

Differences Between Emerging Adults' and Adults' Internet Use Before and During the COVID-19 Emergency: The Role of Well-Being and Mood Regulation

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ABSTRACT

The COVID-19 pandemic highlighted the significance of Internet use in many contexts of human life (e.g., work/study, family, and leisure), daily activities, and developmental tasks (e.g., transition to university/work) associated with specific life stages (e.g., emerging adults, 18-29 years, and adults, over 30 years old). Based on the lifespan model of developmental challenges and focusing on emerging adulthood and adulthood, the current study analyzed functional and dysfunctional Internet use in two different Italian populations: before and during the COVID-19 emergency. The sample consisted of 375 individuals who completed an online survey before COVID-19 and 286 who completed same survey during the COVID-19 emergency. All questionnaires were related to well-being, life/work satisfaction, problematic Internet use, cyberloafing, and interaction overload. Both samples were further differentiated into three life stages, associated with specific transitions and developmental tasks: early emerging adults (18-24), older emerging adults (25-29), and adults (over 30). Results show how the transitions (and related developmental tasks) of each life stage affect, in relevant ways, the functional or dysfunctional Internet use as well as well-being and life satisfaction related to Internet use.

KEYWORDS

emerging adults
mood regulation
adults
internet use
COVID-19

INTRODUCTION

The coming of the COVID-19 emergency, in addition to determining important changes in people's behaviors at a health prevention level, determined relevant shifts in people's life habits, mainly due to the many periods of lockdowns worldwide and in Italy (Onyeaka et al., 2021). During the global lockdown, the Internet had become essential for continuing to carry out many activities in different contexts (i.e., work/study, leisure, and family). Indeed, the need for social distancing for health prevention required people to interact, communicate, and maintain networks of relations by means of the Internet (Feldmann et al. 2021; Karasmanaki & Tsantopoulos, 2021; Vadhat, 2021).

From the perspective of the lifespan model of developmental challenges (Hendry & Kloep, 2002), the pandemic situation determined by COVID-19 could be considered a nonnormative shift, that is, a "change that does not occur for everyone, but only for some, perhaps for very few individuals. [...] These shifts can be developmental 'turning points' (or 'turning processes'), and they can have enduring consequences by affecting subsequent events through a process of cumulative advantages or disadvantages ('cascading constraints', in the language of dynamic system theory)" (Kloep et al., 2009, p. 340). However, considering the pervasiveness of the emergency and the number of individuals involved, we can associate it with historical changes, that

is, non-normative shifts producing relevant changes to the entire macrosystem (Hendry & Kloep, 2002). These changes can be temporary (such as a pandemic, economic crises, or wars) or permanent (such as the industrial revolution) and involve all members of specific groups or communities, although the effects on the individual lifecycles are different. Although the COVID-19 pandemic affected people of all ages, a population that suffered particularly from this emergency is that of emerging adults (Ohannessian, 2022). Emerging adulthood (Arnett, 2000, 2014) is a period of life from 18 to 24 years (younger emerging adults) and from 25 to 29 years (older emerging adults). It is characterized by most of the human transitions linked to many developmental tasks (Arnett et al., 2011), such as leaving their parents' home to have more autonomy, passing from school to university and then to work to achieve educational and training goals, experiencing different working solutions to find, for example, financial independence, moving to different locations to find better work solutions, and the formation and maintenance of romantic relationships. Certainly, many of these developmental tasks associated with emerging adulthood suffered

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disruption or stagnation during COVID-19 (Ohannessian, 2022). For example, when the pandemic situation began, employment was more difficult to find and maintain. Thus, transitioning to financial independence for many emerging adults was more difficult. In colleges and universities, the lockdowns forced students to transition from in-person classes to online and remote learning. In many cases, these systemic changes forced emerging adults to move back to their parents' home. This sort of spiral that has gradually weakened the autonomy and financial independence of many emerging adults also affected their relationships, changing not only the amount of time they spent with family members, peers, and partners, but also the quality of these relations. Social capital, characterized by strong and weak ties (a simplification of bonding social capital and bridging social capital), is one of the most important resources affecting the emerging adulthood life stage, particularly for overcoming barriers between different activity systems in which they transit (e.g., from school or university to work) and for presocialization to new contexts (Benvenuti et al., 2019). In contrast to emerging adults, in industrial countries characterized by an advanced economy, adults (over 30 years) are perceived as individuals having more financial independence, more autonomy, more working and romantic partnership stability, and possibly also having children. Thus, their developmental tasks are quite different from those associated with emerging adulthood (Benvenuti et al., 2022).

During the entire COVID-19 pandemic, due to the restriction in moving freely, both for emerging adults and adults, Internet use represented the main solution for work, learning, and leisure. Therefore, many online applications became essential to carrying on the developmental tasks related to their specific life stages. For example, to construct and maintain social capital, both for family, working, and leisure contexts, interactive online applications, although already important before the COVID-19 period, became essential for interacting and communicating at distance. However, the integration of many of these applications with human skills (in this case, social skills) empowers performance and allows for results that otherwise would have been impossible (Benvenuti & Mazzoni, 2020; Mazzoni & Iannone, 2014). For example, social networking sites are not simply used to maintain and construct bonding social capital (within-group communication) and bridging social capital (Between group communication), but they also facilitate latent ties, that is, those connections that are already technologically existent, but not yet socially activated (Haythornthwaite, 2002, 2005) that individuals activate only when they are needed. In this regard, from the social constructivism perspective of Vygotskij (1978) and, more specifically, from Leont'ev's point of view (Leont'ev, 1981; Mazzoni & Benvenuti, 2015), the integration between a human skill and a technological artifact could be seen as a functional organ that, similarly to the situation of the zone of proximal development, allows individuals to achieve results impossible to reach when working alone or without the help of a technological tool (e.g., sharing photos and videos in real time worldwide). Despite this functional aspect of Internet applications, allowing individuals to better carry on their developmental tasks, their protracted use or use to compensate some lack or weaknesses (e.g., taking pictures or filming videos to an event to post

it and receiving social approval by means of likes or enhancing one's self-esteem Benvenuti & Mazzoni, 2020; Zywicki & Danowski, 2008) could generate a sort of inverse instrumentality (Ekbia & Nardi, 2012). This means a dysfunctional "process involving the objectification of users, whereby their behavior is regulated in a predictable manner, drawing them in or pushing them away from their activities" (Benvenuti et al., 2022, p. 98) and their developmental tasks. In this regard, the current study aimed to investigate the functional and dysfunctional Internet use and its applications in transitional life stages, such as emerging adulthood, comparing them with adults before and after the COVID-19 pandemic. In particular, the current study analyzed the relations between dimensions related to human well-being (such as life satisfaction, work/study satisfaction, and subjective well-being) and dimensions related to dysfunctional Internet use such as problematic Internet use (that affects activities in daily life), cyberloafing (using the Internet for activities unrelated to work), and interaction overload (level of interaction requests exceeding the individual's preferences or capacity) in three different samples: younger emerging adults (18-24.), older emerging adults (25-29) and adults (over 30).

THE STUDY

From an evolutionary perspective considering the life cycle, the main objective of the current study was to understand whether and how specific life stages characterized by peculiar transitions and relative life challenges (Hendry & Kloep, 2002; Kloep & Hendry, 2009), affect the relation between life and work satisfaction, well-being, and Internet use. Furthermore, by considering the perspective of Hendry and Kloep (2002), since data was collected before and during COVID-19, the second objective was to verify whether and how this nonnormative life shift (and the relative challenge) has determined differences in the aforementioned relationships. More specifically, since the previous literature has already specified the different tasks, activities, and challenges that characterize younger emerging adults, older emerging adults, adults, and their different life and professional stability (Arnett et al., 2011; Hendry & Kloep, 2002), the current study hypothesized that the three different life periods play an important role in differentiating people's functional and dysfunctional Internet use, and thus, their life and work satisfaction and well-being, both before and during COVID-19. Furthermore, as many Internet applications during COVID-19 could be considered as part of functional organs allowing people to continue to carry out their activities, we hypothesized important changes in the relations between age, dysfunctional Internet use (problematic Internet use, cyberloafing, and interactions overload) and life/work satisfaction and well-being. In particular:

H1: Since studies show that age is negatively related to problematic Internet use, and problematic internet use is negatively related to life satisfaction, work satisfaction, and well-being, we expected to find this relation before COVID-19. However, we also expected that this relation would be less evident during COVID-19. Indeed, during COVID-19, many Internet applications were essential to achieve daily tasks and activities. Thus, functional Internet

use should be higher than dysfunctional use. For example, using the Internet to regulate one's mood (trying to receive "likes" or to increase one's connections) is typical of adolescence and it still occurs in younger emerging adults, while it is less evident in older emerging adults and adults (Mazzoni et al., 2016; Mazzoni et al., 2017). However, while this behavior was associated with lower life satisfaction, work satisfaction and well-being pre-COVID-19, during COVID-19, this was one of the ways to maintain contact with the surrounding world. Therefore, we expected that this negative association would be less evident.

H2: At the same time, as life is characterized by the prevalence of online interactions, mixing different contexts that overlap (family, work/university, and free time), we expected that interactions overload would be negatively related to life satisfaction, work/university satisfaction, and well-being. However, this relation should be more evident before COVID-19, since during COVID-19, the use of online interactions was functional to carry on daily activities and to maintain one's social capital. Thus, online interactions should be perceived as less disturbing. However, as age determines important differences in the tasks and activities being carried out online, we expected that age would relate more strongly with interactions overload during COVID-19 than before.

H3: Differently from problematic Internet use and interactions overload, as cyberloafing has been found also to relate positively with life satisfaction, work satisfaction, and well-being, we expected that this dimension, both before and during COVID-19, would be positively related with satisfaction and well-being.

The challenge represented by COVID-19 has changed how people in different age groups use digital technologies (a massive use of the Internet to continue university and work activities, the need to use many types of applications to be in contact with friends and family members, etc.) to carry out daily activities and achieve life and work objectives. Thus, this dynamic should determine important differences in three life periods (younger emerging adults, older emerging adults, and adults) before and during COVID-19. More specifically, as younger emerging adults live a period of life in which interactions (particularly online) and the construction and maintenance of social capital is crucial, while older emerging adults and adults live a period in which the use of the Internet is more linked to work and professional activities, we expected:

H4: A significant main effect of life period on all dimensions concerning dysfunctional Internet use;

H5: A significant main effect of shift determined by COVID-19, particularly as regards problematic Internet use, with more evident problematic Internet use by younger emerging adults than older emerging adults and adults, principally in dimensions related to emotions (mood regulation). We also expected a more evident perception of interactions overload in adults than in younger emerging adults and older emerging adults due to an important change in their habitual way of communicating in everyday life activities (as online interactions were the most important types of communication during COVID-19).

METHODS

Participants and Procedures

After obtaining the authorization from the bioethics committee of the University of Bologna a voluntary response sampling was employed and, to ensure sample diversity, Italian adults attending various university and vocational training courses, but also participants of seminars and webinars (principally parents of students of all school levels), in which one of the foci was the functional and problematic Internet use, were recruited as study subjects. In this way, the online questionnaire was used as a tool to reflect about Internet use and its applications. The study was conducted from June 2018 to September 2022. The online questionnaire (completely anonymous, voluntary, and noncommercial) was constructed using the Qualtrics platform and, to gain access, participants clicked on a hyperlink or used a QR code distributed by lecturers/tutors involved in the data collection. The first part of the questionnaire requested signatures on the informed consent form and the data processing consent form, following GDPR¹. The two signatures were required to participate in the study. After deleting incomplete answers, a total of 661 participants took part in the study (see Table 1 for descriptive statistics).

Measures

DEMOGRAPHIC VARIABLES

Participants who completed the questionnaire from June 2018 to the first lockdown in Italy, that is, March 9th, 2020, were categorized as pre-COVID-19 period, while participants who completed the questionnaire from the beginning of the lockdown to September 2022, when COVID-19 alerts were still on the agenda, were categorized as COVID-19 period. We gathered data about three principal demographic variables: gender, age, and educational qualification. In this study, gender (female and male) and age were particularly relevant. Previous studies, starting from the initial massive diffusion of the Internet around 2000, have already shown differences between females and males as regards Internet use by stressing a gap between the two populations (Odell et al., 2000; Shaw & Gant, 2002; Weiser, 2000). However, more recent studies have demonstrated that this gap is nearly closed (Mazzoni et al., 2016; Mazzoni et al., 2017; Upadhyay & Guragain, 2017). By considering general Internet use together with the applications used, the online activities, and problematic Internet use, further studies suggested that differences between males and females still persist (Laconi et al., 2015; Muñoz, 2020; Twenge & Martin, 2020). Thus, it is important to determine whether gender plays a relevant role, before and during COVID-19, and it should be considered in the subsequent analyses. Furthermore, as explained before, age is the most important demographic variable in the current study. First, many studies highlight the relation between age and functional or dysfunctional Internet use (Auxier & Anderson, 2021; Benvenuti & Mazzoni, 2020; Benvenuti et al., 2018; Benvenuti et al., 2022; Ioannidis et al., 2018). Second, it allowed for the construction of three samples on which the current study focused the analysis: younger emerging adults (18-24),

older emerging adults (25-29), and adults (over 30). Finally, even though few studies have addressed the effects of educational qualification on functional and problematic Internet use, some studies have found important association between education level and the use of many technological devices (Van Deursen & Van Dijk, 2019), including the Internet (Reisdorf & Grosej, 2017). Thus, in the current study, we focused on checking whether education level is related with the other dimensions before and during COVID-19.

LIFE SATISFACTION AND WORK/STUDY SATISFACTION

Life satisfaction and work/study satisfaction (for university students) were measured with two specific items (one each) derived from the Italian version of the Satisfaction with Life Scale (SWLS), designed to measure subjective global cognitive judgments of satisfaction with individual life (Di Fabio & Gori, 2016; Diener et al., 1985). The two items were "I am satisfied with my life" and "I am satisfied with my work/study." Participants answered the items on a four-point Likert-type scale from "strongly agree" to "strongly disagree," without the possibility to choose a neutral answer (neither agree nor disagree). Thus, we collected negative or positive opinions of the participants. Cronbach's α coefficient was not calculated since there were only two items.

WELL-BEING

The Italian version (Carrozzino et al., 2022; Nicolucci et al., 2004) of the WHO-5 Well-Being Scale (Topp et al., 2015) was used to assess well-being. The scale contains five items rated on a six-point Likert scale (from "no time" to "all of the time"). The Cronbach's α coefficient of this scale was .83.

PROBLEMATIC INTERNET USE

The Italian version (Fioravanti et al., 2013) of the Generalized Problematic Internet Use Scale 2 – GPIU2 (Caplan, 2010) was used to assess problematic Internet use by considering only the same 15 items of the original version, and not the 20 items of the Italian validation, on a 5-point Likert scale (from "not at all" to "always"). The GPIU2 scale is composed by four subscales: preference for online social interactions (POSI; $\alpha = .765$), deficient self-regulation (DSR; $\alpha = .853$); mood regulation (MR; $\alpha = .781$), and negative outcomes (NO; $\alpha = .722$). The Cronbach's α coefficient of the entire scale was .88.

CYBERLOAFING

The cyberloafing scale was created by selecting items having a reliability value higher than .70, as suggested by Fabrigar et al. (1999) and Fabrigar and Wegener (2012), from the 16-item scale by Blau et al. (2006). Thus, the cyberloafing scale was composed of seven items analyzing surfing, e-mailing, and chatting about nonwork-related topics, rated on a five-point Likert scale (from "not at all" to "always"). The Cronbach's α coefficient was .84.

INTERACTIONS OVERLOAD

Not many studies have been conducted on interactions overload and it is difficult to find specific scales (He, 2020). Thus, interactions

overload was measured by constructing a specific scale inspired Misra & Stokols (2012), Laumer et al. (2013), and He (2020). It was composed of 14 items on a five-point Likert scale (from "not at all" to "always"). After an exploratory factor analysis, we found three factors. The first was named contextual disturbing interactions (CDI, Cronbach's $\alpha = .80$), that is, "being subjected to undesired interaction due to a combination of interaction content, person, and situation" (Ljungberg & Sorensen, 1998). In other words, all the situations in which a call, a message, an e-mail, or a notification disturb the activity that is taking place. The second factor was ineffectiveness of the communication modality (ICM, Cronbach's $\alpha = .73$), that is, "being subjected to desired interaction through an undesired interaction mode" (Ljungberg & Sorensen, 1998). In other words, receiving relevant information, communications, or anything else through communication channels deemed inadequate. For example, these risks causing the information to be forgotten, not giving it due importance, or not noticing it at all. The third factor was needed to disconnect from interactions (NDI, Cronbach's $\alpha = .62$), that is, the need to turn off the means of communication to not receive further communications or information. Although this last factor had a rather low reliability coefficient, the Cronbach's α coefficient for the entire scale was .84.

Statistical Analysis

The first step of the analysis divided participants into two groups: pre-COVID-19 period and COVID-19 period. Next, an analysis of variance (ANOVA) was performed to check whether gender is a factor affecting the examined variables. To answer the first research question and to verify the three hypotheses, SPSS 28 software was used to carry out two correlation analyses on the two groups. To answer the second research question and to verify the main two hypotheses, two ANOVAs comparing the three different life periods before and during COVID-19, and a multivariate generalized linear model were carried out, also using SPSS 28.

RESULTS

Descriptive Statistics

First, participants were divided in two groups based on the date they completed the questionnaire: before (pre-COVID-19 period) and after (COVID-19 period) March 9th, 2020, the day in which the first lockdown started in Italy. The groups were as follows: pre-COVID-19 period = 375 (61,1% women); COVID-19 period = 286 (72,4% women). Second, as the second most important variable of the current study was life stages, age was divided in three periods (see Table 1): 18-24 (younger emerging adults), 25-29 (older emerging adults), and over 30 (adults).

For education level, the two groups were similarly characterized, with most having a high school diploma (30,1% in the pre-COVID-19 period and 70,3% in the COVID-19 period) or university degree (51,8% in the pre-COVID-19 period and 24,1% in the COVID-19 period). Differences were determined by the fact that most of the COVID-19 group were younger emerging adults (18-24).

TABLE 1.

Participants Divided by Life Stages and Questionnaire Completion

Life stages	Questionnaire completed				Total	%
	pre-COVID-19 period		COVID-19 period			
	n	%	n	%		
Younger emerging adults	89	23,7%	171	59,8%	260	39,3%
Older emerging adults	86	22,9%	29	10,1%	115	17,4%
Adults	200	53,3%	86	30,1%	286	43,3%
Total	375	100,0%	286	100,0%	661	100,0%

Hypothesis Testing

Since many previous studies highlighted a gender gap as relates to the Internet, a one-way ANOVA (with gender as independent variable/factor and the other variables as dependent variables) was carried out to verify the existence of differences between females and males concerning the study variables. No differences were found between males and females considering both groups (pre-COVID-19 and COVID-19), except for GPIU2 outcome in everyday life, in which both genders scored the lowest levels of all GPIU2 factors. Thus, gender was not considered in the subsequent analyses. Then, we carried out two correlation analyses, one on the pre-COVID-19 group (see Table 2) and one on the COVID-19 group (see Table 3).

Of the many correlations resulting from the analysis of the pre-COVID-19 group, for the objectives of the current study, we focused specifically on age, life/work satisfaction, well-being, and factors related to Internet use. Considering age, in the pre-COVID-19 group, it was negatively related with problematic Internet use (particularly with deficient self-regulation and with mood regulation) and with cyberloafing, but not with Interactions overload, except for a negative correlation with need to disconnect from interactions. As regards life satisfaction, it was negatively related with problematic Internet use (particularly deficient self-regulation, mood regulation, and outcome in everyday life), and with all the dimensions of interactions overload. There were no statistically significant correlations with cyberloafing. As it pertains to work/study satisfaction are negatively related to all factors of interactions overload, while no statistically significant correlations with cyberloafing and problematic Internet use were observed, except for a weak negative correlation with mood regulation. Finally, concerning well-being, it showed a weak negative correlation with generalized problematic Internet use, but a strong negative correlation with mood regulation, and outcome in everyday life. Well-being was also negatively correlated with interactions overload (specifically with contextual disturbing interactions and ineffectiveness of the communication modality), while no statistically significant correlations were observed for cyberloafing.

For the COVID-19 group, age was negatively correlated with the GPIU2 (particularly with mood regulation) and cyberloafing, while no statistically significant correlations were observed with the general measure of interactions overload. However, age showed a positive

correlation with contextual disturbing interactions (weak) and with ineffectiveness of communication channels, as well as a negative correlation with the need to disconnect from interactions.

Life satisfaction was negatively correlated with problematic Internet use (particularly with deficient self-regulation and outcome in everyday life), and (weakly) with the general measure of interactions overload, even though none of the factors were statistically significantly correlated with age, and no statistically significant correlations were observed for cyberloafing.

Work/study satisfaction showed only a weak negative correlation with problematic Internet use (specifically with outcome in everyday life).

Finally, well-being, showed a weak negative correlation with generalized problematic Internet use (specifically with mood regulation and outcome in everyday life) and with the general measure of interactions overload (two weak correlations with contextual disturbing interactions and ineffectiveness of the communication modality), while statistically significant correlations were observed with cyberloafing.

To answer the second research question and verify H4 and H5, two one-way ANOVAs were carried out: one for the pre-COVID-19 group (see Table 4) and one for the COVID-19 group (see Table 5). The three life stages (younger emerging adults, older emerging adults, and adults) were considered as independent variables/factors while well-being and dysfunctional Internet use variables were considered as dependent variables. Last, to verify the combined effects of life stages and COVID-19 on the variables, a general linear model was carried out.

In the pre-COVID-19 group, results showed statistically significant differences in life satisfaction, with adults having higher life satisfaction than younger emerging adults; mood regulation, with both younger emerging adults and older emerging adults using the Internet to regulate their mood much more than adults; GPIU, with younger emerging adults having higher problematic Internet use than adults; -and need to disconnect from interactions, with younger emerging adults perceiving a higher need to disconnect from interactions principally than adults, but also than older emerging adults.

In the COVID-19 group, results showed statistically significant differences in work/study satisfaction, with younger emerging adults having higher satisfaction than older emerging adults; mood regulation, with younger emerging adults and older emerging adults using the Internet to regulate their mood much more than adults; GPIU, with younger emerging adults having higher problematic Internet use than adults; cyberloafing, with younger emerging adults having higher cyberloafing than adults; contextual disturbing interactions, with adults perceiving much more contextual disturbing interactions than younger emerging adults; ineffectiveness of the communication modality, with adults perceiving a higher ineffectiveness of the communication modality than both younger emerging adults and older emerging adults; -and need to disconnect from interactions, with younger emerging adults perceiving a higher need to disconnect from interactions than adults. Finally, results of the general linear model carried out to verify the combined effects of period of life and COVID-19 on the variables showed three statistically significant effects on work/study satisfaction ($p < .05$), disturbing interactions ($p < .05$) and ineffectiveness of communication channels ($p < .05$).

TABLE 2. Descriptive Statistics and Correlations in the Pre-COVID-19 Group

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	35.92	13.12	-													
2. Educational Qualification	5.14	1.20	.37	-												
3. Life Satisfaction	3.09	0.62	.14**	.03	-											
4. Work/University Satisfaction	2.93	0.70	.08	.05	.50**	-										
5. Well-Being	2.60	0.86	.14**	.13*	.49**	.42**	-									
6. GPIU – Preference for Online Interactions	1.05	0.77	.05	.08	-.03	.04	-.00	-								
7. GPIU – Deficient Self-Regulation	1.02	0.77	-.14**	.10	-.16**	-.03	-.05	.40**	-							
8. GPIU – Mood Regulation	1.12	0.86	-.36**	.04	-.22**	-.11*	-.20**	.30**	.60**	-						
9. GPIU – Outcome in Everyday Life	0.21	0.46	-.08	-.05	-.22**	-.10	-.16**	.18**	.53**	.32**	-					
10. GPIU – Generalized Problematic Internet Use	0.89	0.57	-.18**	.08	-.20**	-.05	-.12*	.61**	.92**	.77**	.60**	-				
11. Cyberloafing	1.60	0.80	-.14**	.04	-.06	-.02	-.01	.22**	.38**	.29**	.19**	.39**	-			
12. Interaction Overload – Contextual Disturbing Interactions	1.40	0.65	-.04	.09	-.18**	-.23**	-.22**	.12*	.30**	.26**	.26**	.32**	.29**	-		
13. Interaction Overload – Ineffectiveness of the Communication Modality	1.33	0.79	.02	.05	-.16**	-.18**	-.17**	.06	.22**	.17**	.21**	.22**	.16**	.64**	-	
14. Interaction Overload – Need to Disconnect from Interactions	1.38	0.97	-.19	-.00	-.15**	-.12*	-.10	-.05	.01	.09	.12*	.04	-.03	.23**	.20**	-
15. Interaction Overload – Interactions Overload	1.38	0.59	-.07	.08	-.21**	-.24**	-.23**	.09	.28**	.26**	.27**	.30**	.24**	.95**	.79**	.45**

Note. N = 375.
*p < .05; **p < .01.

TABLE 3. Descriptive Statistics and Correlations in the COVID-19 Group

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	29.42	12.92	-													
2. Educational Qualification	4.55	0.95	.56**	-												
3. Life Satisfaction	3.02	0.60	.06	.05	-											
4. Work/University Satisfaction	2.92	0.71	-.01	-.06	.48**	-										
5. Well-Being	2.54	0.83	.11	.17**	.48**	.44**	-									
6. GPU – Preference for Online Interactions	1.14	0.75	.07	-.01	-.09	-.06	-.05	-								
7. GPU – Deficient Self-Regulation	1.17	0.74	-.12	-.09	-.13*	-.10	-.12	.36**	-							
8. GPU – Mood Regulation	1.53	0.95	-.39**	-.26**	-.08	-.04	-.14*	.40**	.58**	-						
9. GPU – Outcome in Everyday Life	0.27	0.48	.02	.01	-.22**	-.21**	-.14*	.19**	.42**	.24**	-					
10. GPU – Generalized Problematic Internet Use	1.06	0.56	-.17**	-.14*	.16**	-.12*	-.15*	.63**	.90**	.80**	.52**	-				
11. Cyberloafing	1.71	0.71	-.30**	-.12*	.01	-.01	.02	.05	.28**	.35**	.16**	.31**	-			
12. Interaction Overload – Contextual Disturbing Interactions	1.45	0.59	.13*	.11	-.11	-.11	-.14*	.21**	.34**	.22**	.24**	.35**	.20**	-		
13. Interaction Overload – Ineffectiveness of the Communication Modality	1.29	0.78	.15**	.17**	-.11	-.07	-.14*	.08	.11	.06	.17**	.13*	.12*	.65**	-	
14. Interaction Overload – Need to Disconnect from Interactions	1.66	0.95	-.28**	-.20**	-.06	-.05	-.07	-.01	.11	.20**	.15**	.15**	.20**	.29**	.24**	-
15. Interaction Overload – Interactions Overload	1.45	0.56	.06	.08	-.12*	-.11	-.16**	.16**	.29**	.21**	.25**	.31**	.21**	.94**	.80**	.51**

Note. N = 286.
*p < .05; **p < .01.

TABLE 4.

ANOVA-Post-Hoc (Bonferroni) Comparison Between the Three Life Stages in the Pre-COVID-19 Group

Variable	Comparison		Mean difference	SE	df
	Life stages	Life stages			
Life satisfaction	Younger emerging adults	Older emerging adults	-.126	.09	372
		Adults	-.190*	.08	372
	Older emerging adults	Adults	-.064	.08	372
Work/study satisfaction	Younger emerging adults	Older emerging adults	-.089	.11	372
		Adults	-.069	.09	372
	Older emerging adults	Adults	.020	.09	372
Well-being	Younger emerging adults	Older emerging adults	-.061	.13	372
		Adults	-.196	.11	372
	Older emerging adults	Adults	-.135	.11	372
GPIU - preference for online interactions (POSI)	Younger emerging adults	Older emerging adults	-.085	.12	372
		Adults	-.084	.10	372
	Older emerging adults	Adults	-.001	.10	372
GPIU - deficient self-regulation (DSR)	Younger emerging adults	Older emerging adults	.231	.12	372
		Adults	.230	.10	372
	Older emerging adults	Adults	-.002	.10	372
GPIU - mood regulation (MR)	Younger emerging adults	Older emerging adults	.271	.12	372
		Adults	.683**	.10	372
	Older emerging adults	Adults	.411**	.11	372
GPIU - outcome in everyday life (OEL)	Younger emerging adults	Older emerging adults	.137	.07	372
		Adults	.085	.06	372
	Older emerging adults	Adults	-.052	.06	372
GPIU – generalized problematic internet use	Younger emerging adults	Older emerging adults	.157	.08	372
		Adults	.229**	.07	372
	Older emerging adults	Adults	.071	.07	372
Cyberloafing	Younger emerging adults	Older emerging adults	.230	.12	372
		Adults	.242	.10	372
	Older emerging adults	Adults	.011	.10	372
Interaction overload - Contextual disturbing interactions (CDI)	Younger emerging adults	Older emerging adults	.191	.10	372
		Adults	.096	.08	372
	Older emerging adults	Adults	-.095	.08	372
Interaction overload - Ineffectiveness of the communication modality (ICM)	Younger emerging adults	Older emerging adults	.070	.12	372
		Adults	-.020	.10	372
	Older emerging adults	Adults	-.089	.10	372
Interaction overload - Need to disconnect from interactions (NDI)	Younger emerging adults	Older emerging adults	.353*	.14	372
		Adults	.477**	.12	372
	Older emerging adults	Adults	.124	.12	372
Interaction overload - Interactions overload	Younger emerging adults	Older emerging adults	.188	.09	372
		Adults	.126	.07	372
	Older emerging adults	Adults	-.062	.08	372

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

TABLE 5.

ANOVA-Post-Hoc (Bonferroni) Comparison Between the Three Life Stages in the COVID-19 Group

Variable	Comparison		Mean difference	SE	df
	Life stages	Life stages			
Life satisfaction	Younger emerging adults	Older emerging adults	.202	.12	283
		Adults	-.052	.08	283
	Older emerging adults	Adults	-.254	.13	283
Work/study satisfaction	Younger emerging adults	Older emerging adults	.362*	.14	283
		Adults	.075	.09	283
	Older emerging adults	Adults	-.286	.15	283
Well-being	Younger emerging adults	Older emerging adults	-.827	.17	283
		Adults	-.196	.11	283
	Older emerging adults	Adults	-.114	.18	283
GPIU - preference for online interactions (POSI)	Younger emerging adults	Older emerging adults	-.077	.15	283
		Adults	-.125	.10	283
	Older emerging adults	Adults	-.049	.16	283
GPIU - deficient self-regulation (DSR)	Younger emerging adults	Older emerging adults	.117	.15	283
		Adults	.195	.10	283
	Older emerging adults	Adults	.078	.16	283
GPIU - mood regulation (MR)	Younger emerging adults	Older emerging adults	.135	.18	283
		Adults	.852**	.12	283
	Older emerging adults	Adults	.717**	.19	283
GPIU - outcome in everyday life (OEL)	Younger emerging adults	Older emerging adults	-.220	.09	283
		Adults	-.035	.06	283
	Older emerging adults	Adults	.185	.10	283
GPIU – generalized problematic internet use	Younger emerging adults	Older emerging adults	.014	.11	283
		Adults	.216**	.07	283
	Older emerging adults	Adults	.202	.12	283
Cyberloafing	Younger emerging adults	Older emerging adults	.078	.14	283
		Adults	.407**	.09	283
	Older emerging adults	Adults	.328	.15	283
Interaction overload - Contextual disturbing interactions (CDI)	Younger emerging adults	Older emerging adults	.004	.12	283
		Adults	-.200*	.08	283
	Older emerging adults	Adults	-.204	.12	283
Interaction overload - Ineffectiveness of the communication modality (ICM)	Younger emerging adults	Older emerging adults	.059	.15	283
		Adults	-.354**	.10	283
	Older emerging adults	Adults	-.412*	.16	283
Interaction overload - Need to disconnect from interactions (NDI)	Younger emerging adults	Older emerging adults	.173	.18	283
		Adults	.554**	.12	283
	Older emerging adults	Adults	.382	.20	283
Interaction overload - Interactions overload	Younger emerging adults	Older emerging adults	.040	.11	283
		Adults	-.125	.07	283
	Older emerging adults	Adults	-.165	.12	283

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

DISCUSSION AND CONCLUSIONS

First, although gender was a factor considered in the analysis, contrary to many studies on the gender digital gap, results showed that, neither before nor during COVID-19, gender determined significant differences in the variables considered in the current study. On the one hand, it is likely that the gender gap is nearly closed, as some recent studies have already suggested (Mazzoni et al., 2016; Mazzoni et al., 2017; Upadhyay & Guragain, 2017). On the other hand, it is also likely that the pandemic period and the consequent necessity to use the Internet for most human needs (work, university, school, family, and leisure) has further narrowed the already very small digital gender gap.

Regarding the effect of the lockdown phases determined by COVID-19 and the consequent massive use of the Internet during the pandemic period, important differences can be highlighted from before the pandemic period. As assumed (H1), an important change was found in the relation between age and problematic Internet use. While before COVID-19, age was negatively related to deficient self-regulation, mood regulation, and generalized problematic Internet use, during COVID-19, only the last two relations persisted. This means that while before the pandemic, early emerging adults showed a higher difficulty in self-regulating their Internet use and a higher Internet use to regulate mood than older participants, during COVID-19, these relationships disappeared. During COVID-19, it is likely the potential of many Internet applications, as part of functional organs to satisfy daily human needs, were more evident. This could have leveled the perception of being able to regulate Internet use in different age groups. Evidence of this can be found when considering mood regulation. Although, contrary to our hypothesis, it was negatively related to age both before and during COVID-19, in line with our hypothesis, before the lockdown periods, it was strongly negatively related with life satisfaction and well-being, and weakly with work/university satisfaction. During COVID-19, it was weakly negatively related only with well-being. Before COVID-19, the methods for regulating one's mood were probably not strictly linked to the Internet. On the contrary, if repeated, this behavior lowered satisfaction and well-being. During COVID-19, as the Internet became a way to connect, interact, and carry out and regulate many human activities, its use to regulate one's mood was perceived less dysfunctional for life and work/university satisfaction. Thus, the first hypothesis was partially confirmed.

A similar effect (H2) was found for the relation between interactions overload, on the one hand, and life satisfaction, work/university satisfaction, and well-being, on the other. As assumed, before COVID-19, all interactions overload factors were negatively related with life satisfaction, work/university satisfaction, and well-being, except for the association between need to disconnect from interactions and well-being. During COVID-19, only a weak association with well-being remained. Contrary to what we assumed, age was only related to interactions overload during COVID-19. Particularly interesting is the fact that the association with contextual disturbing interactions and ineffectiveness of the communication modality was positive, while it is negative with need to disconnect from interactions. We could hypothesize that older

persons, less habituated to interact massively or exclusively by means of Internet applications, simultaneously mixing different contexts (work, leisure, and family), during lockdown periods perceived a higher disturbance from undesired interactions combining different contents, persons, and situations or from interactions performed by means of undesired interaction modes (Ljungberg & Sorensen, 1998), due to lower skills with Internet applications to interact than younger persons. However, for younger people, the further increase in the use of Internet applications to interact during lockdown periods (e.g., for university courses) has probably determined a perception of a higher need to be disconnected from interactions than for older people (having a more regulated and focused use of Internet applications).

While problematic Internet use and interactions overload have been found to relate negatively with life satisfaction, work/university satisfaction, and well-being (even though to a different extent before and during COVID-19), in line with some studies showing a positive association between these latter variables (life satisfaction, work/university satisfaction, and well-being) and cyberloafing, we assumed (H3) the same positive association both before and during COVID-19. Contrary to our hypothesis, cyberloafing was not related to satisfaction or well-being, both before and during COVID-19. A possible interpretation of this result is that studies on cyberloafing are normally strictly linked to working environments and working activities, while the current study did not specifically refer to working contexts. This could possibly have affected the participants' perception of cyberloafing situations. The period of COVID-19, blending in a unique context work/university, leisure, and family, probably made it difficult to differentiate between cyberloafing and other activities more linked to work/university contexts. Regarding life periods (H4), as assumed, relevant significant differences between younger emerging adults, older emerging adults, and adults in dysfunctional Internet use, both before and during COVID-19, were observed. These differences are related to variables already highlighted in the previous analysis: generalized problematic Internet use, mood regulation, interactions overload factors of contextual disturbing interactions, ineffectiveness of the communication modality, and need to disconnect from interactions. In line with the literature, younger people suffer more from generalized problematic Internet use than older people, and this is particularly evident for Internet use to regulate mood, an online behavior linked to adolescence but still active in younger emerging adults. For younger emerging adults, social networking sites are an important context in which constructing their own identity (Yang et al., 2017), developing and maintaining social capital (Mazzoni & Iannone, 2014; Steinfeld et al., 2008), and finding social support (Benvenuti et al., 2020) influence a person's mood of the day. For interactions overload, the significant differences found between younger emerging adults and adults confirm and deepen the interpretation of H2. Younger emerging adults live a period of life in which Internet use to interact, communicate, while also constructing and maintaining their social capital is crucial. Thus, they are more skilled in using many types of online applications and in mixing contexts of interactions. Adults seem to be more disturbed by many contextual interactions and to perceive communication modalities as more ineffective than younger emerging

adults. However, this massive and multicontextual use of online interactions has a cost: younger emerging adults perceived a significantly higher need to disconnect from interactions than adults, since the latter live a period of life in which most of their activities are particularly focused on achieving working and professional objectives (Eccles et al., 2003; Salmela-Aro et al., 2007; Tanner & Arnett, 2016), but also on the use of digital technologies more oriented toward specific goals (Benvenuti et al., 2022).

However (H5), this is particularly true during COVID-19, while before COVID-19, the effects of life periods on problematic Internet use and on interactions overload were less evident. On the one hand, life periods determine different ways to use Internet applications. This fits particularly with the specific tasks of the period (e.g., constructing and maintaining social capital during transitions for younger emerging adults). On the other hand, a non-normative shift such as that determined by COVID-19, and the consequent lockdown periods, has determined differences in the previous use of digital technologies that have stressed some critical effects (such as the higher need to disconnect from interactions in younger emerging adults, or the higher perception of disturbing interactions and ineffectiveness of the communication modalities in adults). This is further confirmed by the general linear model that showed combined effects of life periods and COVID-19 concerning, in particular, factors of interactions overload.

To conclude, as we do not have enough scientific data on emerging adults and lockdown in Italy, the current study becomes far more significant for the entire Italian population, suggesting and highlighting the relevance of life stages for the functional or problematic effects of Internet use based on tasks and activities related to those periods, and the consequences of non-normative shift such as COVID-19 on the use of digital technologies and their effects on younger emerging adults, older emerging adults, and adults. However, it has some limitations to be addressed. First, the current study presented a cross-sectional survey with data collected in two different periods, before and during COVID-19. The basic idea is that the non-normative shift of COVID-19 determined most of the resulting differences between the analyzed groups. However, to have a deeper understanding of these dynamics, a longitudinal study with a survey before, during, and after COVID-19 with the same participants would be better, although it would have been very difficult to foresee COVID-19 coming. A second limitation was that the current study considered the COVID-19 period as a single phase, while it was characterized by periods of lockdown and periods in which there was the possibility to move more freely. Thus, research should also consider these important aspects related to the possibility to meet in person or not, and consequently, to interact in person or not. A third limitation was that data collection took a long time (June 2018 to September 2022). This could have been influenced by various events we are currently not aware of. It is possible that essential differences would have been revealed even if the pandemic had not happened. A fourth and last weakness was that the study did not consider occupation and the different aspects in which some types of working/university activities could affect the considered variables (Garrett & Danziger, 2008; Jacukowicz & Merez-Kot, 2020). Indeed,

the different online activities requested by different work or university contexts may affect the perception of functional or problematic Internet use. Despite these weaknesses, the current study provides an important analysis about the effects of critical events like COVID-19 on some variables related to problematic Internet use, considering different life stages and the connected tasks, activities, and objectives.

FOOTNOTES

¹ <https://gdpr.eu/what-is-gdpr/>

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The authors report there are no competing interests to declare.

This paper has followed APA ethical guidelines and it was approved by an institutional review board of the University of Bologna: <https://www.unibo.it/en/research/research-facilities/ethics-committees/bioethics-committee>.

This paper is not currently under review at any other journal and this research has not been published elsewhere.

DATA AVAILABILITY

Data are available on request contacting the authors.

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