57, *vs.* M_f=2.21, DS_f=1.85, $t(73)$=-0.66, p=.511], nor by proportions of participants with/without NSSI [Males=13/58, 22.4%, *vs.* Females=62/244, 25.4%; $\chi^2(1, N=302)=0.23$, p=.635]. The onset ages ranged from 5 to 25 y.o. (M=14.9, DS=4.77) without gender differences. Participants declared on average 2.31 self-harm forms in their own history and 2.15 in the last year (range 1-8 for both periods). Finally, only 8/75 (10.1%) participants declared that they had gone to a doctor for the consequences of self-injurious behaviors (6 once, 2 twice).

PWB and DERS

Tables 3 and 4 show the estimated differences (MANOVA) for PWB and DERS scores. Furthermore, no differences emerged in all measures between T_1 and T_2. NSSI group

highlighted significantly higher DERS scores and lower PWB rates (both subscales and Total scores). Unexpected no differences resulted for the Autonomy and Personal growth dimensions of the PWB.

Table 3. MANOVA 2 (Phase: T1 *vs.* T2) x 2 (NSSI: Yes *vs.* No) report with distribution statistics and univariate tests for PWB dimensions [Box test: $F(63, 29685.79)=1.51$, $p=.006$; Multivariate tests – Phase: Pillai's trace=0.02, $F(6, 293)=1.06$, $p=.389$, $\eta p^2=.021$; NSSI: Pillai's trace=0.07, $F(6, 293)=3.44$, $p=.003$, $\eta p^2=.066$; Phase*NSSI: Pillai's trace=0.01, $F(6, 293)=0.32$, $p=.925$, $\eta p^2=.007$].

PWB Dimension	Phase	NSSI (*n*)	Mean	*SD*	*Sources*	*F* (1, 298)	*MSe*	*p*	ηp^2
Self-Acceptance	T1	Yes (50)	33.88	8.66	Phase	0.31	69.39	.576	.001
		No (109)	37.63	7.67	NSSI	**15.60**		**< .001**	**.050**
	T2	Yes (25)	32.40	10.56	Phase*NSSI	0.51		.475	.002
		No (118)	37.81	8.26					
Autonomy	T1	Yes (50)	39.98	7.04	Phase	0.85	56.46	.358	.003
		No (109)	41.27	7.62	NSSI	2.90		.090	.010
	T2	Yes (25)	38.52	7.83	Phase*NSSI	0.23		.630	.001
		No (118)	39.80	7.54					
Environmental Mastery	T1	Yes (50)	38.80	8.18	Phase	0.11	62.02	.741	.000
		No (109)	41.19	7.11	NSSI	**7.85**		**.005**	**.026**
	T2	Yes (25)	38.48	10.52	Phase*NSSI	0.39		.535	.001
		No (118)	42.24	7.78					
Personal Growth	T1	Yes (50)	44.26	7.28	Phase	1.77	38.25	.184	.006
		No (109)	45.12	5.66	NSSI	3.56		.060	.012
	T2	Yes (25)	44.64	7.82	Phase*NSSI	0.79		.374	.003
		No (118)	47.03	5.76					
Purpose in Life	T1	Yes (50)	38.30	9.71	Phase	0.002	72.33	.966	.000
		No (109)	41.32	7.41	NSSI	**10.89**		**.001**	**.035**
	T2	Yes (25)	37.36	11.16	Phase*NSSI	0.56		.453	.002
		No (118)	42.16	8.28					
Positive Relations	T1	Yes (50)	31.38	8.78	Phase	0.02	60.65	.887	.000
		No (109)	34.28	7.15	NSSI	**12.52**		**< .001**	**.040**
	T2	Yes (25)	30.60	8.75	Phase*NSSI	0.74		.390	.002
		No (118)	35.37	7.70					
PWB Total	T1	Yes (50)	225.60	39.64	Phase	0.00	1256.53	1.000	.000
		No (109)	240.82	32.61	NSSI	**14.18**		**< .001**	**.045**
	T2	Yes (25)	222.00	43.75	Phase*NSSI	0.519		.472	.002
		No (118)	244.42	35.28					

Table 4. MANOVA 2 (Phase: T1 vs. T2) x 2 (NSSI: Yes *vs.* No) report with distribution statistics and univariate tests for DERS dimensions [Box test: $F(63, 29685.79)=0.90$, $p=.702$; Multivariate tests – Phase: λ di Wilks=0.99, $F(6, 293)=0.36$, $p=.902$, $\eta p^2=.007$; NSSI: λ di Wilks=0.94, $F(6, 293)=3.24$, $p=.004$, $\eta p^2=.062$; Phase*NSSI: λ di Wilks=0.98, $F(6, 293)=1.06$, $p=.386$, $\eta p^2=.021$].

DERS Dimension	Phase	NSSI (*n*)	Mean	*SD*	*Sources*	*F* (1, 298)	*MSe*	*p*	ηp^2
Awareness	T1	Yes (50)	5.76	2.52	Phase	0.25	6.03	.618	.001
		No (109)	5.57	2.58	NSSI	**5.76**		**.017**	**.019**
	T2	Yes (25)	6.56	3.03	Phase*NSSI	3.39		.067	.011
		No (118)	5.11	2.16					
Clarity	T1	Yes (50)	12.82	4.88	Phase	0.06	20.12	.801	.000
		No (109)	11.62	4.11	NSSI	**7.38**		**.007**	**.024**
	T2	Yes (25)	13.48	5.47	Phase*NSSI	0.65		.422	.002
		No (118)	11.28	4.42					
Non acceptance	T1	Yes (50)	17.92	6.64	Phase	0.07	44.52	.798	.000
		No (109)	14.60	6.45	NSSI	**6.68**		**.010**	**.022**
	T2	Yes (25)	16.76	6.85	Phase*NSSI	0.98		.322	.003
		No (118)	15.28	6.85					
Impulse	T1	Yes (50)	17.98	6.26	Phase	0.07	35.14	.795	.000
		No (109)	13.74	5.07	NSSI	**16.18**		**< .001**	**.051**
	T2	Yes (25)	17.28	6.78	Phase*NSSI	1.23		.269	.004
		No (118)	14.87	6.32					
Strategies	T1	Yes (50)	21.22	6.35	Phase	0.46	45.95	.497	.002
		No (109)	18.45	6.22	NSSI	**7.98**		**.005**	**.026**
	T2	Yes (25)	21.76	8.42	Phase*NSSI	0.01		.913	.000
		No (118)	19.19	7.07					
Goals	T1	Yes (50)	17.48	4.30	Phase	0.87	25.06	.353	.003
		No (109)	15.50	4.76	NSSI	**4.79**		**.029**	**.016**
	T2	Yes (25)	17.68	5.30	Phase*NSSI	0.41		.521	.001
		No (118)	16.60	5.43					
DERS Total	T1	Yes (50)	103.62	22.23	Phase	0.08	1256.53	.776	.000
		No (109)	89.53	22.10	NSSI	**13.26**		**< .001**	**.043**
	T2	Yes (25)	102.88	29.06	Phase*NSSI	0.25		.615	.001
		No (118)	92.21	26.17					

Correlations

Table 5 shows the set of estimated associations, differentiating participants with/without NSSI. Table 6 reports the set of estimated associations between NSSI parameters (i.e., onset age, number of self-harm forms (person's history), number of NSSI forms (last year), the Covid-19-related experience index (only for T_2), and PWB and DERS scores. Note that both the number of self-harm forms and the number of NSSI forms are negatively associated to PWB measures and positively associated to DERS measures.

Table 5. Pearson's *r* coefficients between personal characteristics and PWB and DERS scores.

Factor	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Gender	•	-.165*	.057	-.070	-.088	-.080	-.046	-.048	-.049	-.083	.018	.096	.108	.136*	.194**	.180**	.179**
2. Age (years)	-.149	•	.469**	-.144*	.021	.008	-.125	-.094	<.001	-.070	.251**	-.053	.022	-.068	-.050	-.076	-.033
3. Educational level	.072	.164	•	-.011	-.051	.096	-.045	.047	-.006	.009	.081	.026	-.004	-.029	.012	.074	.030
4. Self-Acceptance	.012	.023	.070	•	.427**	.748**	.568**	.759**	.510**	.878**	-.397**	-.431**	-.368**	-.355**	-.618**	-.330**	-.545**
5. Autonomy	-.123	.139	.176	.441**	•	.471**	.279**	.429**	.238**	.626**	-.098	-.292**	-.322**	-.261**	-.365**	-.367**	-.400**
6. Environmental Mastery	.071	.003	.090	.801**	.325**	•	.518**	.756**	.425**	.856**	-.315**	-.418**	-.373**	-.370**	-.636**	-.471**	-.583**
7. Personal Growth	.125	-.007	.170	.708**	.310**	.729**	•	.565**	.419**	.702**	-.406**	-.270**	-.166*	-.247**	-.401**	-.103	-.311**
8. Purpose in Life	.013	.011	.077	.855**	.403**	.844**	.742**	•	.471**	.870**	-.269**	-.439**	-.307**	-.333**	-.577**	-.324**	-.505**
9. Positive Relations	.035	.087	.231*	.341**	.141	.408**	.425**	.402**	•	.665**	-.230**	-.357**	-.233**	-.192**	-.379**	-.183**	-.343**
10. PWB Index	.030	.051	.167	.896**	.536**	.889**	.834**	.921**	.583**	•	-.366**	-.484**	-.390**	-.384**	-.651**	-.395**	-.590**
11. Awareness	.149	-.121	-.158	-.337**	-.230*	-.361**	-.343**	-.357**	-.351**	-.423**	•	.387**	.132*	.162*	.292**	.072	.309**
12. Clarity	.004	-.079	-.177	-.571**	-.168	-.566**	-.437**	-.553**	-.298**	-.565**	.445**	•	.435**	.457**	.556**	.317**	.661**
13. Non acceptance	.074	-.195	-.140	-.359**	-.418**	-.356**	-.229*	-.319**	-.121	-.381**	.193	.329**	•	.619**	.592**	.544**	.811**
14. Impulse	.126	-.009	-.258*	-.369**	-.226	-.338**	-.351**	-.360**	-.104	-.374**	.079	.422**	.566**	•	.655**	.587**	.824**
15. Strategies	.142	-.118	-.094	-.671**	-.404**	-.652**	-.608**	-.704**	-.249*	-.707**	.336**	.536**	.561**	.633**	•	.652**	.874**
16. Goals	.223	-.232*	-.086	-.409**	-.511**	-.398**	-.321**	-.374**	-.070	-.438**	.094	.300**	.689**	.611**	.657**	•	.781**
17. DERS Index	.152	-.143	-.187	-.591**	-.424**	-.587**	-.511**	-.593**	-.229*	-.628**	.346**	.647**	.785**	.822**	.869**	.800**	•

Note: Gender (male = 1, female = 2); below the diagonal NSSI participants' data (*n* = 75), above the diagonal no-NSSI participants' data (*n* = 227).
Correlation significant at *.05 or **.01 level (two-tailed).

Table 6. Pearson's *r* coefficients between NSSI parameters, Covid-19-related Experience Index and PWB and DERS scores.

FACTORS	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
Onset age		-.225	-.111	.175	.048	.006	-.012	.065	.179	.179	.068	.004	-.014	-.039	.055	.094	.118	.068
Number of self-harm forms (personal history)			.482**	.155	-.385**	-.125	-.468**	-.394**	-.484**	-.484**	-.508**	.323**	.413**	.196	.287*	.426**	.110	.379**
Number of NSSI (last year)				.338	-.442**	-.092	-.428**	-.465**	-.431**	-.431**	-.504**	.357**	.215	.169	.116	.370**	.140	.274*
Covid-19-related Experiences					-.349	-.202	-.194	-.015	.307	.307	-.190	.100	.016	.103	-.098	.328	.119	.099

Note: 1 = Onset age; 2 = Number of self-harms (history); 3 = Number of NSSI (last year); 4 = Covid-19-related Experience Index; PWB: 5 = Self-Acceptance, 6 = Autonomy, 7 = Environmental Mastery, 8 = Personal Growth, 9 = Purpose in Life, 10 = Positive Relations, 11 = PWB Index; DERS: 12 = Awareness, 13 = Clarity, 14 = Non acceptance, 15 = Impulse, 16 Strategies, 17 = Goals, 18 = DERS Index; *Onset age: n* = 69; *Covid-19-related Experiences: n* = 25; Others: *n* = 75.

Correlation significant at *.05 or **.01 level (two-tailed).

4. Discussion

The COVID-19 pandemic introduced psychological distress and many changes in people's life that lasted for months beyond the peak of the rapid disease outbreak (Mazza et al., 2020). This study aimed to explore to what extent the perceived well-being in the context of COVID-19 pandemic was associated with NSSI occurrence among Italian youth adults, with a comparison between the period immediately after the total lockdown (T_1) and the continuing health emergency (T_2). The results indicate that 31.4% of the respondents reported having engaged in NSSI in T_1, while the percentage is reduced to almost half (17.5%) in the months in which the health emergency persisted but there were fewer restrictions on daily life (T_2). It is difficult to make an accurate comparison between these data and the prevalence of NSSI amongst the young Italian adults before COVID-19, since the available studies are heterogeneous for measures and samples. However, the observed occurrence of NSSI in T_1 resulted markedly higher than the incidence before the pandemic (20%) reported by Sarno, Madeddu, & Gratz (2010). The lockdown was an exceptional condition that probably has exacerbated the psychological vulnerability of some individuals increasing the risk of NSSI behaviors. During the strict lockdown prolonged home confinement (8 weeks in Italy), lack of contacts from close people, worries for job and future, dramatic images from hospitals, and the number of deaths released by the media were all multiple sources of distress associated with increased negative emotions in general population (Mazza et al., 2020). As far as we know, currently there are not any longitudinal studies on the psychological adaptation of the general population in the months following the peak of the pandemic. In Italy, this period has coincided with a partial reduction of social restrictions (e.g., meeting a limited number of friends) and the reopening of some community activities (shops, universities, etc.). Excluding any causal relationship between these living conditions and the occurrence of self-harm, in T_2 the estimate prevalence of NSSI episodes (17.5%) returned similar to the pre COVID-19 period (Sarno et al., 2010).

The most frequent forms of declared NSSI were *severe scratching*, *cutting*, and *carving into skin*. *Carving* was declared exclusively by females, confirming only for this NSSI behavior the reported differences between the genders (Cipriano et al., 2017). The higher the number of self-injury methods (personal history), the more forms of declared NSSI (last year), confirming that previous self-harm behaviors are a risk factor for NSSI persistence. Participants stated that they used two or more methods of self-injure (average 2.2 forms, range 1–8), but rarely they had recourse to a health professional after a NSSI episode.

There were no differences in perceived well-being levels between T_1 and T_2 phases. This result is in line with López et al. (2020) who report that the life challenges related to the COVID-19

did not affect the psychological well-being in old adults (aged > 60 y.o.), with the only exception of the loss of loved person due to COVID-19. In the present study some COVID-19 related experiences as potential stressors were assessed (T_2 phase), but no associations emerged with the perceived well-being. Anyway, among respondents with NSSI the rate of COVID-19 related experiences resulted small (4% positivity, 40% friend/loved person positivity, 4% hospitalization of a loved one). It is plausible that in this sample (mainly university students) these experiences were less destabilizing than the death of a close person from COVID-19 experienced by older adults (López et al., 2020).

As hypothesized, young adults who engaged in NSSI (*vs.* without) reported lower levels of psychological well-being (PWB; Ryff, 1989). Particularly, participants reported lower Self-acceptance, and this result is coherent with studies finding negative associations between NSSI and other self-related constructs such as self-criticism, self-blame, and low self-esteem (Forrester et al., 2017; Zelkowitz & Cole, 2019). Secondly, participants experienced low satisfaction for interpersonal relationships. Adults with NSSI (*vs.* without NSSI) reported less daily contact with their intimates (friends and family), perceived lower levels of support, and were less likely to use support seeking to cope with distress (Turner et al., 2017). These findings underscore the importance of considering the interpersonal functions of NSSI (e.g., communicating distress, seeking support, feeling connected with others; Muehlenkamp et al., 2013), alongside the intrapersonal functions (tension reduction/affect regulation), but further investigation is needed. Furthermore, we do not know if among the participants the quality of interpersonal relationships changed following COVID-19 pandemic. Findings on the impact of life restrictions on family/peer relationships report both positive and negative changes. Recent studies among Italian young adults evidence more closeness to family/friends (Calandri et al., 2021; Cavallini et al., 2021), but also increased loneliness (Lisitsa et al., 2020) and worsening of romantic relationships during the total lockdown (Cuccì et al., 2021). Globally, better relationships during COVID-19 resulted associated with greater well-being (Cantarero et al., 2020). From a preventive perspective it is interesting that positive relationships mitigate suffering and alienation that an individual feels, and may lead to a reduction in future NSSI episodes (Turner et al., 2017).

Third, participants with NSSI engagement (*vs.* without NSSI) reported lower Environmental mastery and Purpose of life. Non-suicidal self-harm can be considered as a pattern of compensatory behaviors to satisfy the need for competence and achieve a sense of personal control (Emery et al., 2016). The Purpose of life – a way of conceiving one's life as having goals, direction, and meaning – is a core dimension in adults' well-being (López et al., 2020; Ryff & Keyes, 1995), but negative expectations about the future, and helplessness are associated with NSSI (Rodríguez et al., 2017). Conversely, having a sense of purpose in life, significance of one's

existence, and life satisfaction is predictive of NSSI cessation from adolescence to adulthood (Halpin & Duffy, 2020; Whitlock et al., 2015).

Contrary to expectations, no differences emerged in Personal growth (having a sense of development of one's potential, facing new challenges) and Autonomy (internal locus of evaluations, independent decisions, etc.), two dimensions relevant for young people's life transitions (Melendro et al., 2020). It is possible that the uncertainties related to the COVID-19 pandemic – obstacles in pursuing personal goals, uncertainty regarding education and employment, etc. – have influenced these dimensions of well-being, feeding a sense of stagnation and frustration that involved all participants (with/without NSSI behaviors).

As hypothesized, participants who engaged in NSSI reported higher scores in all subscales of the Difficulties in Emotion Regulation Scale (DERS), in line with literature reporting more dysregulation (according to DERS) by people with NSSI (Midkiff et al., 2018), and strong associations (with medium-to-large size effects; Wolff et al., 2019) between limited access to emotion regulation strategies and NSSI. When faced with stressful life circumstances individuals with emotion dysregulation may be unable to tolerate an overload of negative states adopting NSSI to alleviate the tension and provide immediate relief. In addition, according to the interpersonal functions of NSSI, people can communicate their psychological suffering and obtain comfort or social support (Nock & Prinstein, 2004). Emotion dysregulation can be conceptualized as an individual's vulnerability characteristic that, together with other intrapersonal (i.e., low physical tolerance to stress, negative cognitive styles) and interpersonal risk factors (such as poor problem-solving or communication skills) mediates the link between distress, negative emotional experiences and NSSI (Liu et al., 2016). In other words, distress predicts emotion dysregulation that, in turn, increases the risk of engaging in NSSI. It is plausible that during COVID-19 some factors perceived as incontrollable – the fear of contagion, worries for family/friends, social restrictions, or financial problems – could have accounted for a multiple source of stress that triggered negative emotions (particularly fear, boredom, sadness, and frustration; Vindegaard & Benros, 2020) increasing the risk of NSSI in people with limited access to emotion regulation strategies (Robillard et al., 2021). In addition, people have experienced the difficulty of meeting friends and carrying out physical activity (both outdoors and in gyms), that is, activities that are an effective way of relieving stress (Maugeri et al., 2020; Villani et al., 2021).

Significant negative associations emerged between psychological well-being and emotion dysregulation. A considerable positive association also emerged between previous self-harm (individual's history) and emotion dysregulation, in line with literature linking emotional difficulties with the persistence of self-harm from adolescence to adulthood (e.g., Gratz &

Roemer 2008). Moreover, a significant but small correlation resulted between last-year NSSI and emotion dysregulation. It is possible that this low statistical association may depend on the parameter adopted in this study as NSSI measure (number of forms), whereas other studies used more specific parameters, such as the NSSI frequency/intensity or a daily diary of episodes (Kiekens et al., 2020). In addition, the final sample of participants with NSSI is small, therefore further researches on larger samples may deepen the link between low tolerance of distress, emotion dysregulation, and NSSI engagement. This focus on emotional regulation strategies is important to consider for intervention, since improving emotion-regulation strategies could prevent NSSI occurrence, and perceived emotion regulatory capability predicts NSSI cessation in emerging adults (Halpin & Duffy, 2020; Kiekens et al., 2017).

5. Limitations

This study has some limitations that should be considered. First, in the context of restrictions for COVID-19 pandemic, data detection was web-based through the sharing of the questionnaires on popular social networks and instant messaging chats. It is not possible to exclude a self-selection of participants due the sensitivity of the study topic and/or a bias of sampling among more active users of social media. Therefore, this convenience sampling limits the representativeness to the general population. In addition, the respondents were predominantly women, but this limitation is common to many studies on NSSI (*see* for example, Martorana, 2015; Wester et al., 2018). Second, the NSSI occurrence was self-reported. Although the DSHI is a valid and reliable questionnaire, the assessment may have been biased by participants' memory and/or their subjective estimation of NSSI. However, for the potential bias due to the social desiderabily, we excluded some respondents after checking their Lie scores. This methodological choice reduced the final sample size, so limitating the generalization of our findings. Finally, the study was targeted at a community-based sample, but the presence of clinical symptoms was not assessed. In some participants the pre-existing vulnerability may have increased the pandemic related stress, increasing the risk of NSSI. In particular, internalizing symptoms, borderline personality disorder, substance abuse, and eating disorders are often reported in self-injured youths and adults (Cipriano et al., 2017; D'Agostino et al., 2020; Depestele et al., 2017). In a preventive perspective, it is important to identify those psychopathological conditions (such as severe depression) that are precipitating factors for NSSI and the trajectories towards suicide attempts (Kranzler et al., 2016).

6. Conclusions and future directions

Despite these limitations, the strength of this study is to have explored the prolonged impact of COVID-19 pandemic on psychological well-being and the risk of NSSI occurrence in non-clinical young adults. As far as we know, there are not many studies exploring the psychological

consequences of COVID-19 pandemic not only during the total lockdown – the "stay-at-home" period (Villani et al., 2021) – but also in the medium-term period. In addition, this study assumed a positive (eudaimonic) perspective of psychological well-being, thus differentiating from the more numerous studies that explored the physical and psychological problems (insomnia, internet overuse, anxiety, mood fluctuations, loneliness, etc.) due to COVID-19 (Mazza et al., 2020; Tuason et al., 2021). The eudaimonic perspective places the realization of one's strengths, sense of agency, meaning in life, satisfaction with relationships as core components of adaptive psychological functioning and resilience to adversity (Ryff & Keyes, 1995). COVID-19 pandemic could adversely affect people's well-being, increasing the risk of engaging NSSI as maladaptive coping method to manage distress and negative emotional experiences. Conversely, in this study higher levels of self-acceptance, environmental control, purpose of life and satisfaction for interpersonal relationships differentiate young adults without NSSI behaviors.

In conclusion, in a new condition of uncertainty and distress such as COVID-19 pandemic, better psychological well-being may have acted as a protective factor to NSSI engagement (Halpin & Duffy, 2020; Whitlock et al., 2015). Therefore, paying attention to the dimensions of psychological well-being can be important for prevention in general population. NSSI is a hidden phenomenon and it involves adolescents and young people who rarely ask for professional help to deal with psychological suffering. Incorporating the promotion of youths' psychological well-being could be a promising target of intervention, particularly in community and educational contexts (i.e., counseling or school-based program). The efficacy of psychological interventions aimed to increase emotion regulation skills as adaptive behaviors to manage distress without self-injury is well documented (Aggarwal et al., 2021; Kaess et al., 2019). Recently, online support groups were also proposed. The group can offer "a space where young people could safely and freely meet to talk with their peers about similar experiences they might share […] where conversations are moderated and supervised by a professional" (Gargiulo et al., 2021, p. 4). The narration of the experiences of self-harm gives possibility to contain the anguish, to recognize and label emotions with the aim of regulating them.

Future evidence-based programs are needed to evaluate how enhancing psychological well-being can help young people to manage distress life circumstances reducing the risk of developing harmful behaviors.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any potential conflict of interest.

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