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How and why? Effects of COVID -19 and Lockdown on University Students' Language: An Italian Study

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Abstract

In 2020, Italy became the first country in Europe to impose a nationwide lockdown with restrictive measures that particularly affected northern regions. As part of a larger Italian study, 20 students from the University of Turin were asked to describe their experiences of the lockdown and pandemic emergency using a photovoice task. We analyzed the texts using LIWC and investigated the differences in the use of linguistic categories between March 2020 and March 2021. Differences between pandemic phases were found primarily between the first months of the lockdown and one year later. Over time, participants expressed themselves cognitively rather than emotionally. In contrast to other studies, at the emotional level, words related to sadness decreased, while those related to anxiety increased. Our interpretation of the results suggests the peculiarity of the course of the pandemic in Italy, as well as the continued expansion of measures to contain the virus.

Keywords: COVID-19, lockdown, LIWC, psycholinguistics, psychological states

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Introduction

In February 2020, COVID-19 begins to spread among the Italian population. 48 days after the official notification of the first cases by the Chinese government, Italy witnesses a rapid spread of the virus: it will be the first Western country to be confronted with the pandemic and consequently to take containment measures.

On March 9, 2020, Italy officially enters phase one of the pandemic's containment, later referred to as the lockdown phase. During this phase, the Italian government imposes highly restrictive measures on all citizens to prevent the spread of the virus. On March 22, the lockdown is further tightened in Italy: it is forbidden to move outside one's community unless it can be proven that this is necessary for health or professional reasons. Despite the measures being implemented equally across the national territory, there are significant territorial differences in the extent of the spread: the virus is spreading faster in the northern regions, which will continue to report significantly higher epidemic levels, than in the southern regions. Within a few days, the Italian population experiences a sudden and radical change in their daily lives. Nevertheless, this phase reflects a high level of compliance and adherence to the rules established by the government (Travaglino & Moon, 2021). Containment measures will last in Italy until May 4, 2020, when the descending pandemic curve supports the beginning of a second phase in which containment measures will be partially relaxed.

During this time, many consider the virus to be no longer as dangerous, reinforcing the sense that the end of the crisis and a gradual return to normalcy are being approached (Sarli & Artioli, 2020). On June 15, containment measures are further relaxed with the start of phase three, which involves coexistence with the virus: Italy sees the reopening of gambling halls, betting shops, theaters, cinemas, cultural and social centers. At the end of the summer of 2020, a trend reversal is observed and the epidemic curve rises for a second time. A new medical emergency prompts the government to once again establish a set of rules that prevent people from gathering in the same place: This is the beginning of what will be called a second wave of infectious cases. In Italy, this wave will be treated with different methods than the first. Restriction measures are selectively tightened depending on the epidemic indices measured in each region. It is interesting to note that the reduction in time spent away from home, with no change in restriction rules, is not comparable to the amount measured during the first wave of lockdown (Manica et al., 2021): compliance seems to be lower and a growing distrust of the government is observed (Chirico et al., 2021).

Various consequences of the pandemic are described in the literature, informing us that young age and female gender are risk factors for mental health (Birditt, Turkelson, Fingerman et al., 2021; Gambin et al., 2021; Gualano et al., 2020; Lisitsa et al., 2020; Nelson & Bergeman, 2020; Shevlin et al., 2020), sexual and relationship changes (Döring, 2020; Gambin et al., 2021; Grubbs et al, 2020; Lehmiller et al, 2020; W. Li et al, 2020; Sanchez et al, 2020; Yuksel & Ozgor, 2020; Williamson, 2020), and about how an increase in depressive disorders (Tshimula et al., 2021; Zhang et al, 2021) and negative feelings in general (Ashokkumar & Pennebaker, 2021; Basile et al, 2021; Chew et al, 2020; Mamun & Griffiths, 2020; Medford et al, 2020; Serafini et al, 2020; Tan et al, 2021; Zhao et al, 2020).

Several studies reported that college students with higher than average levels of distress at baseline are at risk for exposure to the impacts and consequences of the pandemic and containment efforts. Specifically, higher levels of depression and anxiety have been reported (Essadek & Rabeyron, 2020; Fu et al., 2021; Wang et al., 2020), as well as PTSD and stress (Kibbey et al., 2021; X. Li et al., 2021). Due to the restrictions and isolation, social networks such as Facebook, Reddit, Weibo, and Twitter have taken a central role in people's lives, allowing them to maintain social contacts that were drastically reduced by the pandemic. This led to a series of papers that examined whether and how COVID -19 affected people by analyzing their posts and threads (Su et al., 2020; Mozes et al., 2021; Yu et al., 2021). Words and narratives are the bridge that connects reality to the mind and enables the construction of meanings (Solano, 2007). The analysis of narratives enables us to understand how people ascribe meaning to themselves and their world in more or less adaptive ways (Gandino, 2019). Narrative processes allow individuals to organize their experiences to create a coherent and continuous sense of identity (Veglia & Di Fini, 2017; Di Fini & Veglia 2019). The experience of traumatic or emotionally upsetting events influences the processes of meaning attribution and reflects the language one uses to narrate them to self and others (Neimeyer, 2006). Analyzing the language used in narratives and self-narratives appears to be a powerful tool for assessing an individual's physical and psychological state especially during and across critical events (Tausczik & Pennebaker, 2010; Fernàndez-Lansac & Crespo, 2015; Gandino et al., 2020). Putting highly emotional experiences into words can be a very complicated task because they are represented by memory in the form of images whose sounds, smells, and sensations are vague and confusing (Pennebaker & Chung, 2007). Analyzing pandemic-related narratives can reveal how individuals process information, perceive risks, and adapt their behaviors in response to evolving circumstances (Cohn et al., 2017). For example, the analysis of terms related to emotions has revealed to be an effective tool for assessing physical and mental conditions, providing useful information on the risk for PTSD. Most studies showed that sensory aspects prevail in traumatic narratives, and sensory details are strongly related to the presence of post-traumatic symptoms. Instead, it seems that the use of words associated with cognitive flexibility reflects the ability to adopt multiple perspectives when individuals attribute value to their experiences. (Fernandez-Lansac & Crespo, 2015).

Moreover, language use reflects social connections, support networks, and community responses. Analyzing these narratives can elucidate how individuals perceive social norms, adhere to public health guidelines, and engage in collective action during crises (Rimé et al., 2020).

The present study aims to investigate, in a longitudinal design, the psychological impact of the pandemic and lockdown on the daily life of a sample of Italian university students between March 2020 and March 2021. In particular, we aimed to explore linguistic markers representing psychological processes related to the experience of the pandemic and the lockdown. Moreover, given the prevalence in psycholinguistic research of studies referring to large aggregate data collected on

the Internet, we were interested in the psychological impact of such harsh and extended restricted living conditions on Italian students and its evolution over time.

Specifically, participants were asked to perform a daily photovoice task in which several descriptions of photographs selected to represent their own experiences were analyzed at the psycholinguistic level. In addition, these descriptions were analyzed to determine if and how they changed linguistically.

Method

The present study is part of a broader research project involving the following Italian universities: Turin, Padua, Florence, Chieti, Naples and Palermo (Gaboardi et al., 2022). In the framework of the latter project, data were collected through photo diaries in two steps during the period March-April-May 2020: T1, i.e., during the third week of the lockdown (March 25-31) and T2, during the penultimate week before the lifting of the lockdown measures (April 22-18), as announced by the national authorities. Participants completed consent forms and participated in the study voluntarily and without financial compensation. The voluntary nature of participation and the fact that participation would not affect their student status in any way were emphasised. The ethics committee of the University of Padua approved the study [protocol code 3537 of April 7, 2020]. The University of Turin collected additional data in a third step: T3, one year after the lockdown period, in the first week of March 2021.

The activity required each student to take a photo every day for one week in T1, one week in T2 and one week in T3 that depicted his or her mood during daily life at home. The task was to take a daily photo accompanied by a short description (text). Along with the photo, the participants were to give it a title and a short description (maximum 400 words), answering the following questions: a) Describe the content of the photo; b) Why did you take this photo?; c) What did you want this photo to represent?; d) How does it relate to your experience during this time of health emergency? The instructions did not specify the use of any particular device for taking the photos.

All material was sent in a Word file to the unit contact professor. At the end of each week, the lead professor of the unit provided general feedback to the participants on the content that emerged from the photographs. All participants contributed equally to the study. There were frequent contact between professors and participants in order to guarantee continuity in participation in the study.

In this article, the results related to the types of photos and their contents will not be presented. It presents the psycholinguistic results from the data collected by the University of Turin during the three steps. For this subset of participants 350 photos with texts were collected.

Data Analytic Strategy

Linguistic Inquiry and Word Count (LIWC; Pennebaker et al., 2015) is computer-based text analysis software. The software analyzes the text and determines the proportion of words that fall into each of the LIWC linguistic categories of words ("function words" and "content words"). These categories consist of 17 standard linguistic dimensions (e.g., word count, pronouns, articles, etc.), 25 dictionaries of words that capture psychological constructs (e.g., affection, cognitive processes, etc.), 10 dictionaries related to "relativity" (time, space, motion), and 19 dictionaries related to more general topics (e.g., work, home, leisure activities) (Pennebaker, Francis, Booth, 2001). Empirical results obtained with the LIWC show that it is able to detect meanings across a variety of trial arrangements and uncover attentional focus, emotions, social relations, thinking styles, and differences between individuals (Tausczik & Pennebaker, 2010). Validation studies have shown that, particularly in the negative and positive emotion categories, LIWC category ratings correlated with raters' emotional ratings for the same text excerpt (Ashokkumar & Pennebacker, 2021).

Once the texts-and associated photographs-were collected, their linguistic content was refined for analysis using the Italian version of the LIWC (Alparone et al., 2002). Starting from 7 files created by each participant at each time point (T1, T2, T3), the photographs were removed and only the titles and descriptions were kept, which were later merged into a single text for each participant at each time point.

The present study focuses on the following lexical categories: Word count, first person singular and plural pronouns, words related to insight, words related to positive emotions, words related to anger, sadness, fear, cognitive processes, perceptual processes, space, time, movement, work, social processes, achievement, religion, and death. Statistical analyzes were performed using SPSS version 27.0. Because some of the LIWC categories we considered were not normally distributed at all time points, preliminary analyzes were performed using the Friedman test. Planned pairwise comparisons with Wilcoxon signed-rank tests were performed to test whether there were within-group differences in the use of some lexical categories of interest (pronouns, negative emotions, positive emotions, cognitive mechanisms, time) between measurements at two specific time points (T1 vs T2, T2 vs T3, and T1 vs T3).

The data that support the findings of this study (textual corpus) are available from the corresponding author upon request.

Sample

The present study shows the results of a sub-sample (N = 20) of the total sample (N = 107), referring to students of the University of Turin, in the North of Italy. All participants attended the community psychology program. Of the 20 students, 10 performed the photovoice task during all three phases (the remaining 10 participants were no longer available to participate in the third phase of the project). 5 students are male and 15 are female. Their average age is 22.9 years (SD 1.91; range 21-27 years). Regarding housing status at the beginning of the lockdown, 15% lived alone, 10% with their partner, il 60% with their family, and 15% with friends/ roommates.

Results

Analyzing frequencies of single words via LIWC-22, we obtained Word Cloud patterns and tabs depicting words most frequently used by sample students. We initially filtered out the texts with an ad-hoc list of stop words (e.g., articles, prepositions punctuation, auxiliary verbs, numbers and small linguistic particles). We chose to keep words that were part of the question such as "how, why/because, when, who", or personal pronouns, or temporal references, because they linguistically reflect the individual's attempt to make sense of what is happening, to contextualize it in time, space, and social relationships. Table 1 shows the 20 most frequently used words in each sentence and the percentage of documents containing each word. It's noteworthy that the most frequently used words were similar across the three times, "how/like/as" (merged in a single word in Italian: "come"), "why/because" (just "perché" in Italian), "my" and "today" being at the top few spots. Thanks to the "Contextualizer" function of LIWC-22 it was possible to infer the context in which each term was used in the texts, promoting a qualitative data interpretation. Words such as "why/because" and "today" mainly appear to answer the questions posed by the task, that is motivating the choice of a particular photo and performing the task day by day. The word that expresses "how/like/as" ("come" in Italian) is mainly used to wonder on what was happening (e.g., "how we got there?"), to express analogies in order to describe the person's own internal experience (e.g., "a period as if there were always clouds") and to introduce comparisons with other time periods or other people. The word "my" is related to the description of various environmental details, to people and to significant places portrayed in the photos (e.g., "my room", "my family", "my body").

Friedman test indicated that there was a statistically significant difference in the mean ranks of many LIWC categories for the three different assessments examined (Table 2). The table also shows pairwise comparisons that we performed with Wilcoxon signed-rank test.

In general, there was a statistically significant difference between T2 and T3 and between T1 and T3 in many word categories.On average, students used a higher number of words in their week at T3 (M = 1356.1, SD = 712.61), followed by T1 (M = 1289.3, SD = 625.53), and with T2 (M = 1118.2, SD = 639.96) corresponding to the least amount. The mean was statistically significantly different between T1 and T2, $\chi 2$= 9.8, p < .05.

As regards the use of pronouns, the linguistic category "I" slightly decreased between T1 (M = 3.67, SD = 1.53), T2 (M = 3.6, SD = 1.49) and increased at T3 (M = 6.52, SD = 1.43) ($\chi 2$ = 15, p < .001). The category "We" increased significantly over the three times (T1, M = .42, SD = .29; T2, M = .43, SD = .33; T3, M = 2.74, SD = .9) ($\chi 2$= 15.2, p < .001).

Regarding the affect category, it increased between T1 (M = 3.88, SD = 1.14) and T2 (M = 4.38, SD = 1.65) and decreased at T3 (M = .30, SD = .21) ($\chi 2$= 15.8, p < .001). The differences between the three times were statistically significant for both positive ($\chi 2$= 15, p < .001) and negative emotions ($\chi 2$ = 15.2, p < .001). During the first and second phase the average of words related to sadness seem to be more numerous than other negative emotions. During the third phase, instead, the prevailing category among negative emotions is related to anxiety. While words related to Sadness decreased through time (T1, M = .71; T2, M = .77; T3, M = .23; $\chi 2$= 15.2, p < .001), those related to Anxiety increased (T1, M = .27; T2, M = .36; T3, M = 1.53; $\chi 2$ = 15.8, p < .001).

Cognitive mechanisms category increased between T1 (M = 5.52, SD = 1.31) and T2 (M = 6.29, SD = 1.77) and decreased at T3 (M = .75, SD = .48) ($\chi 2$ = 15.8, p < .001). Levels of the Causation category significantly increased over time ($\chi 2$ = 15.8, p < .001), instead levels of Insight category decreased ($\chi 2$ = 12.8, p < .002).

Regarding the Time category, verbs in the present tense decreased between T1-T2 and T3 (T1, M = 8.34, SD = 1.35; T2, M = 8.76, SD = 1.89; T3, M = 5.23, SD = 1.65; χ^2 = 16.8, p < .001), while the use of future tense increased over the time (T1, M = .14, SD = .12; T2, M = .19, SD = .17; T3, M = 8.35, SD = 1.75; $\chi 2$ = 15.4, p < .001).

Tab. 1. First twenty words most frequently used in the three time points.

3rd week of lockdown (N=20)			7th week of lockdown (N=20)			1 year after the lockdown (N=10)		
Word	**Fr.**	**% docs with word**	**Word**	**Fr.**	**% docs with word**	**Word**	**Fr.**	**% docs with word**
my	169	100	**How/as**	134	95	**How/as**	83	90
How/as	164	95	**my**	127	95	**because**	56	90
because	148	95	**today**	121	95	**my**	56	100
me	116	95	**because**	120	90	**today**	55	90
today	115	95	**time**	99	95	**period**	51	90
photo	113	85	**if**	96	90	**photo**	48	80
also	100	100	**photo**	86	85	**if**	48	90
home	99	95	**also**	86	95	**time**	47	100
period	98	95	**home**	84	95	**to do**	47	100
time	90	90	**me**	82	95	**me**	42	100
to do	88	90	**period**	72	75	**always**	42	80
to be	75	95	**always**	65	85	**also**	42	90
when	67	75	**to do**	63	80	**before**	35	90
always	65	85	**to be**	59	80	**everything**	34	100
if	61	80	**when**	57	70	**home**	32	90
everything	56	70	**only**	55	80	**day**	31	70
moment	55	90	**everything**	54	75	**year**	31	70
quarantine	54	80	**things**	49	70	**way**	30	70
things	50	65	**day**	49	70	**to be**	30	80

Tab. 2. Word categories with significant differences at 3rd week of lockdown (T1), 7th week of lockdown (T2), and 1 year after the lockdown (T3), and comparison between the three time points in terms of changes in LIWC categories.

	3rd week of lockdown (N=20)		7th week of lockdown (N=20)		1 year after the lockdown (N=10)		Friedman test		T1 vs T2	r	T2 vs T3	r	T1 vs T3	r
LIWC categories	M	SD	M	SD	M	SD	$\chi 2$	*p*	*p*		*p*		*p*	
Word Count	1289.30	625.53	1118,20	639.93	1356.10	712,61	9.8	<.05	.001	0.7	.09		.87	
I	3.67	1.53	3,60	1.49	6.52	1,43	15	<.001	.76		.005	0.9	.005	0.9
We	0.42	0.29	0,43	0.33	2.74	0,90	15.2	<.001	.98		.005	0.9	.005	0.9
Affect	3.88	1.14	4,38	1.65	0.30	0,21	15.8	<.001	.04	0.5	.005	0.9	.005	0.9
Positive feelings	2.29	0.58	2,57	1.08	4.11	1,24	13.4	.001	.60		.005	0.9	.005	0.9
Positive Emotions	0.63	0.29	0,72	0.50	2.48	0,56	15	<.001	.16		.009	0.8	.005	0.9
Optimism	0.67	0.33	0,70	0.53	0.67	0,25	1.4	>.05	.05	0.4	.005	0.9	.005	0.9
Negative emotions	1.50	0.79	1,70	0.86	0.66	0,26	15.2	<.001	.18		.005	0.9	.005	0.9
Anxiety	0.27	0.30	0,36	0.36	1.53	0,84	15.8	<.001	.18		.005	0.9	.005	0.9
Anger	0.22	0.23	0,28	0.22	0.24	0,20	0.1	>.05	.03	0.5	.005	0.9	.005	0.9
Sadness	0.71	0.43	0,77	0.41	0.23	0,32	15.2	<.001	.05	0.4	.005	0.9	.005	0.9
Cognitive Mechanisms	5.52	1.31	6,29	1.77	0.75	0,48	15.8	<.001	.02	0.5	.005	0.9	.01	0.8
Causation	0.92	0.41	1,06	0.40	5.91	1,39	15.8	<.001	.35		.005	0.9	.005	0.9
Insight	1.96	0.63	2,42	0.81	0.91	0,46	12.8	<.002	.07		.005	0.6	.005	0.9
Discrepancy	1.66	0.63	1,91	1.03	2.00	0,76	1.9	>.05	.35		.007	0.8	.005	0.9
Inhibition	0.21	0.19	0,30	0.28	1.84	0,70	15	<.001	.97		.01	0.8	.005	0.9
Tentative	2.29	0.79	2,59	1.07	0.37	0,14	15	<.001	.78		.09		.005	0.9
Certainty	1.08	0.44	1,27	0.60	2.73	1,21	12.6	<.05	.02	0.5	.005	0.9	.005	0.9
See	0.48	0.32	0,46	0.27	1.03	0,40	11.4	<.05	.44		.05	0.6	.005	0.9
Hear	0.23	0.15	0,25	0.22	0.44	0,18	11.4	<.05	.29		.005	0.9	.005	0.9
Communication	0.85	0.35	0,60	0.36	2.63	0,89	15.2	<.001	.03	0.5	.005	0.9	.005	0.9
Friends	0.19	0.18	0,24	0.27	0.67	0,48	11.7	<.05	.32		.005	0.9	.005	0.9
Family	0.30	0.20	0,34	0.40	0.20	0,18	4.7	>.05	.39		.005	0.9	.005	0.9
Time	4.95	1.03	5,24	1.39	0.51	0,40	15.2	<.001	1.0		.007	0.9	.005	0.9
Past	1.33	0.57	1,60	0.63	5.23	1,65	16.8	<.001	.84		.005	0.9	.005	0.9
Present	8.34	1.35	8,76	1.89	1.49	0,81	15.8	<.001	.50		.02	0.7	.008	0.8
Future	0.14	0.12	0,19	0.17	8.35	1,75	15.4	<.001	.12		.005	0.9	.005	0.9
Space	1.17	0.48	1,14	0.41	0.21	0,21	14.6	<.001	.53		.009	0.8	.02	0.7
Up	0.26	0.23	0,27	0.24	1.37	0,41	15.4	<.001	.65		.005	0.9	.005	0.9
Down	0.05	0.06	0,06	0.08	0.26	0,24	11.1	<.05	.88		.17		.009	0.8
Inclusion	2.83	0.68	2,56	1.00	0.04	0,05	15.2	<.001	.38		.009	0.8	.005	0.9
Exclusion	4.48	1.01	4,49	1.01	2.55	0,87	9.8	<.05	.001	0.7	.09		.87	
Motion	1.18	0.35	1,27	0.47	4.44	0,79	15.8	<.001	.76		.005	0.9	.005	0.9
Home	1.20	0.61	0,96	0.50	0.80	0,35	5	>.05	.98		.005	0.9	.005	0.9
Occupation	1.08	0.52	1,10	0.55	1.47	0,44	8.6	<.05	.04	0.5	.005	0.9	.005	0.9
Achievement	0.67	0.32	0,82	0.56	0.22	0,29	12.6	<.05	.60		.005	0.9	.005	0.9
Death	0.05	0.14	0,04	0.06	0.12	0,13	2.8	>.05	.16		.009	0.8	.005	0.9
Body	0.46	046	0,60	0.47	0.76	0,40	6	.05	.05	0.4	.005	0.9	.005	0.9
Health	0.03	0,07	0,06	0.12	0.18	0,34	11.2	<.05	.18		.005	0.9	.005	0.9

Discussion

The present study was aimed at analyzing, on the psycholinguistic level, descriptions of own everyday lives produced by 20 Italian university students during the first lockdown phase (third and second-last weeks) and a year after it. The texts were produced in the context of a Photovoice task. The latter method represents, through the act of documenting an act of everyday internal experience, a way of expressing a complex system comprised of themes, meanings and critical issues in a context of reflection and awareness (Santinello & Vieno, 2013). In the present study, such method allowed to grasp the participants' point of view through a form of narration expressed not only by images, but words as well. A psycholinguistic analysis of descriptions paired with the images represented the focus of this part of the study.

Regarding single word frequencies, the three times present a uniform picture regarding most used terms. In fact, words such as "how/like/as", "why/because", "my" and "today" cover the first few spots in each phase. The nature of the request, that is to justify the choice of each photo on each day of the week, certainly influenced the use of the word "why/because" ("perché" in Italian). A similar observation can be drawn on consistent use of the word "today", which appears to be in line with the reflective features of a task which was asking to represent the participant's everyday life with a photo paired with a description, performing it every day for a week. Concerning high use of "how/like/as" and particular contexts in which this was detected, the participants seem to show, with that word ("come"), the descriptive effort encountered in trying to translate into words both what is portrayed in the photos as well as what is emerging

from their internal experience. Such task is even more complex in the context of the pandemic, which is an unexpected and unknown event onerous to be expressed in words.

Many of the here considered psycholinguistic categories demonstrated statistically significant differences across the three studied periods. Conforming with studies on psychological consequences of COVID-19 and lockdown, psychological effects of the pandemic and of the containment measures employed appear to be expressed through specific linguistic markers (Ashokkumar & Pennebaker, 2021; Basile et al., 2021; Tshimula et al., 2021; Zhang et al., 2021). Since categories of words related to emotion appear to vary across pandemic phases, we can hypothesize these would reflect variations in emotional experiences. In fact, Vine, Boyd and Pennebaker (2020) inform us on how the personal use of emotion vocabularies parallels with the subject's internal experience; the use of a specific linguistic category serves the role of a predictor (and an amplifier) of pre-existing emotions.

Comparing the three times, psycholinguistic analysis via the LIWC software didn't detect as many significant differences between T1 and T2 as when those times were compared with T3. This could be ought to inhomogeneity in elapsed time between T1 and T2, which was far less compared with elapsed time between T2 and T3. The fact that a whole year elapsed since lockdown could have determined a broader transformation of internal experience and of its consequent expression in the form of a narrative description.

In the pronouns, a clear increase in the linguistic categories "I" and "we" can be observed between T1-T2 on the one hand and T3 on the other. This phenomenon could be due to increased autobiographical reflection with time, which, considering a partial return of normality and possibilities to visit open air places, could have encouraged a novel sense of agency and initiative (testified by first-person singular which performs an action). Nevertheless, many studies showed the existence of a positive correlation between personal pronouns use and depressive disorders as well as anxiety (Bernard et al., 2016; Brockmeyer et al., 2015; Bucci & Freedman, 1981; Edwards & Holtzman, 2017; Tackman et al., 2019). The increase in using first-person plural, instead, could narratively reflect the progressive reunification with others permitted by new loosened measures, as well as a rediscovered sense of belonging.

Concerning psychological processes in general, both linguistic categories included in the Affection macrocategory and those included in the Cognitive Mechanisms macrocategory significantly decrease at T3; one year after lockdown, university students appear to focus the texts paired with photos on aspects more descriptive of context, action and involved characters, rather than on self-reflective and introspective dimensions. This interpretation is supported by the instead increasing tendency in using words related to Movement, Work and Body. During all three times the participants express themselves in more cognitive than emotional terms. It's interesting to note that one of the most frequently used words, across all three steps, is "why/because" (testified by high levels in the LIWC category called Causation, which increase significantly): this could reflect a constant attempt to attribute a meaning or direction to the occurrences associated with the pandemic, considering both the menace brought by an unknown virus as well as social restrictions imposed with lockdown measures, events never experienced before. Furthermore, literature informs us on how a larger use of words pertaining to the Cognitive Mechanisms category can express a higher level of cognitive processing and thinking structure (Ashokkumar & Pennebaker, 2021; Su et al., 2020). However, that could as well indicate an extreme rationalization attempt which could render able to set a distance from an emotion that would be highly activating and destabilizing, such as those related to potentially traumatic events. Increasing levels of the Causation category are in fact related to a decreased use of words linked to Insight. Continuing the analysis of the Cognitive Mechanisms, use of words linked to Possibility (which expresses doubt, confusion, indefiniteness) significantly decreases, in contrast with words related to Certainty (which expresses confidence, trust and firmness) and Inhibition (expressing avoidance, defense, prevention) which increase in use: lockdown being more and more distant, people's thoughts appear more concrete and disenchanted. This could be explained by continued practice with current regulations, appropriate behaviors and cohabitation with the pandemic phenomenon.

On an emotional level, categories such as Positive Sensations and Positive Emotions see a significant increase across the three times, while Negative Emotions decrease. In general, the use of words related to emotion indicates the level of immersion in the described situation (Holmes et al., 2007). As time passed, in parallel with loosening of containment measures, the sample demonstrated progressive acceptation and an attentional focus on a narrative and photographic depiction of aspects of everyday life able to offer relief, serenity and openness (particularly towards nature, light moments of familiar sharing, playful and recreational activities, initially oriented inward and then outward). The increase in words related to positive emotions is in line with what was reported in a longitudinal study in UK (Mozes et al., 2021; Aiello et al., 2021). According to Strong's (1990) model, related to social reactions to epidemics, a first phase of denial is followed by a second phase of anger, concluding with a third phase of progressive acceptation. The Italian students constituting this sample demonstrated developing acceptation and positivity in their descriptions. However, while words related to Sadness decrease through time, those related to Anxiety increase. This result could be due to T3 not coinciding, in Italy, with a clear and unequivocal end to a situation featured by danger and restrictions, but with a new phase marked by uncertainty depending on the oscillatory movement of spreading curves. While during the first few phases of the pandemic the situation was more definite and people looked at the circumstances like a moment circumscribed in time, afterwards the sense of unpredictability became chronic, elongating anxiety states towards an uncertain future. All this likely made people feel the need to cognitively and socially redefine the problem, leading to a state of constant alert and powerlessness. The feeling of an uncertain present, from which one tries to "flee", appears to translate in a tendency to use, across time steps, significantly more and more past tenses and future tenses, while using less and less present tenses.

The increase in words related to Anxiety after lockdown is not in line with the results emerged in other studies employing the same method of linguistic analysis. A Ukrainian study conducted by Kostruba (2021), during the second

wave of restrictions, detected quite low anxiety levels among participants. Likewise, a longitudinal study conducted in UK by Mozes, van der Vegt and Kleinberg (2021) detected a decrease, a year after the start of the pandemic, of anxiety-related words. Our result could be related to the peculiarity of the pandemic course occurred in Italy, as well as to the further extension of the virus containment measures.

Concerning Social Communication, the increase in words related to this category at T3 could be linked to a new recovery phase, even though partial and yet limited, regarding social contacts and sharing of spaces and events other than the domestic environment. This interpretation is supported by the additional increase in references to fiendship relationships and decrease in references to familiar relationships, unlike the first phase of lockdown. Even though not reaching statistical significance, terms referring to Home decrease as well during the third phase, highlighting the progressive outward reopening.

Terms relating to both the Body and Health increase between the first two phases on the one hand and the third phase on the other. This result could be linked to better knowledge and awareness on the pandemic phenomenon, its effects and prevention measures adopted.

Limitations and future directions

The present study has some limitations. First, the sociodemographic characteristics of the sample deserve attention because the participants are homogeneous, i.e., they are students and predominantly female. All participants attended the community psychology program and may be more introspective than other groups of students. The small number of subjects in our subsample does not allow for generalizable conclusions, but merely suggests that we pay attention to the changes in the narration of everyday life along the three periods under consideration.

In addition, the diary component of photovoice was not included because we chose to combine the texts produced over the course of a week into a single text file for each phase, which precluded the possibility of examining variations in the use of linguistic categories from day to day. An in-depth analysis of the day-to-day variations would allow us to examine additional intra-subject effects of the photovoice tasks on language use and associated mental states. Similarly, the exclusion of the photovoice component is a limitation because it hinders the integration of texts with their paired descriptions.

Considering the limitations now pointed out, one of the possible future directions is to conduct further studies on the crossed analysis of the linguistic and photographic components: The inclusion of both forms of expression used by students to describe their inner experiences could provide more detailed information about their everyday experiences of isolation and the pandemic.

Ethical approval
Participants completed informed consent and took part in the study voluntarily without financial compensation. The University of Padua Ethics Committee approved the research

Data availability statement
The data that support the findings of this study (textual corpus) are available from the corresponding author upon request.

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Author Contributions
Conceptualization, G.D.F. and G.G.; methodology, G.D.F.; formal analysis, G.D.F.; data curation, G.G.; writing-original draft preparation, G.D.F. and E.M.V.; writing-review and editing, S.F., A.S., and C.C.; supervision, F.V.; project administration, G.G. All authors have read and agreed to the published version of the manuscript.

Declaration of Conflicting Interests
The authors declare no conflict of interest.

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References

Aiello, L. M., Quercia, D., Zhou, K., Constantinides, M., Šćepanović, S., & Joglekar, S. (2021). How epidemic psychology works on Twitter: Evolution of responses to the COVID-19 pandemic in the US. *Humanities and Social Sciences Communications, 8*(1), 1-15. https://doi.org/10.1057/s41599-021-00861-3

Alparone, F. R., Caso, S., Solano, L., & Prezza, M. (2002). Traduzione e adattamento al contesto linguistico italiano del "Linguistic Inquiry and Word Count" (LIWC). In *Emozioni: cultura, comunicazione, benessere* (pp. 133-140). Progedit.

Ashokkumar, A., & Pennebaker, J. W. (2021). Social media conversations reveal large psychological shifts caused by COVID-19's onset across US cities. *Science advances, 7*(39). https://doi.org/10.1126/sciadv.abg7843

Basile, V., Cauteruccio, F., & Terracina, G. (2021). How dramatic events can affect emotionality in social posting: The impact of COVID-19 on Reddit. *Future Internet, 13*(2), 29. https://doi.org/10.3390/fi13020029

Bernard, H. R., Wutich, A., & Ryan, G. W. (2016). *Analyzing qualitative data: Systematic approaches*. SAGE publications.

Birditt, K. S., Turkelson, A., Fingerman, K. L., Polenick, C. A., & Oya, A. (2021). Age differences in stress, life changes, and social ties during the COVID-19 pandemic: Implications for psychological well-being. *The Gerontologist*, 61(2), 205-216. https://doi.org/10.1093/geront/gnaa204

Brockmeyer, T., Zimmermann, J., Kulessa, D., Hautzinger, M., Bents, H., Friederich, H. C., ... & Backenstrass, M. (2015). Me, myself, and I: self-referent word use as an indicator of self-focused attention in relation to depression and anxiety. *Frontiers in Psychology, 6*, 1564. https://doi.org/10.3389/fpsyg.2015.01564

Bucci, W., & Freedman, N. (1981). The language of depression. *Bulletin of the Menninger Clinic, 45*(4), 334.

Chew, Q. H., Wei, K. C., Vasoo, S., Chua, H. C., & Sim, K. (2020). Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: practical considerations for the COVID-19 pandemic. *Singapore medical journal, 61*(7), 350. https://doi.org/10.11622/smedj.2020046

Chirico, F., Ferrari, G., Nucera, G., Szarpak, L., Crescenzo, P., Ilesanmi, O. (2021) Prevalence of anxiety, depression, burnout syndrome, and mental health disorders among healthcare workers during the COVID-19 pandemic: A rapid umbrella review of systematic reviews. *J Health Soc Sci*, *6*(2):209-220.

Cohn, M. A., Mehl, M. R., & Pennebaker, J. W. (2017). Linguistic markers of psychological change surrounding September 11, 2001. *Psychological Science, 18*(11), 908-911. https://doi.org/10.1111/j.1467-9280.2007.01900.x

Di Fini, G., & Veglia, F. (2019). Life themes and attachment system in the narrative self-construction: Direct and indirect indicators. *Frontiers in Psychology, 10*, 1393. https://doi.org/10.3389/fpsyg.2019.01393

Döring, N. (2020). How is the COVID-19 pandemic affecting our sexualities? An overview of the current media narratives and research hypotheses. *Archives of sexual behavior, 49*(8), 2765-2778. https://doi.org/10.1007/s10508-020-01790-z

Edwards, T., & Holtzman, N. S. (2017). A meta-analysis of correlations between depression and first person singular pronoun use. *Journal of Research in Personality, 68*, 63-68. https://doi.org/10.1016/j.jrp.2017.02.005

Essadek, A., & Rabeyron, T. (2020). Mental health of French students during the Covid-19 pandemic. *Journal of affective disorders, 277*, 392-393. https://doi.org/10.1016/j.jad.2020.08.042

Fernández-Lansac, V., & Crespo, M. (2015). Narrative length and speech rate in battered women. *PloS one*, *10*(11), e0142651. https://doi.org/10.1371/journal.pone.0142651

Fu, W., Yan, S., Zong, Q., Anderson-Luxford, D., Song, X., Lv, Z., & Lv, C. (2021). Mental health of college students during the COVID-19 epidemic in China. *Journal of Affective Disorders, 280*, 7-10. https://doi.org/10.1016/j.jad.2020.11.032

Gaboardi, M., Gatti, F., Santinello, M., Gandino, G., Guazzini, A., Guidi, E., Novara, C., Sola, T., Ceglie, E., Di Fini, G., Di Napoli, G., & Procentese, F. (2022). The photo diaries method to catch the daily experience of Italian university students during COVID-19 lockdown. *Community Psychology in Global Perspective, 8*(2), 59-80. https://doi.org/10.1285/i24212113v8i2p59

Gambin, M., Sękowski, M., Woźniak-Prus, M., Wnuk, A., Oleksy, T., Cudo, A., Hansen, K., … Maison, D. (2021). Generalized anxiety and depressive symptoms in various age groups during the COVID-19 lockdown in Poland. Specific predictors and differences in symptoms severity. *Comprehensive Psychiatry 105,* 152222. https://doi.org/10.1016/j.comppsych.2020.152222

Gandino, G. (2019). Rorschach Test and Systemic Theory: A Proposal of a Qualitative Method for Content Analysis. *Rorschachiana*, *40*(1), 55-71. https://doi.org/10.1027/1192-5604/a000111

Gandino, G., Di Fini, G., Bernaudo, A., Paltrinieri, M., Castiglioni, M., & Veglia, F. (2020). The impact of perinatal loss in maternity units: A psycholinguistic analysis of health professionals' reactions. *Journal of Health Psychology, 25*(5), 640-651. https://doi.org/10.1177/1359105317727841

Grubbs, J. B., Hoagland, K. C., Lee, B. N., Grant, J. T., Davison, P., Reid, R. C., & Kraus, S. W. (2020). Sexual addiction 25 years on: A systematic and methodological review of empirical literature and an agenda for future research. *Clinical Psychology Review, 82*, 101925. https://doi.org/10.1016/j.cpr.2020.101925

Gualano, M. R., Lo Moro, G., Voglino, G., Bert, F., & Siliquini, R. (2020). Effects of Covid-19 Lockdown on Mental Health and Sleep Disturbances in Italy. *International Journal of Environmental Research and Public Health, 17*(13), 4779. https://doi.org/10.3390/ijerph17134779

Holmes, D., Alpers, G. W., Ismailji, T., Classen, C., Wales, T., Cheasty, V., ... & Koopman, C. (2007). Cognitive and emotional processing in narratives of women abused by intimate partners. *Violence Against Women, 13*(11), 1192-1205. https://doi.org/10.1177/1077801207307801

Kibbey, M. M., Fedorenko, E. J., & Farris, S. G. (2021). Anxiety, depression, and health anxiety in undergraduate students living in initial US outbreak "hotspot" during COVID-19 pandemic. *Cognitive Behaviour Therapy, 50*(5), 409-421. https://doi.org/10.1080/16506073.2020.1853805

Kostruba, N. (2021). Social restrictions in the COVID-19 pandemic as a traumatic experience: Psycholinguistic markers. *East European Journal of Psycholinguistics, 8*(1). https://doi.org/10.29038/eejpl.2021.8.1.kos

Lehmiller, J. J., Garcia, J. R., Gesselman, A. N., and Mark, K. P. (2020). Less sex, but more sexual diversity: changes in sexual behavior during the COVID-19 coronavirus pandemic. Leisure Sci. 43, 295–304. https://doi.org/10.1080/01490400.2020.1774016

Li, W., Li, G., Xin, C., Wang, Y., & Yang, S. (2020). Challenges in the practice of sexual medicine in the time of COVID-19 in China. *The Journal of Sexual Medicine, 17*(7), 1225-1228. https://doi.org/10.1016/j.jsxm.2020.04.380

Li, X., Fu, P., Fan, C., Zhu, M., & Li, M. (2021). COVID-19 stress and mental health of students in locked-down colleges. *International journal of environmental research and public health, 18*(2), 771. https://doi.org/10.3390/ijerph18020771

Lisitsa, E., Benjamin, K. S., Chun, S. K., Skalisky, J., Hammond L. E., Mezulis, A. H. (2020). Loneliness among young adults during covid-19 pandemic: The mediational roles of social media use and social support seeking. *Journal of Social and Clinical Psychology, 39*(8). https://doi.org/10.1521/jscp.2020.39.8.708

Mamun, M. A., & Griffiths, M. D. (2020). First COVID-19 suicide case in Bangladesh due to fear of COVID-19 and xenophobia: Possible suicide prevention strategies. *Asian journal of psychiatry, 51*, 102073. https://doi.org/10.1016/j.ajp.2020.102073

Manica, M., Guzzetta, G., Riccardo, F., Valenti, A., Poletti, P., Marziano, V., … Merler, S. (2021). Impact of tiered restrictions on human activities and the epidemiology of the second

wave of COVID-19 in Italy. *Nat Commun 12*, 4570. https://doi.org/10.1038/s41467-021-24832-z

Medford, R. J., Saleh, S. N., Sumarsono, A., Perl, T. M., & Lehmann, C. U. (2020). An "infodemic": leveraging high-volume Twitter data to understand early public sentiment for the coronavirus disease 2019 outbreak. *Open Forum Infectious Diseases, 7*(7). https://doi.org/10.1093/ofid/ofaa258

Mozes, M., van der Vegt, I., & Kleinberg, B. (2021). A repeated-measures study on emotional responses after a year in the pandemic. *Scientific Reports, 11*(1), 23114. https://doi.org/10.1038/s41598-021-02414-9

Neimeyer, R. A. (2006). Complicated grief and the quest for meaning: A constructivist contribution. *OMEGA-Journal of Death and Dying, 52*(1), 37-52. https://doi.org/10.2190/EQL1-LN-3V-KNYR-18TF

Nelson, N., & Bergeman, C. (2020). Daily Stress Processes in a Pandemic: The Effects of Affect, Worry, and Age. *Innovation in Aging, 4*(Suppl 1), 941. https://doi.org/10.1093/geroni/igaa057.3446

Pennebaker, J. W., & Chung, C. K. (2007). Expressive writing, emotional upheavals, and health.

Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). Linguistic inquiry and word count: LIWC 2001. *Mahway: Lawrence Erlbaum Associates, 71(*2001), 2001.

Pennebaker, J.W., Booth, R.J., Boyd, R.L., & Francis, M.E. (2015). *Linguistic Inquiry and Word Count: LIWC2015.* Austin, TX: Pennebaker Conglomerates (www.LIWC.net).

Rimé, B., Mesquita, B., Boca, S., & Philippot, P. (2020). Beyond the emotional event: Six studies on the social sharing of emotion. *Cognition & Emotion, 14*(5), 601–627. https://doi.org/10.1080/026999399379079

Sanchez, T. H., Zlotorzynska, M., Rai, M., & Baral, S. D. (2020). Characterizing the impact of COVID-19 on men who have sex with men across the United States in April, 2020. *AIDS and Behavior, 24*(7), 2024-2032. https://doi.org/10.1007/s10461-020-02894-2

Santinello, M., Vieno, A. (Eds.) (2013). *Metodi di intervento in psicologia di comunità*. Il Mulino.

Sarli, L., & Artioli, G. (2020). Before, during and after the COVID-19 pandemic. *Acta Bio Medica: Atenei Parmensis, 91*(Suppl 12). https://doi.org/10.23750/abm.v91i12-S.10993

Serafini, G., Parmigiani, B., Amerio, A., Aguglia, A., Sher, L., & Amore, M. (2020). The psychological impact of COVID-19 on the mental health in the general population. *QJM: An International Journal of Medicine, 113*(8), 531-537. https://doi.org/10.1093/qjmed/hcaa201

Shevlin, M., McBride, O., Murphy, J., Miller, J. G., Hartman, T. K., Levita, L., ... & Bentall, R. P. (2020). Anxiety, depression, traumatic stress and COVID-19-related anxiety in the UK general population during the COVID-19 pandemic. *BJPsych open, 6*(6). https://doi.org/10.1192/bjo.2020.109

Solano, L. (Ed.). (2007). *Scrivere per pensare. La ritrascrizione dell'esperienza tra promozione della salute e ricerca*. Milano: Franco Angeli.

Strong, P. (1990). Epidemic psychology: a model. *Sociology of Health & Illness, 12*(3), 249-259. https://doi.org/10.1111/1467-9566.ep11347150

Su, Y., Lee, D. K. L., Xiao, X., Li, W., & Shu, W. (2021). Who endorses conspiracy theories? A moderated mediation model of Chinese and international social media use, media skepticism, need for cognition, and COVID-19 conspiracy theory endorsement in China. *Computers in Human Behavior, 120*, 106760. https://doi.org/10.1016/j.chb.2021.106760

Su, Y., Xue, J., Liu, X., Wu, P., Chen, J., Chen, C., ... & Zhu, T. (2020). Examining the impact of COVID-19 lockdown in Wuhan and Lombardy: a psycholinguistic analysis on Weibo and Twitter. *International Journal of Environmental Research and Public Health, 17*(12), 4552. https://doi.org/10.3390/ijerph17124552

Tackman, A. M., Sbarra, D. A., Carey, A. L., Donnellan, M. B., Horn, A. B., Holtzman, N. S., Edwards, T. S., Pennebaker, J. W., & Mehl, M. R. (2019). Depression, negative emotionality, and self-referential language: A multi-lab, multi-measure, and multi-language-task research synthesis. *Journal of Personality and Social Psychology, 116*(5), 817–834. https://doi.org/10.1037/pspp0000187

Tan, H., Peng, S. L., Zhu, C. P., You, Z., Miao, M. C., & Kuai, S. G. (2021). Long-term Effects of the COVID-19 Pandemic on Public Sentiments in Mainland China: Sentiment Analysis of Social Media Posts. *Journal of Medical Internet Research, 23*(8). https://doi.org/10.2196/29150

Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *Journal of language and social psychology, 29*(1), 24-54. https://doi.org/10.1177/0261927X09351676

Travaglino, G. A., & Moon, C. (2021). Compliance and self-reporting during the COVID-19 pandemic: a cross-cultural study of trust and self-conscious emotions in the United States, Italy, and South Korea. *Frontiers in Psychology, 12*, 684. https://doi.org/10.3389/fpsyg.2021.565845

Tshimula, J. M., Chikhaoui, B., & Wang, S. (2021). COVID-19: Detecting Depression Signals during Stay-At-Home Period. *arXiv.* https://doi.org/10.48550/arXiv.2103.00597

Veglia, F., & Di Fini, G. (2017). Life themes and interpersonal motivational systems in the narrative self-construction. *Frontiers in psychology, 8*, 1897. https://doi.org/10.3389/fpsyg.2017.01897

Vine, V., Boyd, R. L., & Pennebaker, J. W. (2020). Natural emotion vocabularies as windows on distress and well-being. *Nature communications, 11*, 4525. https://doi.org/10.1038/s41467-020-18349-0

Wang, X., Hegde, S., Son, C., Keller, B., Smith, A., Sasangohar F. (2020). Investigating Mental Health of US college students during the COVID-19 pandemic: Cross-sectional survey study. *J Med Internet Res, 22*(9). https://doi.org/10.2196/22817

Williamson, H. C. (2020). Early effects of the COVID-19 pandemic on relationship satisfaction and attributions. *Psychological Science, 31*(12), 1479-1487. https://doi.org/10.1177/0956797620972688

Yu, M., Li, Z., Yu, Z., He, J., & Zhou, J. (2021). Communication related health crisis on social media: a case of COVID-19 outbreak. *Current Issues in Tourism, 24*(19), 2699-2705. https://doi.org/10.1080/13683500.2020.1752632

Yuksel, B., & Ozgor, F. (2020). Effect of the COVID-19 pandemic on female sexual behavior. *International Journal of Gynecology & Obstetrics, 150*(1), 98-102. https://doi.org/10.1002/ijgo.13193

Zhang, Y., Lyu, H., Liu, Y., Zhang, X., Wang, Y., & Luo, J. (2021). Monitoring depression trends on Twitter during the COVID-19 pandemic: Observational study. *JMIR infodemiology, 1*(1). https://doi.org/10.2196/26769

Zhao, Y., An, Y., Tan, X., & Li, X. (2020). Mental health and its influencing factors among self-isolating ordinary citizens during the beginning epidemic of COVID-19. *Journal of Loss and Trauma, 25*(6-7), 580-593. https://doi.org/10.1080/15325024.2020.1761592