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Editorial

New Editors: Fabio Presaghi[a], Carlo Lai[b]
Past-Editors: Francesco Gazzillo[b], Stefano Livi[a]

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Scientific Editors of Psychology Hub have changed. New Editors are Fabio Presaghi and Carlo Lai, that greet past Editors Francesco Gazzillo and Stefano Livi, for their work and for having migrated the Psychology Hub into the international rankings of Psychology Journals with H-index and Impact Factors.

The first four contributions of the present issue of Psychology Hub were Edited by the past Editors, while the new Editors edited the last contribution.

In the first contribution, titled "Do text messages impact adolescents' sleep? A Narrative Review", Mesce, Cerniglia, and Cimino review the literature on the impact of adolescents' text messaging habits and their sleep health. Based on their narrative review, the Authors confirmed the positive association of the role of texting habits during bedtime with several sleep disturbances.

The second contribution by Baldner, Viola, and Pierro, titled "The indirect Need for Cognitive Closure effect on preference for men in authority", investigates and replicates the hypothesis that individuals with a chronic or acute NCC can seize and freeze upon stereotypes, as they represent stable and indisputable knowledge. Results confirmed that individuals (independently of gender) who endorse these stereotypes into their belief systems are going to prefer men over women in authority.

Loscalzo and Giannini, the third contribution, titled "Covid-19 Outbreak and Italian College Students' Well-being: Evidence for both Negative and Positive Consequences", gives us a glimpse into the College student's psychological and physical impairment due to Covid-19 restrictions. Based on an ample sample of 6075 Italian college students, results showed that many Italian college students experienced high levels of sleep quality impairment and had high stress, depression, and anxiety symptoms during the lockdown.

The fourth contribution is a critical review, titled "The Definition and Similar Constructs of Gratitude: A Critical Review", by Subramanian, Thakur, and Chalil, on similarities and differences between the 22 definitions of gratitude and other similar constructs to find a single definition. The authors conclude their contribution with a proposal that gratitude should be defined by just three aspects: the emotional aspect, the unexpected benefit, and the situational aspect.

Finally, a research note from Prislei, Di Cicco, d'Urso, and Sensales, titled "Representations of immigration on Facebook: A lexicographic analysis of the communication of Italian populist and non-populist leaders (2019-2021)", based on social representation theoretical framework, proposes a psycho-social reading of Facebook posts by five Italian political leaders (Giorgia Meloni and Matteo Salvini, two leaders of the right and center-right populist parties; Luigi Di Maio the leader of the populist catch-all party 5-Star Movement;

and Nicola Zingaretti and Laura Boldrini, two left-wing non-populist leaders) during the Conte II government (5 September 2019 to 13 February 2021) and concerning communication on immigration. Results showed that populist leaders from the right parties produced far more populist posts on immigration than left-center leaders, confirming a solid interrelation between social media communication and populism.

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Do text messages impact adolescents' sleep? A Narrative Review

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Abstract

New technologies, such as cell phones, are now a fundamental part of daily life and have become an essential tool in the social lives of all individuals. Adolescent sleep has been explored through various conceptual and empirical models and the most recent research shows that electronic media use has a significant role in sleep, especially during adolescence. This paper reviews the current knowledge of the impact of adolescents' text messaging habits and their sleep health. A narrative review of the literature on the impact of texting habits on adolescents' sleep was performed. Empirical evidence concerning adolescents' sleep confirms the relevance of texting habits in developing and maintaining sleep disturbances. In particular, increased time spent texting after getting into bed is associated with insufficient sleep, insomnia, and irregular sleep patterns, such as social jetlag, tiredness in school, difficulties in both waking up and falling asleep and differences between weeknights and weekends.

Keywords: sleep; adolescence; texting; text messages

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Introduction

Sleep is a fundamental indicator of overall health and concurrently an important component of individual wellness since it affects physical, emotional, and mental health as well as daily functioning. (Langer & Filer, 2020). Sleep needs vary across ages and are impacted by lifestyle and health (Barber & Cucalon, 2017; Kloss et al., 2016): sleep is essential for adolescent physical growth and development, just as for socio-emotional development and wellbeing (Dewald et al., 2010; Perkinson-Gloor, Lemola, & Grob, 2013; Sivertsen et al., 2015). Guidelines for sleep times are broken down by age group: 8 to 10 hours of nightly sleep is recommended for teenagers (Chaput, Dutil, & Sampasa-Kanyinga, 2018). However, despite these recommendations, the average duration of nighttime sleep among adolescents has declined by one hour in the last century (Matricciani, Olds, & Petkov, 2012): compared to adolescents in 2009, adolescents in 2015 were more likely to report getting less than 7 hours of sleep per night (Twenge, Krizan, & Hisler, 2017).

Several studies have shown that poor-quality sleep and inadequate amounts of sleep during adolescence predict worse academic performance, worse mental health, depression, anxiety, suicidal ideation, risk-taking behaviors, and poorer quality of life (Chelminski et al., 1999; Fredriksen et al., 2004; Gau et al., 2007; Lee et al., 2017; Roberts, Roberts, & Duong, 2009; Short & Louca, 2015; Short et al., 2013; Tarokh, Saletin, & Carskadon, 2016; Titova et al., 2015). Sleep deficiency among adolescents is considered a public health problem in the U.S. (Wernett & Emory, 2017) and in European and Asian countries (Huang, Wang, & Guilleminault, 2010; Sivertsen et al., 2014).

Puberty is a time of changing sleep patterns now characterized by a pronounced shift of bedtimes to later in the evening. For many students, this results in sleep deprivation during the school week and sleeping in on weekends (Crowley, Acebo, & Carskadon, 2007; Lemola, Schwarz, & Siffert, 2012; Perkinson-Gloor et al., 2013). The delay of bedtime during adolescence is a consequence of both biological maturation and environmental factors (Crowley et al., 2007). Among the environmental factors, electronic media use in the evening seems to have a relevant role: research on children's and adolescents' evening use of electronic media and its effect on sleep consistently shows that such use is associated with a reduction in total sleep time and delayed bedtime (Cain & Gradisar, 2010).

Exposure to electronic media is pervasive, especially during adolescence: teenagers in the United States can pass an average of eight hours per day using them (Rideout, Foehr, & Roberts, 2010). As media becomes lighter, smaller, and more accessible, adolescents are bringing media into their beds. According to the *2014 Sleep in America Poll*, 75% of children aged 6-17 had at least one media device in their room, including televisions (45%), music players (40%), tablets or smartphones (30%), video game consoles (25%) and computers (21%) (National Sleep Foundation, 2015). 85% of both male and female adolescents reported using their computer within the last hour before bed; over 90% of adolescent females and around 80% of adolescent males reported using their cell phone within the last hour before bed: approximately 50% of adolescents called or texted after lights out at least once a month when they would otherwise be sleeping (Hysing et al., 2015).

Digital technologies can interfere with sleep in three different ways: (a) by replacing time spent sleeping, for example, frequent aural notifications from mobile phones signaling email, social media alerts, and text messages may affect adolescents' sleep, including sleep efficiency, by awakening them throughout the night (Fobian, Avis, & Schwebel, 2016), (b) by containing psychophysiologically arousing content (e.g., highly positive or negative peer interactions such as text messages and social media) that can interfere with the ability to fall asleep, and (c) through melatonin-suppressing light emissions from devices that increase alertness and delay sleep onset (Burnell et al., 2022; LeBourgeois et al., 2017). When the exposure occurs before bed, it significantly prolongs sleep onset, delays the circadian clock, suppresses melatonin, and decreases morning alertness (Chang et al., 2015; Wood et al., 2013).

Several studies have shown that cell phone usage at night is associated with poor subjective sleep quality, excessive daytime sleepiness, insomnia, and increased medical complaints, including self-reported headaches, difficulties with attention and focus (Arora et al., 2014; Gradisar et al., 2013; Honda et al., 2008; Munezawa et al., 2011; Van den Bulck, 2007).

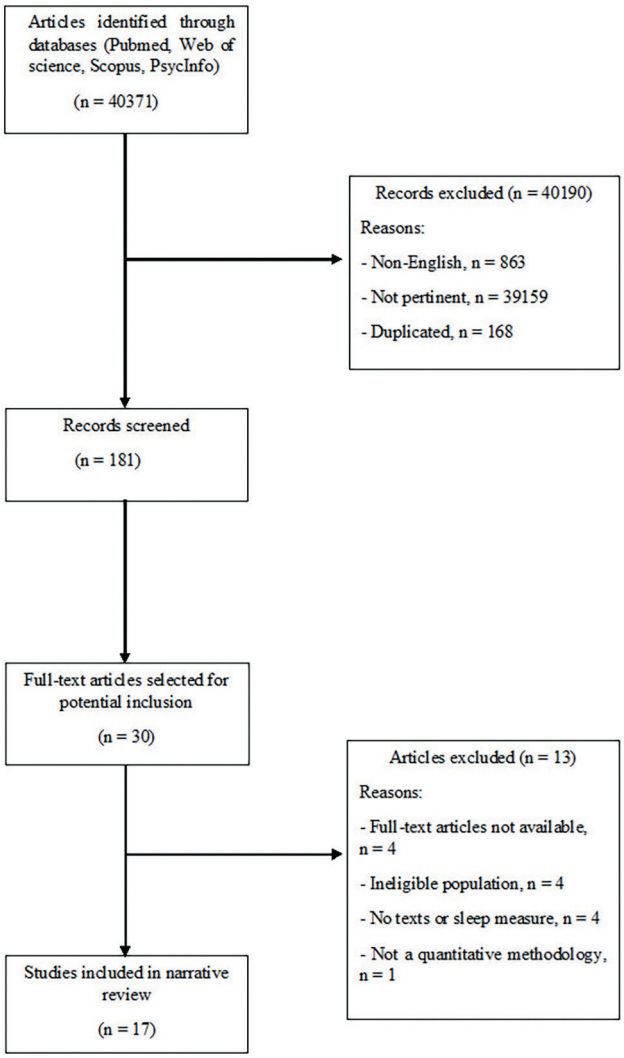
The "24/7", and "always-on" nature of society, compounded by easy access to cell phones, the Internet, television, and other media may have significantly contributed to the sleep deprivation and poor sleep experienced by young adults (Moulin & Chung, 2016). Texting is especially high in adolescents and young adults and many studies show that sending or receiving text messages not only contributes to later bedtimes and inadequate amounts of sleep but can also affect circadian rhythm (Carter et al., 2016; Crowley et al., 2015; Lemola et al., 2015; Malone et al., 2016; Touitou, 2013; Van den Bulck, 2007) and lead to social jetlag (Wittmann et al., 2006).

Based on the above considerations, this narrative review aimed to examine the current knowledge of the relationship between adolescents' sleep and their text messaging habits.

Method

The review of international literature was performed in the following electronic databases; a total of 40371 studies (PubMed, n = 397; PsychInfo, n = 148; Web of Science, n = 342; Scopus, n = 39484) were initially identified. The key terms used were: (adolescen* OR teen* OR "young adults" OR "high school students") AND (WhatsApp OR telegram OR chat* OR messag* OR text*) AND (sleep* OR insomnia OR circadian OR "morningness-eveningness" OR "delayed sleep" OR "social jet-lag" OR hypersomnia). The search strategy is detailed in Figure 1.

Fig. 1. Flow chart.



Eligibility Criteria

Since the primary focus of this review was the impact of text messaging on sleep habits in adolescents, articles that addressed other well-being constructs (e.g., school burnout and academic performance, depressive symptoms, headaches) were included only if they also made specific reference to the purpose of the review.

Studies were excluded based on the following criteria: (a) the article did not describe a quantitative methodology; (b) the article was not available in full text; (c) the article was written in languages other than English; (d) the article was not published between January 2012 and January 2022; (e) the article did not contain a measure of sleep habits and/or a measure of text messaging habits; (f) the study did not include a sample of adolescents aged between 13 and 19 years.

Results

Seventeen studies were included in the narrative review, published from 2013 to 2021. Eight (47.06%) of the studies were conducted in the United States of America, six (35.29%) studies were conducted in Europe, two (11.77%) in Oceania, and one (5.88%) in Asia. Study sample sizes ranged from 55 to 4511 participants and consisted of adolescents ranging in age from 12 to 19 years.

Among the 17 studies selected in this review, most showed that receiving or sending text messages has an influence on adolescents' sleep. A brief description of these studies is given in Table 1.

Tab. 1. Characteristics of included studies.

Reference	Age (years)	Sample (N)	Measurement of Text Messages	Measurement of Sleep
Burnell et al., 2022	M = 13.37 SD = 1.14	388	Number text x/day; Hours spent messaging	Wearable-recorded sleep, n = 254 Self-reported sleep, n = 134
Durusoy et al., 2017	M = 15.6 SD = 1.3	2150	Number text x/day (classified in categories)	Survey of sleep disturbances over the past month
Fobian, Avis, & Schwebel, 2016	M = 14.89 SD = 0.62	55	Total time spent texting daily; Number of times subjects were awakened in the night by their phone	Actigraphy (Phillips Respironics MiniMitter Actiwatch-2 devices); Sleep diaries
Garmy, 2014	M = 16	204	Frequency of texting at night rated on a Likert scale	Survey of sleep duration, bedtime, tiredness, difficulties falling asleep, and waking up.
Garmy and Ward, 2018	M = 16.23 SD = 0.63	278	Frequency of texting at night rated on a Likert scale	Sleep and Media Habits Questionnaire
Garmy et al., 2020	Range = 13-15	1518	Frequency of texting/other messaging at night rated on a Likert scale	Survey-based on the Sleep and Media Habits Questionnaire
Grover et al., 2016	Range = 13-18	1537	Survey about instant messaging before and after lights out	Survey of sleep duration and daytime sleepiness symptoms
Hena and Garmy, 2020	M = 13.9 SD = 0.4	1518	Frequency of texting/other messaging at night rated on a Likert scale	Survey-based on the Sleep and Media Habits Questionnaire
Lemola et al., 2015	M = 14.8 SD = 1.3	362	Frequency of texting/other messaging and time spent online in bed before sleep and in general rated on a Likert scale	Insomnia Severity Index; Survey about sleep duration
Nathan and Zeitzer, 2013	M = 16 SD = 1.2	211	Survey about the subjective impact of mobile phone use rated on a Likert scale	Epworth Sleepiness Scale (ESS) modified for use in adolescents rated on a Likert scale
Pecor et al., 2016	Range = 13-18	633	The survey instrument was a modified version of the one developed by Ming and colleagues (2011). Students were instructed to complete the survey based on a typical day	

Reference	Age (years)	Sample (N)	Measurement of Text Messages	Measurement of Sleep
Polos et al., 2015	M = 13.3 SD = 2	3139	Time spent texting and on social media; Number of texts sent/received while in bed after lights-out; Number of times per night they were awakened in bed due to incoming texts	Minimal Insomnia Severity Scale; Pediatric Daytime Sleepiness Scale; Children's Morningness-Eveningness Preferences Scale; Survey about sleep duration and bedtimes
Reynolds et al., 2019	M = 13.3 SD = 2	189	A survey to determine the frequency of instant messaging use during the hour before bedtime, assessed on a Likert scale	Children's Report of Sleep Patterns
Smith et al., 2020	Range = 13-17	4811	Prebedtime Behavior Questionnaire (adapted)	Pittsburgh Sleep Quality Index
Tamura et al., 2017	M = 16.2 SD = 0.9	295	A survey about mobile phone use: time x/day	Athens Insomnia Scale
Tavernier et al., 2017	M = 14.5 SD = 1.84	71	Number text x/day; Time spent messaging	Actiwatch Score (Phillips Respironics)
Whipps et al., 2018	M = 18.7 SD = 0.4	114	Nighttime media usage was assessed using 7 questions adapted from those used by Adachi-Mejia et al (2014) rate on a Likert scale	Pittsburgh Sleep Quality Index

Sleep efficiency

Fobian and colleagues (2016) evidence that sleep efficiency was negatively related to daily time spent text messaging ($r(52) = -0.29$, $p < .05$), consistent with findings of Tavernier and colleagues (2017): at the daily level, adolescents slept less on days when they reported spending more time than usual texting ($B = -0.236$, $P = .011$); another study (Burnell et al., 2022) found associations between sleep duration and hours spent messaging (respected, self-report sleep: $b = -.64$, $p = .008$, $\beta = -.17$; wearable-recorded sleep: $b = -.83$, $p = .010$, $\beta = -.20$) and also noted association with later bedtime and hours spent messaging ($b = 61.88$, $p < .001$, $\beta = .23$).

One study (Polos et al., 2015) observed that STRICT (Sleep Time-Related Information and Communication Technology) use correlated positively with insomnia and negatively with sleep duration on school nights, and positively with later bedtimes; the effect sizes were modest in general, with most of the correlation coefficients between 0.2 and 0.4.

Adolescents' sleep habits are particularly influenced by texting in bed or during the night: in one study (Grover et al., 2016), no difference in sleep duration was observed among groups of students with different messaging durations before lights out ($F = 1.35$, $p = .25$); there was, however, a significant difference among categories of messaging duration after lights out ($F = 3.69$, $p = .005$). Two of the seventeen studies show that sending and/or receiving text messages at night was significantly associated with having shorter sleep on weeknights ($p = .001$), being tired more often at school ($p = .028$), having greater difficulties both sleeping ($p = .010$) and waking up ($p = .019$), going to bed later in the week ($p = .034$) and weekends ($p = .001$), and waking up later on weekends ($p = .031$) (Garmy, 2014; Garmy & Ward, 2018).

However, Reynolds and colleagues (2019) noted that there was no significant association between the high frequency of instant messaging in the hour before bed and time in bed; further, they observed that controlling for age, the odds of reporting insufficient sleep on most nights was an OR = 2.68 (95%, CI = 1.39 - 5.17) times higher for those reporting a high frequency of instant messaging. Consistently, one study (Smith et al., 2020) demonstrated that limited texting was associated ($p = .012$) with longer sleep duration for boys aged 13-14 years and that limiting texting ($p = .012$), and Internet access ($p = .013$) were associated with longer sleep duration for boys aged 15-17 years. In this regard, Garmy and colleagues (2020) found that short sleep duration (<8 hours) is correlated with nighttime texting x/week: OR = 2.50 (95% CI = 1.90–3.28, $p<.0001$).

One study (Pecor et al., 2016) evinced no difference in hypersomnolence scores between students who messaged after lights out and those who did not ($H = 0.31$, $df = 1$, $p = 0.58$), and, finally, one study (Nathan & Zeitzer, 2013) showed that even if there wasn't a Spearman correlation between the number of texts and sleepiness ($r = 0.13$, $p = 0.07$), in examining the final model it appears that adolescents who felt that they needed to be accessible "around the clock" (ESS = 9.2 ± 2.9) were sleepier than all others (ESS = 6.7 ± 3.4) ($p < 0.01$, post hoc t-test); this study also shows that those who had attempted to reduce their mobile phone use had a higher texting rate (60 vs. 20 per day; $p < 0.01$, Mann–Whitney U test) and stayed awake later than desired more often (53% vs. 11%, weekly or daily; $p < 0.01$, $\chi 2$ test).

A 2015 study (Lemola et al., 2015) differs slightly from previous findings: sleep duration on weekdays and sleep difficulties were negatively correlated with all types of electronic media use at night, however, regression models revealed that being online on social media or chatting in bed, but not watching TV, video games, and calling/text in bed, were related with sleep duration on weekdays ($\beta = -.21$, $t = -4.13$, $p < 0.001$).

Finally, time spent using the mobile phone may also be important: Tamura and colleagues (2017) noted that using a cell phone for 120 min or more for online chatting was associated with insomnia (OR: 2.81; 95% CI: 1.28–6.15), compared with mobile phone use of 30 min or less for online chat.

Sleep disturbances

One of the studies included (Whipps et al., 2018) observed that higher scores on the Pittsburgh Sleep Quality Index, indicative of poorer sleep quality, were related to reports of texting after bed ($r = .199$, $p = .04$) and, also, that texting was related to sleep interruptions ($r = .293$, $p = .002$).

Durusoy and colleagues (2017) evidenced that sleep disturbances were more frequent in mobile phone users (OR =

1.53, CI = 1.05–2.21) and that number of text x/day (> 200) and sleep disturbances were significantly associated: OR = 1.84 (95% CI = 1.23 – 2.74, p < .001).

A 2013 study (Nathan & Zeitzer, 2013) observed that adolescents who felt that they needed to be accessible "around the clock" (ESS = 9.2 ± 2.9) were sleepier than all others (ESS = 6.7 ± 3.4) (p < 0.01, post hoc t-test). In this regard, a 2015 study (Lemola et al., 2015) showed that being online on social media or chatting in bed before sleep, but not watching TV, video games, calling/texting in bed, and having the mobile switched on at night, was related with sleep difficulties (β = .22, t = 4.10, p < 0.001). Polos and colleagues (2015) observed that STRICT use correlated positively with daytime sleepiness, and negatively with children's morningness-eveningness preferences scores, suggesting evening chronotype. The effect sizes were modest in general, with most correlation coefficients between 0.2 and 0.4.

Sending and/or receiving text messages at night was significantly associated with being tired more often at school (p = .028; Garmy, 2014) and poorer overall health (p<.0001; Garmy et al., 2020).

One study (Grover et al., 2016), noted that for daytime sleepiness symptoms scores, there was no difference among categories of messaging before lights out (H = 3.39, df = 4, p > .05) but there was a significant difference among categories of messaging duration after lights out (H = 25.25, df = 4, p < .001).

Finally, one study focused on social jetlag: Hena and Garmy (2020) found a significant association with texting at night (p = 0.002); nighttime texting showed a significant OR (OR = 1.487) with social jetlag.

Discussion

This narrative review aims to examine the relationship between adolescents' sleep and their text messaging habits. Research in the last decade has documented that greater overall electronic media use, especially nighttime-specific, was associated with worse sleep quality and shorter sleep duration (e.g., Cain & Gradisar, 2010; Carter et al., 2016; LeBourgeois et al., 2017; National Sleep Foundation, 2015; Schoeni, Roser, & Röösli, 2015; Woods & Scott, 2016). Specifically, media use is associated with three aspects of adolescent sleep health: sleep efficiency, sleep onset, and sleep offset (Oka, Suzuki, & Inoue, 2008; Van den Bulck, 2004). STRICT use during adolescence is significantly associated with insomnia, daytime, and eveningness sleepiness and also correlates with poor academic performance, later bedtimes, and fewer hours of sleep on school nights; age and gender moderate some of these relationships (Polos et al., 2015). Mobile phone overuse was linked to disturbances in sleep habits, which is known to be a risk factor for insomnia (Gellis et al., 2014). Sending and receiving text messages, in-bed in particular, is rampant: it's more common in high school students and girls and appears to be more widespread than previously reported (Adachi-Mejia et al., 2014; Munezawa et al., 2011). In fact, while boys reported playing video games more compared to girls (Galland et al., 2017; Hysing et al., 2015; Mullan, 2018; Pieters et al., 2014; Rideout, 2016), girls, in contrast, were more engaged with activities involving communication, including social media and text messages (Rideout, 2016; Viner, Davie, & Firth, 2019). Evidence report that girls had significantly shorter sleep duration than boys (Garmy, 2014; Garmy et al., 2020; John, 2014; Polos et al., 2015).

Increased time spent on media use or/and texting after getting into bed is associated with delayed sleep onset; compared to adolescents, those who reported sending more online messages had shorter sleep duration: this review shows that sending or receiving text messages was associated with increased odds of sleep disturbances, social jetlag, insufficient sleep, and insomnia (Durusoy et al., 2017; Garmy et al., 2020; Hena & Garmy, 2020; Reynolds et al., 2019; Tamura et al., 2017).

Texting at night is a sleep-disturbing activity: in fact, it's associated with shorter sleep, sleep problems, and irregular sleep patterns, such as tiredness in school, difficulties in both waking up and falling asleep, and differences between weeknights and weekends, as some of the studies selected in this review showed (Burnell et al., 2022; Fobian et al., 2016; Garmy, 2014; Garmy & Ward, 2018; Garmy et al., 2020; Grover et al., 2016; Hena & Garmy, 2020; Polos et al., 2015; Tavernier et al., 2017; Whipps et al., 2018).

Receiving text messages at night can particularly affect sleep, as teens who text each other right before bed may find it difficult to disengage from these conversations to sleep (Burnell et al., 2022). Research indicated that increased phone awakenings at night were associated with earlier sleep onset. This could be because sleep disruption due to awakenings caused by incoming texts after bedtime may cause insomnia but this is unlikely to be the sole explanation. One potential explanation is that habitually engaging in texting in bed and being awoken by such texts primes the adolescent for a state of psychological and physiological hyperarousal due to excessive emotional and mental stimulation around and after bedtime (Polos et al., 2015). One study selected in this review (Nathan & Zeitzer, 2013) shows that even if there wasn't a Spearman correlation between the number of texts and sleepiness, in examining the final model it appears that adolescents who felt that they needed to be accessible "around the clock" were sleepier than all others; this study also shows that those who had attempted to reduce their mobile phone use had a higher texting rate and stayed awake later than desired more often.

Prior research suggests that the combination of teen social pressures, circadian biology, and the immediacy of texting as a means of communication may become mutually reinforcing factors (Troxel, Hunter, & Scharf, 2015). This combination of factors, in turn, makes it exceedingly difficult for teens to "disconnect" at bedtime or provide sufficient time to unwind before bedtime, potentially setting the stage for inadequate quality or insufficient sleep. Moreover, exposure to backlit displays that are common to mobile devices may affect sleep by disrupting circadian function and melatonin expression (Arora et al., 2014). Sleep integrity may be compromised even with just a few text messages: indeed, it has been shown that even brief pulses of light lasting seconds through closed eyelids can delay melatonin release (Figueiro, Bierman, & Rea, 2013). Time spent messaging is important because it could be extending time spent on completing other tasks that consequently could limit adolescents' sleep: those who do not send or receive

messages may be more efficient without constant distractions and sleep disruptions (Grover et al., 2016).

The content of messages may also interfere with sleep. Although texting communication tends to be neutral, some content can nonetheless be psychophysiologically stimulating, such as sexual exchanges or text-based conversations that are distressing, negative in content, or retread daytime concerns that may conceivably result in maladaptive autonomic responses, leading to sleep initiation and maintenance difficulties (Burnell et al., 2022; Ehrenreich et al., 2020; LeBourgeois et al., 2017; Polos et al., 2015).

Limitations and suggestions for future research

Inspired by previous work (Mei et al., 2018), this review aimed to focus attention on the relationship between adolescents and nighttime texting, going to outline a general overview of possible sleep issues that may result. It was found that the impact of text messaging on youth sleep is well known but poorly investigated: in fact, only 17 studies were included to meet eligibility criteria. Thus, the first limitation is the small number of studies, which may reduce the statistical power to determine heterogeneity and accuracy of effect sizes. Furthermore, the results of the selected studies should be viewed considering several methodological limitations: most of the selected studies did not use standardized questionnaires to measure the number of text messages or time spent sending/receiving texts. Sleep, instead, has been measured primarily by self-reported data that could be biased by social desirability; some studies have measured sleep with a wearable instrument, and although it is more objective than self-report assessments, it should not be considered the "gold standard" for obtaining sleep data as other methods are available, such as polysomnography, although more expensive and less environmentally valid. In future studies, sleep could be objectively assessed with actigraphy, while sleep hygiene and electronic media use could be measured by experience sampling methods in order to achieve higher validity of measurement.

In addition, in some studies (Fobian et al., 2016; Garmy & Ward, 2018; Nathan & Zeitzer, 2013; Reynolds et al., 2019; Tamura et al., 2017; Tavernier et al., 2017; Whipps et al., 2018) because of the small sample size (N < 300), some of the statistically significant results may have been due to chance alone; future studies should be conducted using a larger sample size to validate these findings.

Because of the cross-sectional design of the studies, it is not possible to conclude causality. It is impossible to determine which factors most influence sleep duration, and thus health, given that puberty itself is a factor. Future studies should have a longitudinal design to examine these associations in the context of experimental designs and specifically assess possible bidirectional effects between texting habits and sleep behaviors.

Conclusions

Modern technologies, intrusive and/or too engaging digital platforms and media-related behaviors are rapidly changing and exceed our understanding of their impact on sleep and health. Hand-held mobile screens, such as smartphones and tablets, complicate research on the relationships between media and sleep in developing individuals (LeBourgeois et al., 2017).

Excessive media use in the late evening and overnight may further exacerbate the negative consequences of inadequate sleep: in particular, this narrative review demonstrates that sending or receiving texts impacts adolescents' sleep and may be associated with sleep difficulties such as delayed awakening and/or falling asleep, insomnia, worse sleep quality, and daytime tiredness.

Lack of sleep, as well as inadequate sleep, are associated with daytime tiredness (Hale & Guan, 2015), which in turn is linked to a large number of negative consequences, including poor academic performance, worse physical health, and a host of psychological problems that impact healthy daytime functioning (Beebe, 2011; Davis, Avis, & Schwebel, 2013; Falbe et al., 2015; Stallones, Beseler, & Chen, 2006; Wolfson & Carskadon, 2003). In fact, due to the continuous development of infrastructures and technologies, electronic media have penetrated deeply into daily life and have become an essential tool in the social life of all individuals.

The results of this review show that future research must continue to focus on these issues.

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All authors contributed equally to this manuscript.

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The indirect Need for Cognitive Closure effect on preference for men in authority

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Abstract

A recent research has found an effect of the need for cognitive closure, or the desire for stable and certain knowledge, on the acceptance on stereotypes of women as not wanting, and not being good at, roles involving authority. This study found an indirect, experimentally manipulated (i.e., acute) NCC effect, through these harmful gender stereotypes, on preference for men in positions of authority. According to NCC theory, individuals who have either an acute or chronic desire for stable and certain knowledge can accept many kinds of stereotypes, given that stereotypes themselves are perceived to be sources of stable and certain knowledge. As the NCC can be acute as well as chronic (i.e., an individual difference), we sought to assess the indirect effect of chronic NCC on preference for men in authority through acceptance of harmful gender stereotypes. We conceptually replicated this finding in a sample of 199 participants recruited from the United States. Given these results, we suggest avenues for future research.

Keywords: Need for Cognitive Closure; Sexism; Management

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The indirect Need for Cognitive Closure effect on preference for men in authority

Outcomes related to harmful stereotypes about women exist in many domains—including representation in roles that have been traditionally held by men, like management and leadership roles—and appears to be a global phenomenon (World Economic Forum, 2021). There is a substantial literature on this topic that dates back to the 1970s (for a handful of examples see Eagly & Karau, 2002; Glick & Fiske, 2011; Spence & Helmreich, 1972). For example, Role Congruity Theory, a principle theory in this field, states that stereotypes of how women *should* act are incompatible with stereotypes of how leaders *should* act; consequently, women leaders can be harmed by this stereotype incongruity (Eagly & Karau, 2002).

Only recently has research asked whether harmful gender stereotypes—particularly about women in the "nontraditional" domains of management and leadership—are more accepted when individuals have a need for stable and secure knowledge about their social worlds. This *need for cognitive closure* (NCC; Kruglanski, 2004) motivates individuals to find desired stable and certain knowledge about the world, first by *seizing* upon knowledge (i.e., the urgency phase) and then by *freezing* upon it (i.e., the permanence phase). The NCC can be either chronic (i.e., an individual difference) or acute (i.e., the consequence of a particular state). According to NCC theory, any source of information can be seized and frozen upon, as long as it is perceived to offer the desired stability and certainty. For instance, individuals high in either a chronic or acute NCC can be more likely to engage in system justification (e.g., Jost, 2019), as the status quo can provide stable and certain knowledge about our social worlds (e.g., Jost & Hunyady, 2005).

Likewise, there is an interesting potential link between the NCC and stereotypes. Even though there is no stereotypic content in the NCC construct itself, stereotypes themselves are sources of knowledge that apply to large groups and are resistant to change and, thus, can provide desired stability and certainty in knowledge. The potential for stereotypes to grant perceived stable and certain knowledge can be referred to as its *epistemic property*. Given stereotypes' epistemic property, they could be very attractive to individuals with a chronic or acute NCC. According to this argument, harmful stereotypes about women in leadership and management can be accepted because they provide perceived stability and certainty. Consequently, individuals with a chronic or acute NCC could also be more likely to prefer men in authority as a result of their acceptance of these stereotypes.

Although early research with small samples found a relationship between NCC and stereotypes (Kruglanski & Freund, 1983), and more recent research has found an NCC effect on different types of behavior consistent with stereotypes (Baldner et al., 2021a; Baldner & Pierro, 2019a, Study 1; Baldner & Pierro, 2019b; Roets, Van Hiel, & Dhont, 2011), there has been very little modern research that has directly assessed the relationship between NCC and work-related gender stereotypes. The little research that exists regards perceptions of women as being incompatible with leadership and authority. For instance, (1) chronic NCC had an effect on gender stereotype-congruent memories among individuals confronted with women leaders, (2) chronic NCC had an indirect effect on the acceptance of these stereotypes (Baldner & Pierro, 2019a, Study 2), and (3) acute NCC had an indirect effect on preference for men in roles of authority through these specific stereotypes (Baldner et al., 2021b). These studies included gender as a covariate; there is not yet evidence that are meaningful gender differences among individuals with an NCC. These findings are consistent with the research conducted by Roets and colleagues (2011): although these researchers did not specifically investigate stereotypes of women in positions of authority, they nonetheless found an indirect effect of chronic NCC on sexism through various right-wing attitudes, controlling for participants' gender.

Given that the NCC can be both acute and chronic, and given the importance of replication in modern social psychology (Świątkowski & Dompnier, 2017), it is important to conceptually replicate the direct effect of chronic NCC on acceptance of these stereotypes as well as the indirect effect of chronic NCC on women's outcomes through these stereotypes. In the current work, we will focus on the replication of the indirect NCC effect on preference for men in authority through acceptance of these stereotypes (Baldner et al., 2021b); this could have practical importance for women's outcomes in many roles, from management to technical and expert roles.

Hypotheses, Research Plan, and Power Analysis

The primary objective of this research was to assess the indirect effect of self-reported (e.g., chronic) NCC on the preference for men in positions of authority through acceptance of stereotypes of women as not wanting, and not being good at, these types of positions. We also considered participants' age, gender, and political orientation as potential covariates that could influence this relationship. Power analysis for the indirect NCC effect was assessed through a Monte Carlo simulations application developed by Schoemann, Boutlon, & Short (2018). This application takes, as input, the correlations between variables as well as the standard deviation of each variable. For the purposes of the power analysis, we initially assumed a moderate relationship (r=.30) between our measures of NCC and preference for men in authority, as well as a strong relationship (r=.50) between our measure of gender stereotypes and preference for men in authority. We then reduced these assumptions, to rs=.20 and .40, respectively, in order to account for the potential effect of our covariates. Standard deviations for each variable were set to 1. Given power and alpha of 80% and 5%, respectively, we would need a sample of at least 188 participants. Supplementary power analyses for correlations were conducted with G*Power 3.1 (Faul et al., 2009). Setting alpha to 5%, we have the power to observe correlations of .19, .22, and .25 at 80%, 90%, and 95% power, respectively. The research was approved by the university ethical committee and informed consent was asked of all participants before data collection; participants had the option to withdraw from the study without penalty at any time. Data for our analyses can be found at https://osf.io/3wk4m/?view_only=91c932eff1554cfeb78c2777aa785996.

Methods

Participants

Given the online nature of our data collection, we wanted to recruit a slightly larger sample than what was required by our power analysis in order to account for participants who did not complete all tasks. We recruited 223 participants through Amazon Mechanical Turk, 199 of which completed all tasks. These 199 participants (*Mage*=40.8, *SDage*=13.3; 60.8% women) were our final sample. Participants were predominantly university graduates (59.3%) White (76.9%); 7.5% were Black, 8.5% Latino, 6.0% Asian; 2 participants indicated their ethnicity as "other."

Measures

Need for Cognitive Closure. Participants completed the 14-item NCC scale (Pierro & Kruglanski, 2005). Items on this scale measure both the seizing (e.g., "In case of uncertainty, I prefer to make an immediate decision, whatever it may be") and freezing (e.g., "Generally, I do not search for alternative solutions to problems for which I already have a solution available") tendencies. All items are responded to on likert-type scale from 1 (*Strongly Disagree*) to 6 (*Strongly Agree*) and are averaged to form a single NCC score. In the current study, internal reliability was adequate (α=.79).

Gender Stereotypes. Participants completed the 7-item scale on negative work-related stereotypes towards women developed by McCoy and Major (2007). Items on this scale assess both career aspirations (e.g., "On average, women enjoy supervising others less than men do") as well as items that deal with emotional stability "e.g., "Women on average are more likely than men to become emotional when dealing with stress"). All items are responded to on likert-type scale from 0 (*Strongly Disagree*) to 6 (*Strongly Agree*) and are averaged to form a single stereotypes score. In the current study, internal reliability was adequate (α=.83).

Preference for men in authority. Participants responded to the 15-item Gender Authority Measure (GAM; Rudman & Kilianski, 2000). Items on this scale assess the general preference to be subordinate to men (e.g., "In general, I would rather work for a man than for a woman") as well as the preference to be under the authority of men in specific professions (e.g., "If I were in serious legal trouble, I would prefer a male to a female lawyer"). All items are responded to on likert-type scale from 1(*Strongly Disagree*) to 5 (*Strongly Agree*) and are averaged to form a single GAM score. In the current study, internal reliability was adequate (α=.84).

Covariates. In addition to the above variables, we also assessed participants' gender, as well as their political orientation. The latter was measured by a single item, developed by Koleva and colleagues (2012). Responses were made on a likert-type scale from 1 (*Strongly Liberal*) to 6 (*Strongly Conservative*).

Results and Discussion

As can be seen from Table 1, the measures for NCC, gender stereotypes, and GAM were all intercorrelated. All correlations were sufficiently strong to be visible at 95% power. The very large correlation between GAM scores and the measure of gender stereotypes, $r(197)=.60$, $p<.001$, 95% CI [.50, .68] allows to state with 97.5% confidence that this effect has at least a large magnitude (i.e., $r=.50$). The large-to-moderate correlation between NCC and the measure of gender stereotypes, $r(197)=.40$, $p<.001$, 95% CI (.27, .51), allows us to state with 95% confidence that the effect is approximately between moderate (i.e., $r=.30$) and large in magnitude (i.e., $r=.50$). The fairly moderate correlation between NCC and GAM scores, $r(197)=.35$, $p<.001$, 95% CI (.22, .46), cannot rule out the possibility of a small-to-moderate effect. These correlations were slightly larger than what we assumed for the purposes of our power analysis.

Tab. 1. Bivariate Correlations and Demographic Statistics (n=199)

	1	2	3	4	5	M	SD
1. NCC	(.79)					3.74	0.70
2. GS	.40**	(.83)				3.31	1.18
3. GAM	.35**	.60**	(.84)			2.94	0.66
4. PO	.13†	.18**	.36**	-		3.56	1.58
5. Gender	-.07	-.16*	-.23**	-.03	-	-	-
6. Age	-.15*	-.21**	-.09	.14*	-.06	40.84	13.30

Note. PO=Political Orientation; higher values indicate more conservative orientations; Gender (1 = Man; 2 = Woman); Internal reliabilities on the diagonal
†p<.10; *p<.05; **p<.01

In addition, there were weaker correlations between other variables. Particularly noteworthy correlations were between political orientation and gender stereotypes (i.e., higher gender stereotypes associated with more politically conservative belief), $r(197)=.18$, $p=.009$, 95% CI (.04, .31); and between gender and gender stereotypes (i.e., higher gender stereotypes among men), $r(197)= -.16$, $p=.009$, 95% CI (-.29, -.02). There were also significant correlations between age and both NCC, $r(197)= -.15$, $p=.031$, 95% CI (-.28, -.01) and gender stereotypes, $r(197)= -.21$, $p=.003$, 95% CI (-.33, -.07). Although these correlations are interesting in that their respective confidence intervals cannot rule out moderate effects, only the correlation between age and gender stereotypes is sufficiently large to be detected at 80% power given our sample, notwithstanding the statistical significance.

We followed up this analysis by assessing the indirect NCC effect on preference for men in authority through gender stereotypes, controlling for participants' age, gender, and political orientation. The indirect effect was assessed through the SPSS PROCESS macro version 4.0 with 5,000 bootstrapped samples. As can be seen from Table 2 and Figure 1, NCC had a significant effect on the measure of gender stereotypes (b=0.57, t=5.30, $p<.001$, 95% CI [0.36, 0.79]) and gender stereotypes had a significant effect on preference for men in authority (b=0.27, t=8.08, $p<.001$, 95% CI [0.20, 0.33]), controlling for NCC. The NCC effect on the dependent variable fell below significance when the gender stereotypes measure was included in the model (b=0.10, t=1.94, $p=.053$, 95% CI [-0.001, 0.21]). The indirect effect was significant, b=0.15, se=0.03, 95% CI (0.09, 0.22).

Tab. 2. Indirect NCC on GAM scores through Gender Stereotype acceptance (n=199)

	Gender Stereotypes					GAM				
	b	t	95% CI		*p*	b	t	95% CI		*p*
			LL	UL				LL	UL	
NCC	0.57	5.30	0.36	0.79	<.001	0.10	1.94	-0.001	0.21	.053
GS	-	-	-	-	-	0.27	8.08	0.20	0.33	<.001
PO	0.12	2.52	0.02	0.21	.012	0.10	4.72	0.06	0.15	<.001
Gender	-0.36	2.39	-0.66	-0.06	.017	-0.18	-2.57	-0.33	-0.04	.010
Age	-0.01	-3.00	-0.03	-0.004	.003	-0.0009	-0.30	-0.006	0.004	.757

Fig. 1. *Indirect NCC effect on preference for men in authority through gender stereotypes*

Note. †p<.10; *p<.05; **p<.01

Exploratory Analysis: The potential moderating role of gender in the relationship between NCC and acceptance of work-related gender stereotypes

Although previous research has not found evidence of any interaction effect between NCC and gender on stereotype-related outcomes, this dataset provided the opportunity to test for this possibility. In order to do so, we used PROCESS model 8; this allows for a NCC x gender interaction on both the mediator (i.e., acceptance of harmful gender stereotypes) and the outcome (i.e., preference for men in authority). Results are displayed on Table 3. As can be seen, neither interaction was significant. The simple effects on NCC on the mediator were significant among both men (effect= 0.65, se=0.16, *p*<.001) and women (effect= 0.52, se=0.13, *p*<.001). However, the simple effects of NCC on the outcome were only significant among men (effect= 0.18, se=0.08, *p*=.02) but not women (effect= 0.05, se=0.06, *p*=.41).

Tab. 3. Exploratory NCC x Gender Moderated Mediation Analysis (n=199)

	Gender Stereotypes					GAM				
	b	t	95% CI		*p*	b	t	95% CI		*p*
			LL	UL				LL	UL	
NCC	0.57	5.27	0.36	0.79	<.001	0.10	1.94	-0.001	0.21	.053
GS	-	-	-	-		0.27	8.03	0.20	0.33	<.001
Int.	0.13	0.63	-0.29	0.56	.524	0.12	1.27	-0.07	0.33	.205
PO	0.12	2.52	0.02	0.21	.012	0.10	4.74	0.06	0.15	<.001
Gender	-0.36	2.37	-0.66	-0.06	.018	-0.18	2.55	-0.32	-0.04	.011
Age	-0.01	-3.02	-0.028	-0.006	.002	-0.001	-0.37	-0.006	0.004	.708

Note: Int= NCC x Gender interaction

General Discussion

There has not been much research on the relationship between the need for cognitive closure, acceptance of harmful gender stereotypes in the workplace, and their outcomes. The little research exists, however, has focused more on the effect of acute NCC even though NCC can be both acute and chronic. The primary objective of the current study was to conceptually replicate a past finding: that there is an indirect effect of chronic NCC on a preference for men in authority through the acceptance of stereotypes of women as not wanting, and not being good at, these types of roles (Baldner et al., 2021a). We replicated this result with an appropriately powered sample. According to our theory, individuals with a chronic or acute NCC can seize and freeze upon stereotypes, as they represent knowledge that is perceived to bestow the desired stability and certainty. Individuals who incorporate these stereotypes into their own belief systems can then act upon them—in our case, by preferring men over women in authority. We also briefly tested, in an exploratory analysis, the potential moderating role of gender in the relationship between NCC and acceptance of harmful gender stereotypes. We did not find evidence for this effect. On one hand, this is consistent with past research that has found that both men and women with an NCC can have harmful attitudes and behaviors towards women in authority (Baldner et al., 2021a; Baldner & Pierro, 2019a; Baldner & Pierro, 2019b; Pica et al., 2018; Roets et al., 2011).

This research has practical implications that could be critical in furthering our understanding of the discrimination that women face in the workplace. If our conclusions are generally correct, then variables such as gender and political orientation, although important, cannot be sufficient to explain attitudes towards men and women in authority. Instead, it is possible that women and/or individuals on the political left can also have these harmful attitudes as long as they have a desire for stable and certain knowledge that can be satisfied by accepting harmful stereotypes about women in positions of authority. This could turn the spotlight to overlooked groups who are nonetheless at risk for holding negative views to women. Moreover, it could present a way to reverse these attitudes, inasmuch as it is possible to either change individuals' need for closure or to use this need in the service of women in these roles—for instance, by presenting individuals with information about women in roles of authority that reflects positive and important information that is also relatively stable and certain.

However, there is other interesting research to be done on this topic. In the current study, we found weak but potentially interesting correlations involving gender, age, and political orientation. Indeed, the study that inspired this work (Baldner et al., 2021a) also found evidence for a possible moderating effect of political orientation, such that the relationship between NCC and acceptance of these stereotypes was actually stronger among political liberals. Likewise, there were interesting correlations involving both gender and age. It is feasible that men and women could differ on the perceptions of women in authority; given that gender stereotypes change over time (e.g., Charlesworth & Banaji, 2021), it could also be possible that older individuals are more accepting of older stereotypes that have lost some of their popularity. On the other hand, given

that individuals high in either an acute or chronic NCC can engage in system justification, it could be possible that these factors would not influence the NCC effect. Taking all of these factors together, it could be interesting to study the NCC effect among a sample of young, left-wing women to assess the extent of the NCC effect.

Another important direction for future research on the relationship between NCC and acceptance of gender stereotypes regards its cross-cultural impact. Research has also studied gender stereotypes, more broadly, in cross-cultural designs (for a recent example, Obioma, Hentschel, & Hernandez Bark, 2021), as well as in understudied cultures (for a recent example, Shafi, 2021). There is a great need for this kind of cross-cultural research, as studying a construct in different cultures can test it in under different influences and, ultimately, can tell us more about the construct (Wang, 2016). However, the NCC has not yet been studied in cross-cultural designs.

Research on the NCC is often conducted in Italy, Belgium, and the United States, three WEIRD (Western, Educated, Industrialized, Rich, and Democratic) countries that nonetheless differ for outcomes for women in roles of authority. For instance, in the most recent Global Gender Gap Report (World Economic Forum, 2021), the United States ranked 29th of 156 countries on the proportion of women legislators, senior officials, and managers—the data most related to outcomes for women in "nontraditionally feminine" roles. On the other hand, Italy ranked 98th. Understanding the differences between these two countries would be of great help and the possible role of the NCC should be investigated. Of course, this effect could be studied in many other countries.

This study had limitations which should be noted and that can be addressed in future research. Inherent in the nature of the chronic (i.e., self-report) NCC is that the current study used a completely self-report design. Any correlational design brings with it two general possibilities: that one of the variables causes the other or that both are caused by a third variable. Although we have causal evidence for the NCC effect from the research that inspired this study (Baldner et al., 2021a), this causal pathway itself could benefit from further study. Indeed, it would be both interesting and informative if an experimental mediation design, in which both the NCC and acceptance of harmful gender stereotypes would be experimentally manipulated, was a focus of subsequent research. In this way, we could more fully establish the causal path from NCC to preference for men in authority through acceptance of these stereotypes. We are also not aware of any research on variables that could cause NCC, acceptance of harmful stereotypes, and preference for men in authority. Moreover, as mentioned above, we cannot make strong conclusions about the potential roles played by participants' age, gender, and political orientation; future work can investigate the NCC effect in more focused samples.

Author Contributions

The first author (CB) primarily wrote the manuscript and conducted analyses

The second author (MV) assisted with writing and analyses

The third paper (AP) developed hypotheses and edited the manuscript

Conflict of interest

The authors have no conflicts to present

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Ethical Approval

This research was approved by the departmental ethics committee, protocol number 0000570

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Covid-19 Outbreak and Italian College Students' Well-being: Evidence for both Negative and Positive Consequences

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Abstract

Background: The Covid-19 virus rapidly spread worldwide, with Italy being one of the most affected countries. College students might have experienced psychological and physical impairment due to this threat to their health and the uncertainty concerning their academic path because of universities' unexpected and sudden closure. Hence, we aimed to analyze college students' well-being during the Covid-19 pandemic. Methods: We gathered 6075 Italian college students (M age = 23.60±5.02). They have been evaluated for depression, anxiety, stress, daytime sleepiness, and sleep quality impairment. MANOVAs, MANCOVAs, and one-sample t-tests (with students gathered before the pandemic as the reference group) have been performed. Results: During the Covid-19 pandemic, females and Humanities students experienced higher psychological and physical impairment than males and Technology students. Though, the participants generally experienced an amelioration in their well-being compared to students evaluated before the Covid-19 outbreak, indicating a positive effect of the pandemic. Conclusions: We suggest that Universities should increase their psychological services' offering, including group counseling interventions. They should also plan to reduce the burden felt by their students during the "regular" academic life. They could allow students to attend lessons from home through recording, and they should try to reduce the overstudying climate.

Keywords: anxiety; depression; pandemic; psychopathology; sleep

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Introduction

In December 2019, many cases of pneumonia of unknown etiology arose in Wuhan, Hubei province, China. The pathogenic agent was a novel Coronavirus: 2019-nCov, or Covid-19 (Ryu & Chun, 2020; Wang, Horby, Hayden, & Gao, 2020). This virus rapidly becomes a global public health emergency due to its substantial mortality rate and rapid transmission (Guan et al., 2020; Liu, Gayle, Wilder-Smith, & Rocklöv, 2020; Rocklöv, Sjödin, & Wilder-Smith, 2020). In the beginning, it seemed that the spread happened through direct contact with local fish and animal markets; next, Chan et al. (2020) highlighted that it could also be transmitted person-to-person, including contact with asymptomatic people (Rothe et al., 2020), hence increasing its diffusion rate.

Italy is among the most affected countries outside China. The first Italian case was registered on February 20, 2020, in a hospital in a small city of Northern Italy (Gagliano et al., 2020). On August 30, 2020, the World Health Organization (2020) reported 266.853 cases and 35.473 deaths for Italy. To contain the pandemic, the Italian government, among other measures, decided to allow individuals' movements only for well-motivated reasons (i.e., health or work) and, therefore, closed schools and universities. Hence, from March 2020, Italian college students suddenly found themselves in a home-confinement situation and without the possibility of attending courses and taking exams in person. Hence, they lived in great uncertainty concerning how their universities would have managed their lessons, exams, and graduation since their institutions provided information gradually, based on the epidemiologic situation's development and the government's decisions. Thus, their physical and psychological well-being could have been negatively affected since they experienced both a life-threatening situation and great vagueness concerning their academic path. In line with this speculation, Clabaugh, Duque, and Fields (2021) found high levels of uncertainty regarding the academic future and high levels of distress and difficulties in coping with the changes due to the pandemic in US university students. Moreover, Loscalzo and Giannini (2021) found that intolerance of uncertainty positively predicts Studyholism (or obsession towards studying; cfr., for more details concerning this construct, Loscalzo, 2019, 2021; Loscalzo & Giannini, 2017, 2018a, 2018b, 2020, 2022a), which in turn predicts an impairment in study quality and motivation.

In the literature, an increasing number of studies highlighted psychological and physical downsides among the general population during the Covid-19 outbreak (e.g., Dozois, 2021; Franceschini et al., 2020; Mazza et al., 2020; Pierce et al., 2020; Wang, Pan, Wan, Tan, Xu, Ho, & Ho, 2020). Concerning college students specifically, almost half of the wide Chinese sample analyzed by Ma et al. (2020) showed mental health issues, with the highest prevalence for probable acute stress (34.9%), followed by probable acute depression (21.1%) and anxiety (11.0%). Li, Cao, Leung, and Mak (2020) further highlighted the negative impact of the Covid-19 pandemic on college students' psychological health: when assessed after two weeks of lockdown, students reported increased anxiety and depressive symptoms and higher negative affect. About other countries, Bangladeshi university students experienced high levels of depression and anxiety (Islam, Barna, Raihan, Khan, & Hossain, 2020), and more than half of a (small) sample of Medical Sciences Iranian students suffered from psychological distress during the Covid-19 pandemic (Ghafari, Mrighafourvand, Rouhi, & Tabrizi, 2021). In the US, students evaluated their health as poorer than before the Covid-19 outbreak (Hagedorn, Wattick, & Olfert, 2022). In France, a study conducted on more than 69.000 university students by Wathelet et al. (2020) showed that a consistent percentage of students showed suicidal thoughts (11.4%), severe distress (22.4%), high levels of perceived stress (24.7%), severe depression (16.1%), and high anxiety (27.5%). Finally, also Italian college students have been negatively affected by the Covid-19 pandemic. Interestingly, Romeo, Benfante, Castelli, and Di Tella (2021) found that Italian university students experienced higher anxiety and depression than workers.

Hence, this study aims to analyze further Italian students' well-being during the Covid-19 pandemic. More specifically, it evaluates if some demographic and study-related variables are associated with a higher psychological and physical impairment (also controlling for negative affect as a personality trait). Moreover, we compare students' well-being with that of students assessed before the pandemic to evaluate if there is a difference in their health. We did not posit a hypothesis about the increase or decrease in well-being during the pandemic since we speculate that both cases could apply. The qualitative analysis conducted on 202 Italian college students showed that most participants experienced negative effects on their study (83.70%), such as anxiety for the uncertainty concerning the exams' format, the fear of being forced to delay graduation, and difficulties in their study concentration. However, almost half of the participants also reported positive effects, including using the study to cope with the distress due to lockdown and more time for studying (Loscalzo, Ramazzotti, & Giannini, 2021). Therefore, this qualitative study suggested both positive and negative study-related consequences for many students. In the same line, Loscalzo and Giannini (2021) showed that, when compared to a group of students gathered before the Covid-19 outbreak, Italian college students experienced higher levels of Studyholism (as a negative study-related variable) but also lower dropout intention. Therefore, we can speculate that, for some students, the abrupt changes in the academic and social life, jointly with the worry about contracting the virus, might have caused higher distress. Though, at the same time, other students might have benefited from these changes, as the lockdown might have allowed them to have more time for studying and following online lessons, with a consequent ameliorating in their well-being.

By shedding light on college students' well-being during the Covid-19 pandemic, this study might provide valuable insights for university-based interventions to manage the consequences of the Covid-19 outbreak.

Methods

Participants

We recruited a sample of 6075 Italian college students aged between 18 and 68 years (M age = 23.60±5.02) during the

first lockdown imposed by the government in 2020. Most of them are females (74.6%) and not working besides studying (76.5%). The majority of them live in Tuscany (80.3%), across 10 of its Counties (46.7% living in Florence). Though, all Italian regions are represented, with the following distribution concerning the three macro-areas (there are some missing data): North, 10.3%; Center, 83.4%, South, 5.8%. In line with this geographic distribution, most students are enrolled at the University of Florence (78.3%). Among the other most represented universities there are Bologna (1.7%), Bergamo (1.3%), and Pisa (1.1%). All other universities report a percentage of enrolled students below .9%. About the major of study, we recruited students from all the main courses. Among the ones most represented, there are Educational studies (9.8%), Economy (9.5%), Engineering (8.4%), Psychology (7.8%), Social Sciences (6.6%), Medical Studies (6.5%), Architecture and Design (6.1%), and Law (5.2%). Finally, the proportions of students in years 1 to 5 were 19.4%, 17.1%, 29.0%, 14.3%, 18.9% (1.3% is missing). This sample has also been used for different analyses reported in other papers (Loscalzo & Giannini, 2021, 2022b; Loscalzo et al., 2021).

To compare the levels of the psychological and physical well-being of the current participants with that of students evaluated before the Covid-19 outbreak, we used the sample gathered by Loscalzo and Giannini (2019), which is similar to our current sample concerning age (Mean = 23.53±4.43) and gender prevalence (females: 75.4%). Moreover, the University of Florence is again the most represented, even with a lower percentage (i.e., 39.2%). The samples are similar also concerning the distribution for the seven macro-areas related to the major of study. More specifically, the values for each macro-area are, for Loscalzo and Giannini (2019) and the present sample respectively: Technology, 11.2% and 15.4%; Social Sciences, 31.0% and 40.4%; Humanities, 25.9% and 15.4%; Medical Studies, 13.0% and 6.5%; Sciences, 12.8% and 9.2%; Nursing (and other courses under the label of "Health Professions", for Loscalzo and Giannini, 2019), 1.1% and 2.5%; Other Medical studies (labeled "Para-Medical studies" in Loscalzo and Giannini, 2019), 5.0% and 3.5%. The distribution of Loscalzo and Giannini (2019) is also similar concerning the proportion of students in years 1 to 5: 16%, 20.9%, 26.7%, 14.2%, and 15.2%.

Materials

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1998). It is a 20-item self-report instrument that assesses Positive and Negative Affect. The response format is a 5-point Likert scale ranging from 1 (*Very slightly* or *not at all*) to 5 (*Extremely*). There are two versions of the PANAS that refer, in the instruction, to affect as a trait or state. We used the trait version for this study since we aimed to include negative affect as a covariate. We administered the Italian version by Terracciano, McCrae, & Costa (2003), which reported a Cronbach's *alpha* of .87 for negative affect, trait version.

Mini Sleep Questionnaire (MSQ; Zoomer, Peder, Rubin, & Lavie, 1985). It is a 10-item self-report instrument comprehending two scales: Sleep (or Sleep Quality Impairment) and Wake (or Daytime Sleepiness). The participants answer a 7-point Likert scale ranging between 1 (*Never*) and 7 (*Always*), referring to their last 7 days. We administered the Italian version (Natale, Fabbri, Tonetti, & Martoni, 2014), which does not include one item (snoring) in the scoring, and that is characterized by a Cronbach's *alpha* of .75 for both scales.

Depression Anxiety Stress Scales-21 (DASS-21; Lovibond and Lovibond, 1995a). It is a 21-item self-report scale derived from the 42-item version (DASS; Lovibond and Lovibond, 1995b). It comprehends three scales: Depression, Anxiety, and Stress. The participants answer through a 4-point Likert scale ranging between 0 (*Did not apply to me at all - Never*) and 3 (*Applied to me very much, or most of the time – Almost always*), referring to the symptoms experienced in the last 7 days. We used the Italian validation by Bottesi et al. (2015), which retained the three-factor and one-factor structures. The internal reliability (Cronbach's α) of the DASS-21 scales (in the community sample) are .82 (Depression), .74 (Anxiety), and .85 (Stress).

Procedure

First, we asked for approval from the Ethical Committee of the University of Florence. Next, we created an online questionnaire, including the instruments described in the previous section and other scales not used for the present paper. Moreover, we asked for demographic data (e.g., gender, age) on the first page of the questionnaire. Concerning the Informed Consent, we wrote the related information on the first page of the questionnaire; hence, we asked the participants to check a box saying they agreed to participate in the research by filling out the questionnaire on the following pages.

To get a broad sample of participants, we asked for our University Office's collaboration: students attending courses in Florence received the questionnaire's link through an invite sent to their institutional email address. Moreover, to gather students from other Italian cities, we spread the link on Facebook University groups (including University of Florence groups).

Data Analysis

We performed analyses using SPSS.26.

First, we investigated the percentages of students characterized by severely impaired physical and psychological well-being. We used Natale et al. (2014)'s cut-off score for sleep quality and daytime sleepiness (or wake quality). For selecting the cut-offs for the three DASS-21 scales, we used Mazza et al. (2020) approach: we calculated the scores corresponding to one (average symptoms) and two (high symptoms) standard deviations referring to the Mean values reported by Bottesi et al. (2015) for the Italian community sample on which they validated the Italian DASS-21.

Next, we analyzed through 10 MANOVAs if there are differences in psychopathology and sleep concerning gender, area of living (i.e., North, Center, South Italy), year of study, major of study (as coded in seven macro groups, in line with

Loscalzo and Giannini, 2022b and Loscalzo and Giannini, 2019), and professional condition (i.e., student or student and worker). Then, when statistically significant, we repeated MANOVAs analyses, including trait negative affect as a covariate (MANCOVAs). Given the high number of multiple comparisons (37 follow-up ANOVAs in total), we adjusted the alpha level through the Bonferroni correction for multiple comparisons; hence, we used an adjusted alpha level of .001 (Chen, Feng, & Yi, 2017).

Finally, for evaluating if the levels of psychological and physical well-being changed during the Covid-19 outbreak, we performed five one-sample t-tests, calculating Cohen's *d* for effect size. We used the *Mean* found by Loscalzo and Giannini (2019) in their broad sample of Italian college students as the reference value for these analyses.

Results

Psychological and physical well-being of college students during the Covid-19 outbreak

First, we analyzed how many students might be classified as poor sleepers and experiencing high and extremely high depression, anxiety, and stress symptoms.

Regarding physical well-being, the participants reported scores ranging between 4 and 28 (M = 15.91±5.83) for wake quality (or daytime sleepiness) and scores ranging between 5 and 35 (M = 17.24±6.97) for sleep quality impairment. In line with these high *Mean* values, more than half of the participants scored higher than the clinical cut-off for daytime sleepiness (59.7%, n = 3629) and sleep quality (52.5%, n = 3192).

Concerning psychological health, the scores for depression, anxiety, and stress range between 0 and 21 for all the DASS-21 scales, and the *Mean* values are higher than those found by Bottesi et al. (2015) in their community sample. There are high percentages of students with "high" and "extremely high" scores for depression, anxiety, and stress symptoms. Table 1 shows the frequency and the percentages for each score's category and DASS-21 scale, while Table 2 reports the *Mean* values for the three scales.

Tab. 1. Frequencies and percentages for the DASS-21 scores.

DASS-21 scale	Score	*f*	%
Depression	Average	2596	42.7
	High	1084	17.8
	Extremely High	2395	39.4
Anxiety	Average	3730	61.4
	High	684	11.3
	Extremely High	1661	27.3
Stress	Average	2883	47.5
	High	1521	25.0
	Extremely High	1671	27.5

Note. Average, High, and Extremely High cutoff scores have been calculated using Mazza et al.'s (2020) method.

Demographic and study-related differences concerning psychological and physical well-being during the Covid-19 outbreak

Next, to evaluate if, during the Covid-19 outbreak, there have been differences in students' well-being concerning some demographic and study-related variables, we performed 10 MANOVAs with DASS-21 and MSQ scales as dependent variables.

For gender, the multivariate test showed a statistically significant effect on both the DASS-21 [F(3, 6071) = 64.11, p < .001, partial η2 = .03] and the MSQ [F(2, 6072) = 127.36, p < .001, partial η2 = .04]. More specifically, follow-up ANOVAs showed that females, as compared to males, have higher levels of Depression, Anxiety, Stress, Daytime Sleepiness, and Sleep Quality Impairment. Table 2 shows the descriptive statistics and ANOVAs results.

About the area of living (i.e., North, Center, South Italy), using the Bonferroni correction for the alpha level (i.e., .001), the multivariate test did not show a statistically significant effect on the DASS-21: F(6, 12072) = 2.53, p = .019, partial η^2 = .001. Instead, the area of living has a statistically significant multivariate effect on the MSQ: F(4, 12074) = 5.96, p < .001, partial η^2 = .002. Though, follow-up ANOVAs showed a statistically significant effect on Daytime Sleepiness only: students living in Central Italy reported lower levels (M = 15.75±5.87) than both students living in North (M = 16.73±5.69, p < .001) and South (M = 16.62±5.40, p = .021) Italy.

Moreover, being a full-time student, or a student who also works, does not have an effect on the DASS-21 [F(3, 6071) = .97, p = .406, partial η^2 < .001] and on the MSQ [F(2, 6072) = 2.45, p = .086, partial η^2 = .001]. Neither the year of study have an effect on the DASS-21 and MSQ, respectively: F(12, 15837.76) = 1.80, p = .043, partial η^2 = .001; F(8, 11974) = 1.54, p = .137, partial η^2 = .001.

Finally, the major of study, as coded in seven areas (i.e., Technology, Social Sciences, Humanities, Medical Studies, Sciences, Nursing, and Other Medical Studies), has a multivariate statistically significant effect on both DASS-21 [F(18, 15933.02) = 5.69, p < .001, partial η^2 = .01] and MSQ [F(12, 11268) = 4.26, p < .001, partial η^2 = .005]. Follow-up ANOVAs showed a statistically significant effect for all the subscales (Table 2 shows the descriptive statistics and the ANOVAs results). Bonferroni post-hoc analyses highlighted that students from Humanities majors have higher Depression and Anxiety than students from Technology, Social Sciences, and Medical areas (p < .001), and – marginally – higher Depression as compared to Other Medical students (p = .051) and higher Anxiety than Sciences students (p < .001). Also, they have higher Stress than Technology (p = .001), Social Sciences (p = .001), and Sciences (p = .005) students. Humanities students also have higher Daytime Sleepiness than Technology (p < .001), Social Sciences (p < .001), Sciences (p = .028), and Other Medical (p = .031) students. Finally, Humanities students have higher Sleep Quality Impairment than Technology (p < .001) and Social Sciences (p = .002) students. Moreover, Technology students have lower Sleep Quality Impairment than Social Sciences (p = .052) and Nursing (p = .007) students.

Tab. 2. ANOVAs results of DASS-21 and MSQ scales by gender and area of study

Variable		Group	*n*	*M(SD)*	*F*	*df*	*p*	partial η*2*
Depression	Gender	Male	1542	7.55(5.44)	57.97	1,6073	<.001	.01
		Female	4533	8.81(5.67)				
		Tot	6075	8.49(5.64)				
	Area of Study	Technology	933	8.49(5.66)	8.37	6,5635	<.001	.01
		Soc.Sciences	2455	8.27(5.48)				
		Humanities	935	9.66(5.92)				
		Medical	395	7.86(5.69)				
		Sciences	558	8.84(5.81)				
		Nursing	154	8.21(5.77)				
		Other.Medical	212	8.35(5.46)				
		Total	5642	8.56(5.66)				
Anxiety	Gender	Male	1542	4.05(4.14)	128.46	1,6073	<.001	.02
		Female	4533	5.63(4.93)				
		Tot	6075	5.23(4.79)				
	Area of Study	Technology	933	4.81(4.64)	7.95	6,5635	<.001	.01
		Soc.Sciences	2455	5.23(4.70)				
		Humanities	935	6.12(5.26)				
		Medical	395	4.90(4.51)				
		Sciences	558	4.83(4.64)				
		Nursing	154	5.84(5.04)				
		Other.Medical	212	5.47(5.00)				
		Total	5642	5.27(4.81)				
Stress	Gender	Male	1542	9.26(5.35)	163.97	1,6073	<.001	.03
		Female	4533	11.29(5.38)				
		Tot	6075	10.78(5.44)				
	Area of Study	Technology	933	10.55(5.42)	3.88	6,5635	.001	.004
		Soc.Sciences	2455	10.75(5.30)				
		Humanities	935	11.58(5.60)				
		Medical	395	10.67(5.44)				
		Sciences	558	10.51(5.63)				
		Nursing	154	11.03(5.80)				
		Other.Medical	212	10.91(5.49)				
		Total	5642	10.84(5.45)				
Daytime Sleepiness	Gender	Male	1542	14.01(5.58)	227.38	1,6073	<.001	.04
		Female	4533	16.55(5.78)				
		Tot	6075	15.91(5.83)				
	Area of Study	Technology	933	15.45(5.83)	5.31	6,5635	<.001	.01
		Soc.Sciences	2455	15.90(5.79)				
		Humanities	935	16.86(5.91)				
		Medical	395	16.07(5.66)				
		Sciences	558	15.86(5.84)				
		Nursing	154	16.06(5.67)				
		Other.Medical	212	15.46(6.06)				
		Total	5642	15.98(5.83)				
Sleep Quality Impairment	Gender	Male	1542	15.24(6.70)	175.66	1,6073	<.001	.03
		Female	4533	17.92(6.93)				
		Tot	6075	17.24(6.97)				
	Area of Study	Technology	933	16.45(6.97)	6.57	6,5635	<.001	.01
		Soc.Sciences	2455	17.26(6.88)				
		Humanities	935	18.30(7.06)				
		Medical	395	17.09(7.01)				
		Sciences	558	17.19(7.24)				
		Nursing	154	18.62(6.99)				
		Other.Medical	212	17.01(7.03)				
		Total	5642	17.31(6.70)				

Note. Anxiety, Depression, and Stress are from the DASS-21 (Depression Anxiety Stress Scale-21). Daytime Sleepiness and Sleep Quality Impairment are from the MSQ (Mini Sleep Questionnaire). Technology = Engineering, Architecture, Design, Informatics; Soc.Sciences = Social Sciences: Psychology, Sociology, Economy, Law, Educational Studies, …; Humanities: Literature, Language, Philosophy, History, …; Other.Medical = Other Medical studies, that is, majors of the medical area but different from the Medicine and Surgery course (here labeled "Medical studies"): Biotechnology, Pharmacy, Odontoiatry. In Loscalzo and Giannini (2022b) and Loscalzo and Giannini (2019), this group is labeled "Para-Medical".

Psychological and physical well-being of college students during the Covid-19 outbreak controlling for trait negative affect

We found that gender, area of living, and major of study are associated with students' well-being during the Covid-19 outbreak. Hence, we performed MANCOVAs analyses adding trait negative affect as a covariate to evaluate if they still predict students' well-being when controlling for the tendency to experience negative affect as a stable trait.

The MANCOVAs we run on DASS-21 and MSQ, using gender as independent variable, highlighted that negative mood has a statistically significant effect on both the scales, respectively: $F(3, 6070) = 1442.76$, $p < .001$, partial $\eta^2 = .42$; $F(2, 6071) = 776.31$, $p < .001$, partial $\eta^2 = .20$. Though, controlling for negative affect, gender still has a multivariate effect on both the DASS-21 and the MSQ, respectively: $F(3, 6070) = 24.59$, $p < .001$, partial $\eta^2 = .01$; $F(2, 6071) = 65.34$, $p < .001$, partial $\eta^2 = .02$. However, subsequent ANOVAs highlighted that gender does not have a statistically significant effect on Depression when controlling for negative mood. It still affects Anxiety and Stress instead. About Daytime Sleepiness and Sleep Quality Impairment, gender still has a statistically significant effect on them when controlling for negative affect (see Table 3 for follow-up ANCOVAs results).

Tab. 3. ANCOVAs results of DASS-21 and MSQ scales by gender and area of study (trait negative affect as control variable)

Variable		*F*	*df*	*p*	partial $\eta 2$
Depression	Gender	.18	1,6072	n.s.	<.001
	Area of Study	5.60	6, 5634	<.001	.006
Anxiety	Gender	32.96	1,6072	<.001	.005
	Area of Study	6.25	6, 5635	<.001	.007
Stress	Gender	41.85	1,6072	<.001	.007
	Area of Study	2.59	6, 5634	n.s.*	.003
Daytime Sleepiness	Gender	116.32	1,6072	<.001	.019
	Area of Study	4.80	6, 5634	<.001	.005
	Area of Living	11.40	2, 6037	<.001	.004
Sleep Quality Impairment	Gender	78.89	1,6072	<.001	.013
	Area of Study	6.00	6, 5634	<.001	.006
	Area of Living	1.52	2, 6037	n.s.	.001

Note. Anxiety, Depression, and Stress are from the DASS-21 (Depression Anxiety Stress Scale-21). Daytime Sleepiness and Sleep Quality Impairment are from the MSQ (Mini Sleep Questionnaire). Area of Study has been coded in 7 areas: Technology; Social Sciences; Humanities; Medical studies; Nursing; Other Medical studies [In Loscalzo and Giannini (2022b) and Loscalzo and Giannini (2019), this group is labeled "Para-Medical"]; Area of Living = North, Center, South Italy. * p = .017, it is not statistically significant using the adjusted alpha level of .001.

Concerning the area of living, we performed a MANCOVA with the MSQ scales as dependent variables. We did not perform the MANCOVA for the DASS-21 since the previous MANOVA did not show a statistically significant effect on this scale. The MANCOVA showed that negative mood has a multivariate statistically significant effect on the MSQ: $F(2, 6036) = 850.51$, $p < .001$, partial $\eta^2 = .22$. However, the area of living is still significant as well: $F(4, 12072) = 6.11$, $p < .001$, partial $\eta^2 = .002$. More specifically, follow-up ANOVAs confirmed the previous MANOVAs' results since it still predicts Daytime Sleepiness only: it is lower in students living in Central Italy as compared to students living in North ($p < .001$) and South ($p = .035$) Italy (see Table 3 for follow-up ANOVAs results).

Finally, the two MANCOVAs performed with the major of study as independent variable showed that negative mood has a multivariate effect on both the DASS-21, $F(3, 5632) = 1388.64$, $p < .001$, partial $\eta^2 = .43$, and the MSQ, $F(2, 5633) = 780.65$, $p < .001$, partial $\eta^2 = .22$. Though, the major of study still has a multivariate statistically significant effect on both the DASS-21, $F(18, 15930.19) = 4.88$, $p < .001$, partial $\eta^2 = .005$, and the MSQ, $F(12, 1266) = 850.51$, $p < .001$, partial $\eta^2 = .004$. However, compared to MANOVA results, when controlling for negative affect as a trait and using the Bonferroni correction, the study's major does not predict Stress (see Table 3 for follow-up ANOVAs results). About Bonferroni post-hoc comparisons, Humanities students still have higher Depression than Technology ($p = .006$), Social Sciences ($p < .001$), Medical ($p = .006$), and Other-Medical ($p = .008$) students, as well as higher Anxiety than Technology ($p < .001$), Social Sciences ($p = .054$), and Sciences ($p < .001$) students. Though, they do not have higher Anxiety than Medical students, controlling for negative affect. Moreover, Social Sciences students have higher Anxiety than Technology students ($p = .017$). About the MSQ, Humanities students still have higher Daytime Sleepiness than Technology ($p < .001$) and Other Medical ($p = .008$) students, but not than Social Sciences and Sciences students. Moreover, they still have higher Sleep Quality Impairment than Technology students ($p < .001$), but not than Social Sciences students. Finally, Technology students still have lower Sleep Quality Impairment compared to Social Sciences ($p = .003$) and Nursing ($p = .002$) students.

Comparison of students' well-being before and during the Covid-19 pandemic

Finally, to evaluate if the well-being of Italian college students worsened or ameliorated during the Covid-19 pandemic, we performed five one-sample t-test to compare the levels of anxiety, depression, and stress (psychological disorders), as well as the levels of sleep quality impairment and daytime sleepiness (physical impairment), of the present sample with another wide sample of Italian college students gathered before the Covid-19 outbreak ($n = 1958$; Loscalzo and Giannini, 2019). The result of these analyses showed that Italian students, during the Covid-19 pandemic, feel better. More specifically, as compared to the previous Italian sample, they scored lower on all the scales: Depression, $M = 8.49 \pm 5.64$, $t(6074) = -8.36$, $p < .001$, $d = -.11$; Anxiety, $M = 5.23 \pm 4.79$, $t(6074) = -26.21$, $p < .001$, $d = -.34$; Stress, $M = 10.78 \pm 5.44$, $t(6074) = -15.35$, $p < .001$, $d = -.20$; Daytime Sleepiness, $M = 15.91 \pm 5.83$, $t(6074) = -28.26$, $p < .001$, $d = -.36$; Sleep Quality Impairment, $M = 17.24 \pm 6.97$, $t(6074) = -15.54$, $p < .001$, $d = -.20$.

Discussions

This study aimed to analyze the impact of the Covid-19 pandemic on college students' psychological (depression, anxiety, stress) and physical (daytime sleepiness and sleep quality impairment) well-being.

The results showed that many Italian college students experienced high levels of sleep quality impairment during the lockdown since more than half of the participants scored higher than the cut-off for both daytime sleepiness and sleep quality impairment. This result aligns with Franceschini et al. (2020) since they found that about half of their sample is a poor sleeper (using a different scale than ours and a total score only). Hence, our study provides further evidence about the sleep quality impairment of Italians, with a specific focus on college students and highlighting that this impairment concerned both sleep and wake quality. In addition, our participants also have high levels of stress, depression, and anxiety symptoms. More specifically, the *Mean* values of the students who participated in this study are much higher compared to both Bottesi et al. (2015) community sample and Mazza et al. (2020) sample of Italian people gathered during the Covid-19 outbreak. In line with this, the percentage of students scoring high or extremely high are considerable, especially for depression (57.2%) and stress (52.5%), as they affected more than half of the participants. Anxiety, even if widespread at high levels, has a lower prevalence (38.6%). Mazza et al. (2020) found, like in our college sample, that high or extremely high depression (32.8%) and stress (27.2%) are more spread than anxiety (18.7%) in the general population during the Covid-19 pandemic. However, their values of prevalence are considerably lower than the ones we found in college students. Hence, the present study further supports the ample prevalence of very high symptoms of depression, stress, and (to a lower extent) anxiety in the Italian population during the Covid-19 lockdown. Also, our study provides further support to Romeo et al.'s (2021) findings, namely that Italian university students experienced higher anxiety and depression (and stress, like we found) than Italian workers or, more generally, than the Italian population taken as a whole. Also, our study provides further evidence to previous studies highlighting a consistent spread of psychological symptoms across various countries during the Covid-19 pandemic (e.g., Ghafari et al., 2021; Islam et al., 2020; Ma et al., 2020; Wathelet et al., 2020).

About demographic-related differences, we found that females experienced higher psychological (except for depression) and physical impairment than males during the pandemic, even when controlling for negative affect as a trait. We found instead only a difference for the area of living, also when controlling for negative affect: students living in Central Italy reported lower daytime sleepiness than students living in North or South Italy. Therefore, living in Italy's areas less affected by the virus (the North has been the part of Italy affected the most) is not associated with higher psychological well-being; though, students of Central Italy feel better concerning one of the sleep variables. No differences in well-being arisen about being a full-time student (compared to a student who also works) and concerning the year of study. Finally, being a Humanities student (e.g., Literature, Language, Philosophy, History) is associated with the highest well-being impairment during the Covid-19 pandemic. More specifically, controlling for the effect of negative mood, they reported higher depression and anxiety than Technology and Social Sciences students, higher depression than Medical and Other-Medical students, and higher anxiety than Sciences students. They also had higher daytime sleepiness than Technology and Other-Medical students and higher sleep quality impairment than Technology students. Instead, Technology students (e.g., Engineering, Architecture, Informatics) seem to be the ones who experienced the slightest impairment since they also have lower anxiety than Social Sciences students and lower sleep quality impairment than Social Sciences and Nursing students.

In sum, Italian college students, especially females and Humanities students, experienced a high psychological and physical impairment during the pandemic, while males and Technology students experienced lower impairment levels.

However, comparing the whole sample with another sample of Italian college students gathered before the pandemic, we found that the participants experienced an amelioration in both their physical and psychological well-being, suggesting a positive effect of the pandemic on Italian college students. Hence, in contrast with Li et al. (2020) and Hagedorn et al. (2022), we found that Italian college students' mental health improved during the pandemic. The different results could be due to differences in the countries concerning both cultural and virus-related aspects. Though it should also be noted that our study compared two different groups of students gathered at different times, while Li et al. (2020) performed a longitudinal study – they found an increase in psychological symptoms after two weeks of lockdown – and Hagedorn et al.'s (2022) results are based on students' self-evaluation concerning their health before and after the Covid-19 outbreak. Hence, including our study, we have three research using three different methodologies for evaluating an increase/decrease in symptoms during the Covid-19 pandemic. Therefore, other studies comparing mental and physical health before and during the Covid-19 pandemic could help disentangle the reasons for these different results.

Among the limitations of this study, there is a lower representation of North and South Italy students than Central Italy and a higher prevalence of females and Social Sciences students. However, it has the merit of having analyzed a wide sample of Italian college students, which is heterogeneous for year and major of study, and that has been gathered during the Covid-19 outbreak. Moreover, it highlights that there has been a high prevalence of physical and psychological symptoms among college students during the Covid-19 pandemic. However, when comparing the whole sample of participants with a previous sample of college students, it arose that, in general, the Covid-19 pandemic, with the consequent closure of universities and the online format for lessons and exams, seems to have alleviated physical and psychological symptoms. In sum, in line with other studies (Loscalzo & Giannini, 2021; Loscalzo et al., 2021), we found evidence for both positive and negative consequences associated with the Covid-19 pandemic. However, we would like to stress that in the context of a general trend showing that students experienced an ameliorating in their symptoms, we should not underlook

the results highlighting the high prevalence of extremely high levels of anxiety and, especially, depression, stress, and sleep issues, as they characterize a large part of the individuals who took part in our research.

In conclusion, taking into account that a large part of Italian college students has been affected by high psychological and physical impairment and that college students seem to have been affected by this impairment to a greater extent than both the general and the working population, we recommend universities to take care of these negative consequences associated with the Covid-19 outbreak. They could implement psychological counseling interventions – even in an online format – aiming to improve students' well-being. They should provide students with counseling services to detect those still experiencing a high level of impairment and offer them psychological intervention to reduce their symptoms. At the same time, it would be helpful to make available group counseling interventions to allow students to share their feelings and thoughts related to the pandemic and the impact on their study, hence reducing the risk for psychopathology and dropout. Since we found that students generally experienced an ameliorating of their psychological and physical well-being during the lockdown, the students who found some positive consequences on their studying and their health might constitute a role model for the students who faced higher distress instead. Finally, considering the improvement in students' well-being during the home-confinement, universities should also plan to reduce the burden felt by their students during the "regular" academic life. For example, they could allow them to attend lessons from home through recorded lessons and provide them with psychological support throughout their studies. Also, they should try reducing the overstudying climate, which might favor higher academic distress.

Author Contributions YL and MG designed the study. YL performed the statistical analyses and wrote the draft of the paper. MG critically revised the content of the paper. All the authors approved the final version of the paper

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The Definition and Similar Constructs of Gratitude: A Critical Review

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Abstract

Despite the interest shown in the concept of gratitude over the last decade, there is no agreement on its definition and underlying dimensions. This paper provides a critical review of the definitions of gratitude and other similar constructs. A total of 22 definitions for gratitude were identified. The identified definitions were analyzed against each other for their commonality and differences. After highlighting the lacunae, lack of consensus, and overlap among the available definitions of gratitude, this paper differentiates gratitude from other similar constructs.

Keywords: Gratitude, Definition, Indebtedness, Reciprocity norms, Obligation, and Gratitude's similar construct

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Introduction

Gratitude is not an uncommon emotion that can be easily neglected and deserves empirical and theoretical attention (Sommers & Kosmitzki, 1988). Among the consequences of gratitude we find personal and relational well-being (Nezlek, Newman, & Thrash, 2017; Jans-Beken et al., 2019). Research on gratitude has been done from the personal level to interpersonal (Leong et al., 2020), group (Tsang, 2020), and recently to the organizational level (Fehr, Fulmer, Awtrey, & Miller, 2017; Ford, Wang, Jin, & Eisenberger, 2018). The studies have been sprawling from the domain of psychology, social psychology (Ma, Tunney, & Ferguson,2017), religion (Aghababaei, Błachnio, & Aminikhoo,2018), medical (Otto, Szczesny, Soriano, Laurenceau, & Siegel, 2016), and business management (Fehr et al.,2017). The context and usage of the term gratitude differ in all this research domains. For example, experimental studies have tried to understand the gratitude from personal to social ('one to one') context. Religious literature tries to understand the metaphysical nature of gratitude. They have defined gratitude from a 'generalized context.' There are also sport (Chen, & Chang, 2017) and organizational literature (Cain, Cairo, Duffy, Meli, Rye, & Worthington Jr,2019) where there is a 'specific' conception of gratitude (towards the coach or team leader). Moreover, several studies have also used some similar terms such as 'indebtedness' (McCullough, Kimeldorf, & Cohen, 2008), or 'reciprocity norms' (DeSteno, Bartlett, Baumann, Williams, & Dickens, 2010; Zhang, Chen, & Ni, 2020) while discussing the meaning of gratitude.

In response to the rising interest in gratitude, it is essential to gain a more in-depth examination of the term gratitude. In this aspect, we aim to critically review the definition of gratitude and differentiate this construct from other similar constructs within the context of the selected gratitude literature. We have highlighted the commonalities, differences, and lacunae of the available definitions by doing this analysis.

Locating definitions

We chose the following criteria to find the gratitude definitions:

a) The definitions should be from a broader discipline (psychology, personality, business studies, and sociology), and they also should have been cited by journals indexed in Scopus (Q3 and above) at least 100 times or more except some classical works like Smith (1976) and Simmel (1950).
b) We adopted "purposive sampling," as well as "snowball" sampling to get the definitions. Our objective was to get the various definitions possible ("maximum variation sampling") from the literature. The keyword used was gratitude and gratefulness.

Analysing the definitions

We did content analysis and table the available definitions with the authors and years. From the table developed, we identified the themes. The emerging (common) themes from the definitions and the lack of divergence were discussed. To understand the term gratitude further, we have also differentiated gratitude from similar terms such as appreciation, reciprocity norms as such.

Tab. 1. Definitions of Gratitude

No.	Author	Definition
		"that underlies the appreciation of goodness in others and in oneself".
1	Klein (1957)	"Gratitude is rooted in the emotions and attitudes that arise in the earliest stage of infancy, when for the baby the mother is the one and only object".
2	Smith (1976)	"a passion or sentiment that motivates us to reward others for the good things they have done for us."
3	Simmel (1950)	"a cognitive-emotional reminder to people of their need to reciprocate."
4	Bertocci & Millard (1963)	"The willingness to recognize the unearned increments of value in one's experience."
5	Weiner (1985)	"an attribution-dependent state."
6	Clore, Ortony, & Foss (1987)	"a complex state that belongs to the category of affective-cognitive conditions in which both effect and cognition are predominant-meaning components of the term."
7	Lazarus & Lazarus (1994)	"one of the "empathic emotions" whose roots lie in the capacity to empathize with others."
8	Fitzgerald (1998)	"Gratitude include not only a warm sense of appreciation for something or somebody but also a sense of goodwill towards that thing or person and a resultant disposition to act positively because of appreciation and goodwill."
9	McCullough et al. (2001)	"a social emotion produced in social exchanges."
10	McCullough et al., (2002).	"a generalized tendency to recognize and respond with grateful emotion to the roles of other people's behavior in the positive experiences and outcomes that one obtains."
11	Emmons, & McCullough (2003).	"a state that requires one to endorse two facts: (a) that one has achieved a positive outcome, and (b) that this positive outcome came from an external source."
12	Emmons & McCullough (2004)	"a positive emotional reaction in response to the receipt of a gift or benefit from someone."
13	Tsang (2006a)	"a positive emotional reaction to the receipt of benefit that is perceived to have resulted from the good intentions of another"
14	Tsang, (2006b)	"a positive emotion that can occur in a recipient when a benefactor intentionally gives a valued gift to them."
15	McCullough, Kimeldorf, & Cohen (2008).	"a positive emotion that typically flows from the perception that one has benefited from the costly, intentional, voluntary action of another person."
16	Lambert et al. (2009)	"includes being grateful for all sorts of gifts in life (rather than for benefits conferred by those cherished by others). gratitude is viewed more like a life orientation (way of life, personality type)"
17	Wood, Froh & Geraghty (2010)	"a life orientation towards noticing and appreciating the positive in the world."
18	Sansone & Sansone (2010)	"is the appreciation of what is valuable and meaningful to oneself; it is a general state of thankfulness and appreciation."
19	Emmons & Mishra (2011)	"Gratitude requires people to acknowledge that their good fortune is attributable to someone else and is most often directed towards another individual."
20	Chopik, Newton, Ryan, Kashdan, & Jarden (2019)	"as an adaptive evolutionary mechanism that is relevant to healthy psychological and interpersonal outcomes"
21	Solomon (1977), as quoted in Luccarelli (2019)	"Awareness of a gain for which someone else is responsible."

Review of the gratitude definitions

Gratitude is conceptualized differently by different scholars. A sample of definitions of gratitude is presented in the table below. The following table highlights the inconsistencies in the conceptualization of gratitude.

It can be observed that, when defining gratitude, the authors highlighted the following:

a) Function of gratitude
b) Nature of gratitude (emotion/trait)
c) Cause of gratitude
d) Effects of gratitude (consequences)
e) Actors involved (helper required or not)
f) Origin of gratitude (trait/state)
g) There is no agreement among scholars about what gratitude is. A closer analysis of these definitions brought to light some interesting aspects.

Divergence in the elements highlighted

It is observed that different authors highlighted different aspects of gratitude, focusing on some aspects while ignoring others, which is the reason for non-convergence among authors. This analysis has been captured in Table 2 below:

Tab. 2. Comparison of Key Elements among the Definitions

	Definition		Key Elements				
No	**Author**	**Definition**	**defined as**	**Emotion/ Trait**	**Cause**	**Function**	**Target**
1	Klein (1957)	"underlies the appreciation of goodness in others and in oneself". "Gratitude is rooted in the emotions and attitudes that arise in the earliest stage of infancy, when for the baby the mother is the one and only object".	Emotion and attitude	Emotion	appreciation of goodness	build up the relation to the good objects	Good objects (for the infanc, its mother)
2	Smith (1976)	"a passion or sentiment that motivates us to reward others for the good things they have done for us."	Passion or sentiment	Emotion	Good things received	To reward others	Who has done the right things
3	Simmel (1950)	"is also a cognitive-emotional reminder to people of their need to reciprocate."	Cognitive-emotional reminder	Emotion but also cognitive	X	To reciprocate	Explicitly not mentioned
4	Bertocci & Millard (1963)	"The willingness to recognize the unearned increments of value in one's experience."	Willingness to recognize	Willingness is intention only. Since the 'felt' aspect is mentioned here, it is inferred that gratitude is an emotion.	Unearned increments of value	X	X
5	Weiner (1985)	an attribution-dependent state	Attribution-dependent state	State	X	X	X
6	Clore, Ortony, & Foss (1987)	"a complex state that belongs to the category of affective-cognitive conditions in which both affect and cognition are predominant-meaning components of the term."	Affective-cognitive condition	Emotion	X	X	X
7	Lazarus & Lazarus (1994)	"One of the "empathic emotions" whose roots lie in the capacity to empathize with others."	Capacity to empathize with others	Emotion	X	X	Others; not clear whether it is a beneficiary
8	Fitzgerald (1998)	"include not only a warm sense of appreciation for something or somebody but also a sense of goodwill towards that thing or person and a resultant disposition to act positively because of appreciation and goodwill."	A warm sense of appreciation, sense of goodwill toward the thing or person, and a resultant disposition to act positively	Disposition-Trait	Appreciation and goodwill	X	Thing or person
9	McCullough et al., (2001).	"a social emotion produced in social exchanges."	Social emotion	Emotion	X	X	X
10	McCullough et al. (2002)	"a generalized tendency to recognize and respond with grateful emotion to the roles of other people's behavior in the positive experiences and outcomes that one obtains."	Generalized tendency to recognize and respond with grateful emotion	Both trait (generalized tendency) and emotion (respond with grateful emotion)	To the roles of other people's behavior in the positive experiences and outcomes	X	Other people's behavior
11	Emmons & McCullough (2003).	"a state that requires one to endorse two facts: (a) that one has achieved a positive outcome, and (b) that this positive outcome came from an external source."	A state that requires one to endorse	State	A positive outcome from an external source	X	An external source

	Definition		Key Elements				
No	Author	Definition	defined as	Emotion/ Trait	Cause	Function	Target
12	Emmons & McCullough (2004)	"a positive emotional reaction in response to the receipt of a gift or benefit from someone."	Positive emotional reaction	Emotion	To the receipt of a gift or benefit from someone	X	Someone
13	Tsang (2006a).	"a positive emotional reaction to the receipt of benefit that is perceived to have resulted from the good intentions of another"	Positive emotional reaction	Emotion	to the receipt of benefit resulting from good intentions	X	Another
14	Tsang (2006b)	"a positive emotion that can occur in a recipient when a benefactor intentionally gives a valued gift to them."	Positive emotion	Emotion	A gift valued by the self	X	Helper
15	McCullough, Kimeldorf, & Cohen (2008).	"a positive emotion that typically flows from the perception that one has benefited from the costly, intentional, voluntary action of another person."	Positive emotion	Emotion	From the perception that one has benefited from the costly, intentional, voluntary action of another person	X	Another person
16	Lambert et al. (2009)	"includes being grateful for all sorts of gifts in life (rather than for benefits conferred by those cherished others); gratitude is viewed more like a life orientation."	A life orientation (i.e., way of life)	Trait	For all sorts of gifts in life	X	All sorts of gifts in life
17	Wood, Froh, & Geraghty (2010)	"A life orientation towards noticing and appreciating the positive in the world."	A life orientation	Trait	Positive in the world	Orients towards the positive	Positive in the world
18	Sansone & Sansone (2010)	"is the appreciation of what is valuable and meaningful to oneself; it is a general state of thankfulness and appreciation."	Appreciation; state of thankfulness	State	Valuable and meaningful to oneself	X	Not specifically but implicitly mentioned (thankfulness for the blessing)
19	Emmons & Mishra (2011)	The tendency "to acknowledge that their good fortune is attributable to someone else and is most often directed towards another individual"	A tendency to acknowledge that their good fortune is attributable to someone else	State	Good fortune	Attribution	Towards another individual
20	Luccarelli (2019)	"an awareness of a gain for which someone else is responsible."	Awareness of a gain	Momentary feeling/not mentioned as emotion.	Gain	X	Mentioned
21	Chopik et al. (2019)	"an adaptive evolutionary mechanism that is relevant to healthy psychological and interpersonal outcomes"	Adaptive evolutionary mechanism	Trait	X	Personal and social well-being	X

The table above highlights that some definitions include gratitude functions (Wood, Froh, & Geraghty, 2010; Emmons & Mishra, 2011), while others do not include these functions (McCullough et al., 2001; Tsang, 2006a). Some definitions require the personal presence of helpers for gratitude to be generated (Luccarelli, 2019), while others (Weiner, 1985; Clore, Ortony, & Foss, 1987) state that this is not a necessary condition. Some definitions mention antecedents and consequences (Smith, 1976; Emmons & Mishra, 2011), while others (McCullough, Kilpatrick, Emmons, & Larson, 2001) ignore them. Similarly, some define gratitude as an emotion (Lazarus & Lazarus, 1994; McCullough, Emmons, & Tsang, 2002), some define it as cognition (Clore, Ortony, & Foss, 1987; Luccarelli, 2019), and some others define it as both cognition and emotion (Simmel, 1950).

The proposed definition of Sansone and Sansone (2010) transcends the involved members (benefactor and beneficiary) and broadens it further to be aware of life's blessings.

This analysis is better captured in the table below:

Tab. 3. Analysis of the Definitions

No.	Author	Emotion	Trait	Cause	Function	Target
1	Klein (1957)	✔		✔	✔	✔
2	Smith (1976)	✔		✔	✔	✔
3	Simmel (1950)	✔			✔	
4	Bertocci & Millard (1963)	✔		✔		
5	Weiner (1985)	✔				
6	Clore, Ortony, & Foss (1987)	✔				
7	Lazarus & Lazarus (1994)	✔				✔
8	Fitzgerald (1998)		✔	✔		✔
9	McCullough et al., (2001).	✔				
10	McCullough, Emmons, & Tsang (2002).	✔		✔		✔
11	Emmons & McCullough (2003).	✔		✔		✔

12	Emmons & McCullough, (2004)	✔		✔		✔
13	Tsang, (2006a).	✔		✔		✔
14	McCullough, Kimeldorf, & Cohen (2006); Tsang (2006b)	✔		✔		✔
15	McCullough, Kimeldorf, & Cohen (2008).	✔		✔		✔
16	Lambert et al. (2009)		✔	✔		✔
17	Wood, Froh, & Geraghty (2010)		✔	✔		✔
18	Sansone & Sansone (2010)		✔	✔		✔
19	Emmons & Mishra (2011)	✔		✔	✔	✔
20	Chopik et al. (2019)		✔		✔	
21	Luccarelli (2019)	✔		✔		✔

Gratitude Vs. similar other constructs

The inconsistencies among the definitions used, especially when the definitions are extended to antecedents and consequences, create a situation wherein a concept can be confused with another similar concept. There could be overlap among the concepts. Hence, it becomes vital to understand other related concepts to develop a better understanding of gratitude. Hence this section captures how gratitude is different from similar concepts such as appreciation, reciprocity norms, indebtedness, obligation, and positive mood.

Gratitude and appreciation

When we come across a good painting, we appreciate its author for his or her talent. When we see a person helping a blind person cross the road, we appreciate that act. Appreciation can be for good work or help given/done to anyone and not necessarily towards oneself. In contrast, the beneficiary's feeling of gratitude is for the helper only.

Appreciation can also happen in the context of the 'process of gratitude.' When help is received, we appreciate the effort of the person and also feel grateful to them. Appreciation is for others' actions. When somebody does more than what is expected, we appreciate their effort or act. For example, in the work of Algoe, Haidt, and Gable (2008), the big sisters (existing members) in the sorority welcome new members (little sisters) by giving them gifts. The little sisters might have appreciated the big sisters' efforts to give gifts, accompanied by feelings of gratitude for the welcome.

Thus, it can be concluded that gratitude is a subordinate feature of appreciation. Gratitude is generated when a benefit is recognized and is accompanied by a sense of thankfulness (Adler & Fagley, 2005). In contrast, there is no such feeling (the 'emotional' part is missing) in appreciation. Gratitude is felt for the addressed 'need' (of the beneficiary). When needs are not met (the benefactor is not successful in helping) and yet the efforts exhibited by others is more than what one expected, we (only) appreciate them (but do not feel grateful). On the other hand, gratitude is felt when we feel we got what we need or more than we deserved/expected.

So, gratitude is experienced only when our needs are met with the help of others. In the above example, while both the little sisters and the teachers/staff appreciate the gesture, only little sisters experience gratitude and not the others.

The following illustrates the difference between Gratitude and Appreciation:

1) Gratitude: Feeling/emotions experienced when a person thinks as follows: "I *got more* (or equal to) than what I deserved (based on expectation)."
2) Appreciation: Feeling/emotions experienced when a person thinks as follows: "Others *did* (*tried to help or helped*) more than I expected from them."

Expectations in both cases are social and are always attributed. "Social" means that expectations are formed while interacting with others, especially during the early socialization stage. "Attributed" means that they are subjective in the actor's mind and hence not strictly comparable across people.

The difference between gratitude and appreciation is captured in the table below.

Tab. 4. Difference between Gratitude and Appreciation

		Higher than expected	
For whom the beneficiary feels?		**Benefit**	**Effort**
	Self	Gratitude	
	Other		Appreciation

Just because there are differences between gratitude and appreciation, it does not mean that there are no overlaps between the two concepts. There are feelings of appreciation when gratitude is experienced as well. If others' efforts or performance exceeded our expectations and are also higher than what one thought one deserved, the person will feel both appreciation and gratitude. However, in cases where a person feels both appreciation and gratitude, as gratitude is a more robust (higher-order) emotion, gratitude may overwhelm feelings of appreciation, making the person feel only gratitude.

Suppose others' efforts or performance exceeded one's expectations of them but are lower than what one thought they deserved or lower than the benefits one was expecting (or one thought they deserved). In that case, only appreciation will be felt, and "gratitude" will not be felt. When one feels that one got more than one expected (deserved), one feels gratitude independent of the person's efforts. We may not appreciate the person, but we will be grateful. Moreover, appreciation can be done by a neutral third party who witnesses a voluntary helping behavior, but that third party may not feel grateful for the helper. However, a grateful feeling emerges between the helper and beneficiary directed towards the helper.

Gratitude and reciprocity norms

The reciprocity norm is the personal awareness of one's obligation to pay back (McConnell, 1993). The gratitude here is beyond the exchange of a gift. It is subjective, personal, and relational, whereas reciprocity is purely perfunctory and impersonal. In some experimental studies, it was proven that gratitude has its pro-social consequences beyond the reciprocity

norms (DeSteno, Bartlett, Baumann, Williams, & Dickens, 2010). The differences between gratitude and reciprocity norms are captured in the table below.

Tab. 5. Difference between Gratitude and Reciprocity

		A propensity to help others and receive help because	
		Someone helped him (but it may not be more than what he expected)	Because he was lucky to receive extraordinary benefit
Nature of return/ feelings	Specific (limited to the benefactor)	Reciprocity	
	Generic (towards everyone)		Gratitude

Both gratitude and reciprocity norms can lead to pro-social behaviors. However, gratitude has a higher propensity to create pro-social behavior as a specific relationship does not influence it. On the other hand, there is a possibility that pro-social behavior will be more generic (not directed towards anyone) yet the target of the gratitude feeling may be specific towards the helper and might take more time to get formed in case of reciprocity norms. Under the gratitude condition, participants exhibit socially inclusive behaviors (prefer to help the benefactor even at the cost of loss of money, facilitating pro-social behaviors even at the cost of losing monetary benefits (Bartlett, Condon, Cruz, Baumann, & Desteno, 2012). This is not so in the case of reciprocity norms.

Gratitude and indebtedness

Indebtedness is "a state of obligation to repay another." This tendency comes from the reciprocity norms that we need to repay the other as we feel obliged to reciprocate the help they received. Gratitude is beyond the "tit-for-tat" mentality. The benefit received because of gratitude can never be equaled by another act, as the original act was unintentional. However, indebtedness can be equaled (Greenberg, 1980).

Indebtedness is a negative feeling or an unpleasant and aversive psychological state. People do not want to feel indebtedness (Bernabé-Valero, Moret-Tatay, & Navarro-Sancho, 2018; McCullough, Kimeldorf, & Cohen, 2008). Studies indicate that people prefer gratitude (Gallup, 1998), as gratitude is a pleasant and positive emotion. It is related to (but not equivalent to) positive emotions, like happiness.

Indebtedness and gratitude primarily differ in the motivational aspect (Deci & Ryan, 2000). Indebtedness has avoidance motivation, whereas gratitude has pro-social motivations (Gray, Emmons, & Morrison, 2001; Emmons, Froh, & Rose, 2019). Indebtedness is felt when the extrinsic motivation is to pay back. Individuals are grateful when the motive to help is a benevolent motive and not an ulterior motive (Visserman, Righetti, Impett, Keltner, & Van Lange, 2018; Weinstein, DeHaan & Ryan, 2010).

They also differ in the way the received help is viewed. Grateful feeling concern for relational value (motivations and the perceived values of the received favor), whereas indebtedness concerns the restoration of equity (Oishi, Koo, Lim, & Suh, 2019; Peng, Nelissen, & Zeelenberg, 2018). The grateful feeling is accompanied by an intrinsic motivation to be pro-social for the received benefits. Indebtedness is accompanied by extrinsic motivation.

Tab. 6. Difference between Gratitude and Indebtedness

		Want to help because of:	
		Someone helped him when no one was willing to help (but he sought help)	Because he was lucky to receive extraordinary benefit
Nature of emotions	Negative and specific	Indebtedness	
	Positive and generic		Gratitude

Gratitude and obligation

An obligation is a negative feeling. People feel uncomfortable (like indebtedness) with an obligation (compelled to reciprocate). Gratitude is a positive feeling (willingly reciprocate). It is like the feeling of indebtedness. Here too, it is the nature of motivation that distinguishes gratitude or obligation (Fitzgerald, 1998; Carr, 2013).

Gratitude and positive mood

Gratitude is a positive emotion. It has a specific cause. On the other hand, the positive mood does not have any specific cause and is generic. The target of gratitude is towards others, human or non-human (Luccarelli, 2019), whereas positive mood is not. A positive mood increases the pro-social response to a situation, but it has a limitation. People with a positive mood may not go for a helping behavior that costs them. Nevertheless, under a grateful condition, people extend their pro-sociality even though it costs them (Tsang, 2006; Jans-Beken et al., 2020).

Discussion

This paper aims to identify and analyze the published definitions of gratitude and the similar constructs of gratitude.

Creating a single definition – the issue

The table 2 and 3 indicate no common thread or a common element that runs across all the definitions. Therefore, it is difficult to converge on one definition of gratitude. Instead of converging to a single definition based on common elements, the possible strategy to bring different scholars together is to create an exhaustive set of elements used by all the scholars. It can be done in such a manner that none of the elements highlighted in any of the definitions are missed. However, this approach can create redundancy. There is a possibility that some of the elements that should not be a part of the definition

would get included. While the redundancy could be useful for better communication across domains, it makes the resultant definition inaccurate and may overlap with similar concepts. The overlap would potentially impact the discriminant validity of the concept at the time of operationalization. It can lead to a problem of concept stretching (Osigweh, 1989).

Is it possible to reduce redundancy? While exploring the elements, it was found that the definition of gratitude also included its antecedents and consequences. For example, many definitions mention the benefits of gratitude. The inclusion of antecedents and consequences creates unnecessary redundancy even though they help the reader understand the concept better and play an essential role in communication. Hence it is proposed that "antecedents" and "consequences" should not be considered part of the definition. They should, therefore, be excluded from the definition of gratitude.

Contradiction in terms of the actors involved

The definitions also throw up another contradiction for the actors involved in the experience of gratitude. Some authors (Luccarelli, 2019) assume the presence of a helper (as a person) and beneficiary, while other authors (Bertocci & Millard, 1963) assume the presence of only the beneficiary, with the helper missing from the definition. According to the first set of authors, gratitude is experienced towards another person. According to the authors' second set, gratitude is not experienced towards another person; however, it can be experienced towards an inanimate thing or God. Combining these two, it can be argued that the beneficiary attributes gratitude. The beneficiary might attribute gratitude to a person or situation (Charzyńska, 2020). The implication is that gratitude is experienced to the expectation of benefit in a situation. It is not an expectation from another (helper) but an expectation based on the perception of "what the experiencer deserves." It is a common observation to notice people being grateful to God, which suggests that a human helper's presence is not necessary. It indicates that gratitude is expressed only compared to an expectation, as a comparison is always involved while experiencing gratitude. The comparison is based on the "expectation that a person had formed of a situation, based on various factors, including past."

Hence, the experience of gratitude relates more to the "expectation the beneficiary had from a situation." Since any situation occurs in a particular space, with time and to individuals, the experience of gratitude will differ based on the situation. Likewise, the expectation of the beneficiary will also differ based on the situation.

Gratitude – cognition, emotion, or affect?

One more inconsistency among the definitions relates to whether gratitude is cognition, emotion, or affect. It has been observed that some authors describe gratitude as cognition (Simmel, 1950) while others describe gratitude as emotion or affect (Fitzgerald, 1998), and some others as both affect and cognition (Clore, Ortony, & Foss, 1987).

This paper opines that gratitude is an emotion. It has also been conceptualized as affect by some scholars, especially when gratitude is off the trait type (rather than state type, when it is an emotion) or when it becomes collective (O'Brien, Mendonça, & Price, 2018). McCullough et al. (2001) define gratitude as affect with moral consequences for the societies hinting towards the collective consequences of gratitude. However, gratitude is not simply a pure cognition. Cognition can be an antecedent (as well, therefore) to gratitude because it is involved in assessing what the beneficiary receives beyond the unexpected, and emotion is the appreciation felt when the assessment of "unexpected benefit" has been made.

Based on the above analysis, it is proposed that the definition of gratitude should have the following components:

a) Emotions
b) Unexpected benefits perceived.
c) It is situational though there is a possibility of trait gratitude.

Discussion on gratitude and similar constructs

Literature has differentiated gratitude from other similar constructs through experimental studies. Still, the term is used interchangeably. Some of the terms like gratitude are appreciation, reciprocity norms, and indebtedness.

Gratitude and appreciation are different in their emergence, accompanied by emotion and target. Appreciation is part of the gratitude process, without accompanying the emotion 'empathy.' As the grateful beneficiary empathizes with the helper's effort, a grateful feeling arises. Thus, it can be concluded that gratitude is a subordinate feature of appreciation, and it is felt only by the beneficiary. In comparison, the 'appreciation' can be from any source. Sometimes, appreciation is also for the talent exhibited where the thankfulness feeling is not at all present.

While gratitude, reciprocity norms, and obligation happen in the dyadic, transactional context, gratitude is a positive and likable emotion. In grateful exchanges, there is a willingness to give back more than what we received. The tendency to payback or help is not only towards the helpers but also for others. Gratitude is more interchangeably used with the term 'reciprocity norm.' It can be observed in the gifting culture in all societies. Reciprocity norm and obligation also governs the social exchange like gratitude does. The reciprocity norm and obligation differ from gratitude in their motivation. The former has extrinsic motivation (to repay the received benefit) because of the involved 'norm,' whereas the gratitude has intrinsic motivation (to repay because of their discretion). The other significant difference is the social exchange's involved emotion: reciprocity norm and obligation are mere a transaction, not accompanied by the 'feeling of thankfulness.'

Conclusion

The paper examines the literature definition of gratitude and distinguishes the term gratitude from other similar constructs. One of the earliest references of gratitude is the 'moral memory of mankind' by Adam Smith (1976). Since then, gratitude is defined and studied in various domains and contexts. On analyzing the definitions of popular studies, we found the

following themes to emerge - the function of gratitude, nature of gratitude (emotion/trait), cause of gratitude, effects of gratitude (consequences), actors involved (helper required or not), and origin of gratitude (trait/state). Based on the analysis, we propose that "antecedents" and "consequences" should not be expressed in the definitions. Moreover, it would help define gratitude from only three aspects—feeling/emotion, an unexpected benefit, and the situational aspect.

The paper also compared gratitude with similar other constructs and investigated the various theories of gratitude in detail. Our examination and analysis of gratitude to their similar terms showed that the similar terms differ from gratitude in their antecedents, consequences, target, and the accompanying emotion. A pro-social act based on a benevolent motivation is the cause and consequences of gratitude, as elucidated by the moral affect theory of gratitude. With the grateful emotion, people reciprocate the help to anyone, not necessarily to the helper. Those similar constructs lack this intrinsic motivation in the social exchanges and the motivation to help the third party.

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Representations of immigration on Facebook: A lexicographic analysis of the communication of Italian populist and non-populist leaders (2019-2021)

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Abstract

This study proposes a psycho-social reading of immigration communication on Facebook by five Italian political leaders during the Conte II government (5 September 2019 to 13 February 2021). The research is inserted into the theoretical framework of social representations that presuppose the complexity and tendentiousness of language by actively participating in constructing reality. We analyzed the discursive construction of the migration phenomenon in the posts published by two leaders of the right and center-right populist parties (Giorgia Meloni and Matteo Salvini, respectively), the leader of the populist catch-all party 5-Star Movement (Luigi Di Maio) and two left-wing non-populist leaders (Nicola Zingaretti and Laura Boldrini), to ensure comprehensive coverage of the different political ideologies in the Italian context. From the entire corpus of posts published by the five leaders under examination during the analyzed period, only the posts concerning immigration were selected, for a total of 1171 posts. Of these, 311 were published by Giorgia Meloni, 760 by Matteo Salvini, 45 by Luigi Di Maio, 30 by Laura Boldrini, and 25 by Nicola Zingaretti. We noticed essential differences in communication regarding the migration phenomenon, with the two right and center-right-wing populist leaders (Meloni and Salvini) more likely to publish posts about immigration and promoting a negative representation of the migration phenomenon, in contrast to Di Maio and especially the two left-wing non-populist leaders Boldrini and Zingaretti.

Keywords: social representations, [im]migration, populisms, mainstream left-wing party, leaders and social media, textual analysis

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Introduction

The immigration question has a centrality both in politics and in social sciences. In Italian politics, this centrality is because Italy has been one of the countries most affected by migratory flows in late years (de Rosa et al., 2021). In the social sciences, there has been much attention to studying the link between this question and populist culture. In recent decades, scientific literature has shown how populism, especially right-wing populism, feeds on a conflictual relationship with migrants: the "Others" par excellence (Mannarini, Veltri, Salvatore, 2019), "the bad guys", opposite to the "good people". This type of relationship is particularly salient in mass media communication (Mazzara et al., 2021) and primarily in social media. Among these, Facebook uses a form of communication that reflects the peculiarities of populism, so much so that it speaks of a sort of "elective affinity"; between this social network and populism (Gerbaudo, 2018). This affinity is mainly based on the Manichean and strongly polarized and conflictual vision of the reality typical of populism (Hawks and Uzunoğlu, 2019; Mazzoleni & Bracelet, 2018; Wirth et al., 2016) and a strongly simplified and emotional language (Mazzoleni, 2014; Blassnig, Ernst, Engesser and Esser, 2020).

These characteristics are shared with the communicative style of Facebook, and as we will show with our study, they appear particularly active in the representations of migrants in Italy.

In the literature, the strong link between populism and immigration has led to neglecting the analysis of the role played by mainstream parties, particularly those of the center-left. Thus, there is no established tradition of studies on how center-left culture represents this world. With rare exceptions (for example, de Rosa et al., 2020; Repetto, 2021), there remains a gap that our research aims to help fill by using a comparative look between the representations built via Facebook by populist leaders with different ideological-cultural orientations and non-populist leaders of the center-left.

Our work is theoretically framed in the tradition of social representations that presupposes the non-neutrality of the language used instrumentally to construct a vision of reality that is functional to the interests of the source. This objective is achieved by a partisan use of specific linguistic markers that direct the reader's attention in one direction rather than another. Thus, for example, Sensales and colleagues (2021) highlighted a difference in the frequency of use of the terms "migrants" and "immigrants" by two Italian populist leaders. Salvini, a center-right populist leader of the League, uses the word "immigrants" more often, which in Italian is a past participle and connotes a passive and invasive phenomenon. Di Maio, leader of the 5 Stars Movement, a transversal populist force more oriented to the center-left, on the other hand, refers more often to the "migrants." This present participle indicates a more active role of refugees and does not imply a negative connotation. These two terms alone are enough for the two leaders to outline two different and opposite representations of the "Othering", full of meaning and functional to their ideological point of view.

Other previous studies have explored the Facebook communication of these two Italian populist leaders. Di Cicco and Sensales (2019) dealt with the analysis of Salvini and Di Maio's posts in the period between 2014 and 2018, analyzing both the entire Facebook communication produced by the two leaders and a subset of posts solely related to the [im]migration topic. The results showed that posts related to the latter category earned more likes, comments, and shares than combined posts.

In addition, the same research looked more specifically at immigration communication on Facebook by the two populist leaders. In particular, following the comparison of some lexicographic features of Salvini and Di Maio's posts, greater salience of negativity and emotionality was highlighted by the leader of the Italian League, who more frequently refers to sadness, anger, and anxiety in his posts. Once again, this demonstrates Salvini's ability to tune in with his electorate, positioning himself as "an 'entrepreneur of fear' capable of activating an 'emotional regime' based on anger" (Sensales, 2005/2019).

A previous analysis of the social pages of the same two leaders in the period between 2013 (the year the Pentastral leader opened his official page on the social network) and the last day of campaigning in 2018 has shown that the audience of the leader of the League is much larger than that of the 5 Stars leader, who still manages to be competitive with his opponent in terms of an average number of likes and shares of posts, even though the posts published by Salvini generate a more significant number of comments, probably due to their higher degree of divisiveness (Di Cicco, 2018).

In the same study, Di Cicco (2018) found differences in the communication between the two leaders at the level of certain aspects of language, such as the different personal deixis. In particular, Di Maio favors the use of the first person plural, showing that he wants to lead a leadership oriented in a collective sense and proposing self-celebratory rhetoric of his party, with posts bearing statements such as "we are here. on the issues we are there", "we are the future of the country" or "we must change this country." On the other hand, Salvini uses the first person singular more frequently, thus presenting himself as a more decisive and more authoritarian leader, posting phrases such as "I am ready. #Italiansfirst" or "I won't give up for the sake of our children," "I say: stop illegal immigrants." This is confirmed by a further analysis of the Facebook posts of the two populist leaders Di Maio and Salvini always in the period between 2014 and 2018 (Sensales, Di Cicco, Baldner, 2021), highlighting, for Salvini, the preference for the first singular pronominal and possessive inflections (I, me, my), while in Di Maio there is a centrality of the first plural pronominal forms.

Sensales and colleagues (2021) also show that the characteristic words of Salvinian communication reveal the link with a "sovereign, securitarian exclusionary right-wing ideology" (Ibidem), in which the "otherness" to be fought are immigrants; on the other hand, the representations of populism induced by Di Maio show a strong ingroup/outgroup differentiation, promoted by the use of the pronominal forms we-our / they-their-them. In this dynamic, while the "we" is referred to Di Maio's party but also in part to "Italy" and the "Italians," the "them" refers to the political opponents of the PD, as well as to Europe and the banks.

These examples highlight how the different use of pronominal markers can activate a syntonic communication of the two leaders about the diverse needs of their electorate, promoting, on the one hand, a more conservative form of populism focused more on leadership development and, on the other hand, a progressive populism aimed at achieving more active participation by citizens (Salgado & Stavrakakis, 2019).

Starting from these studies, we intend to expand the lexicographic analysis of the posts published on Facebook by prominent Italian political leaders, to also study the discursive construction of the migration phenomenon by the non-populist, left-wing leaders Laura Boldrini (member of PD, Democratic Party) and Nicola Zingaretti (secretary of PD) and the right-wing populist leader Giorgia Meloni (secretary of FDI, Brothers of Italy). Thus, their posts were analyzed with those of Matteo Salvini (secretary of League) and Luigi Di Maio (secretary of m5s, Five Stars Movement).

Aims

The general objective of this exploratory study is a linguistic analysis of communication on the issue of immigration by five different Italian political leaders (populists and non-populists). The purpose is to highlight the differences in the social representations of migrants promoted by the five politicians.

Specifically, we analyzed the Facebook posts published by two leaders of the right and center-right populist parties (Giorgia Meloni and Matteo Salvini, respectively), the leader of the 5-Star Movement (Luigi Di Maio), a populist catch-all party, and two center-left-wing non-populist leaders (Nicola Zingaretti and Laura Boldrini) during Giuseppe Conte's center-left cabinet (from 5 September 2019 to 13 February 2021). The five politicians were selected to ensure comprehensive coverage of the different political ideologies that actively clash in the Italian context (populist right, transversal populism, and moderate left) on the issue of immigration.

The following are specific hypotheses (Hp) and objectives (O) based on what is illustrated in the introduction section:

Hp1) we predict a higher frequency of posts by Salvini because he is by far one of the most active political leaders on Facebook;

Hp2) we hypothesize that Salvini and Meloni produce more posts about immigration than the other leaders because the issue of immigration is a workhorse of the political communication of the right and center-right;

Hp3) we assume that the two center-left leaders favor a more varied and complex communication due to a lesser familiarity with Facebook, which leads them to use a more conversational and argumentative tone, not in line with the style requested by Facebook;

Hp4) we presume that the right-wing leader Salvini uses the first person singular more frequently in order to promote a more conservative leadership oriented to autoritharism; on the other hand, we expect that Luigi Di Maio favors the use of the first person plural, promoting a leadership oriented in a collective sense aimed at achieving more active participation by citizens;

Hp5) we expect to find a different identity construction of immigration promoted by politicians of the other parties analyzed. Notably, we hypothesize a more significant presence of references to feelings such as anger, contempt, and fear in the posts published by Salvini and Meloni; in contrast, we hypothesize a lesser focus on the issue of immigration by the other three leaders, particularly Zingaretti and Boldrini;

Hp6) we suppose to find more references to security policies in the two right and center-right leaders and humanitarian policies in the other three leaders, particularly in the two center-left leaders;

O1) we then aim to explore the possible different labels relating to the migration phenomenon to verify the potential coherence of the results of previous research. These researches have shown how the right-populist uses tags, such as the past participle "immigrants," which describes the migratory phenomenon as invasive and dangerous. In contrast, the 5-star populism uses the present participle "migrants," considered "politically correct" (see Sensales, Di Cicco, Baldner, 2021). In our case, we expect to find these differences with similar labels between Di Maio and the two non-populist leaders.

Methodology

Material under analysis

Data was gathered and extracted through the Miralytics platform[1] (https://www.miralytics.social/) using an automatic exploration based on keywords considered relevant to the theme of immigration.

Such words are, specifically: "-migr-", "stranger-" "refugee-", "clandestin-", "asylum seekers-", "NGO", "Sea-Watch-", "Aquarius-", "Diciotti-", "Gregoretti-", "landing-" "barge", "shipwreck-", "gommon-" "expulsion-", "invasion-", "Africa-", "scafist-", "Lifeline", "Carola", "Rackete", "Silvia Romano", "Lampedusa", "Riace-", "Lucano-", "somal-", "marocc-", "tunis-", "niger-", "sene-", "algeri-" "campo/i rom-", "nomad-", "ius soli-", "islam-", "racism-" "asylum seeker(s)", "Alan Kurdi", "Salvamento Marittimo", "Open Arms", "#openports", "#closeports", "hospitality", "security decree", "borders".

This allowed us to select 1171 posts related to immigration only, for a total of 41471 words ("tokens"). The frequency distribution is reported in Table 1, which also contains data

Tab. 1. Frequency distributions for the number of immigration-related posts made on the Facebook pages of the five political leaders under study, the number of words, the average of words per posts, the different words contained in those posts, and detected lexical density.

Facebook Page	N. Posts	Corpus size (Tokens)	N. Words per Post (Mean)	Distinct words (Types)	Lexical density (Types/Tokens)
Giorgiamelonipaginaufficiale (giorgiamelonifficialpage)	311	13089	42,09	3347	25.6
LauraBoldrini	30	1254	41,8	798	63.6
LuigiDiMaio	45	5185	115,22	1654	31.9
Nicolazingaretti	25	1459	58,36	842	57.7
Salviniofficial	760	20484	26,95	4210	20.6
Total	1171	41471			

on the number of words published per page. The column of distinct words ("types") shows the number of words present in the posts, but "merging" the terms used several times (so, for example, if the word "NGO" appears 10 times, in the count of distinct words it will be considered as published only once). Finally, lexical density refers to the ratio of distinct words over the total words. This table provides an idea of the complexity and articulation of the language of each of the five leaders analyzed.

Operational Path

On the extracted posts, we conducted a lemmatization of the terms to group the inflected words into a single type, thus avoiding excessive dispersion of frequencies. For example, we have grouped "threats," "threatening," and "threatened" in the canonical form "threat."

The lemmatization of the vocabulary resulted in 6046 words out of the original 41471.

Data Processing and Textual Statistics

In analyzing textual data, a lexicometric approach, which originated in French-speaking countries and was firmly rooted in continental Europe (Lébart & Salem, 1994), was privileged. This approach is mainly based on comparing lexical profiles and, therefore, on the distribution of word frequencies.

Specifically, for the realization of this study, the statistical elaborations of the textual data were conducted through the procedures of SPAD-T, a software designed by Lébart and Salem in 1988. This tool is based on the analysis of graphic forms, i.e., it is able to recognize each word of a text as an element whose characteristic feature is the visual appearance; this means that, for example, words with the same meaning but written differently are not recognized as identical.

Thus, SPAD-T is able to provide a paradigmatic representation of the word corpus extracted by the software. Specifically, this is made possible by the Mots procedure, which provided the general vocabulary of the five politicians under consideration in this case. It is, therefore, a "vertical" type of analysis in which the representation of the text is made without taking into account the development of the discourse but only by extracting the words and reconstructing the statistics related to them, highlighting the most frequent ones, but also those belonging to certain morphological groups. With this procedure, the frequencies of each of the vocabulary headwords of all five leaders were obtained, both in alphabetical order and rank order (from the most frequent to the least frequent words).

Secondly, the software allows the extraction of information related to that part of the language that is particularly significant. This phase is beneficial to extract the so-called peculiar language, i.e., that 12-15% of the vocabulary is generally considered more relevant to carry out the textual analysis (Bolasco, 2005). The lexical analysis allows the identification of some language constants in terms of the percentage incidence of some word classes, thus allowing the title of the so-called basic vocabulary (Ibid.). In this research, SPAD-T's VOSPEC procedure allowed the identification of lexical cores typical of the different social pages of politicians. This step, relying on the chi-square logic, allows the identification of typical associations of different groups because such "typicality" occurs when the lexical item appears with an intra-group frequency significantly different from the global one (PROB. < .05). In this case, the significance of the differences is assessed through the ratio between the frequency of the lexical item in the reference group and the frequency that this item would have according to the hypothesis of random distribution in the various groups. The procedure makes it possible to develop tables in which both the frequency of the word in the group and the frequency of the expression in the entire corpus of data analyzed are presented, as well as the significance level of this difference. Using this procedure, the specific vocabulary of each leader was obtained. The tables report the frequencies of posts and characteristic words for each of the five leaders. Specifically, five tables were created (one for each leader), in which each row corresponds to a term used in the posts and whose columns report the internal frequency of use (i.e., how many times that word is used in the communication of the leader under examination) and the global frequency (i.e., the number of times that word is present in the entire population of posts analyzed).

Finally, the examples of phrases that were statistically most representative of the communication of each politician and their followers were used. These examples are provided directly from the VOSPEC stage.

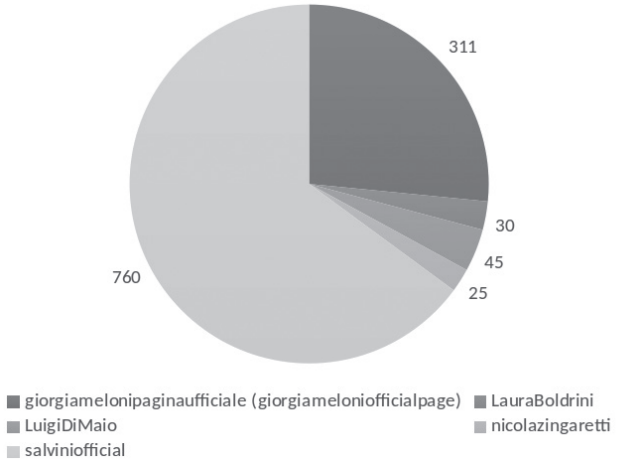
Starting from here, word clouds were created to be compared using only the frequencies of the words characteristic of the different lexical cores (i.e., statistically significant with probability < .05), thus omitting all other information provided by the output and avoiding making the reading of the results difficult.

Results And Comments

Analysis of the frequencies of posts with reference to immigration

In presenting these results, the data in Table 1 were used. Figure 1 shows how Matteo Salvini publishes the majority of posts related to the topic of migrants. Specifically, 65% of the

Fig. 1. Frequency distribution of immigration-related posts published on the Facebook pages of the five leaders surveyed



posts examined were collected on Matteo Salvini's Facebook page, Giorgia Meloni published 26%, and the remaining 9% by the other three leaders (Luigi Di Maio = 4%, Laura Boldrini = 3%, and Nicola Zingaretti = 2%).

Their results confirm that Hp1(Salvini is the Italian political leader who posts the most on Facebook) and Hp2 (Salvini and Meloni produce more posts about immigration than the other leaders).

Lexical density analysis

The number of words contained in these posts was also analyzed. Figure 2 shows these results, highlighting how the two right and center-right-wing populist leaders, Giorgia Meloni and Matteo Salvini, devote more words to the topic. In fact, on the page of the League leader, 49% of the total words are posted, while that of Giorgia Meloni contains 32%. Luigi Di Maio's page includes 12% of actual words, while the remaining 7% is distributed among Laura Boldrini's (4%) and Nicola Zingaretti's (3%) pages. The number of words per post was also analyzed (Fig.3) to provide an idea of the average length of each post, regardless of the number of posts published. This made it possible to highlight how Di Maio published the longest posts, followed (in order) by Zingaretti, Boldrini, Meloni, and Salvini, whose average number of words per post is 26.95 compared to Di Maio's 115.22.

The most interesting data is provided by the distribution of the frequencies of distinct words and the analysis of the lexical density of the posts published by the five political leaders.

Specifically, Figure 4 reports the number of distinct words in relation to the posts of the five different leaders, while Figure 4 reports lexical density data.

About the last graph (Figure 5), it should be noted that non-populist center-leftist leaders Laura Boldrini and Nicola Zingaretti report the highest level of lexical density, highlighting a more complex articulation of language than the other three leaders, thus confirming Hp3 (the two center-left leaders favor a more varied and complex communication using a more argumentative tone).

Fig. 2. Frequency distribution of words contained in immigration-related posts on the Facebook pages of the five leaders surveyed

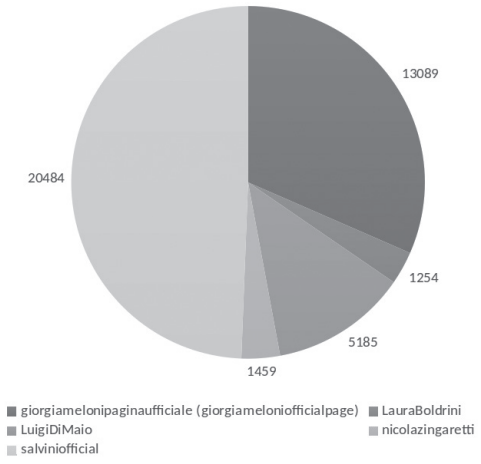


Fig. 3. Average N. Words per post

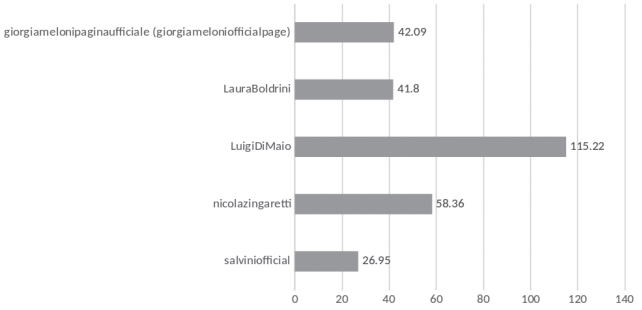


Fig. 4. Frequency distribution of the distinct words contained in the immigration-related posts published on the Facebook pages of the five leaders examined

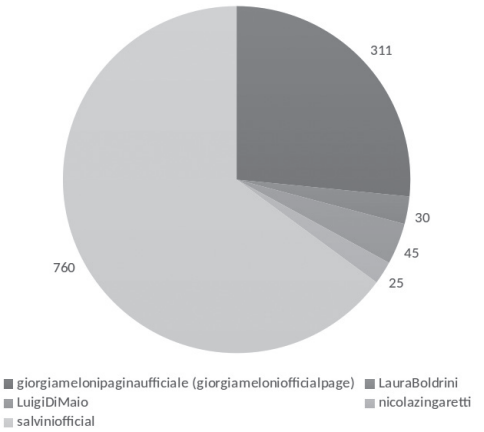
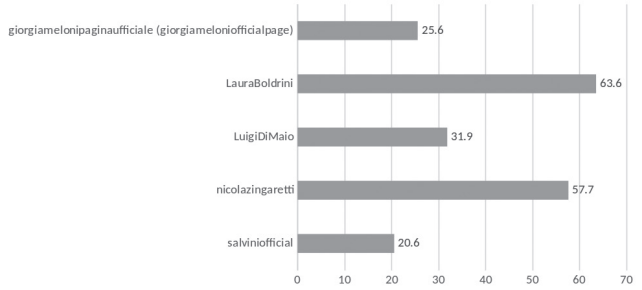


Fig. 5. Lexical density of the immigration-related posts published on the pages of the leaders under study



Analysis of the vocabulary of five leaders

A lexicographic textual analysis was conducted through the SPAD-T software.

First, the Mots procedure provided the general vocabulary of the five politicians under consideration. Table 2 reports the 30 most frequent vocabulary words in the migration-related posts published overall by the two right and center-right-wing populist leaders Giorgia Meloni and Matteo Salvini, the cross-party populist Luigi Di Maio, and the two non-populist leaders Laura Boldrini and Nicola Zingaretti.

The Mots results highlight the self-referentiality of the communication of the leaders under consideration: the three most frequent words are "Italy," "government," and "Italians," where the first and third terms refer to the superordinate ingroup to which all five leaders belong, and the second one can be traced to the ingroup dimension for Di Maio, Boldrini,

Tab. 2. Frequencies of the 30 most used words in immigration-related posts published on the Facebook pages of Giorgia Meloni, Matteo Salvini, Luigi Di Maio, Laura Boldrini and Nicola Zingaretti

Italian Words	English translation	Frequency	Percentage
Italia	Italy	541	1,30 %
Governo	Government	535	1,28 %
Italiani	Italians	335	0,80 %
Clandestini	Illegal immigrants	247	0,59 %
Sbarchi	Landings	227	0,54 %
Immigrati	Immigrants	223	0,53 %
Immigrazione	Immigration	178	0,42 %
Lega	League	176	0,42 %
Porti	Ports	166	0,40 %
Pd	Pd	165	0,40 %
Europa	Europe	146	0,35 %
Sicurezza	Security	136	0,32 %
Sinistra	Left	135	0,32 %
Paese	Country	124	0,30 %
Confini	Borders	115	0,28 %
Stato	State	104	025 %
Lampedusa	Lampedusa	99	0,24 %
Noi	We	94	0,23 %
Nostra	Our	91	0,22 %
Aperti	Open	89	0,21 %
Casa	Home	79	0,19 %
Salvini	Salvini	79	0,19 %
Ong	Ngo	75	0,18 %
Fermare	To stop	72	0,17 %
Libia	Libya	66	0,16 %
Clandestina	Clandestine	65	0,16 %
Parlamento	Parliament	61	0,15 %
Solidarietà	Solidarity	61	0,15 %
Profughi	Refugess	59	0,14 %
Migranti	Migrants	54	0,13 %

and Zingaretti and the outgroup dimension for Meloni and Salvini. The ingroup dimension is also recalled by the terms "we" and "our." Then, among the most frequent words, references to the outgroup appear: "illegal immigrants," "landings," "immigrants," and "immigration," all terms attributable to the narrative style characteristic of exclusionary populism and the rhetoric of the right and center-right parties. In the last places, however, we find words that refer to inclusive dynamics ("solidarity," "refugees," and "migrants").

Finally, we highlight the presence of the words "league" and "pd" (the only two political parties whose names appear in the first 30 more frequent words) and "salvini," leader in anti-immigration communication.

Analysis of Specific Vocabulary for each leader

Vospec procedure made it possible to identify lexical cores typical of each leader examined.

To facilitate the results reading, in this section, word clouds (created with WordArt software) are reported, showing the 30 most frequent typical words in posts, divided according to the politician's page from which they were extracted. With these words, we have built the typical word clouds of each leader. The word clouds are comparable and constructed using only the lexical items frequency of the different lexical nuclei (i.e., words with PROB. < 0.50). The word size within these clouds reflects their different frequency, in absolute terms, within the reference group.

Fig. 6. Wordcloud of immigration-related posts published on Giorgia Meloni Facebook page.

Fig. 7. Wordcloud of immigration-related posts published on Matteo Salvini Facebook page.

Fig. 8. Wordcloud of immigration-related posts published on Luigi Di Maio Facebook page.

Fig. 9. Wordcloud of immigration-related posts published on Laura Boldrini Facebook page.

Fig. 10. Wordcloud of immigration-related posts published on Nicola Zingaretti Facebook page.

Comparing Figures 7 and 8, it is possible to see how Di Maio favors the use of the first person plural, as opposed to Salvini, who more frequently uses the first person singular. Indeed, in figure 8, it should be noted how the words "our", "we must", "we can, "we are", "we", "we are (doing)" and "our country" are the most used by the Five Stars leader; on the other hand, in figure 6 we cannot see this kind of words related to Salvini's Facebook posts, containing the words "I" and "my country instead". This confirms Hp4 (Salvini adopts a language orientated to achieve an authoritarian leadership, while Di Maio favors the use of a more inclusive language).

Vospec procedure also highlights significant differences in the words used by the five leaders in their posts. In the word cloud related to Salvini's posts, we can see words like "clandestines", "invasion", "illegal immigrants", and "delinquents", all terms that promote a negative portrayal of immigration and activate feelings of anger and fear about the migrants' actions on Italian territory *("dozens and dozens of illegal immigrants land undisturbed on the island, unchecked. the invasion continues...."* [2]*).* Similarly, words like "to defend", "naval block", "illegality", "scandalous" and "illegal immigrants" appear in Meloni's posts word cloud *("a government that not only allows anyone to enter italy illegally, but also fails to deal with illegal immigrants."* [3]). The two right and center-right-wing political leaders most frequently report references to sadness, anger, and anxiety in their posts, demonstrating their willingness to activate fear and resentment.

On the other hand, in the specific vocabulary of Nicola Zingaretti, expressions referring to feelings of intolerance or anger toward migrants are absent, replaced by terms of denunciation against injustices affecting asylum seekers ("hate", "racism", "victims", "violence"; *"after years of wars, innocent victims, refugees, violence Syria does not deserve another armed conflict"* [4]). In Boldrini's specific vocabulary, there are no messages inciting the repatriation of asylum seekers or the closure of Italian ports, but words such as "to save" appear in posts expressing humanity toward illegal immigrants. Moreover, terms like "right", "humanitarian" and "humanity" appear in Boldrini's specific vocabulary, which once again highlights a discursive construction of the migration phenomenon centered on feelings of solidarity and brotherhood towards them, totally absent in the posts of right and center-right-wing leaders *("it is important to remember today, #june20, #worldrefugeeday, that we must protect and safeguard refugees together with the #eu. #withrefugees"* [5]). As for Di Maio's specific vocabulary analysis, no terms that can be traced back to activating hatred against migrants appear, despite the populist leader promoting a migrant repatriation policy *("faster repatriations, including by ship and not only by plane."* [6]). These results confirm Hp5 (the five leaders under analysis promote different representations of immigration, with Salvini and Meloni inciting hatred and anger and Boldrini and Zingaretti promoting a more inclusive policy).

The results also reveal references to different migration policies by the leaders under review. The two center-leftist leaders use terms such as "right," "life," "humanitarian," and "humanity," which highlight a discursive construction of the migration phenomenon centered on feelings of solidarity and brotherhood toward them *("thousands of migrants in bosnia abandoned in the woods and under the snow. together with many parliamentarians, MEPs, and institutional figures I signed an appeal"*[7]). There is also no evidence of words referring to feelings of impatience or anger towards migrants. The latter are instead found in the posts of the two right and center-right.-wing leaders *("friends, alone I don't count for anything, but together we can save our country from the devastating invasion project that excites the left and fattens the soros-funded NGOs: an uncontrolled and unregulated immigration that humiliates Italians in need..."* [8]), who moreover advocate the urgency of adopting immediate policies of repression *("defend the borders, protect the Italians: flash mob of fratelli d'italia in catania"* [9]).

As for Di Maio, the word "repatriations" turns out to be statistically significant, thus characterizing Di Maio's linguistic choices. In most posts, the leader of the Five Stars speaks of the migration situation as a problem whose only solution lies in refusing to accept asylum seekers *("in the meantime, thanks to the work of Minister Lamorgese, from August 10 the repatriations of Tunisians who have landed in Italy will resume"* [10]. However, unlike the characteristic narrative of right and

center-right-wing populist leaders, Di Maio does not make particular accusations toward migrants but emphasizes their disadvantaged socioeconomic condition (*"migratory flows of desperate people who have no choice, and which Italy cannot manage"* [11]). Thus, Di Maio seems to take a position against the arrival of asylum seekers in Italy. Still, at the same time, he seems to distance himself from the accusatory and impatient attitude typical of Salvini and Meloni's narrative style. On the other hand, as already pointed out by Cedroni (2014), one of the main characteristics of populist rhetoric is launching deliberately ambiguous and contradictory messages to gather support from different targets.

These results confirm Hp6 (there are more references to security policies in the two right and center-right leaders and humanitarian policies in the other three leaders, particularly in the two center-left leaders).

The results also show a tendency of leaders to use different labels in relation to the migration phenomenonon. Di Maio (Fig. 8) refers more often to the word "migrants". At the same time, Salvini uses the term "immigrants" more often (Fig. 7), as shown in the previous study by Sensales, Di Cicco, and Baldner (2021). Salvini also frequently uses the term "clandestines", denouncing the irregular situation of refugees on Italian soil. However, this research also shows Meloni's tendency to refer more often to "immigrants" (Fig. 6) and the preference of the two center-left leaders to use terms such as "migrants", "refugees" and "men" (Fig. 9 and 10), showing a more sympathetic attitude towards asylum seekers. These results fulfill O1 of our research concerning exploring the different labels used by the five leaders under examination.

Conclusions

The study made it possible to compare the differences in the discursive construction of the migration phenomenon by Italian political leaders belonging to different political alignments (populist right, transversal populism, and moderate left). We were thus able to highlight two opposing ways of constructing the representations of the migratory phenomenon: that of the populist right of the angry-disparaging exclusionary type and that humanitarian inclusive of the center-left, while the transversal populism is placed in an intermediated position with exclusionary rhetoric without emotional tones.

Through the analysis of the five leaders' communication via Facebook, we have shown how specific linguistic markers are instrumentally used for different ideological needs. In this way, one of the main assumptions of the theory of social representations is confirmed. Indeed, by contesting the transparency of language, it affirms its opacity at the service of different ideological cultures.

Overall, our results confirm the hypotheses and satisfy the proposed objectives. They also contribute to bridging the knowledge gap related to the scarce literature on social media communication centered on immigration by center-left non-populist leaders. Finally, they show the strong interrelation between social media communication and populism. The number of posts produced by three populist leaders (particularly Salvini and Meloni) is far greater

The results revealed notable differences in communication regarding the migration phenomenon, with Salvini and Meloni more likely to use arguments geared toward activating a situation of emergency and feelings of anger and intolerance in their followers, and with Boldrini and Zingaretti more often using inclusive and denunciatory terms toward the unfavorable conditions in which they pour migrants. Di Maio's tendency to disparage the acceptance of migrants on Italian soil then emerged, but without pouring out angry words towards them, confirming himself as the leader of a party of transversal populism, capable of capturing the most heterogeneous protest instances while gaining support on both the left and the right.

The lexical analysis then showed how populist leaders (especially right and center-right-wing leaders) publish posts that repeat the same words more often than Boldrini and Zingaretti. In this way, it is confirmed what is supported by the literature on the extremely simplified style typical of populist communication via social media. On the contrary, non-populist leaders have greater lexical variety and density. From this, we can deduce that the expressive spectrum of a political leader is much broader, more complex, and articulated the less populist his rhetoric is.

Author Contributions

G.S., conceptualization; G.S., L.P. and G.D.C. developed the proposal; L.P. wrote the first draft with inputs and comments from G.S. and G.D.C.; E.D. provided data; G.D.C. conducted the statistical analysis; G.S., supervision. All authors contributed significantly and agree with the content of the manuscript. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare that they do not have competing interests.

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Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Notes

[1] Miralytics is a Facebook-based sentiment analysis software that extracts, stores and processes textual data published by the main Italian politicians on their official pages.

[2] Italian version (I.V.): "decine e decine di clandestini sbarcano indisturbati sull›isola, senza controlli. l›invasione continua...."

[3] I.V.: "un governo che, non solo permette a chiunque di entrare illegalmente in italia, ma non riesce nemmeno a gestire gli immigrati clandestini"

[4] I.V.: "dopo anni di guerre, di vittime innocenti, di profughi, di violenze la siria non merita un altro conflitto armato"

[5] I.V.: "è importante ricordare oggi, #20giugno, #giornatamondialedelrifugiato, che dobbiamo proteggere e tutelare i rifugiati insieme all'#eu. #conirifugiati""

[6] I.V: "rimpatri più veloci, anche via nave e non solo in aereo"

[7] I.V.: "migliaia di migranti in bosnia abbandonati tra i boschi e sotto la neve. insieme a tanti parlamentari, eurodeputati ed esponenti istituzionali ho firmato un appello"

[8] I.V.: "amici, da solo non conto nulla, ma insieme possiamo salvare il nostro paese dal devastante progetto di invasione che eccita la sinistra e ingrassa le ong finanziate da soros: un'immigrazione incontrollata e senza regole che umilia gli italiani in difficoltà…", e ancora "continua l'emergenza a lampedusa, nel vergognoso silenzio del #governoclandestino. fai girare"

[9] I.V.: "difendere i confini, proteggere gli italiani: flash mob di fratelli d'italia a catania"

[10] I.V.: "intanto grazie al lavoro della ministra lamorgese, dal 10 agosto riprenderanno i rimpatri dei tunisini che sono sbarcati in italia"

[11] I.V.: : "flussi migratori di disperati che non hanno scelta, e che l›italia non può gestire"

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