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Internet use during the COVID-19 outbreak: A resource for well-being or an amplifier of psychological distress? A study on an Italian sample

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Abstract

Internet usage increased globally during the COVID-19 pandemic. This study examined the role of online/offline relational resources to see whether the Internet improved well-being or amplified psychological distress, also considering the mediating role of Internet use motives. A sample of 573 Italian adults (Mean age = 40.28 years; SD = 16.43; 64% women) reported their motives for Internet use during lockdown and completed standardized measures on loneliness, online social support, well-being and problematic Internet use (PIU). A path analysis showed that loneliness positively predicted PIU and negatively predicted well-being, whereas perceived online social support positively predicted well-being. Loneliness was significantly associated with social/coping motives, which in turn were associated with PIU. Moreover, loneliness mediated the relationship between online social support and PIU. No significant mediating role was found for knowledge and studying/working motives. These findings call for tailored efforts to blunt the impact of social isolation and foster social connectivity.

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1. Introduction

With the COVID-19 outbreak, self-isolation and social distancing measures were introduced by governments in several countries to reduce the spread of the contagion. The literature has emphasized the potential impact of lockdown-related changes (such as disruption of face-to-

face human connection, closing of schools, reduction of outdoor activities, closure of commercial activities, and financial insecurity) on people's psychological well-being (Huang & Zhao, 2020; Liu et al., 2020; Montemurro, 2020; Sood, 2020; Vijayaraghavan & Singhal, 2020). Furthermore, since an increased use of the Internet has been recorded worldwide among the general population (Masaeli & Farhadi, 2021), an important debate began on whether the Internet acted as a resource for well-being or as an amplifier of psychological distress.

On these premises, the current study aimed to deepen the current knowledge on the association between common relational experiences during the COVID-19 pandemic (i.e., loneliness and social support) and health outcomes in terms of problematic Internet use (PIU) and subjective well-being among Internet users.

1.1 Internet use: a double-edged sword

Using the Internet during the COVID-19 pandemic could be a double-edged sword: on the one hand, Internet use may have represented for many people a significant resource to counteract physical distancing and isolation, especially during lockdown, since the Internet allows individuals to preserve connections with family members and friends, to receive social support and interactions, to carry out study and work activities that serve to maintain a sense of continuity and meaningful purposes, as well as to provide compensative strategies for adventurous activity, entertainment, and sexual solicitations for bored individuals (Annalakshmi et al., 2020; Masaeli & Farhadi, 2021). On the other hand, the large-scale entry of technology into individuals' lives during lockdown is thought to have caused anxiety, fear and confusion, due to contradictory messages and fake news (Schimmenti et al., 2020) and an increase in PIU (Masaeli & Farhadi, 2021).

According to the symptom model of behavioural addiction research (Griffiths, 2005; Meerkerk et al., 2009; Young, 1998), PIU is mostly characterized by loss of control (i.e., spending more time than intended online and unsuccessful attempts to diminish internet use), preoccupation (i.e., obsessive thought patterns involving internet use and preference for internet above other activities), and withdrawal symptoms (i.e., unpleasant states when offline). Different approaches to PIU conceive it as a maladaptive compensatory strategy to deal with pre-existing problems (e.g., negative affective states) that causes or increases interpersonal conflicts and other negative consequences for daily life (Caplan, 2010; Kardefelt-Winther, 2014; Spada, 2014).

People can gain emotional relief and fulfil the need for social contacts through easily accessible means like Internet devices; however, over-reliance on such coping strategies can lead to adverse consequences (Brand et al., 2019; Kardefelt-Winther, 2014). Although most studies focused on the individual's characteristics, such as anxiety and depression (Ođacı & Çikrici, 2017; Radeef

& Faisa, 2018), recent studies have turned their attention to people's relational context (e.g., in terms of perceived loneliness and social support) that might represent a source of psychological distress or, on the other hand, a resource to cope with life's challenges. Previous studies had widely supported the positive relationship between psychosocial problems, such as low social support and loneliness, and greater problematic use of social media (Caplan, 2007; Elhai et al., 2020; Ferrante & Venuleo, 2021; Marino et al., 2018a, 2018b; Musetti et al., 2020; Schimmenti & Caretti, 2017). The COVID-19 pandemic seems to have intensified the sense of loneliness and psychological distress (Kim & Jung, 2021; Loades et al., 2020), and, thus, may have increased the tendency to engage in Internet use in an excessive manner as a way to compensate for negative feelings of depression and stress related to lockdown and self-isolation, as suggested by the recent systematic review by Masaeli and Farhadi (2021). However, the adaptive or maladaptive value of this coping mechanism on people's well-being during the pandemic needs to be explored in more depth (Masaeli & Farhadi, 2021; Saltzman et al., 2020).

A crucial aspect that the current study attempted to address is related to the need to simultaneously take into account users' perception of the offline and online relational context (in terms of perceived loneliness and online social support) in order to explain their level of well-being and their vulnerability to PIU, which are associated to each other (Wang & Wang, 2013). Although during the pandemic mental health advisors recommended the use of Information and Communication Technologies (ICT) to reduce feelings of anxiety and social isolation (Mucci et al., 2020), the existing literature on social media use and well-being yields conflicting results, with some studies finding a positive association between social media use and reduction of isolation, stress and panic (Brooks et al., 2020) and other studies finding a positive association between social media use, anxiety (Boursier et al., 2020), stress (Meier et al., 2016) and depression (e.g., Appell et al., 2016; Bendau et al., 2021).

1.2 Compensatory Internet use and motives for using the Internet during the pandemic

According to the "social compensation vs. enhancement hypothesis" (Zywica & Danowski, 2008), online social support can be either positive or negative depending on the strength of the user's perception of support in offline life. That is, seeking online social support in order to compensate for weak offline social networks is likely to lead the user to be confronted with a further worsening of its social functioning, which, in turn, decreases his or her well-being and increases the likelihood of engaging in PIU. Grieve and colleagues (2013) support this perspective in their study on a large sample of Australian adults: the effect of online social support in predicting PIU and well-being was moderated by offline social support. However,

there is a lack of studies that tested the “social compensation vs. enhancement hypothesis” in the context of COVID-19.

From this perspective, the specific motives that drive people to use the Internet (e.g., for social connectedness, to cope with negative states, to get information, and for study/work purposes) may play a crucial role in ascertaining the positive (i.e., well-being) vs. negative (i.e., PIU) consequences of Internet use. For this reason, the current study tested the role of three internet use motives (social/coping, knowledge, studying/working) in mediating the relationship between offline and online relational resources (loneliness and perceived online social support) and PIU and well-being during COVID-19 outbreak. Indeed, previous studies suggested that motives for internet use distinguish between healthy internet use and unhealthy or problematic internet use behaviours (Marino et al., 2017, 2018b). For instance, it has been found that the levels of PIU among people who use the Internet to entertain themselves and to establish social interaction are higher than that of those who use the Internet primarily to obtain information (Caplan, 2002; Ceyhan, 2011). However, the meaning of using the Internet to achieve different purposes may be specific to the COVID-19 health emergency and related measures of self-isolation. For instance, establishing online social interaction may be felt as a need also by people who do not usually have difficulty meeting friends face to face. Searching for information may entail not only gaining knowledge about the virus but may also expose individuals to misinformation, which fuels uncertainty, fear and anxiety (Schimmenti et al., 2020; Zimmermann et al., 2020). More research is needed in order to evaluate how the specific challenges posed by the COVID-19 pandemic are related to the differing impacts of the motives for internet use on well-being and PIU.

1.3 The present study

The study was conducted in Italy, the first Western country that implemented self-isolation policies in response to the first wave of the pandemic, during the national lockdown, established on March 11 and then eased after May 4, 2020 (Guzzetta et al., 2021).

The present study aimed to simultaneously examine the association between two relational resources (i.e., loneliness and perceived online social support) and two outcomes (i.e., PIU and well-being) during the COVID-19 outbreak, taking into account that PIU and well-being are likely to be negatively associated. Furthermore, the study examined whether (and to what extent) three motives for using the Internet (i.e., social/coping, knowledge, and studying/working) mediate the associations between loneliness and perceived online social support on the one hand and the two outcome variables on the other hand.

2. Method

2.1 Participants and Procedures

An anonymous online survey was available online from 4th to the 24th May 2020. The protocol was disseminated through social networks.

A total of 600 questionnaires were collected; of these, 573 were completed and were used for the purpose of the present study (Mean age = 40.28; SD = 16.43; women: 366 [64%]; aged 18-25: 173 [30.2%]; aged 26-35: 108 [18.8%]; aged 36-45: 56 [9.8%]; over 45: 236 [41.2%]).

2.1 Measures

Internet use motives. Seven *ad hoc* items were used to detect the main motives of internet use in the previous two weeks. The items were derived from prior research (Leung, 2006) on the motives for using the Internet, which highlighted the role of the Internet both for mood management (i.e., entertainment, distraction, information seeking) and social compensation (i.e., winning recognition and maintaining relationships). The items consist of 7 statements referring to how extensively the participants used the Internet to acquire cultural knowledge/entertainment (e.g., checking out museum exhibits, reading e-books), to have fun, escape from reality, acquire information about the COVID-19 emergency, satisfy interpersonal and social needs, for work/study, to keep in touch with loved ones (family, friends). An example item is: “In the last two weeks, how much have you used the Internet for work/study?”. Respondents were asked to use a 4-point Likert scale to evaluate the use of the Internet for each function (from 1 = “Not at all” to 4 = “Very much”) (Cronbach’s $\alpha = .63$). The score obtained for each item was considered separately.

Loneliness. The General Loneliness subscale of the Italian Loneliness ILS (Zammuner, 2008) was used as a measure of subjective loneliness. ILS General Loneliness describes people who feel a disagreeable or unacceptable lack of meaningful social relationships and comprises 7 items measuring subjective perceptions of both social and emotional loneliness. An example item is: “I lack companionship”. Participants were asked to rate the degree to which they identify with every statement in “the past two weeks” on a 4-point Likert scale (from 1 = “I often feel this way” to 4 = “I never feel this way”). In order to obtain the total score, a reverse-scoring procedure was performed for all the items and then the sum of the item scores was considered, with a high score indicating a high level of subjective loneliness. A good internal consistency was found in the current study (Cronbach’s $\alpha = .80$).

Perceived online social support. The questionnaire for the Evaluation of Social Support (SS) (Poortinga, 2006) was adapted to measure people's perception of the availability of online support. The instrument consists of 7 statements related to online relationships and their capacity to make you feel good and to give encouragement. An example item is: "Online there are people I know who can be relied on no matter what happens". Each item is rated on a 3-point scale: 1="not true", 2="partly true", and 3="certainly true". The total score was obtained by summing each item score, with a high score indicating a high level of perceived online social support. Good internal consistency was found in the current study (Cronbach's $\alpha = .90$).

Well-being. The Italian version (Di Fabio, 2016) of the Flourishing Scale (FS; Diener et al., 2010) was used to evaluate general well-being. The FS encompasses eight items regarding human flourishing, namely positive functioning, in important areas such as: purpose in life, relationships, self-esteem, feelings of competence and optimism. An example item is: "My social relationships are supportive and rewarding". Participants were asked to answer by thinking about the past two weeks. Response options rated on a 6-point Likert scale ranging from 1="Strongly disagree" to 7="Strongly agree". By summing the score of each item, the total score was obtained, with a higher value indicating high levels of flourishing. The FS showed good reliability in the present study (Cronbach's $\alpha = .88$).

Problematic Internet use. The 5-item version of the cross-nationally validated Compulsive Internet Use Scale (CIUS; Lopez-Fernandez et al., 2019) was used for assessing PIU, intended as an over-attachment to the use of the Internet, resulting in psychological, social, and professional impairment (Meerkerk et al., 2009). CIUS items capture the main symptomatic domains of PIU, namely loss of control, preoccupation regarding internet use, withdrawal symptoms, coping/mood modification, and conflict. An example item is: "Do you find it difficult to stop using the Internet when you are online?". All items referred to the last two weeks. They are scored on a 5-point Likert scale from 0 = "never" to 4 = "very often". The total score corresponds to the sum of the item scores; the higher the total score, the higher the level of PIU. Validated in eight languages, including Italian, the CIU is recognized as one of the best instruments to assess PIU in terms of its psychometric properties and consistency of findings across different samples (Lopez-Fernandez et al., 2019). Good internal consistency was found in the current study (Cronbach's $\alpha = .76$).

All procedures performed in the study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The project was approved by the Ethics Commission for Research in Psychology of the Department of History, Society and Human

Studies of the University of Salento. Participants were informed about the general aim of the research, the anonymity of responses and the voluntary nature of participation and signed an online informed consent. No incentive was given.

2.2 Data Analyses

First, as a preliminary step, a principal component analysis (PCA) – using SPSS v.22 – was applied to the ratings of the Internet use motives to identify a few variables (formative factors) that can summarise the co-variance among the indicators (Coltman et al., 2008). The solution of PCA was rotated using Varimax rotation. The participants' factorial scores on the components extracted by PCA were used as a measurement of their patterns of motives for internet use.

Second, bivariate correlation analyses were conducted in order to test the associations between the variables of interest (loneliness, perceived online social support, PIU, well-being, patterns of motives for internet use identified through the PCA and age).

Third, the pattern of relationships among variables of interest was examined through path analysis. The package Lavaan (Rosseel, 2012) of the software R (R Development Core Team 2020) and a single observed score for each construct included in the model were used. Specifically, the covariance matrix of the observed variable was analyzed with maximum likelihood method estimator (Satorra & Bentler, 1994) and a bootstrap approach (1000 bootstrap samples) was used to test for mediation. R^2 of each endogenous variable and the Total Coefficient of Determination (TCD; Bollen, 1989; Jöreskog & Sörbom, 1996) were considered in order to evaluate the goodness of fit of the model. In the tested model, PIU and well-being were the dependent variables, loneliness and perceived online social support were the independent variables, whereas the three motives (social/coping, knowledge, and studying/working) were the mediators, and age was included as control variables on the two outcomes. The full model was first tested; path coefficients that were not significant at the 5% level were subsequently removed step-by-step in order to select the most plausible model (Marci et al., 2021).

3. Results

The scree plot of PCA applied to the Internet use motives indicated a three-component solution (Table 1) as a good choice (variance explained = 64%). Variables loading heavily on the first component (34.2% of the variance) were to have fun/to spend time, to escape from reality, to satisfy interpersonal and social needs, and to maintain connections with loved ones; this component was labelled "*Social/coping motives*". Variables loading heavily on the second component (16.37% of the variance) were to acquire information on the COVID-19 health

emergency and to acquire cultural knowledge/entertainment (e.g., checking out museum exhibits, reading e-books); this component was labelled “*Knowledge motives*”. Finally, only one item loads significantly on the third component (13.34% of the variance) which was labelled “*Studying/working motives*”. The three factors are consistent with the core motivations found by previous studies on uses and gratifications of media (Flanagin & Metzger, 2001; LaRose & Eastin, 2004). The factorial scores of the participants on the three components were considered as indicators of the patterns of internet use motives and were used for the subsequent analysis.

Table 1. Components of internet pattern of use (PCA)

Items	Factor loadings			Components' label
	1	2	3	
to have fun/to spend time	.81		-.13	
to escape from reality	.76			
to satisfy interpersonal and social needs	.67	.27	.23	<i>Social/Coping motives</i>
to maintain connections with the loved ones	.60	.40	.24	
to acquire information on the COVID-19 health emergency		.78		<i>Knowledge motives</i>
to have cultural entertainment (to visit museum online, to read books online...)	.14	.71		
to study/to work			.96	<i>Studying/working motives</i>

Means and standard deviations of all the variables are presented in Table 2, along with range, skewness, kurtosis, and bivariate correlations between the variables. Skewness and kurtosis values suggested that measurements were normally distributed overall, not exceeding the conventional cut off of ± 3 (e.g., Mayers, 2013).

Table 2 - Means, standard deviations, ranges, and inter-correlations of study variables

	Mean	SD	Range	Skewness (SE)	Kurtosis (SE)	2	3	4	5	6	7	8
1. PIU	5.44	3.90	0-20	.871(.103)	.771(.205)	-.23***	.10*	.27***	.44***	.06	.10*	-.34***
2. Well-being	40.96	8.60	8-56	-.422(.103)	-.069(.205)		.31***	-.48***	-.01	.10*	.11*	.06
3. Perceived online social support	17.46	3.53	7-21	-.926(.103)	.129(.205)			-.32***	.34***	.14***	.10*	-.19***
4. Loneliness	13.65	3.68	7-26	.505(.103)	-.320(.205)				.10*	-.01	-.02	-.12**
5. Social/coping motives	11.03	2.58	4-16	-.103(.103)	-.442(.205)					.30***	.08	-.37***
6. Knowledge motives	5.35	1.38	2-8	-.136(.103)	-.349(.205)						.11*	.02
7. Learning/Working motives	3.27	.99	1-4	-1.124(.103)	-.005(.205)							-.21***
8. Age	39.97	16.31	18-84	.414(.103)	-1.143(.205)							

As expected, most of the study variables were associated with each other. In particular, PIU and well-being were negatively associated. Moreover, the strongest negative correlation was observed between well-being and loneliness whereas the strongest positive correlation was found between PIU and social/coping motives. Studying/working motives were weakly

associated with well-being. Perceived online social support was more strongly associated with well-being than with PIU.

The full model was tested including all the variables of interest but revealed that several path coefficients were not significant at the $p < .05$ level (i.e., the paths between loneliness and knowledge and studying/working motives; the paths between social/coping motives, knowledge, age, and well-being; the paths between knowledge and studying/working motives, perceived online social support and PIU). Thus, these non-significant paths were removed step by step and the final model including all the significant paths is shown in Figure 1.

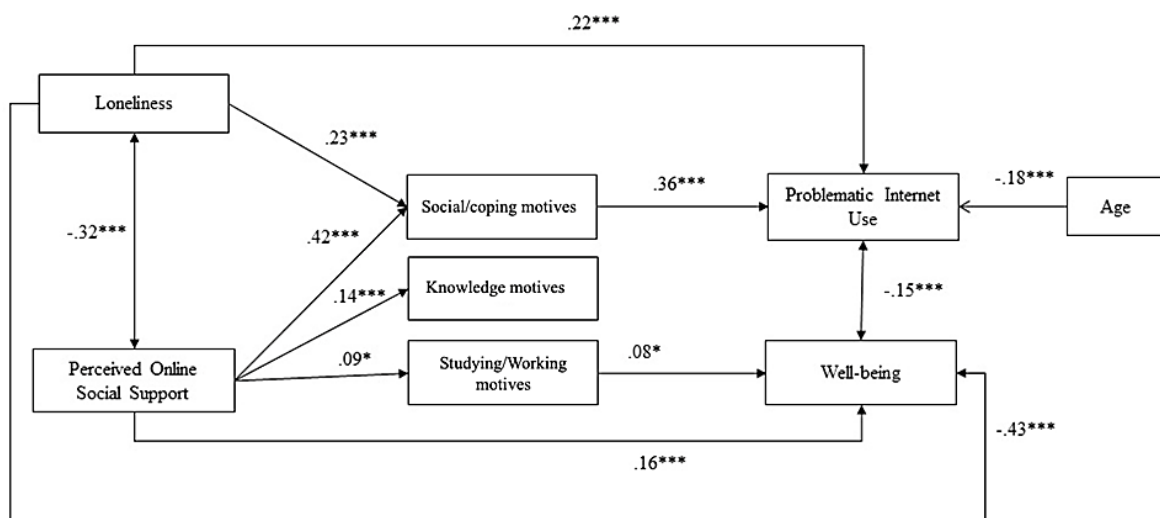


Figure 1. Final model including all the significant paths

Specifically, loneliness was directly and positively associated with PIU and negatively with well-being. Moreover, loneliness was positively associated with social/coping motives, which, in turn, was positively associated with PIU. Perceived online social support was directly and positively associated with well-being. Perceived online social support was also positively associated with the three motives, with the strongest association observed with social/coping. The studying/working motive was positively (though weakly) associated with well-being. Age was negatively associated with PIU. The two outcomes (PIU and well-being) were negatively associated with each other.

With regard to indirect relationships, two indirect relationships were significant (that is, their 95% confidence intervals did not include zero): the mediating role of social/coping motive between loneliness and PIU ($\beta = .082$, $b = .084$ [.052-.120], $z = 4.771$, $p < .001$), and the mediating role of social/coping motive between perceived online social support and PIU ($\beta = .150$, $b = .160$ [.111-.217], $z = 6.152$, $p < .001$). Moreover, the results indicated that the mediating role of the studying/working motive between perceived online social support and well-being

was not significant ($\beta = .008$, $b = .018$ [.000-.046], $z = 1.561$, $p = .131$). With regard to model fit, the model accounted for 24% of the variance for PIU and 27% for well-being. Substantial lower variance was observed for the mediators (i.e., 16% for social/coping, 2% for knowledge, and 1% for studying/working motives). Finally, the total amount of explained variance by the model (Total Coefficient of Determination, $TCD = .43$) indicated a good fit to the observed data. Indeed, this TCD corresponds to a correlation of $r = .66$, which can be considered a medium to large effect size (Cohen, 1988).

4. Discussion

The main purpose of the study was to provide an in-depth understanding of PIU and well-being during the COVID-19 pandemic, with a specific focus on the role of loneliness, perceived online social support and motives for using the Internet.

The negative association observed between PIU and well-being was expected and consistent with the previous literature (Muusses et al., 2014; Schimmenti et al., 2012). Although the debate regarding the directionality of this association remains open, a few longitudinal studies suggest that PIU and well-being mutually reinforce each other, in that lower well-being influences escapism via the Internet (Biolcati et al., 2017), which in turn increases the likelihood of PIU, which in a vicious circle further decreases well-being, leading to harmful consequences (Kim et al., 2009; Van den Eijnden et al., 2008; Vidal et al., 2020). Consistently with the view of a circular linkage, we argue that in the context of lockdown measures related to the COVID-19 emergency, the likelihood of PIU was increased by poor well-being and vice-versa, probably because of reduced offline social contacts, negative mental health and maladaptive coping strategies, such as maladaptive internet use.

With regards to PIU, the tested model suggested that the social/coping motive partially mediates the relationships between loneliness and PIU and between online social support and PIU. This result is consistent with the compensatory hypothesis of internet use (Kardefelt-Winther, 2014) and other influential theoretical models (e.g., self-medication model, see Schimmenti & Caretti, 2010, 2017; see Schimmenti et al., 2012, for an application of the model to PIU) that underline the important role played by psycho-social problems in increasing PIU (Casale et al., 2014; McPherson et al., 2013; Venuleo et al., 2016, 2020a). Indeed, people experiencing loneliness might tend to excessively engage in internet use to compensate for the lack of relational resources and to seek more social connectedness and positive emotions. Such users might be more likely to believe that they will be able to manage their negative feelings online and to increase their social contacts. However, such maladaptive engagement in internet

use is likely to turn into problematic patterns, in terms of compulsive use and preoccupations concerning online activities (Kircaburun et al., 2019; Li & Chung, 2006). In other words, if seeking online social support is meant to compensate for poor offline social interactions, it is possible that the user will tend to develop PIU. Indeed, such online communication often lacks the intimacy, support and quality of offline human relationships and may trigger a snowball effect (Turkle, 2011).

Moreover, it should be noted that loneliness, but not perceived online social support, was directly associated with PIU.

It could be argued that the expected social and emotional benefits behind the use of the Internet for social and coping motives may be only apparent or at least partial, since feeling lonely increases the likelihood of PIU as such (Caplan, 2006; Kim et al., 2009; Valkenburg & Peter, 2009). It could be the case that the health emergency and the measure of self-isolation and physical distancing may have exacerbated negative feelings and perception of loneliness, thus intensifying the use of the Internet to the extent to which users reached problematic levels of Internet use (Ciccarelli et al., 2022), which in turn were associated with poor well-being in a vicious circle (Alheneidi et al., 2021; Boursier et al., 2020; Cauberghe et al., 2021).

With regards to well-being, the results of the present study indicate that loneliness was directly and negatively associated with well-being, whereas perceived online social support was positively associated with well-being. Previous studies have consistently suggested that social isolation relates to health mental problems (de Jong Gierveld et al., 2018; Marinaci et al., 2020; Venuleo et al., 2021a; Saltzman et al., 2020). Recent studies highlighted that in a time of physical distancing imposed by COVID-19 measures, loneliness increased (Saltzman et al., 2020) and represented a major risk factor for well-being among youths and older adults (Groarke et al., 2020; Macdonald & Hülür, 2021). On the other side of the coin, the positive, though weak, association between online social support and well-being suggest that the perceived support received from online social interactions might have reduced potential harm posed by isolation, increasing the sense of purpose in life, relationships, self-esteem, feelings of competence and optimism. Moreover, as suggested by the significant associations with the three motives to use the Internet, online social support fuelled the use of the Internet to carry on work/study activities, to acquire information and identify alternative ways to spend free time and, above all, to maintain social interactions in a novel at-risk condition (Canale et al., 2022). The findings suggested that studying/working motive was positively (though weakly) associated with well-being. Given the sudden breakdown of daily routine and habits imposed by the lockdown in

various domains of life, carrying on work and study activities online became a basic necessity and might have offered a resource to maintain a sense of continuity and meaningful purpose (Mota et al., 2021; Schnell & Krampe, 2020). Recent studies have suggested that maintaining a sense of meaningfulness in life has a buffering effect on psychological distress in time of COVID-19 (Schnell & Krampe, 2020) and that internet users that foregrounded the possibility of carrying on their daily activities online tended to see the Internet as a resource and to show higher levels of well-being (Venuleo et al., 2022).

With regards to control variables, only age was found to be negatively associated with PIU. Young people, such as college students, have been often identified as a high-risk group for internet-related problems (e.g., Japan: Oka et al., 2021; China: Sun et al., 2020; India: Islam et al., 2020; Iran: Turks: Ozturk & Ayaz-Alkaya, 2021). Previous studies conducted before the COVID-19 pandemic had already suggested that young adults are more likely to use the Internet in a compulsive way to face challenges both in the educational and relational fields (Far et al., 2014; Kirkaburun & Griffiths, 2019; Kuss & Lopez-Fernandez, 2016). It is likely that the lifestyle changes related to lockdown measures intensified and amplified these challenges, posing greater uncertainty regarding their future and educational perspectives, and reducing the opportunities for socializing (Glowacz & Schmits, 2020; Huang & Zhao, 2020).

5. Limitations

Some limitations of the present study need to be acknowledged. First, there may be some bias due to the online recruiting method and the non-randomly selected sample; as a result, different age groups are not equally represented and people who are less confident with technology were not reached by the investigation. Second, the use of self-reported data to measure internet use and the increase in the use of application devices during the pandemic may have influenced answer accuracy. Third, as the study did not assess any pre-existing conditions related to the target variables, we cannot exclude that PIU and well-being are only partially related to the pandemic and measures of self-isolation.

Moreover, we proposed an interpretation of loneliness as a factor of vulnerability for well-being and PIU; however, the relationship between PIU and loneliness and PIU and well-being is an enduring question. On one hand, PIU might be conceptualized as a compensation strategy for loneliness and, broadly speaking, poor well-being and a way of facing life's challenges (Caplan., 2007; Casale et al., 2014). On the other hand, a competing hypothesis is that people who spend excessive time on the Internet neglect social interaction and, thus, are more likely to develop loneliness and poor well-being (Moody et al., 2001, Sharma & Sharma, 2018; Wang et al., 2003).

Due to the nature of the study design, our study does not allow us to support either direction. Probably, the best view is to consider the relation among these variables in terms of circular causality (Kim et al., 2009; Moretta & Buodo, 2020).

Finally, further studies are needed to investigate the role of other important factors in mediating the effect of the target variables on people's well-being and PIU: individual risk factors, such as anxiety and depression as recognized correlates of lockdown measures (Benke et al., 2020; Liu et al., 2020; Ranieri et al., 2021), subjective and contextual aspects, such as the way people have interpreted the health emergency (Marinaci et al., 2021a; Venuleo et al., 2022), the different life situations and the related specific challenges posed by the pandemic (Marinaci et al., 2021b) as well as the kind of strategies adopted at macro-level to support citizens (Schmidt, 2020).

6. Conclusions

Despite the limitations, these findings deserve attention both at the theoretical and intervention levels. On the theoretical level, the results support the view that the use of the Internet in the context of COVID-19 does not always represent a risk for PIU and poor well-being. The Internet may be used either as a resource to gain social relief or as an amplifier of loneliness, depending on the motives for using the Internet and the meaning that such use acquires in the light of the relational resources available to the individual to deal with a disruptive event like the pandemic. Path analysis identified loneliness as a common core factor underpinning poor well-being and increased PIU. However, the results also highlighted the double role of perceived online social support, which was found to increase well-being, offering support for a compensatory social interaction model in a novel risk condition (Casale et al., 2022), but also associated with a potentially problematic motive for using the Internet (social/coping) that increased the levels of PIU. Thus, it could be that when online social interactions successfully combine with offline social interactions, internet and social media use can represent an adaptive tool without constituting a risk for problematic internet use.

On the intervention level, these findings allow us to recognize the critical impact of social disconnectedness, perceived isolation and lack of social support on well-being and PIU. However, these kinds of considerations have found little space in the debate on the impact of the pandemic. On the one hand, the institutional responses put in place to protect citizens have mostly interpreted health in biological terms, marginalizing the psychological aspect of well-being; on the other hand the overriding focus of scholars in the human and social sciences on the negative effects of the health emergency has overshadowed the many variations in the experience of quarantine due to contextual aspects related to the micro-sphere (such as who

one lives with and the quality of the relationship), as well as the macro social sphere (e.g., the institutional responses put in place to respond to the health emergency and to support citizens) (Venuleo et al., 2020b). Despite the fact that the COVID-19 pandemic has been evolving positively in many countries during the last year, it is likely that the negative consequences for social life will persist for many people, especially for those who experienced loneliness and struggled to adjust to the “new normal” situation. Therefore, innovative and effective efforts to blunt the impact of social isolation and bolster social connectivity are more critical than ever before. Pivotal initiatives to increase distal connectivity during the current pandemic are documented (Smith et al., 2020). For example, many organizations are using telephone reassurance and efforts to encourage involvement, which include having community health workers, social workers, clinicians, and other personnel make telephone calls to vulnerable groups in order to check on their general well-being and identify needs, offer an opportunity for socializing, and link them to available services and resources. Capitalizing on existing research and practices in the field, clinicians and health/social services can contribute to the effort of mitigating the risk of social isolation when physical distancing is needed to ensure people’s safety.

Declaration of Interest

The authors have no financial or non-financial interests to disclose.

Compliance with Ethical Standards

All procedures performed in the study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The project was approved by the Ethics Commission for Research in Psychology of the Department of History, Society and Human Studies of the University of Salento (protocol n. 53162 of 30 April 2020). Participants were informed about the general aim of the research, the anonymity of responses and the voluntary nature of participation.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Authors’ contribution

All authors contributed to the study conception, design and data collection. Material preparation was performed by Lucrezia Ferrante and Simone Rollo. Data analysis was performed by Claudia

Marino, Lucrezia Ferrante and Simone Rollo. The first draft of the manuscript was written by Claudia Venuleo and Claudia Marino; all authors commented on previous versions of the manuscript. Adriano Schimmenti supervised all the phases of the study.

Conflict of Interest Statement

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

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