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Research Paper

Fear of COVID-19, depression, anxiety, and their association with Internet addiction disorder in a sample of Italian students



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ABSTRACT

Background: The 2019 Coronavirus (COVID-19) pandemic has led to a worldwide lockdown which has obliged people to stay confined at home, often resulting in social distancing measures and isolation, which can lead to mental health problems as well as to specific Internet-use disorders. This study aims to investigate fear of COVID-19, anxiety, and depression symptoms, and their impact on Internet addiction disorder, modeled as intrapersonal conflicts and interpersonal conflicts, during the COVID-19 epidemic.

Method: An online questionnaire was administered to 454 Italian students during the first national lockdown. All the recruited participants completed measures including the Depression, Anxiety, and Stress (DASS-21), Fear of COVID-19, and Internet addiction.

Results: The results of the present study demonstrated that fear of COVID-19 was associated with Internet addiction disorder, and fear of COVID-19 mediated the relationship between anxiety and Internet addiction disorder. Finally, controlling for covariates (age and gender), fear of COVID-19 was linked to Internet addiction disorder.

Limitations: Limitations include the cross-sectional research design and reliance on data exclusively from Italy.

Conclusions: Results are discussed in the framework of the Interaction-Person-Affect-Cognition-Execution (I-PACE) conceptualization of affective and cognitive responses as strategies for explicating the psycho-pathology of excessive Internet use.

1. Introduction

Internet is a resource for everyone, and especially for adolescents who like to receive and share personal, social information, and new knowledge. Previous studies have found that excessive use of the Internet is often associated with negative health conditions, including physical and emotional distress (e.g., anxiety, depression), and the risk of becoming addicted (Dong et al., 2020; Li et al., 2019; Ismail et al., 2020). The current COVID-19 pandemic has changed individual and social life experiences (Taylor et al., 2020). Home quarantine and social distancing measures, for example, have been associated with an increase of anxiety and negative emotions (Al-Kandari and Al-Sejari, 2020; Gao et al., 2020). Thus, the main purpose of the current study was to investigate fear of COVID-19 and its association with Internet addiction disorder, considered as a dysfunctional coping strategy to handle negative emotions.

Although no clear definition of Internet addiction exists yet, this expression refers to the loss of control over Internet use, which can cause neurological impairments, psychological distress, and a decrease

in socialization in everyday life (Monacis et al., 2018; Servidio, 2017, 2014; Servidio et al., 2019, 2018; Young, 2015). The association between Internet addiction and psycho-pathological variables such as anxiety and depression has been demonstrated (Dong et al., 2020; Seki et al., 2019). People who have experienced emotional problems tend to spend more time online, mainly because of the anonymous nature of the Internet. In addition, other longitudinal studies confirm the relationship between depression, anxiety and Internet addiction. Specifically, Stavropoulos et al. (2017) found that higher levels of anxiety were associated with higher Internet addictive behaviors, but the strength of this association did not change over the time. A similar result was observed in the association between depression and Internet addiction. Moreover, Liang et al. (2016) proved that higher levels of depression were associated with higher Internet addictive behaviors, mainly among female adolescents.

Given that Internet addiction disorder is conceptualized as a dysfunctional strategy to cope with problematic and/or stressful everyday life events (Brand et al., 2019), it has been proposed that people who suffer from symptoms of depression, anxiety, and loneliness are more likely to develop Internet-use disorders (Longstreet et al., 2019). Perceived stress

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resulting from abnormal personal mood (e.g., depression or anxious states) may influence the individual's cognitive processes (Brand et al., 2019), leading him/her to engage in specific online behavior such as, for example, gambling, online gaming, and social media use. Although these behaviors may help people to regulate their personal mood, especially in emergencies such as the COVID-19 pandemic, an excessive use of these online activities may lead to increased the risk of Internet addiction (Blasi et al., 2019; Islam et al., 2020; King et al., 2020). Thus, in order to inform the general population on responsible/safe Internet use, a multidisciplinary and multinational group of experts on problematic Internet use has sought to provide some general (e.g., sleeping regularly) and Internet-specific (e.g., self-monitoring the time spent online) practical recommendations that may help diminish the risks associated with the increased use of information technologies and online activities in the time of the COVID-19 pandemic (Király et al., 2020).

The COVID-19 pandemic is a new Coronavirus emergency which sparked an epidemic of acute respiratory infections in humans centered in Wuhan, Hubei province (China), in late December 2019. Even for households free from the virus, the pandemic emergency, like COVID-19 itself, is likely to work as a major stressor, especially in terms of anxiety and economic difficulties. Self-isolation, which entails social distancing and limitations in interpersonal relationships, could exacerbate negative emotions. Previous studies thus found an association between anxiety, depression, and COVID-19 (Planchuelo-Gómez et al., 2020; van der Velden et al., 2020), and the Internet could contribute to the development of these psycho-pathological symptoms. Indeed, the Internet and social media applications can amplify the risk of mood disorders in citizens, due to the high daily rates of new COVID-19 cases and deaths, which in turn can exacerbate the fear of COVID-19. In fact, prior researches have proven that Internet use as a means to reduce stress and anxiety has increased during the COVID-19 pandemic, and for some individuals this stress and anxiety reduction may have a direct impact on the development of Internet addiction disorder (Gao et al., 2020; Király et al., 2020). However, a recent study found a non-significant direct effect of problematic Internet use on fear of COVID-19, but anxiety mediated this relationship (Hashemi et al., 2020). Conversely, another study found an association between COVID-19 and Internet addiction (García-Priego et al., 2020). It seems that the relationship between Internet addiction and COVID-19 is still ambiguous and that further investigations are required.

However, there has yet to be a study aimed at analyzing the impact of psycho-pathological variables (e.g., anxiety and depression), and fear of COVID-19 on Internet addiction during the ongoing pandemic period in Italy. To bridge this gap, the present study will explore how fear of COVID-19 is related both to negative emotions, mainly anxiety and depression, and to Internet addiction disorder.

2. The present study

2.1. Aim

A survey aimed at investigating the relationship between psycho-pathological variables (anxiety and depression), fear of COVID-19, and Internet addiction disorder (modeled as intrapersonal conflicts and interpersonal conflicts) was conducted among an Italian sample during the pandemic period (first national lockdown). The main objective of the study was to investigate the impact of depression, anxiety, and fear of COVID-19 symptoms on the severity of Internet use considered as a dysfunctional coping mechanism. It was assumed that fear of COVID-19 affects different people in different ways and to varying degrees of severity, particularly during lockdown, which entails social distancing and isolation, which in turn are likely to increase anxiety levels (Xiang et al., 2020). Given that previous studies found an association between depression, anxiety and Internet addiction (Liang et al., 2016; Seki et al., 2019), this relationship could be stronger during the COVID-19 emergency, be-

cause people may have trouble dealing with stressful situations such as the pandemic (Dong et al., 2020).

2.2. Theory

The Interaction-Person-Affect-Cognition-Execution (I-PACE) model represents one of the prominent theoretical approaches to explain excessive Internet use (Brand et al., 2019; Brand et al., 2016). The I-PACE model is based on empirical results from behavioral and neuroimaging studies and outlines the process of development and maintenance of behavioral addictions. The revised version of the I-PACE model (Brand et al., 2019) includes three main factors. First, a predisposing variable marks a distinction between general addictive behaviors (e.g., gambling disorder) and more behavior-specific predisposing variables (e.g., individuals with higher novelty-seeking levels may be more likely to develop gambling disorder). Second, the inner circle of the addiction states that the development of an addictive behavior is the result of the interaction between predisposing variables and specific aspects of the situation (e.g., internal or external stimuli can trigger negative or positive moods in the person). Third, a distinction between early and later stages of the process is used to identify the different roles of moderating and mediating variables depending upon the stage of addiction. Previous studies demonstrated the validity of the I-PACE model for several types of addictive behavior, such as Internet addiction disorder (Montag et al., 2016; Zhang and Bian, 2021).

2.3. Research model

Fig. 1 shows the hypothesized research model, in which anxiety and depression were considered as predisposing predictor variables from the I-PACE model. In this theoretical framework, fear of COVID-19 was modeled as a response to environmental stressors and as a mediator for affective and cognitive responses, which can lead to the adoption of specific behaviors. The dependent variable of the model is Internet addiction disorder (intrapersonal conflicts and interpersonal conflicts). Sex and age were included as covariates, because male and younger individual show greater risk of Internet overuse (for a review see, Kuss and Lopez-Fernandez, 2016).

2.4. Hypotheses

Based on the previous literature, we formulated the following hypotheses:

H1. Fear of COVID-19 should positively be associated with Internet addiction, intrapersonal conflicts (H1a), and interpersonal conflicts (H1b).

H2. Depression (H2a) and anxiety (H2b) should be positively related to fear of COVID-19. Anxiety and depression represent two predisposing variables in the I-PACE model that influence affective and cognitive responses such as fear of COVID-19. Thus, fear of COVID-19 is influenced by anxiety and depression, as indicated by a previous study (Ahorsu et al., 2020).

H3. Fear of COVID-19 should mediate the relationship between the predisposing variables (depression – H3a, and anxiety H3b) and Internet addiction. According to the I-PACE model, affective and cognitive responses are conceptualized as mediating mechanisms between predisposing variables and excessive Internet addiction. Specifically, fear of COVID-19 (an affective response to environmental stressors) should mediate the relationship between predisposing variables (anxiety and depression) and excessive Internet addiction. A previous study has investigated the aforementioned variables in relation to other forms of technology overuse, such as problematic smartphone addiction (Elhai et al., 2020).

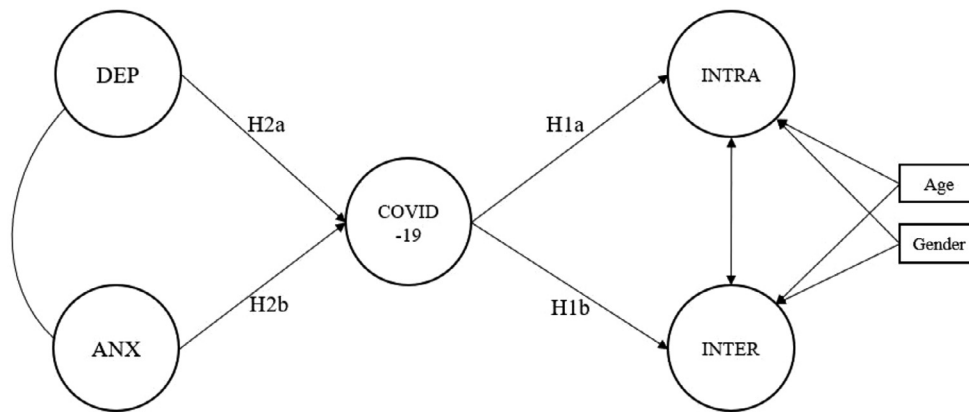


Fig. 1. Hypothesized research model.

Note. DEP = Depression; ANX = Anxiety; INTRA = Intrapersonal conflicts; INTER = Interpersonal conflicts. Circles represent latent variables, while rectangles are observed variables. For visual clarity, all the factor loading paths of each latent variable have been omitted.

3. Method

3.1. Participants and procedures

The data were collected through an online survey delivered during the first national lockdown. For this study, we recruited 454 Italian students by using a snowball sampling technique with the support of social networking applications. The majority of the participants were women ($n = 417$, 91.9%). Their age ranged from 18 to 25, with a mean age of $M = 21.09$ years ($SD = 1.92$).

All the study procedures and materials were designed and conducted according to the ethical standards laid out by the Italian Psychological Association (2015). All participants provided an informed consent and were ensured the anonymity and confidentiality of their answers. They were provided with information about the nature and purpose of the study and were also informed about their right to stop at any time. It took participants about 20 min to complete the anonymous online survey.

3.2. Measures

The participants completed a battery of self-report scales.

3.2.1. Depression Anxiety Stress Scales-21 (DASS-21)

Negative emotional states were assessed with the Italian version of Depression, Anxiety, and Stress Scales-21 (DASS-21) (Bottesi et al., 2015). This is a self-report instrument consisting of three 7-item subscales, to assess depression, anxiety and stress over the last week. Item examples include “I felt that I had nothing to look forward to” (Depression), and “I experienced trembling in the hands” (Anxiety). For the purposes of the current study, we analyzed only depression ($\alpha = 0.899$) and anxiety ($\alpha = 0.877$), which are consistently associated with the risk of Internet addiction (Liang et al., 2016). The responses are given on a 4-point Likert scale, ranging from 0 (*does not apply to me at all*) to 3 (*applies to me most of the time*), with higher scores indicating more negative experiences in the past week.

3.2.2. Fear of COVID-19 scale

The fear of COVID-19 scale (FCV-19S) by Ahorsu et al. (2020), adapted to the Italian language by Soraci et al. (2020), was used to assess fear of COVID-19. The scale consists of 7 items (e.g., *I am most afraid of coronavirus-19*), and each item is rated on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). In our sample, the value of Cronbach’s alpha for FCV-19S was 0.861.

3.2.3. Internet Related Experiences Questionnaire

The Italian version of Internet Related Experiences Questionnaire (IREQ-I) by Servidio et al. (2019) was used to measure two aspects associated with the Internet addiction disorder: intrapersonal conflicts and

interpersonal conflicts. The scale includes 10 items to assess intrapersonal conflicts (5 items, $\alpha = 0.688$; e.g., *When you are not connected to the Internet, do you feel nervous or worried?*), and interpersonal conflicts (5 items, $\alpha = 0.688$; e.g., *How often do you stop doing the things you are doing to be able to spend more time on the Internet?*). Each item is rated on a 4-point Likert scale from 1 (*never*) to 4 (*quite a lot*). The reliability levels for Cronbach’s alpha were acceptable: $\alpha = 0.658$ for intrapersonal conflicts, and $\alpha = 0.648$ for interpersonal ones.

3.3. Statistical analyses

First, we computed descriptive statistics and tests to check the normality of the data. All the variables were sufficiently normally distributed (items had skewness and kurtosis in the $+ 1$ to $- 1$ range). As we required responses for all items, we did not have any missing data.

Second, we computed bivariate correlations (Pearson’s r) using a bootstrap sample of 5000, with 95% bias-corrected and accelerated (BCa) confidence intervals, among the variables of interest and control variables. A t -test for independent sample to check gender differences among the variables of the study was run. Finally, reliabilities of the scales and subscales were estimated by computing Cronbach’s alpha (α).

Then, the factorial structure of the scales was evaluated using confirmatory factor analysis (CFA). Because the items of some scales adopted a four-point Likert answer, we used the weighted least square mean and variance adjusted (WLSMV) estimator as a method of parameter estimation (Byrne, 2012). Scale scores were computed by averaging item responses.

Moreover, to test the hypotheses of the study, a structural equation modeling (SEM) analysis was performed. The models were estimated with the maximum-likelihood parameter with standard errors and a mean-adjusted chi-square test statistic that were robust to non-normality (MLM). The MLM chi-square test statistic is also referred to as the Satorra–Bentler (S–B) chi-square. Gender and age were controlled. Next, we also tested an alternative model by adding direct paths from anxiety and depression to intrapersonal conflict and interpersonal conflicts, comparing the two models with the Mplus’s *diffest* command. Finally, we ran a mediation analysis.

The fit of the CFA and SEM analyses was tested using the following multiple indexes: (a) comparative fit index (CFI) ≥ 0.95 , (b) Tucker–Lewis Index (TLI) ≥ 0.95 , and (c) root mean square error of approximation (RMSEA) ≤ 0.06 , and (d) standardized root mean square residual (SRMR) < 0.08 (Hu and Bentler, 1999). Data analyses were performed using the IBM SPSS Statistic program, version 25, and Mplus, version 7.01 (Muthén and Muthén, 2014).

Table 1

Mean, standard deviation, and bootstrapped Pearson bivariate correlation matrix with 95% bias-corrected and accelerated (BCa) confidence intervals (bootstrap sample of 5000) among study variables ($N = 454$).

	<i>M</i>	<i>SD</i>	2	3	4	5	6
1. Age	21.09	1.92	-0.051 [-0.143, 0.047]	-0.025 [-0.123, 0.071]	0.086 [-0.005, 0.176]	-.118* [-0.214, -0.016]	--143** [-0.234, -0.047]
2. Depression	2.05	0.73	1	.717** [0.659, 0.767]	.167** [0.073, 0.258]	.408** [0.316, 0.494]	.291** [0.197, 0.382]
3. Anxiety	1.85	0.71		1	.277** [0.180, 0.368]	.338** [0.239, 0.436]	.223** [0.124, 0.321]
4. Fear of COVID-19	2.61	0.87			1	.183** [0.090, 0.275]	.230** [0.134, 0.322]
5. Intrapersonal	1.93	0.54				1	.599** [0.534, 0.657]
6. Interpersonal	2.27	0.55					1

Note. Values in square brackets indicate the 95% BCa confidence interval (lower limit and upper limit) for each correlation value.

* $p < .05$.
** $p < .01$.

4. Results

4.1. Preliminary results

The descriptive statistics (mean and standard deviation for all the variables) and bootstrapped bivariate correlations between the variables are shown in Table 1.

The results revealed that females were significantly affected by fear of COVID-19, $M = 2.65$, $SD = 0.86$, $t(454) = -3.72$, $p < .001$, $d = 0.63$. Conversely, males were significantly affected by intrapersonal conflicts, $M = 2.11$, $SD = 0.52$, $t(454) = 1.99$, $p = .046$, $d = 0.34$. There were no other significant differences among gender, depression, anxiety, and interpersonal conflicts.

4.2. CFA and SEM results

The DASS-21 anxiety CFA exhibited a good fit to the data, robust $\chi^2(10, N = 454) = 17.01$, $p = .074$, CFI = 0.998, TLI = 0.996, RMSEA = 0.039, 90% CI [0.000, 0.070], SRMR = 0.016. Also, DASS-21 depression CFA showed a satisfactory fit to the data, robust $\chi^2(11, N = 454) = 36.62$, $p < .001$, CFI = 0.995, TLI = 0.991, RMSEA = 0.072, 90% CI [0.047, 0.098], SRMR = 0.018. The COVID-19 CFA also fit well to the data, robust $\chi^2(9, N = 454) = 24.18$, $p = .004$, CFI = 0.986, TLI = 0.968, RMSEA = 0.061, 90% CI [0.032, 0.091], SRMR = 0.025. Finally, IREQ-I CFA fit reasonably well to the data, robust $\chi^2(31, N = 454) = 134.40$, $p < .001$, CFI = 0.935, TLI = 0.905, RMSEA = 0.086, 90% CI [0.071, 0.101], SRMR = 0.050. For each scale, factor loadings were significantly ($p < .001$) different from zero for each measured variable, confirming the appropriateness of its factorial structure.

The hypothesized research model (Fig. 1) fit sufficiently well to the data, robust $\chi^2(475, N = 454) = 761.44$, $p < .001$, CFI = 0.912, TLI = 0.903, RMSEA = 0.036, 90% CI [0.032, 0.041], SRMR = 0.068. Fig. 2 shows the results of the direct effects, indicating that fear of COVID-19 was associated with anxiety (H2b), but not with depression (H2a).

Controlling for covariates (age and gender), fear of COVID-19 was linked to both intrapersonal conflicts and interpersonal conflicts. Younger age was related to both intrapersonal conflicts and interpersonal conflicts, while gender (only females) was connected to intrapersonal conflicts. Fear of COVID-19 mediated the relationships between anxiety and intrapersonal conflicts, $\beta = 0.172$, $SE = 0.040$, $z = 4.293$, $p < .001$ (H3b), and interpersonal conflicts, $\beta = 0.175$, $SE = 0.042$, $z = 4.160$, $p < .001$ (H3b). Next, fear of COVID-19 did not mediate the relationships between depression and intrapersonal conflicts, $\beta = -0.058$, $SE = 0.032$, $z = -1.846$, $p = .065$ (rejecting H3a) and interpersonal conflicts, $\beta = -0.059$, $SE = 0.032$, $z = -1.838$, $p = .066$ (rejecting H3a).

With regard to the mediation analysis, Table 2 shows the results of total and specific direct and indirect effects in the structural equation model.

Moreover, we also tested an alternative model of the proposed research model by adding direct paths from anxiety and depression to intrapersonal conflicts and interpersonal conflicts, respectively (see Fig. 3). The fit of the revised model is satisfactory, robust $\chi^2(471, N = 454) = 728.83$, $p < .001$, CFI = 0.921, TLI = 0.912, RMSEA = 0.035, 90% CI [0.030, 0.040], SRMR = 0.060.

However, the results of the comparison between the less restrictive model and the more restrictive one showed that they did not differ significantly, $\Delta\chi^2(4, N = 454) = 50.238$, $p < .001$. This result demonstrates that the alternative model is close to the hypothesized model. In addition, after controlling for anxiety and depression on intrapersonal conflicts and interpersonal conflicts, fear of COVID-19 was found to no longer be significant as a mediator (see Table 2).

5. Discussion

The main results of the present study demonstrate that (1) fear of COVID-19 was associated with Internet addiction disorder (intrapersonal conflicts and interpersonal conflicts), and (2) fear of COVID-19 mediated the relationship between anxiety (H3b), but not depression (H3a), and Internet addiction disorder (intrapersonal conflicts and interpersonal conflicts). However, when we tested a partial mediating model, we found that only depression and fear of COVID-19, but not anxiety, was related to both intrapersonal and interpersonal conflicts. Moreover, fear of COVID-19 was no longer significant as a mediator.

Supporting H1, fear of COVID-19 was associated with both intrapersonal conflicts (H1a) and interpersonal conflicts (H1b), indicating a high risk of Internet addiction. The relation between fear of COVID-19 and Internet addiction disorder is consistent with the I-PACE conceptualization of response to environmental stressors driving excessive Internet-use disorder to mitigate negative emotions (Brand et al., 2019, 2016). Thus, to handle the fear of COVID-19, as well as the associated social and personal limitations, mainly during the home quarantine, many people may intensify the use of Internet. Prior studies have demonstrated that the negative impacts of social isolation particularly influence people's emotional and physical conditions (for a review see, Al-Kandari and Al-Sejari, 2020).

However, after we revised the hypothesized research model, by adding and controlling for anxiety and depression as direct predictors of Internet addiction, fear of COVID-19 was still associated with Internet addiction, but the mediation effect was no longer significant. According to our results, despite concerns related to fear of COVID-19, it seems that people could have other everyday-life worries that during the pandemic period tend to increase. Depression, but not anxiety, is directly associated with Internet addiction. Studies on Internet addiction

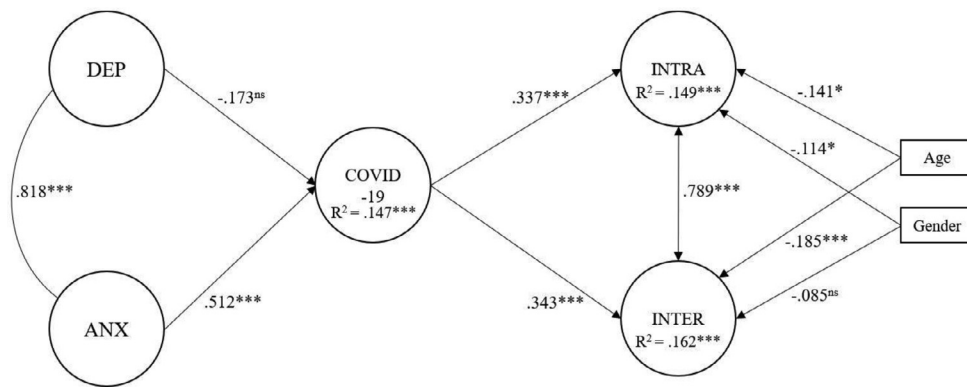


Fig. 2. Hypothesized research model with standardized results.
 Note. DEP = Depression; ANX = Anxiety; INTRA = Intrapersonal conflicts; INTER = Interpersonal conflicts. Gender (1 = male, 2 = female). Circles represent latent variables, while rectangles are observed variables. For visual clarity, all the factor loading paths of each latent variable have been omitted.
 * $p < .05$. *** $p < .001$. ns = Not Significant.

Table 2
 Mediation and indirect effects with standardized estimate of fear of COVID-19 for the relationship between psycho-pathological variables (anxiety and depression) and Internet addiction disorder (intrapersonal and interpersonal conflicts).

Hypothesized research model				
Pathway	Estimate	SE	z	p
DEP → Fear of COVID-19 → INTRA				
Total and specific indirect effect	-0.058	0.032	-1.849	.065
DEP → Fear of COVID-19 → INTER				
Total and specific indirect effect	-0.059	0.032	-1.838	.066
ANX → Fear of COVID-19 → INTRA				
Total and specific indirect effect	0.172	0.040	4.293	.000
ANX → Fear of COVID-19 → INTER				
Total and specific indirect effect	0.175	0.042	4.160	.000
Alternative model				
Pathway	Estimate	SE	z	p
DEP → Fear of COVID-19 → INTRA				
Total	0.418	0.098	4.245	.000
Specific indirect effect	-0.047	0.026	-1.769	.077
Direct effect	0.464	0.100	4.637	.000
DEP → Fear of COVID-19 → INTER				
Total	0.471	0.111	4.223	.000
Specific indirect effect	-0.058	0.032	-1.791	.073
Direct effect	0.528	0.114	4.643	.000
ANX → Fear of COVID-19 → INTRA				
Total	0.054	0.105	0.519	.604
Specific indirect effect	0.125	0.041	3.081	.002
Direct effect	-0.071	0.115	-0.612	.541
ANX → Fear of COVID-19 → INTER				
Total	-0.083	0.113	-0.731	.465
Specific indirect effect	0.154	0.047	3.249	.001
Direct effect	-0.236	0.125	-1.894	.058

Note. DEP = Depression; ANX = Anxiety; INTRA = Intrapersonal conflicts; INTER = Interpersonal conflicts.

have reported a relation between depression and Internet-use disorders (Liang et al., 2016). This association suggests a vicious cycle in which depression and Internet addiction increase each other. For example, people think of releasing their daily stress by using the Internet, thereby increasing their probability of stay connected excessively. During the period of social isolation due to the pandemic, people may increase the time spent online and this could exacerbate their levels of depression. People may use Internet as a dysfunctional coping strategy to alleviate their internalizing problems (e.g., anxiety, depression). Based on the current results, people who experience more intrapersonal conflicts could be more exposed to Internet overuse. Additionally, the reduced social and intimate relationships caused by the home quarantine may increase people's risk of spending more time on the Internet to make up for this limitation (interpersonal conflicts), as they are experiencing social difficulties due to the COVID-19 pandemic (Al-Kandari and Al-Sejari, 2020). All these aspects could be intensified during the ongoing pandemic period, in which other social and everyday difficulties related to COVID-19 (e.g., job insecurity, economic issues, students' uncertainty about their academic

futures, etc.) may result in people running a greater Internet addiction disorder to alleviate negative emotions.

Consistent with H2, we found a positive correlation with fear of COVID-19 for both depression and anxiety. In the SEM model, this link only exists for anxiety (H2b), but not for depression (rejecting H2a). These results can be interpreted in the theoretical framework of the I-PACE model, because psycho-pathologies such as depression and anxiety influence excessive Internet use. It is well known that anxiety causes greater fear, and this has been especially during the pandemic emergency (Taylor et al., 2020), mainly among people with pre-existing anxiety problems, which may be more worried about COVID-19. It becomes important to achieve the right balance by promoting social distancing measures without causing excessive worry (Xiang et al., 2020).

According the hypothesized research model, we found that fear of COVID-19 mediated the relationship between anxiety and Internet addiction, partially supporting H3. This result is consistent with the I-PACE conceptualization of affective and cognitive responses (including responses to environmental stressors) as strategies explicating the as-

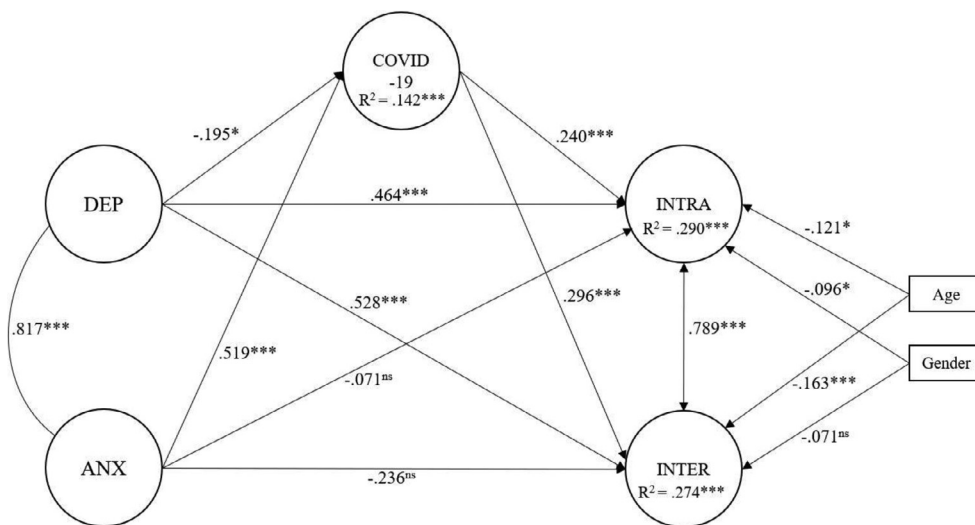


Fig. 3. Alternative model with standardized results.

Note. DEP = Depression; ANX = Anxiety; INTRA = Intrapersonal conflicts; INTER = Interpersonal conflicts. Gender (1 = male, 2 = female). Circles represent latent variables, while rectangles are observed variables. For visual clarity, all the factor loading paths of each latent variable have been omitted.

p* < .05. **p* < .001. ns = Not Significant.

sociation between psychopathologies and excessive Internet use (Brand et al., 2019). As mentioned before, we found no mediation result for depression in the hypothesized research model, or for either psychopathology predictors in the alternative SEM model.

The present study is not without limitations. We used a convenience sample of students from one country, namely Italy, with a higher prevalence of females. This might limit the generalizability of the current results. All the data were collected online, owing to the quarantine restrictions. In addition, the present study was based on a cross-sectional design; therefore, a causal interpretation cannot be confidently developed. However, despite these limitations, the current results provide an initial foundation for investigating the relationship between negative emotions, fear of COVID-19, and the Internet addiction disorder. Moreover, further studies on the impact of COVID-19 on Internet use are necessary to prevent problematic online activities such as pornography, compulsive video gaming, online gambling, social media use, and shopping that could lead to severe behavioral problems and elevate the risk of disordered or addictive Internet use.

Declaration of Competing Interest

The authors report no conflicts of interest with this paper’s study.

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Availability of data and material

Data and survey materials will be made available upon request.

Authors’ contribution

Rocco Servidio performed and interpreted the data analyses and wrote the first draft of the manuscript. Maria Giuseppina Bartolo and Anna Lisa Palermi collected data and suggested modifications to the first version of the paper. Angela Costabile revised the paper critically.

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