

Mood, sleep quality, and dreaming during the third wave of the COVID-19 pandemic in Italy

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Summary. The Coronavirus Disease 2019 (COVID-19) has strongly impacted the world. Recent research findings have shown its significant impact on sleep habits, dreaming, and psychological well-being. In a sample of 329 adult Italian subjects, we investigated the following four factors during the third wave of the COVID-19 pandemic: sociodemographic and COVID-19 related variables, mood (using the Depression, Anxiety, and Stress Scale), sleep (using the Pittsburgh Sleep Quality Index), and oneiric activity (using the Mannheim Dream Questionnaire and the Most Recent Dream instrument). Results indicated that participants presented moderate levels of depression, anxiety, and stress, as well as poor sleep quality. Results also indicated that the participants living in regions subject to the strictest quarantine/isolation measures, as well as participants whose work habits have been negatively affected because of the restrictive measures, reported higher levels of depression, anxiety, and stress, as well as strong effects on their dreams and nightmares. These results applied also to participants directly affected by the COVID-19 pandemic who, in addition, reported poor sleep quality. Finally, as to the participants' most recent dreams, results of the Thematic Analysis of Elementary Contexts showed that dreams seem to be centered on both pleasant memories linked to experiences that are now forbidden as well as on stressful and dangerous situations. In sum, the findings of this study indicate that the COVID-19 pandemic, understood as a contextual, prolonged, and traumatic event, significantly affects people's oneiric lives, as well as their psychological well-being.

Keywords: Psychological well-being, sleep, dreams, continuity hypothesis, traumatic events, COVID-19

1. Introduction

The Coronavirus Disease 2019 (COVID-19) was declared a global pandemic by the World Health Organization. Since then, data regarding infections and deaths all around the world have been steadily increasing, leading governments to adopt strong lockdown measures to reduce the spread of the virus, which has resulted in a drastic form of social isolation (Procentese, Esposito, Gonzalez Leone, Agueli, Arcidiacono, Freda, & Di Napoli, 2021).

Italy is one of the European countries most affected by the pandemic, with 4.201.827 confirmed cases and 125.622 deaths (at the time of writing: July 2021). During the first contagion wave (March-April 2020), the Italian government implemented a total lockdown involving home confinement and social distancing for the entire population, except for proven work needs, emergency or for health reasons, and the closure of most business activities. In autumn 2020, a second wave occurred, and the Italian government decided to adopt new restrictive measures according to the infection diffusion at regional level, as well as to the pressure on the local healthcare system. Indeed, starting from November 2020, based on the severity of restrictions, Italian regions were classified according to four levels of increasing

risk: "White zone", "Yellow zone", "Orange zone", and "Red zone". This classification was then periodically updated based on contagion related data monitoring.

The first Italian and international studies investigating the psychological consequences of the COVID-19 pandemic have shown that quarantine-isolation measures related to the COVID-19 pandemic are associated with increased individual and relational psychological distress, anxiety, and depression (e.g., Benke, Autenrieth, Asselmann, & Pané-Farré, 2020; Casagrande, Favieri, Tambelli, & Forte, 2020; Forte et al., 2021; Huang & Zhao, 2020; Sommantico, 2010; Zurlo, Cattaneo della Volta, & Vallone, 2020). Furthermore, several studies have especially focused on sleep disorders, or poor sleep quality (e.g., Altena et al., 2020; Casagrande et al., 2020; Cellini, Canale, Mioni, & Costa, 2020; Conte et al., 2021; Franceschini et al., 2020; Huang & Zhao, 2020; Salfi, D'Atri, Tempesta, & Ferrara, 2021; Sher, 2020; Xiao, Zhang, & Kong, 2020). Issues related to sleep are linked to the consequences of quarantine-isolation measures, such as, among others: changes in work habits and to sleep schedules, as well as lack of rest and of regular physical exercise. It is, therefore, not excessive to define this period as traumatic, during which mental health services have recorded both a worsening of the symptoms of various individuals with prior struggles, and a generalized spread of anxiety and depression (Giallonardo et al., 2020; Rossi et al., 2020; World Health Organization, 2020). Finally, findings in the literature of dream studies on populations subject to the restrictive measures related to the COVID-19 pandemic (e.g., Barrett, 2020; Conte et al., 2021; Gorgoni, Scarpelli, Alfonsi, Annarumma, Cordone, Stravolo, & De Gennaro, 2021; Guerrero-Gomez et al., 2021; Mariani, Monaco, Christian, & Di Trani, 2021; Pesonen et al., 2020; Scarpelli et al., 2021; Schredl & Bulkeley, 2020; Sommantico, Iorio, Lacatena, & Parrello,

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2021), show that these events have had a strong impact on dreams due to their emotional salience, and thereby influence dream content. In particular, participants who experience COVID-19 more directly report higher emotional intensity in their dreams, which are characterized by a higher presence of sensory impressions (e.g., Barrett, 2020; Iorio, Sommantico, & Parrello, 2020; Parrello, Sommantico, Lacatena, & Iorio, 2020; Schredl & Bulkeley, 2020). Furthermore, during the pandemic, dream imagery was characterized by a strong presence of virus-related themes, particularly anxieties and concerns related to COVID-19 transmission (e.g., MacKay & DeCicco, 2020; Pesonen et al., 2020; Sommantico et al., 2021). Furthermore, Italian studies focused on longitudinal comparison of sleep and dreaming during the first two waves of the COVID-19 pandemic (e.g., Conte et al., 2020; Salfi et al., 2021) highlighted that its impact persisted on both sleep and dream features, despite a sort of adaptation. Indeed, as reported by Conte et al. (2020), during the first two waves, dream variables such as frequency, length, vividness and negative emotionality “were more often increased than decreased compared with the preceding periods, in line with Gorgoni et al.’s findings (2021) on the first pandemic wave” (p. 7).

In accordance with this theoretical framework, we investigated sociodemographic and COVID-19 related variables, depression, anxiety, stress, and sleep quality, as well as oneiric activity, in a sample of 329 adult Italian subjects during the third wave of the pandemic. Firstly, we were interested in identifying both the sociodemographic and COVID-related variables and the mood and sleep quality measures correlated with dream frequency, emotional intensity, and emotional tone of the dreams, as well as nightmare frequency and distress. Secondly, we hypothesized that: a) depression, anxiety, and stress were correlated with poor sleep quality and might impact oneiric activity; b) that poor sleep quality was correlated with higher oneiric activity; c) that the dreams of people living under quarantine-isolation measures related to the COVID-19 pandemic would be characterized by strong negative emotional intensity and the presence of sensory impressions; and d) that participants’ most recent dreams would represent the places where quarantine-isolation is lived out, and would be characterized especially by negative emotions.

2. Method

2.1. Procedure and Participants

Participants were recruited in Italy via the Internet, through advertisements on social media, between March 8, 2021 and April 30, 2021, according to the following criteria: at least 18 years of age and compliant with the quarantine/isolation measures. All data were collected through self-report questionnaires, using an Internet-based survey (Hewson, Vogel, & Laurent, 2016). To improve this web-based sampling, we also used snowball sampling. To do this, we first asked recruited participants to identify other potential respondents from their social network; these potential participants were also asked to nominate individuals from their social network, and so on and so forth. Participation in the study was voluntary, anonymous, and unpaid. All participants included in the study gave consent to participate on the first page of the survey. The informed consent included detailed information about the aims and procedures of the

study, its confidentiality, and the anonymity of the responses. Participants completed, in the following order: a socio-demographic questionnaire, the Depression Anxiety Stress Scale - 21 (DASS-21; Lovibond & Lovibond, 1995), the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), and the Mannheim Dream Questionnaire (MADRE; Schredl, Berres, Klingauf, Schellhaas, & Göritz, 2014). Participants were finally asked to report their Most Recent Dream (MRD; Domhoff, 1996).

The study complied with the American Psychological Association (APA) ethical standards in the treatment of human research participants and conformed to the provisions of the 1964 Helsinki Declaration and its later amendments. Furthermore, the study was approved by the Ethical Committee of Psychological Research of the Department of Humanities of the University of Naples Federico II (protocol no. 30/2020).

There were 329 respondents (76% women; ages 18-83 years, $M = 37.23$, $SD = 16.0$). Most participants (75.1%) lived in a “red zone,” subject to a higher level of restrictive measures. The sample had a high level of education, with 58.4% having completed a university degree or a post-university degree, and 38.3% of the participants having completed secondary school. The majority of participants (51.9%) were employed (37.7% students and 10.4% unemployed or retired). Most participants negatively modified their work habits because of the restrictive measures (67.2% of which 2.7% laid off). Participants who have been

Table 1. Sociodemographic characteristics (N = 329)

	N	%
Gender		
Male	79	24
Female	250	76
Age, years		
18-30	152	46.2
31-50	90	27.4
> 50	87	26.4
Region of Residence		
Red zone	247	75.1
Orange zone	82	24.9
Education		
Until middle school	11	3.3
High school	126	38.3
Graduate or more	192	58.4
Occupation		
Student	124	37.7
Employed	171	51.9
Unemployed or retired	34	10.4
Modified Work Habits		
Yes	221	67.2
No	108	32.8
Personally infected by the COVID-19		
Yes	43	13.1
No	286	86.9
Knowing a COVID-19 Case		
Yes	309	93.9
No	20	6.1
Knowing a COVID-19 Death		
Yes	137	41.6
No	192	58.4

affected by COVID-19 were 13.1%, participants who knew someone infected by COVID-19 were 93.9%, and participants who knew someone who died of COVID-19 were 41.6% (see Table 1).

2.2. Measures

2.2.1 Socio-Demographic and COVID-19 Related Variables

Respondents provided socio-demographic data [e.g., age, gender, region of residence (subject to different restrictive measures), level of education, and profession] via a basic socio-demographic questionnaire. Respondents were also asked to report information about negative changes in work habits related to the COVID-19 pandemic, whether they have been affected by COVID-19, and whether they knew people affected by or who have died of COVID-19.

2.2.2 Mood Measure

Mood was assessed through the Depression Anxiety Stress Scale - 21 (DASS-21; Lovibond & Lovibond, 1995; Italian adaptation and validation by Bottesi et al., 2015). The DASS-21 is a 21-item self-report instrument assessing depression, anxiety, and stress on three subscales: a) Depression (7 items); b) Anxiety (7 items); and c) Stress (7 items). Participants are asked to rate the frequency and severity of depression, anxiety, and stress symptoms on a 4-point Likert-type scale (ranging from 0 = "Did not apply to me at all", to 3 = "Applied to me very much, or most of the time"). Subscale scores are calculated by summing the responses to the seven items multiplied by 2 to suit the original 42 items. The cut-offs for a moderate rating of depression, anxiety, and stress are ≥ 14 , ≥ 10 and ≥ 19 , respectively. For a severe rating of depression, anxiety, and stress, the cut-offs are ≥ 21 , ≥ 15 and ≥ 26 , respectively. In the present study, Cronbach's α was .91 for Depression, .87 for Anxiety, .90 for Stress, and .95 for the total score.

2.2.3 Sleep Quality

Sleep quality was assessed through the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989; Italian adaptation and validation by Curcio et al., 2013). The PSQI is a 19-item self-report questionnaire assessing sleep quality on seven subscales: 1) Subjective sleep quality (item 6, utilizing a 4-point Likert-type scale ranging from 0 = "Not during the past month", to 3 = "Three or more times a week"); 2) Sleep latency (item 2, utilizing a 4-point Likert-type scale ranging from 0 = " ≤ 15 minutes", to 3 = " ≥ 60 minutes", and item 5a, utilizing a 4-point Likert-type scale ranging from 0 = "Not during the past month", to 3 = "Three or more times a week"); 3) Sleep duration (item 4); 4) Habitual sleep efficiency (items 1, 3, and 4); 5) Sleep disturbances (item 5b to 5j, utilizing a 4-point Likert-type scale ranging from 0 = "Not during the past month", to 3 = "Three or more times a week"); 6) Use of sleep medications (item 7, utilizing a 4-point Likert-type scale ranging from 0 = "Not during the past month", to 3 = "Three or more times a week"); 7) Daytime dysfunction (item 8, utilizing a 4-point Likert-type scale ranging from 0 = "Not during the past month", to 3 = "Three or more times a week", and item 9, utilizing a 4-point Likert-type scale ranging from 0 = "No problem at all", to 3 = "A very big problem"). Sleep latency score is obtained by summing scores

on item 2 and item 5a, utilizing a 4-point Likert-type scale ranging from 0 = "0", to 3 = "5-6". Habitual sleep efficiency score is obtained according to the formula [number of hours slept (item 4)] x [number of hours spent in bed (item 1 - item 3)] x 100, utilizing a 4-point Likert-type scale ranging from 0 = "> 85%", to 3 = "< 65%". Sleep disturbances score is obtained by summing scores on item 5b to 5j, utilizing a 4-point Likert-type scale ranging from 0 = "0", to 3 = "19-27". Daytime dysfunction score is obtained by summing scores on items 8 and 9, utilizing a 4-point Likert-type scale ranging from 0 = "0", to 3 = "5-6". A total PSQI score is obtained by summing the scores of the seven subscales. A PSQI total score > 5 indicates subjectively-perceived poor sleep quality. In the present study, Cronbach's α was .83.

2.2.4 Dream Measures

Dream activity was measured through the Mannheim Dream Questionnaire (MADRE; Schredl et al., 2014; Italian adaptation and validation by Settineri, Frisone, Alibrandi, & Merlo, 2019). The MADRE is a 20-item self-report questionnaire about dreams (e.g., dream recall frequency, emotional intensity, and emotional tone), various types of dreams (e.g., nightmares, déjà-vu, lucid dreams), and related phenomena (e.g., attitudes toward dreams, and dream-related literature). In the present study, we only focus on the items Dream recall frequency, Nightmare frequency, Dream emotional intensity, Dream emotional tone, and Nightmare distress.

Dream recall frequency (item 1) is assessed with a 7-point Likert-type scale (ranging from 0 = "Never" to 6 = "Almost every morning"). Nightmare frequency (item 4) is assessed with an 8-point Likert-type scale (ranging from 0 = "Never" to 8 = "Several times a week"). Participants are also asked to report the overall Emotional intensity (item 2, utilizing a 5-point Likert-type scale ranging from 0 = "Not at all intense" to 4 = "Very intense"), Emotional tone (item 3, utilizing a 5-point Likert-type scale ranging from -2 = "Very negative" to +2 = "Very positive"), and Nightmare distress (item 5, utilizing a 5-point Likert-type scale ranging from 0 = "Not at all distressing" to 4 = "Very distressing").

Participants were also asked to report their Most Recent Dreams (MRDs; Domhoff, 1996). Participants were asked to: a) indicate whether the dream occurred last night, last week, last month, or last year, and what time of day the dream was recalled; b) describe the dream as precisely and as fully as they could remember it; c) describe whether the setting of the dream was familiar to them or not; d) describe the people who appeared in the dream: their sex, age, and relationship to the dreamer; e) describe any animals or objects that appeared in the dream; f) describe their feelings during the dream and whether they were pleasant or unpleasant; and g) tell exactly what happened during the dream to them and the other characters. Participants were also asked to self-rate their MRDs regarding the following criteria (Schredl, 2002, 2010): a) the intensity of the Positive emotions (measured on a 4-point Likert-type scale, ranging from 0 = No emotions to 3 = Intense emotions); b) the intensity of the Negative emotions (measured on a 4-point Likert-type scale, ranging from 0 = No emotions to 3 = Intense emotions); c) the Realism/bizarreness of the dream (measured on a 4-point Likert-type scale, ranging from 0 = Realistic dream to 3 = Bizarre dream); and d) the presence of Sensory impressions (measured on a 4-point Likert-type scale, ranging from 0 = No sensory impressions to 3 = Strong sensory impressions).

Table 2. Descriptive Statistics

	Females (N = 250)		Males (N = 79)		Total sample (N = 329)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
DASS-21						
Depression	17.5	10.3	13.6	8.9	16.6	10.3
Anxiety	10.7	9.0	8.8	8.1	10.3	8.9
Stress	21.0	8.9	18.5	10.1	20.4	9.3
PSQI	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Subjective sleep quality	1.5	0.7	1.5	0.8	1.5	0.7
Sleep latency	1.5	0.9	1.5	0.8	1.5	0.9
Sleep duration	1.4	0.9	1.6	1.0	1.4	0.9
Habitual sleep efficiency	0.7	0.9	0.4	0.7	0.6	0.9
Sleep disturbances	1.3	0.6	1.3	0.6	1.3	0.6
Use of sleep medications	0.5	1.0	0.5	0.9	0.5	1.0
Daytime dysfunction	1.1	0.7	1.1	0.8	1.1	0.7
PSQI total score	8.0	3.6	7.9	3.9	8.0	3.7
Dream recall frequency	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Almost every morning	28	11.2	8	10.1	36	10.9
Several times a week	47	18.8	16	20.3	63	19.1
About once a week	41	16.4	17	21.5	58	17.6
About 2 to 3 times a month	53	21.2	17	21.5	70	21.3
About once a month	23	9.2	8	10.1	31	9.4
Less than once a month	39	15.6	10	12.7	49	14.9
Never	19	7.6	3	3.8	22	6.7
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Emotional intensity	3.6	1.0	3.6	1.0	3.6	1.0
Emotional tone	0.7	.09	0.6	1.1	0.6	1.0
Nightmares frequency	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Almost every morning	23	9.2	2	2.5	25	7.6
About once a week	30	12	11	13.9	41	12.5
Two to three times a month	27	10.8	13	16.5	40	12.2
About once a month	51	20.4	10	12.7	61	18.5
About two to four times a year	48	19.2	15	19	63	19.1
About once a year	16	6.4	6	7.6	22	6.7
Less than once a year	17	6.8	5	6.3	22	6.7
Never	38	15.2	17	21.5	55	16.7
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Nightmare distress	3.2	1.1	3.1	1.3	3.2	1.2
Most Recent Dream	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Dream length	83.5	123.9	50.6	56.1	75.6	112.3
Positive emotions	1.1	1.1	0.9	1.0	1.1	1.1
Negative emotions	1.8	1.1	1.9	1.1	1.8	1.1
Realism/bizarreness	1.6	1.0	1.1	1.0	1.4	1.0
Sensory impressions	1.7	1.0	1.5	1.0	1.6	1.0

2.3. Data Analyses Plan

Survey data were then entered into SPSS version 26.0 for quantitative analyses, and T-LAB for quali-quantitative analyses. Data were checked/verified by project staff for accuracy, in order to preserve the meaning-making process carried out by the researcher.

Descriptive analyses were conducted to outline the sociodemographic characteristics of the sample, as well as the COVID-19 related variables, by considering the following features: age, gender, region of residence (subject to different restrictive measures), level of education, profession, changes in work habits, COVID-19 infection, and relationship to people affected by or who died of COVID-19. ANOVA and Tukey tests were used to verify the differences between the subject groups (p-value < .05). Linear regression models

were used for outcome variables (i.e., Dream recall frequency, Nightmare frequency and recall, and MRDs' variables) (p-value < .05). The MRDs' text corpora went through an automatic lemmatization, and a Thematic Analysis of Elementary Contexts was performed. Cluster analysis was carried out by an unsupervised ascendant hierarchical method (the Bisecting K-Means Algorithm).

3. Results

3.1. The MADRE Questionnaire

Descriptive statistics are presented in Table 2. According to the conventional cut-off scores for the DASS-21 and the PSQI (see the Measures section), participants presented

Table 3. Correlations (N = 329)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	-											
2. Depression	-.33**	-										
3. Anxiety	-.25**	.69**	-									
4. Stress	-.28**	.77**	.72**	-								
5. PSQI	.02	.49**	.53**	.57**	-							
6. Emotional intensity	-.15**	.30**	.34**	.37**	.30**	-						
7. Emotional tone	-.05	-.01	-.02	.09	.00	.15**	-					
8. Nightmare distress	-.16**	.25**	.30**	.35**	.28**	.53**	.16**	-				
9. Dream length	-.29**	.20**	.18**	.28**	.09	.26**	-.09	.20**	-			
10. Positive emotions	.01	-.13*	-.13*	-.13*	-.16**	-.07	-.13*	-.14**	-.05	-		
11. Negative emotions	-.16**	.19**	.18**	.26**	.25**	.33**	.19**	.38**	.16**	-.58**	-	
12. Realism/bizarreness	-.16**	.02	-.00	-.02	-.06	-.03	-.01	-.04	.12*	.01	.07	-
13. Sensory impressions	-.12*	.08	.11	.12*	.04	.21**	-.03	.18**	.13*	.27**	.01	.23**

Note. * $p < .05$; ** $p < .01$.

moderate levels of depression, anxiety, and stress, as well as poor overall sleep quality.

Distribution of Dream recall frequency shows the relevance of this phenomenon in our sample. Indeed, only a low number of participants (N = 22; 6.7%) were unable to recall their dreams. According to Schredl (2002), participants were divided into three categories: a) low recallers (from "Never" to "About once a month"; 31%); b) medium recallers (from "About 2-3 times a month" to "About once a week"; 38.9%); and c) high recallers (from "Several times a week" to "Almost every morning"; 30.1%). Participants reported high Emotional intensity and a mostly positive Emotional tone in their dreams.

Distribution of Nightmare frequency shows that, in our sample, this phenomenon is also relevant. Indeed, only a low number of participants (N = 55; 16.7%) did not experience nightmares during the most recent months. Again, participants were divided into three categories: a) low nightmare frequency (from "Never" to "About once a year"; 30.1%); b) medium nightmare frequency (from "About 2-3 times a year" to "2-3 times a month"; 49.8%); and c) high nightmare frequency (from "About once a week" to "Almost every morning"; 20.1%). Participants reported their nightmares as mostly distressing.

In reporting their MRDs, the majority of participants (43.5%) indicated that the dream occurred during the previous week (36.2% last month and 20.4% last night), and that they mainly recalled the dream during the morning (87.8%). The mean length of dream reports was 75.6 words (SD = 112.3). Participants reported medium Positive emotions, high Negative emotions, medium Realism, and a high presence of Sensory impressions in their MRDs.

3.2. Correlations and Group Differences

Zero-order correlations for the total sample are shown in Table 3. Results indicated that Depression, Anxiety, and Stress were significantly positively correlated with PSQI [$r(327) = .49, .53, \text{ and } .57; p < .01$]. Furthermore, results indicated that dream Emotional intensity was significantly positively correlated with Depression, Anxiety, Stress, and PSQI [$r(327) = .30, .34, .37, \text{ and } .30; p < .01$], as well as with Nightmare distress and MRDs Negative emotions [$r(327) = .53 \text{ and } .33; p < .01$]. Results also indicated that MRDs Negative emotions were significantly positively corre-

lated with dream Emotional tone [$r(327) = .38; p < .01$], while MRDs Positive emotions were significantly negatively correlated with Depression, Anxiety, Stress, PSQI, and Nightmare distress [$r(327) = -.13, -.13, -.13, -.16, \text{ and } -.14; p < .05 \text{ and } p < .01$].

ANOVA and Tukey tests showed significant differences (see Table 4). To that end, female participants reported significantly higher levels of Depression and Stress, as well as the longest dreams, and higher levels of bizarreness in their MRDs.

Participants living in a region with higher restrictive quarantine/isolation measures (Red zone) reported significantly higher levels of Depression, Anxiety, Stress, and PSQI. Participants whose work habits have changed as a result of the restrictive measures reported significantly higher levels of Depression, Anxiety, Stress, and PSQI, as well as a significantly higher presence of negative emotions in their MRDs. In particular, participants who experienced a layoff during the lockdown reported significantly higher levels of Depression, Anxiety, and Stress.

Participants who have been personally affected by COVID-19 reported significantly higher levels of PSQI, significantly higher Nightmare distress, and a significantly higher presence of Negative emotions in their MRDs. Participants who personally knew a COVID-19 case reported significantly higher levels of Depression, Anxiety, and Stress, as well as significantly higher Emotional intensity to their dreams, and Nightmare distress. Participants who personally knew someone who died of COVID-19 reported significantly higher levels of Anxiety, Stress, and PSQI, as well as significantly higher Nightmare distress.

High recallers reported significantly higher levels of Depression, Anxiety, and Stress, as well as significantly higher Emotional intensity to their dreams, as well as Nightmare distress. Finally, participants reporting high Nightmare frequency also reported significantly higher levels of Depression, Anxiety, Stress, and PSQI, as well as significantly higher Emotional intensity to their dreams, significantly higher Nightmare distress, and a significantly higher presence of Negative emotions in their MRDs.

3.3. Regression Analyses

Based on previous results, the association between the dependent dream variables (i.e., Dream recall frequency, Emo-

Table 4. ANOVA (N = 329)

Gender	F	M	F (gl)	p	η ²	
Depression	17.5	13.6	9.15 (1, 327)	.003	.03	
Stress	21.0	18.5	4.28 (1, 327)	.039	.01	
Dream length	83.5	50.6	5.23 (1, 327)	.023	.02	
Realism/bizarreness	1.6	1.1	15.49 (1, 327)	.000	.05	
Region	Red zone	Yellow zone	F (gl)	p	η²	
Depression	17.9	12.4	19.10 (1, 327)	.000	.06	
Anxiety	11.3	7.1	14.98 (1, 327)	.000	.04	
Stress	21.4	17.5	10.94 (1, 327)	.001	.03	
PSQI	8.3	7.0	8.40 (1, 327)	.0014	.03	
Work habits changes	Yes	No	F (gl)	p	η²	
Depression	18.9	11.8	40.49 (1, 327)	.000	.11	
Anxiety	11.9	6.9	24.72 (1, 327)	.000	.07	
Stress	21.8	17.5	16.50 (1, 327)	.000	.05	
PSQI	8.4	7.2	6.88 (1, 327)	.009	.02	
Negative emotions	1.9	1.6	5.06 (1, 327)	.025	.02	
Layoff	Yes	No	F (gl)	p	η²	
Depression	30.4	16.2	18.26 (1, 327)	.000	.05	
Anxiety	16.4	10.1	4.56 (1, 327)	.034	.01	
Stress	30.7	20.1	11.67 (1, 327)	.001	.03	
Personally infected by COVID-19	Yes	No	F (gl)	p	η²	
PSQI	9.6	7.7	9.46 (1, 327)	.002	.03	
Nightmare distress	3.7	3.1	9.83 (1, 327)	.002	.03	
Negative emotions	2.3	1.8	8.90 (1, 327)	.003	.03	
Knowing a COVID-19 case	Yes	No	F (gl)	p	η²	
Depression	17.0	10.2	8.59 (1, 327)	.004	.03	
Anxiety	10.6	5.2	7.08 (1, 327)	.008	.02	
Stress	20.8	14.8	7.93 (1, 327)	.005	.02	
Emotional intensity	3.7	3.1	4.44 (1, 327)	.036	.01	
Nightmare distress	3.2	2.6	4.46 (1, 327)	.036	.01	
Knowing a COVID-19 death	Yes	No	F (gl)	p	η²	
Anxiety	11.7	9.2	6.50 (1, 327)	.011	.02	
Stress	22.1	19.2	8.13 (1, 327)	.005	.02	
PSQI	8.8	7.4	12.28 (1, 327)	.001	.04	
Nightmare distress	3.5	3.0	11.26 (1, 327)	.001	.03	
Recallers	High	Medium	Low	F (gl)	p	η²
Depression	20.0	16.1	13.9	9.85 (1, 326)	.000	.06
Anxiety	13.2	9.9	7.9	9.74 (1, 326)	.000	.06
Stress	23.3	20.1	16.9	13.43 (1, 326)	.000	.08
Emotional intensity	4.2	3.7	3.0	35.16 (1, 326)	.000	.18
Nightmare distress	3.5	3.3	2.7	11.08 (1, 326)	.000	.08
Nightmare frequency	High	Medium	Low	F (gl)	p	η²
Depression	23.8	16.2	12.4	29.31 (1, 326)	.000	.15
Anxiety	18.1	9.3	6.6	45.05 (1, 326)	.000	.22
Stress	28.2	20.3	15.4	48.13 (1, 326)	.000	.23
PSQI	10.7	7.9	6.3	32.61 (1, 326)	.000	.17
Emotional intensity	4.5	3.8	2.8	81.64 (1, 326)	.000	.33
Nightmare distress	4.0	3.5	2.2	85.98 (1, 326)	.000	.35
Negative emotions	2.5	1.9	1.3	30.93 (1, 326)	.000	.16

tional intensity, Emotional tone, Nightmare distress, and MRDs variables) and the independent variables Depression, Anxiety, Stress, and Sleep quality were assessed through regression analysis (see Table 5).

Several significant correlations were found for several dream variables, thus indicating that participants who reported higher levels of Depression, Anxiety, and Stress were also higher dream recallers and reported higher Emotional intensity in their dreams, higher Nightmare frequency and

distress, as well as a higher presence of Negative emotions in their MRDs. Furthermore, participants reporting poorer Sleep quality also were higher dream recallers and reported higher Emotional intensity in their dreams, higher Nightmare frequency and distress, as well as a higher presence of Negative emotions in their MRDs. No significant correlations were found for Emotional tone.

The associations between the dependent dream variables and the independent variables work changes, the personal

Table 5. Regression analyses for dream variables 1 (N = 329)

Scale	Depression			Anxiety			Stress			Sleep quality		
	β	t	p	β	t	p	β	t	p	β	t	p
Dream recall frequency	.235	4.37	.000*	.234	4.34	.000*	.278	5.23	.000*	.073	1.32	.188
Emotional intensity	.300	5.68	.000*	.344	6.62	.000*	.365	7.08	.000*	.303	5.75	.000*
Overall emotional tone	-.009	-.16	.877	-.018	-.32	.748	.086	1.56	.120	.000	-.01	.995
Nightmare frequency	.400	7.89	.000*	.434	8.70	.000*	.471	9.66	.000*	.398	7.86	.000*
Nightmare distress	.245	4.57	.000*	.305	5.79	.000*	.348	6.72	.000*	.281	5.29	.000*
Negative emotions	.193	3.56	.000*	.178	3.27	.001*	.256	4.78	.000*	.246	4.59	.000*
Sensory impressions	.083	1.50	.134	.106	1.92	.055	.118	2.15	.033*	.039	.69	.486

Note: β = Standardized estimates

impact of COVID-19, relationship to people affected by COVID-19, and relationship to people who have died of COVID-19 were also assessed through regression analysis (see Table 6).

Several significant correlations were found for multiple dream variables. In particular: a) participants who experienced negative work changes also reported higher Nightmare frequency and a higher presence of Negative emotions in their MRDs; b) participants personally affected by COVID-19 also reported higher Nightmare frequency and distress, as well as a higher presence of Negative emotions and Sensory impressions in their MRDs; c) participants who knew a COVID-19 case were higher dream recallers and reported higher Emotional intensity, as well as higher Nightmare frequency and distress; and, finally: d) participants who knew someone who died of COVID-19 also reported higher Nightmare frequency and distress. No significant correlations were found for Emotional tone.

3.4. Quali-quantitative Analysis of Most Recent Dreams

The MRDs' text corpus (N = 329) was characterized by 24.506 occurrences (of which 4.448 are distinct forms; threshold = 6). Within the corpus, 622 elementary context units (e.c.u.) were identified [of which 572 (91.96%) were classified], and 3.009 lemmas. Analysis highlighted 6 clusters (see Table 7).

Cluster 1: *Disorientation*, made up of 103 e.c.u. (18% of total). Specific vocabulary included the following: answer, ask, believe, calm, call, possible, end, happen. Example of e.c.u.: "I ask the nurse to give me the vaccine, but she says I don't deserve it. A little annoyed, I reply that of course I deserve it."

Cluster 2: *Estrangement*, made up of 125 e.c.u. (22% of total). Specific vocabulary included the following: people, stay, friend, beach, high school, sudden, notice, university, lived, balcony, neighbor, home. Example of e.c.u.: "It was my birthday, and I was having a party despite COVID and suddenly I realized that no one was complying with COVID regulations, and neither am I, so I start covering my face somehow and avoiding people or otherwise keeping my distance. I had a feeling that I was getting out of hand."

Cluster 3: *Family*, made up of 78 e.c.u. (14% of total). Specific vocabulary included the following: mother, embarrassment, brother, sister, uncle, father, phone, life, family, moment, grandfather, woman, dating. Example of e.c.u.: "I was with my mom and sister, and we were on our way to McDonald's when suddenly I ran into my dad, who is in the car with the very woman he left with after the first lockdown, and she was laughing and joking. I drop them off and tell the woman: 'I know, I know you fuck my dad. I would like to stop being teased. I have the right to know.' She was upset, my mother was upset."

Cluster 4: *Danger*, made up of 56 e.c.u. (10% of total). Specific vocabulary included the following: mall, seek, fall,

Table 6. Regression analyses for dream variables 2 (N = 329)

Scale	Have experienced work changes			Have being personally infected			Knowing an infected person			Knowing a died person		
	β	t	p	β	t	p	β	t	p	β	t	p
Dream recall frequency	-.029	-.52	.604	.037	.67	.500	.121	2.21	.028*	-.008	-.15	.880
Emotional intensity	-.043	-.77	.440	.094	1.70	.090	.116	2.11	.036*	.104	1.89	.059
Overall emotional tone	.020	.36	.718	-.035	-.63	.530	-.026	-.47	.636	.076	1.38	.169
Nightmare frequency	-.140	-2.56	.011*	.146	2.66	.008*	.163	2.99	.003*	.112	2.04	.042*
Nightmare distress	-.081	-1.47	.141	.171	3.14	.002*	.116	2.11	.036*	.182	3.35	.001*
Negative emotions	-.124	-2.25	.025*	.163	2.98	.003*	.010	.176	.860	-.008	-.14	.891
Sensory impressions	-.102	-1.84	.066	-.123	-2.24	.025*	.032	.59	.558	.056	1.01	.313

Note: β = Standardized estimates

Table 7. Cluster of MRDs

Cluster	N	%	Name
1	103	18	Disorientation
2	125	22	Estrangement
3	78	14	Family
4	56	10	Danger
5	107	19	Physical proximity
6	103	18	Nightmares

lose, risk, happen, approach, distress, ship, shout, tree, panic. Example of e.c.u.: *“We were on our way to a mall, but the route was different than usual. Upon reaching the parking lot, a shooting starts. Snipers come up to the side of the car and shoot, wounding me.”*

Cluster 5: *Physical proximity*, made up of 107 e.c.u. (19% of total). Specific vocabulary included the following: pleasant, person, kiss, hug, memory, light, review, play, feeling, couch, friends. Example of e.c.u.: *“I dreamt that I was in a prairie, and behind me comes a person I know and haven’t seen in about two years, and he hugs and kisses me, happy to see me again. Immediately afterwards I panic... for more than a year kisses and hugs have been forbidden.”*

Cluster 6: *Nightmares*, made up of 103 e.c.u. (18% of total). Specific vocabulary included the following: feel, move, fear, couldn’t, wake up, anguish, tight, block, naked, pass, get out, worry. Example of e.c.u.: *“I had gone out without a mask, my recurring nightmare. Sense of anguish and panic. Without the mask I felt naked and somehow guilty. Then I couldn’t get out from where I was hiding, as if I was glued and trying to call someone, but no one heard me.”*

4. Discussion

The present study aimed to analyze sociodemographic and COVID-19 related variables, mood, sleep quality, and oneiric activity during the third wave of the pandemic in Italy, in order to understand how this contextual, prolonged, and traumatic event affected people’s oneiric lives, as well as their psychological well-being.

Our results are consistent with recent studies on psychological well-being during the precedent pandemic waves (e.g., Benke et al., 2020; Casagrande et al., 2020; Coiro, Asraf, Tzischinsky, Hadar-Shoval, Tannous-Haddad, & Wolfson, 2021; Forte et al., 2021; Franceschini et al., 2020; Huang & Zhao, 2020; Zurlo et al., 2020), as well as on sleep quality in the time of COVID-19 (e.g., Alfonsi et al., 2021; Altena et al., 2020; Casagrande et al., 2020; Cellini et al., 2020; Coiro et al., 2021; Dai, Zhou, Li, Zhang, & Ma, 2021; Franceschini et al., 2020; Gorgoni et al., 2021; Jahrami, BaHammam, Bragazzi, Saif, Faris, & Vitiello, 2021; Marelli et al., 2021; Salfi et al., 2021; Shillington, Vanderloo, Burke, Ng, Tucker, & Irwin, 2021; Yuskel et al., 2021). Indeed, participants of our study reported moderate levels of Depression, Anxiety, and Stress, as well as poor Sleep quality. Furthermore, results indicated that Depression, Anxiety, and Stress were significantly positively correlated with poor Sleep quality, thereby indicating a possible influence of psychological difficulties on Sleep quality. Participants living in a region with higher restrictive quarantine/isolation measures, as well as participants whose work habits have changed as a result of the restrictive measures (in particular, participants who experienced a layoff during the lockdown), reported significantly

higher levels of Depression, Stress, and poor Sleep quality. We can therefore hypothesize that living under the strictest restrictive measures, as well as experiencing work changes, has relevant negative effects on individuals’ psychological well-being and sleep quality.

Moreover, our results indicated that participants who have been personally affected by COVID-19 reported significantly higher levels of poor Sleep quality, that participants who personally knew a COVID-19 case reported significantly higher levels of Depression, Anxiety, and Stress, and that participants who personally knew someone who died of COVID-19 reported significantly higher levels of Anxiety, Stress and poor Sleep quality. We can hypothesize that being more personally affected by the COVID-19 pandemic has negative consequences on individuals’ psychological well-being and sleep quality.

Our results are also consistent with previous studies on dreaming during the first two waves of the COVID-19 pandemic (e.g., Barrett, 2020; Conte et al., 2021; Gorgoni et al., 2021; Guerrero-Gomez et al., 2021; Iorio et al., 2020; MacKay & DeCicco, 2020; Parrello et al., 2020; Pesonen et al., 2020; Scarpelli et al., 2021; Schredl & Bulkeley, 2020; Sommantico et al., 2021). Indeed, participants in our study reported high Emotional intensity of their dreams, mostly distressing nightmares, as well as high Negative emotions and a high presence of Sensory impressions in their MRDs. Moreover, our results indicated that participants who have been personally affected by COVID-19 reported significantly higher Nightmare distress and a significantly higher presence of Negative emotions in their MRDs, while participants who personally knew a COVID-19 case reported significantly higher Emotional intensity to their dreams and Nightmare distress, and that participants who personally knew someone who died of COVID-19 reported significantly higher Nightmare distress.

In accordance with theoretical considerations on the transformative function of dreams and dreaming (Sommantico, 2018), we can hypothesize that being personally affected by, knowing people affected by or who have died of COVID-19, could stimulate a dream work that would express itself through high negative Emotional intensity. This data is also in line with the continuity hypothesis of dreaming and waking life, especially as applied to traumatic events (e.g., Barrett, 2001; Hartmann & Basile, 2003; Rosen, Reynolds, Yeager, Houck, & Hurwitz, 1991; Schredl, 2006), as well as classical psychoanalytic theory (e.g., Sommantico, 2016; Freud, 1900), according to which significant events in waking life can be associated with dreamt emotions.

The quali-quantitative analysis of the MRDs has also added important data, by highlighting recurring themes in the MRDs and thus confirming a strong continuity with waking experience. Indeed, participants dreamt of various aspects of the COVID-19 pandemic, such as vaccines, personal protective equipment, and restriction measures, all of which are related to stressful, dangerous, and disorientating situations. On the other hand, participants dreamt of pleasant memories related to the past by expressing their need to return to new forms of physical closeness, as well as of unexpected or embarrassing family situations. Differently from previous studies on dreaming during the first two waves of the COVID-19 pandemic (e.g., Iorio et al., 2020; Parrello et al., 2020; Sommantico et al., 2021), participants’ MRDs did not represent the places where quarantine-isolation is lived

out, maybe due to the less restrictive measures adopted during the third wave, as well as to an already underlined adaptation to the situation (Conte et al., 2021).

However, this study presents several limitations: a) convenience sampling implies possible biases, such as volunteers' bias (related to the special characteristics of individuals who voluntarily participate in a study); b) our sample was not balanced with respect to gender; and c) the lack of data on participants' oneiric lives prior to the onset of the COVID-19 pandemic prevents comparisons. Previous limitations and the cross-sectional study design limit the generalizability of results, as well as the conclusions that can be drawn.

5. Conclusions

The present study was conducted during the third wave of the COVID-19 pandemic in Italy, when mass media continuously communicated the increasing number of transmissions and deaths, and reminded audiences of the obligation to practice isolation and social distancing.

Results of the present study highlight the severe impact of the COVID-19 pandemic on individuals' psychological well-being, as well as on sleep quality. According to the continuity hypothesis of dreaming and psychoanalytic theory, results also show how a prolonged and traumatic event, such as the COVID-19 pandemic, can appear in dreams through explicit references to the virus and its correlates.

In sum, this study demonstrates how the integration of experimental and clinical perspectives, including both qualitative and quantitative analyses, when combined with different theoretical approaches, such as the continuity hypothesis and psychoanalytic theory, contributes to a deeper and more comprehensive analysis of dreaming.

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