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Trends on Behavioral Addictions
Temas em Dependências
Comportamentais

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Excessive Internet and smartphone use and emotional problems in students of psychology and psychologists

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Abstract

Objective

This study aimed to investigate the prevalence of Internet Addiction, its main predictors, and associations with psychological problems in psychology students ($n = 1,916$) and psychologists ($n = 4,359$).

Method

Participants completed a sociodemographic questionnaire and measures of interest. It was observed that 9.3% of the students and 4.0% of the psychologists screened positive for internet addiction.

Results

All participants with internet addiction presented a significantly higher frequency of depression, anxiety, and stress symptoms, however, these problems were predictors for internet addiction only among the professionals.

Conclusion

Understanding the pattern of internet addiction can help to support the development of specific public policies for these individuals.

Keywords: Addiction; Adults; Internet; Smartphone; Students.

The increase of digital media use is a global phenomenon arising from new modes of social interaction. Currently, Brazil has the third-highest daily internet use according to World Wide Web Foundation (2016). Also, Brazil is second in terms of

time spent using the Internet outside of the school environment (3.1 h/day) by students. For example, 26% of students are online more than six hours a day according to Organization for Economic Co-operation and Development (2017).

Excessive use of the Internet can lead to the development of various health problems, such as Internet Addiction (IA). Some authors have noted a higher prevalence of IA in adolescents and young adults compared to older adults. In South Korea, IA's prevalence among adolescents was 12% and 8% among adults (Heo et al., 2014). In university students, the prevalence of IA is very heterogeneous, especially in Latin America with a prevalence rate of 51% in Ecuador (Ramos-Galarza et al., 2018) and 25% in Colombia (Buitrago et al., 2016). In Brazil, two studies indicated a prevalence of 21.2% (Terres-Trindade & Mosmann, 2016) and 62% (Della-Méa et al., 2016).

In contrast to the prevalence rates of IA in adolescents, only a handful of studies have investigated the impact of IA on health professionals. In one study, the authors reported a prevalence of 11.4% among health professionals, of which 50.9% presented a high risk of burnout syndrome (Avci & Sahin, 2017). Concerning psychology students, 8.6% of them at a Peruvian university ($N = 418$) were addicted to Facebook (Wolniczak et al., 2013). Moreover, those considered addicted showed a higher risk of having sleep-related problems ($aOR = 1.3$; 95% CI: 1.04-1.67).

The association between IA and emotional problems has been investigated mainly with adolescents. However, several Brazilian studies have evaluated the association between IA and mental disorders in colleges. Della-Méa et al. (2016) found no significant associations were detected between IA and anxiety, depression, and stress. In regard to the adult population, there are still no Brazilian studies. Considering a few Brazilian studies regarding IA, it is essential to investigate the use of digital media and its emotional and social impacts, especially among students and professionals who directly work in the mental health field.

In this context, this study aimed to (i) investigate the prevalence of IA and the pattern of smartphone use in a sample of Brazilian psychology students and psychologists; (ii) assess the association between IA and the following symptoms: depression, anxiety, stress and satisfaction with life; (iii) compare the pattern of use of smartphones and IA levels between psychology students and psychologists, and (iv) analyze the direct and indirect predictors to IA based on a network analysis model and each variable's influence on the network.

Method

Participants

This is a cross-sectional study comprised of psychology students ($n = 1,916$) and psychologists ($n = 4,359$) who completed an online survey. Participants were recruited using different dissemination strategies according to specific profiles of the sample. With regards to students, we publicized a link to the study through social networks. This link was also sent by email to the coordinators of undergraduate courses and the Student Centers from Brazilian Universities in all Regions. Regarding psychologists, the Department of Institutional Communication of Institution publicized the link on social networks and sent emails to psychologists who had previously registered at various conferences, symposiums, and courses.

The inclusion criteria were; 1) be psychology students in any year or graduates in the area and 2) have a smartphone and access the Internet at least once a week. From the sample, 232 individuals ($n = 62$ students; $n = 170$ psychologists) were excluded as they reported not accessing the Internet at least once a week and did not have a smartphone. Thus, the final sample consisted of 6,275 participants.

Instruments

Sociodemographic Questionnaire: contained the following questions: income, marital status, education, region of residence, type of university (public or private) and the most commonly used method of accessing the Internet. It also included five questions about the use of smartphones. This questionnaire was based on previous studies (Heo et al., 2014).

Internet Addiction Test (IAT): aims to measure IA's severity through 20 questions. In Brazil, the IAT was adapted and validated with high internal consistency ($\alpha = 0.85$) (Conti, et al., 2012). The IAT classifies participants into three groups: Non-Risk Users (NRU; 0-19 points); Low-Risk Users (LRU; 20-49 points), or Risk and High-Risk Users (RHU, 50-100 points). We based this classification according to the previous studies (Andrade et al., 2021; Andrade, Scatena, Bedendo, et al., 2020; Andrade, Scatena, Martins, et al., 2020).

Depression, Anxiety and Stress Scale (DASS-21): consists of 21 items using a Likert-type scale. The items' weight was adapted to adjust the scale's final score, following the instructions for this instrument (Vignola & Tucci, 2014). We classified the participants into one of three categories for each of the symptoms, as the follows: (i) Depression, they were classified as "No-risk" (0-9 points), "Moderate-risk" (10-20 points) or "High-risk" (above 21 points); (ii) Anxiety symptoms, "No-risk" (0-7 points), "Moderate-risk" (8-14 points) or "High-risk" (above 15 points); (iii) Stress, "No-risk" (0-14 points), "Moderate-risk" (15-25 points) or "High-risk" (above 26 points). The DASS-21 was adapted and validated in Brazil (Vignola & Tucci, 2014), with high internal consistency for all three subscales ($\alpha = 0.92$ for depression, $\alpha = 0.86$ for anxiety, and $\alpha = 0.90$ for stress).

Satisfaction With Life Scale (SWLS): assesses life satisfaction from five Likert type questions (1 to 7 points). Participants were classified into three categories; Unsatisfied (5-14 points); Satisfied (15-25 points), or Very satisfied (26-35 points).

Procedures

Initially, a pilot study was conducted with students ($n = 20$) and psychologists ($n = 20$) to assess the platform's functionality and identify any potential technical problems in collecting the data. The data of these participants were not considered in the final analysis. We found some problems regarding of item completion, system syntax errors, and database access that were fixed before the study began. After this first step, the questionnaire's link was published using the strategies mentioned above and was available for six months. The online questionnaire could be completed using different media types, such as computers, smartphones, and tablets, with each participant completing it only once (by using automatic detection of the Internet Protocol address).

There was a general description of the study on the homepage, and the instruments could only be completed after reading the description as well as providing informed consent.

Data from continuous variables were standardized using the Z-score procedure, and values above or below three standard deviations (outliers) were excluded from the specific analyses to reduce any possibility of bias. Regarding the continuous variables, the homogeneity of the variances was evaluated by Levene's Test, and the data were analyzed by using the One-Way Analysis of Variance. When significance was detected, we used a posteriori Scheffé's Test to identify groups' specific differences. Nominal variables were analyzed using the Chi-square test (χ^2) or Fischer's Exact Test when Chi-square assumptions were violated (Rveiro et al., 2020).

In line with previous studies (Andrade, Scatena, Bedendo, et al., 2020; Cruz et al., 2018; Yamauchi et al., 2019), we accessed the effect size based on Cramer's V Test according the following Degrees of Freedom (df): $df = 1$ (0 to 0.1 = small) (0.11 to 0.3 = moderate) (0.31 to 1.0 high); $df = 2$ (0 to 0.07 = small) (0.08 to 0.21 = moderate) (0.22 to 1.0, high); $df = 3$ (0 to 0.06 = small)

(0.07 to 0.17 = moderate) (0.18 to 1.0 high). The Eta Square Test (η^2) was used as the effect size for analysis of variance with 0 to 0.4 small, 0.41 to 0.79 moderate, and 0.8 to 1.0 high as the magnitude of effect.

Logistic regression models were used to evaluate IA predictor variables' influence, using the severity level of the IAT instrument as an outcome. The variables used in the crude and adjusted models were: age (in years), sex (0 = male; 1 = female), marital status (0 = married; 1 = single), believing their use of the internet to be harmful (0 = no; 1 = yes), satisfaction with life (0 = unsatisfied, 1 = satisfied, 2 = very satisfied), and depression, anxiety and stress. This process was adopted based on previous studies (Gonçalves et al., 2021).

Finally, a network analysis was performed to investigate the direct and indirect predictors of IA and the conditional associations among all variables (nodes) with the IA's network. Partial correlation coefficients were obtained from the standardized matrix, which can be interpreted as partial regression coefficients (or betas), by using the same rule of interpretation of effect size (0.1 = small, 0.3 = moderate and ≥ 0.5 = large). The significance level of all analyses in this study was .05, and the software used was JASP (free use), version 0.12.1.

All procedures carried out in this study were following the institutional research committee's ethical standards. The Research Ethics Committee approved this study of *Universidade Federal de São Paulo* (nº 1,517,340; CAAE 53793116.1.0000.5505).

Results

As shown in Table 1, most participants were female, and the mean age of students and psychologists was 22 and 36 years, respectively. Most of the participants were single, with a higher

Table 1

Social demographic profile of students (N = 1,916) and psychology professionals (N = 4,359). Continuous data were expressed as the mean and standard deviation (\pm) and frequencies as percentages (%)

| Variables | Students | Psychologists | Test | p | Effect size |
|---|--------------------|--------------------|------------------|-----|-------------|
| Gender n (%) | | | $\chi^2 = 28.2$ | ** | 0.06 |
| Male | 460 (24) | 793 (18.2) | | | |
| Female | 1,456 (76) | 3,566 (81.8) | | | |
| Age (M, SD) | 22.4 (± 2.4) | 36.6 (± 9.9) | F = 2,320.8 | *** | 0.29 |
| Marital status n (%) | | | $\chi^2 = 298.9$ | | 0.21 |
| Single | 1,382 (72.1) | 2,131 (48.9%) | | | |
| Married | 465 (24.3) | 1,813 (41.6%) | | | |
| Divorced | 69 (3.6) | 415 (9.5%) | | | |
| Have Children? n (%) | | | $\chi^2 = 132.1$ | *** | 0.14 |
| Yes | 465 (24.3) | 1,698 (39.4) | | | |
| No | 1,445 (75.7) | 2,613 (60.6) | | | |
| Region of Brazil n (%) | | | $\chi^2 = 54.6$ | * | 0.09 |
| Southeast | 875 (45.6) | 2,229 (51.4) | | | |
| Northeast | 561 (29.3) | 916 (21) | | | |
| South | 293 (15.3) | 678 (15.5) | | | |
| Central West | 111 (5.8) | 334 (7.6) | | | |
| North | 76 (4) | 202 (4.5) | | | |
| University n (%) | | | $\chi^2 = 71.8$ | ** | 0.10 |
| Private | 1,630 (85.1) | 3,292 (75.5) | | | |
| Public | 286 (14.9) | 1,067 (24.5) | | | |
| Most common advice to access Internet n (%) | | | $\chi^2 = 37.9$ | ** | 0.07 |
| Smartphone | 1,383 (72.3) | 2,808 (64.6) | | | |
| Computer | 495 (25.9) | 1,466 (33.7) | | | |
| Other | 34 (1.8) | 74 (1.7) | | | |

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. χ^2 = Chi Squared Test.

F: ANOVA; N: Participants; p: significance level; 95% CI: Confidence Interval.

prevalence among the students. Approximately 20% of the the student sample reported having children, while 40% of psychologists reported having children.

As shown in Table 2, the number of hours using a smartphone was almost twice in the RHU than the NRU group. Among those who were addicted, more than 70% perceived that their IA caused impairments in their everyday life. The RHU group showed more severe symptoms of depression, anxiety, and stress and lower satisfaction with life. Moreover, the frequency of the most severe symptoms in the RHU for depression, anxiety and stress were 7, 6 and 5 times higher than those of the NRU group.

Regarding the psychologists (Table 3), those from RHU also used their smartphones for almost twice as long as the NRU group. However, the mean time spent using the smartphones by psychologists from the RHU group was one hour shorter than those from the student group (Table 2).

Similar to the results observed from the student sample, a higher frequency of severe symptoms of depression, anxiety, stress, and lower satisfaction with life was observed in psychologists from the RHU group. Thus, the frequency of these symptoms in this group was significantly higher for depression (10 times), anxiety (7 times), and stress (7 times), compared to those psychologists from the NRU group.

Table 2

Patterns of smartphone use and results of IAT, DASS-21 and SWLS instruments among students classified by the Internet Addiction Test

| Variables | NRU | LRU | RHU | Test | <i>p</i> | Effect size |
|--|--------------------|--------------------|---------------------|------------------|----------|-------------|
| Time spent using smartphone (hours) (<i>M</i> , <i>SD</i>) | 3.7 (± 3.3) | 5.12 (± 3.6) | 6.9 (± 4.3) | $F = 59.2$ | *** | 0.06 |
| How much time do you think you spend using your smartphone? <i>n</i> (%) | | | | $\chi^2 = 294.8$ | *** | 0.28 |
| A little time | 134 (23.2) | 87 (7.9) | 6 (3.5) | | | |
| A moderate amount of time | 368 (63.8) | 556 (50.1) | 39 (22.7) | | | |
| A lot of time | 75 (13) | 467 (42) | 127 (73.8) | | | |
| Do you believe your use harms you? <i>n</i> (%) | | | | $\chi^2 = 142.5$ | *** | 0.27 |
| Yes | 147 (25.5) | 525 (47.3) | 125 (72.7) | | | |
| No | 430 (74.5) | 585 (52.7) | 47 (27.3) | | | |
| Depression <i>n</i> (%) | | | | $\chi^2 = 149.4$ | *** | 0.20 |
| No-risk | 452 (79.6) | 650 (59.6) | 63 (37.3) | | | |
| Moderate-risk | 87 (15.3) | 287 (26.3) | 49 (29) | | | |
| High-risk | 29 (4.8) | 154 (14.1) | 57 (33.7) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 5.28 (± 7.2) | 9.63 (± 9.5) | 15.6 (± 11.7) | $F = 94.2$ | *** | 0.09 |
| Anxiety <i>n</i> (%) | | | | $\chi^2 = 129.7$ | *** | 0.18 |
| No-risk | 466 (82) | 690 (63.2) | 74 (43.8) | | | |
| Moderate-risk | 72 (12.7) | 236 (21.6) | 39 (23.1) | | | |
| High-risk | 30 (5.3) | 165 (15.2) | 56 (33.1) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 3.9 (± 5.7) | 7 (± 8.2) | 11.5 (± 10.3) | $F = 68.9$ | *** | 0.07 |
| Stress <i>N</i> (%) | | | | $\chi^2 = 133.1$ | *** | 0.19 |
| No-risk | 459 (80.8) | 668 (61.2) | 66 (39) | | | |
| Moderate-risk | 76 (13.4) | 266 (24.4) | 51 (30.2) | | | |
| High-risk | 33 (5.8) | 157 (14.4) | 52 (30.8) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 9.1 (± 8.1) | 13.7 (± 10) | 19.4 (± 10.8) | $F = 87.5$ | *** | 0.08 |
| Satisfaction with life <i>n</i> (%) | | | | $\chi^2 = 82.5$ | *** | 0.14 |
| Unsatisfied | 47 (8.2) | 162 (14.6) | 40 (23.3) | | | |
| Satisfied | 234 (40.5) | 571 (51.4) | 97 (56.4) | | | |
| Very satisfied | 296 (51.3) | 377 (34) | 35 (20.3) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 24.6 (± 6.0) | 21.9 (± 6.5) | 19.7 (± 6.7) | $F = 53.9$ | *** | 0.05 |

Note: *** $p < 0.00$. χ^2 : Chi Squared Test.

95% CI: Confidence Interval; F: ANOVA, LRU: Low-Risk Users ($n = 1,075$); NRU: Non-Risk Users ($n = 567$); N: Participants; *p*: significance level; RHU: Risk and High-Risk Users ($n = 167$).

Table 3*Patterns of smartphone use and results of IAT, DASS-21 and SWLS instruments among professionals classified by the Internet Addiction Test instrument*

| Variables | NRU | LRU | RHU | Test | <i>p</i> | Effect size |
|--|-------------|-------------|--------------|------------------|----------|-------------|
| Time spent using smartphone (hours) (<i>M</i> , <i>SD</i>) | 2.9 (±2.6) | 3.9 (±3.0) | 5.6 (±3.6) | <i>F</i> = 108.2 | *** | 0.04 |
| How much time do you think you spend using your smartphone? <i>n</i> (%) | | | | χ^2 = 629.9 | *** | 0.27 |
| A little time | 504 (29.5) | 285 (12.4) | 6 (3.5) | | | |
| A moderate amount of time | 1027 (60) | 1165 (50.5) | 33 (19.5) | | | |
| A lot of time | 179 (10.5) | 854 (37.1) | 130 (77) | | | |
| Do you believe your use harms you? <i>n</i> (%) | | | | χ^2 = 343.7 | *** | 0.28 |
| Yes | 303 (17.7) | 878 (38.1) | 126 (74.6) | | | |
| No | 1407 (82.3) | 1426 (61.9) | 43 (25.4) | | | |
| Depression <i>n</i> (%) | | | | χ^2 = 290.8 | *** | 0.18 |
| No-risk | 1413 (84.2) | 1644 (72.6) | 69 (41.8) | | | |
| Moderate-risk | 214 (12.8) | 476 (21) | 44 (26.7) | | | |
| High-risk | 51 (3) | 145 (6.4) | 52 (31.5) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 4.3 (±6.2) | 6.9 (±7.6) | 15.2 (±11.8) | <i>F</i> = 194.3 | *** | 0.08 |
| Anxiety <i>n</i> (%) | | | | χ^2 = 198.1 | *** | 0.15 |
| No-risk | 1473 (87.8) | 1775 (78.4) | 81 (49.1) | | | |
| Moderate-risk | 147 (8.8) | 335 (14.8) | 43 (26.1) | | | |
| High-risk | 58 (3.4) | 155 (6.8) | 41 (24.8) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 2.7 (±4.9) | 4.3 (±6.1) | 10 (±9.7) | <i>F</i> = 131.8 | *** | 0.06 |
| Stress <i>n</i> (%) | | | | χ^2 = 265.3 | *** | 0.18 |
| No-risk | 1435 (85.5) | 1643 (72.5) | 68 (41.2) | | | |
| Moderate-risk | 177 (10.5) | 461 (20.4) | 49 (29.7) | | | |
| High-risk | 66 (4.0) | 161 (7.1) | 48 (29.1) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 7.6 (±7.6) | 10.9 (±8.5) | 18.4 (±10.6) | <i>F</i> = 170.4 | *** | 0.07 |
| Satisfaction with life <i>n</i> (%) | | | | χ^2 = 165.7 | *** | 0.14 |
| Dissatisfied | 98 (5.7) | 200 (8.7) | 46 (27.2) | | | |
| Satisfied | 577 (33.7) | 987 (42.8) | 82 (48.5) | | | |
| Very satisfied | 1035 (60.6) | 1117 (48.5) | 41 (24.3) | | | |
| Raw score (<i>M</i> , <i>SD</i>) | 25.6 (±5.8) | 24.1 (±6.0) | 19.7 (±7.1) | <i>F</i> = 89.5 | *** | 0.04 |

Note: ****p* < 0.001. χ^2 : Chi Squared Test.95% CI: Confidence Interval; *F*: ANOVA; LRU: Low-Risk Users (*n* = 2,304); NRU: Non-Risk Users (*n* = 1,710); *N*: Participants; *p*: significance level; RHU: Risk and High-Risk Users (*n* = 169).**Table 4***Adjusted logistical regression models predicting the risk of Internet addiction (RHU group) according to Internet Addiction Test instrument among students and psychology professionals*

1 of 2

| Variables | Students | | | Psychologists | | |
|---|----------|-------------|----------|---------------|-------------|----------|
| | aOR | 95% CI | <i>p</i> | aOR | 95% CI | <i>p</i> |
| Gender | | | | | | |
| Female | Ref | | | Ref | | |
| Male | 2.38 | [1.47–3.85] | *** | 2.51 | [1.65–3.82] | *** |
| Marital status | | | | | | |
| Single | Ref | | | Ref | | |
| Married- | 1.45 | [0.69–3.02] | 0.32 | 0.58 | [0.38–0.89] | * |
| Age | 0.95 | [0.87–1.03] | 0.20 | 0.99 | [0.97–1.02] | 0.46 |
| Do you believe your use harms you? | | | | | | |
| No | Ref | | | Ref | | |
| Yes | 2.76 | [1.73–4.43] | *** | 3.02 | [2.01–4.53] | *** |
| Length of time using smartphone | 1.06 | [1.0–1.11] | * | 1.07 | [1.01–1.13] | * |
| How much time do you think you spend using your smartphone? | | | | | | |
| A little time | Ref | | | Ref | | |
| A moderate time | 1.07 | [0.35–3.23] | 0.90 | 1.53 | [0.61–3.83] | 0.36 |
| A lot of time | 3.20 | [1.07–9.57] | * | 6.65 | [2.68–16.5] | *** |

Table 4

Adjusted logistical regression models predicting the risk of Internet addiction (RHU group) according to Internet Addiction Test instrument among students and psychology professionals

2 of 2

| Variables | Students | | | Psychologists | | |
|------------------------|----------|-------------|------|---------------|-------------|------|
| | aOR | 95% CI | p | aOR | 95% CI | p |
| Satisfaction with life | | | | | | |
| Dissatisfied | Ref | | | Ref | | |
| Satisfied | 1.76 | [0.91–3.40] | 0.09 | 2.1 | [1.18–3.75] | * |
| Very satisfied | 1.44 | [0.87–2.39] | 0.15 | 1.32 | [0.86–2.05] | 0.20 |
| Depression | 1.01 | [0.99–1.05] | 0.13 | 1.04 | [1.01–1.06] | ** |
| Anxiety | 1.02 | [0.98–1.04] | 0.54 | 1.04 | [1.01–1.06] | * |
| Stress | 1.02 | [0.99–1.05] | 0.16 | 1.03 | [1.0–1.06] | * |

Note: * $p \leq 0.05$, ** $p < 0.01$; *** $p < 0.001$.

aOR: Adjusted Odds Ratio; Ref: Reference Group (NRU group).

The adjusted models of logistic regressions predicting IA's risk (Table 4) indicated that being a male more than doubled the odds, both among students and psychologists. As for marital status, being married reduced the odds of IA risk only among psychologists, and no significant differences were observed regarding age. Those who believed their use pattern affected their daily activities presented odds between aOR 2.76 (students) to aOR 3.02 (psychologists) for IA. Moreover, for each minute of smartphone use, there was a risk of 6% (students) to 7% (psychologists) of presenting IA ($p < 0.05$).

Figure 1 depicts the IA association network for students and psychologists, and the connections between variables (nodes) are termed edges, in which thickness signifies the magnitude of the associations. We used two-centrality indices to access each node's influence: Closeness (shortest paths length) and Expected influence (the product of the direct and indirect edges). The direct predictors to all participants were depression, gender, type of device used to access the Internet, and Smartphone Use (SmH). Particularly for psychologists, the Number of Messages Sent daily (NmS) and Marital Status (MS) were also direct predictors of IA. For all participants, "Having Children" (Hch) was the most expected influence node in the network, and anxiety was the second most expected influence on students' psychologists and stress.

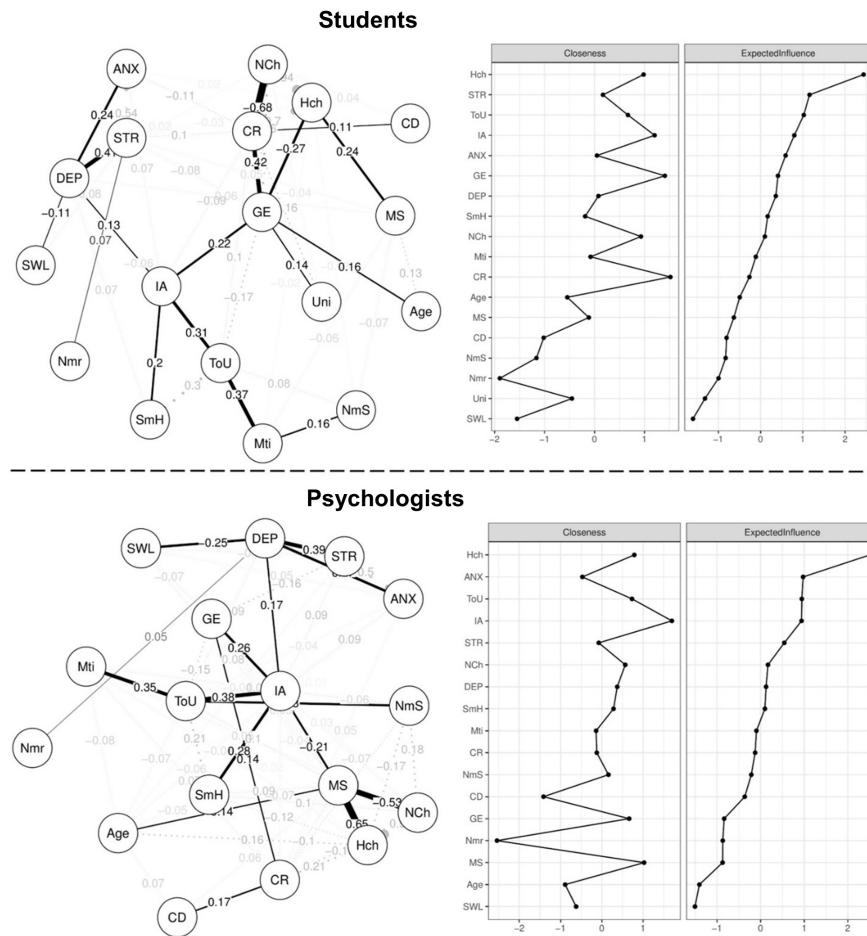
Discussion

To the best of our knowledge, this is the first study to investigate the prevalence of IA and its association with mental disorders from a sample comprised only of psychology students and psychologists. The main results indicated that IA's prevalence ranged from 4% (psychologists) to 9.3% (students). Also, the average time of daily smartphone use was 5 hours among the students and 3.6 among the psychologists. All participants with IA had a significantly higher frequency of more severe symptoms of depression, anxiety, and stress than non-risk individuals, especially among the professionals.

Our data indicated that IA's frequency was higher than observed by Wolniczak et al. (2013) (8.3% in psychology students). A potential reason for the contrasting results is that Wolniczak et al. (2013) adapted the IAT instrument for Facebook behaviors, which impedes the ability to make accurate comparisons with our data. The prevalence of IA among psychologists was lower than Avci and Sahin (2017) study, whose sample comprised various health professionals (11.4%).

Figure 1

Gaussian Graphical Model and two-centrality indices for Internet Addiction according to students and psychologists



Note: Each edge represents the zero-order correlation between two variables, and thickness represents magnitude. Those nodes (variables) with stronger inter associations appear in the center of the network.

Age, ANX: Anxiety, CD: Call Delivered, CR: Call Received, DEP: Depression, GE: Gender, HCh: Do you have children?, IA: Internet Addiction, MS: Marital Status, MTi: How do you rate your mobile time use?, NCh: Number of children, Nmr: Number of messages received daily, NmS: Number of messages sent daily, SmH: Does your smartphone use harm your everyday life?, STR: Stress, SWL: Satisfaction with life scale, ToU: Type of device used to access the internet, Uni: Type of university (public or private).

Some factors can influence the prevalence of IA observed in different studies, such as sample size, the types of instruments used, the context of applying these instruments, different data analysis procedures, and different demographic cultures (Heo et al., 2014). In our study, the IA among psychologists was lower than that among students, and there may be specific factors that influence the use of smartphones and the Internet, one of which is age itself, given that younger generations have greater access to digital media. Thus, IA in the general population is significantly higher in adolescents and young adults than in the adult population (Kuss et al., 2018). In this study, however, age was not a predictor for IA and had a low expected influence on the network model.

In the present study, 40% of the professionals were married and had children, making it likely they have to spend more time on daily activities and might have less spare time. Moreover, the network analysis indicated that the nodes “number of children” and “having children” were both indirect predictors of IA and having children had the most substantial expected influence in the

network of IA for both students and psychologists. The psychologists' network analysis indicated that marital status was a direct predictor of IA (negative correlation). Interestingly, some authors observed that the total IAT score was significantly higher among professionals who were single or divorced and had up to one child, which corroborates our data (Avci & Sahin, 2017),

Regarding the time spent on the smartphone, the students reported using their devices for 4.9 hours a day, a longer time than the psychologists. A similar frequency (Mhour = 4.93) was recently detected among medical students in a Chinese province in which 5.9% presented with moderate to severe IA (Simcharoen et al., 2017). In this sense, this excessive use may impair individuals' daily activities, as shown in our data in which approximately 40% of students and 30% of psychologists reported that their internet used caused harms in their day to day lives.

Moreover, the node SmH "Does your smartphone use harm your everyday life?" was a direct predictor (with a strong positive correlation) of IA for all participants. In this sense, Cho and Lee (2016) evaluated the pattern of Internet and smartphone use in South Korean nursing students and found that almost half were distracted by their smartphones during practical professional procedures. This also seemed to be shared among qualified professionals, as the authors also detected that most students reported that they frequently observed nurses using their phones while at work. Some authors detected difficulties in managing time among nursing students in Turkey, who spent 3 to 6 hours a day online (Öksüz et al., 2018).

For all participants, the prevalence of severe symptoms of depression, anxiety, and stress was significantly higher in the RHU group. These data are relevant because they reflect a psychological illness in a population whose profession is strongly associated with promoting mental health and preventing mental illness. The anxiety node was the second most influential in the network and directly correlated with depression in the professionals. In students, Stress was the second most influential in the network. Additionally, depression was the only emotional problem directed correlated with IA on both groups by network analysis. According to other authors, these findings are an association between different mental disorders and IA, both in university students and adults. In this sense, some authors found that low self-esteem, low life satisfaction, and loneliness were the main variables associated with IA in universities (Bozoglan et al., 2013).

Regarding health professionals, Simcharoen et al. (2017) found higher levels of depression and lower levels of self-esteem and quality of life in medical students with IA than those with no problems. Additionally, Avci and Sahin (2017) also detected a strong association between burnout syndrome and IA among health professionals such as doctors and nurses. The authors also identified other variables involved in emotional exhaustion as being predictors of IA, such as more extended working hours, more extensive work schedules and reduced sleep.

Increased anxiety and stress among individuals with IA in academics and the general adult population (Kuss et al., 2018) have been reported. When assessing the predictors for IA, being male significantly increased the odds in both groups. Indeed, gender was a direct predictor of IA on network analysis, showing a strong expected influence on the network, especially among the students. On the other hand, some authors reported a higher prevalence of IA among women (Lopez-Fernandez et al., 2018).

In the present study, intrapersonal factors (depression, anxiety, and stress) were predictors of IA only among professionals. In a meta-analysis conducted by Koo and Kwon (2014) to evaluate IA's main risk predictors, the strongest predictors were those with intra-personal characteristics (self-efficacy, depression, anxiety, stress, etc.), rather than with interpersonal characteristics.

However, these findings are not consistent in the literature, as observed by Kuss et al. (2018), in which depression and stress were not predictors of IA, both in students and adults. Perceptions of Internet use was the strongest predictor in our study, both for students and psychologists. These data are consistent with other authors that observed a strong correlation between the perception of internet use and smartphone addiction (Carbonell et al., 2018). This study comprised a sample of 792 universities, of which 30% were psychology students.

This study has some limitations that have to be considered. First, participants completed an online survey, and were recruited through different strategies for each sample (students and psychologists), which may suggest some sample bias in subpopulations with specific characteristics. Second, because this is a cross-sectional study, it is impossible to establish causal relationships among variables. In the future, we intend to conduct a longitudinal study to investigate this issue. Third, IA might actuate as a confounding factor for smartphone addiction because there are no specific instruments validated in Brazil to evaluate smartphone use in adults.

Our study also has some strengths, considering the originality of our data. This is the first study evaluating IA's relationship with psychosocial variables regarding psychologists and psychology students on the same study. Another strength is the sample size that comprised participants from all Brazilian regions and the type of statistical analyses performed.

Conclusion

Our main findings indicated a prevalence of IA of approximately 9% and 4% among students and psychologists, respectively. The IA was associated with greater severity of anxiety, depression, and stress and lower satisfaction with life in all individuals. Also, several variables were found to be predictors of IA, mainly among professionals. Network analysis showed that gender, type of device used to access the Internet and depression were the main direct predictors of all participants. Nevertheless, "having children" and "stress" was the most expected influence on students of psychology, while "having children" and "anxiety" were the most expected influence on psychologists.

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Contributors

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