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Moderating Role of Psychological Resilience on Relationship between Internet Addiction and Depression

ABSTRACT

This paper investigated the direct impact of internet addiction on the depression of university students. Literature has shown that excessive internet usage generates depression among university students. Data were analysed with correlation, regression, and structural equation modelling by using SPSS Amos. According to the correlation analysis, there is a direct link between internet addiction and depression among university students. Responses were obtained from 500 students aged 18–32 years, including 332 males (66%) and 168 females (33%). In this study, Siste's internet addiction, Frig Borg's psychological resilience, and Sharif's depression inventory were applied to the respondents. The general strain theory also suggested that excessive internet usage increases depression among students. As a result of hierarchal regression and structural equation modelling applied to determine the moderating role of psychological resilience, it was reported that psychological resilience unveiled a direct, insignificant effect in the relationship between internet addiction and depression in university students. According to the results, internet addiction was reported as a predictor of depression, but it does not seem that psychological resilience has a moderating impact.

Keywords: *Internet Addiction, Depression, General Strain, University Students.*

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Introduction

Excessive use of the internet is increased in individuals with high levels of depression (Lai et al., 2015). Internet addiction has become a growing public health concern with the widespread use of the internet (Cao et al., 2015). Because it may cause academic failure (Whang et al., 2003), sleeplessness (Cao et al., 2010), loneliness (Casales, 2010), and conflict in interpersonal relationships (Griffiths et al., 2014). Recently, depression has emerged as a severe psychological problem in adolescents. As effectively reported by Najaafipour et al. (2012), depression leads to academic failure, poor interpersonal relationships, and a low quality of life among people.

The association between depression and internet addiction among adolescents has been reported as harmful (Lau JTF, 2018). Neira CJB. Baber BL (2012) found internet addiction as the cause of depression in six Asian countries (Lai CM et al., 2015) and predicted a positive relation between depression and internet addiction age between twelve and eighteen years. Convincing evidence indicates that stress is a risk factor for depression and causes relapses (Goeders, 2003). Not everyone who experiences stress develops an addiction. Depression is also correlated with internet gaming disorder (IGD) (Liu et al., 2018). Although there is no scientific evidence showing a causal relationship between depression and IGD, a longitudinal study reported that the outcome of depression could be pathological gaming (Gentile, 2018).

Despite the amount of consistent evidence about the relationship between internet addiction and depression, it has been assumed that internet addiction can lead to ineffective coping and difficulties in everyday life (Lin SSJ & Tsaicc, 2002), which could impair daily life activities, academic performance, and interpersonal relationships (Yen Jy et al., 2008). Furthermore, empirical studies on stress-related factors exposed the academic difficulties, which had previously been reported as a major cause of stress among students (Takahira et al., 2018), found a positive relationship with depression and exhibited the likelihood of having internet addiction (Lam LT, 2010).

Depression is one of the most consistent relationships with internet addiction among individuals reported in previous studies. As a result, resilience factors can protect these mentally healthy individuals (Boonvisudhi & Kuladee, 2017). For instance, psychosocial resilience like positive emotions, optimism, humor, and cognitive appraisal could help reduce stress-induced psychopathology (Nam et al., 2018). Consequently, resilience has been reported to be a protective factor against internet addiction (Liu et al., 2018).

Similarly, lower resilience was reported among adults with internet gaming disorder (Wu, 2016). Basically, resilience is characterised by various

dimensions such as personal competence, personal structure, problem-solving skills, self-efficacy, and capacity for recovery. It has been observed that resilience has a moderating role between depression and game addiction disorder (Canale et al., 2019).

Some recent evidence suggests that resilience allows individuals to successfully adapt to stress or emotional difficulty and avoid stress-related disorders (28). It has been observed that lower resilience leads to a high level of depression. On the contrary, higher perceived depression involves the relationship between low resilience and internet gaming disorder among individuals (Yen et al., 2019).

Literature Review

Association Between Internet Addiction and Depression:

Due to the rapid growth of the internet, it is considered that 40% of the world population has internet access (Montag et al., 2018). The internet enables individuals to establish social connections and risk-free relationships with strangers to express their thoughts and exaggerate aspects that they wish to highlight (Buckingham, 2002). The factor behind the usage of the internet is the availability of the internet, the prospect of accessing prohibited content, and the willingness to take risks (Buckingham, 2002). As the number of users has increased, it is critical to investigate the positive and negative effects of the Internet. Although inadequate and appropriate usage of the internet is beneficial, excessive use has been linked to a variety of maladaptive problems (Liang et al., 2016).

The misuse of the internet has become an internet addiction. Internet addiction can be defined as a loss of control over internet use (Young, 1999). There are various symptoms of internet addiction, including uncontrolled impulsive use, intolerance, excessive use, and impairment in decision-making ability (Ko et al., 2008). In fact, various studies suggested the association between physical and psychological problems such as sleeplessness (Cao & Su, 2007), academic failure (Whang, Lee & Chang, 2003), depression (Morrison & Gore, 2010), loneliness (Casale & Fioravanti, 2011), and social isolation (Valkenburg et al., 2006).

Specifically, depression is associated with internet addiction. Depression is defined as a set of negative emotions and behaviours like loneliness and worthlessness about worthless things (Achen et al., 1993). Similarly, Petersen et al. (1993) reported a strong association between depression and cognitive problems such as self-destructive behaviour, social problems, and delinquent behaviour. Although the empirical evidence supports the link between depression and internet addiction (Yen et al., 2007), it is unclear whether internet addiction is the reason for depression or whether depression comes with the development of internet addiction.

Based on the studies, depressive symptoms are highly connected with internet addiction (Haung, 2016). Such global results show that the high severity of internet addiction causes a high level of depressive symptoms (Yen Jy, 2011). In many studies, depressive behaviour is highly associated with excessive internet usage after controlling for other factors (Senormanci, 2007). Those scientific findings reported that individuals with internet addiction are more likely to be comorbid with depression. The above discussion has shown the causal relationship between internet addiction and depressive behaviour, but it is not a major factor contributing to internet addiction (Yen JY, 2007). In fact, various factors can possibly be associated with some situations, and disorders such as internet addiction and insomnia are associated with internet addiction. Thus, reports show that internet addiction slightly contributes to the depressive scores of individuals (Cheung LM, 2011).

H1: There is an association between excessive use of the Internet and depression among university students.

Moderating the Role of Psychological Resilience in the Relationship between Internet Addiction and Depression

In order to avoid the aforementioned negative consequences, literature suggests protective factors such as "resilience" (Layne CM, 2007). Resilience is defined as a psychological construct and positive adaptation from adverse experiences (Windle G., 2011). This suggests the presence of two components, such as a significant thread and the existence of a positive adaptation, in which individuals and their environments facilitate this capacity for adaptation in the face of adversity (Earvolino, 2007). Although it depends on various factors like the individual's culture, age, ethnicity, and situation as a stressor (Connor & Davidson, 2003). Certainly, psychological resilience is a protective factor against the negative outcomes of a wide range of medical diagnoses, such as internet addiction (Robertson, 2018). The framework of positive psychology emphasises protective components that can minimise internet addiction over the risk factors of internet addiction (Seligman & Csikszentmihalyi, 200). Robertson (2017) found an association between internet addiction and psychological resilience among students.

The discussed protective factor interacts with stressors to minimise the likelihood of negative consequences (O'Leary, 1988). Increasing numbers of researchers have identified a number of protective factors, such as self-esteem (Kobasa, 1979), social support (Mann, 2004), optimism, and positive effects (Pengilly, 2000). Moreover, coping strategies like broad-mindedness are protective in the way that individuals enable themselves to cope with stressful environments successfully (Fredrickson, 2002). Therefore, such interventions aim to reduce stress and improve mental health and have significantly reduced symptoms of depression (Shapiro, 1998) and anxiety

(Deckro, 2002). Similarly, the growing body of literature has proven mindfulness mediation as a protective factor that enables individuals' emotional regulation, enhanced resilience, and reduced depression (Foureur et al., 2013; Nieuwenhuys & Oudejans, 2012).

In fact, many studies found the efficacy of mindfulness intervention among depression and anxiety (Spadaro & Hunker, 2016; Santos et al., 2016; Kang et al., 2016). On the other hand, Lovibond & Lovibond (1995) reported a significant reduction in depression due to the intervention of mindfulness among students. These integrative findings have shown protective factors accompanied by regular practices reduce depression among university students (Van der Riet, 2018).

In this regard, Steinhardt (2008) evaluated the efficacy of an intervention designed to improve resilience as a protective factor and reduce maladaptive copy strategies during stressful academic periods. It is documented that excessive usage of the internet in students who have experienced adverse life events such as academic failures, difficulties with parents, etc. (Tian et al., 2017) helps coping strategies help individuals face stressful events successfully. It means prevailing copy strategies are associated with a change in the propensity for internet addiction (Servidio et al., 2018). Regardless of the predictors of internet addiction, Lai (2015) reported that internet addiction intervenes in the relationship between depression and social anxiety. It means addictive behaviour towards the internet causes additional adaptation stresses and damages the individual's psychosocial wellbeing. Interestingly, empirical findings show that an individual's cognitive style about stressful life events significantly influences their vulnerability to depression (Abramson et al., 2002).

On the contrary, potential buffering effects such as psychological resilience significantly moderates the relationship between gaming disorders and improve psychological health promotion (Lussier, 2007). Although there is no empirical evidence showing a direct moderating effect of psychological resilience, indirect effects show the significant impact of psychological resilience on the gambling problem due to internet addiction among adolescents (Oei et al., 2014). Moreover, there is a there is a negative association between psychological resilience, emotional distress, and addictive behaviour (Fumaz et al., 2007). Although purpose in life has a significant protective factor among the psychological distress and indirect buffering role of addictive behaviour due to excessive use of the internet (Zhang et al., 015). Furthermore, psychological resilience has a significant role as a buffering effect in relation to anxiety symptoms and gaming disorders (Chen et al., 2018).

H2: Psychological resilience has a moderating role in the relationship between excessive use of the internet and depression among university students.

Theoretical Foundations

The current study was carried out using "General Strain Theory," used to analyse the addictive behaviour of individuals (Jun et al., 2015). As suggested by the theory, strains can lead to negative attitudes and psychological distress, which can increase problematic behaviour. Accordingly, depression depends on the internet addiction that links strain with IA. The theory contributes the cause of depression due to internet addiction to the strain. In the present situation, excessive use of the internet leads to depression among university students.

Methods

Participants

Participants were 500 Pakistani university students aged 18–32, with male 332 (66%) and female 168 (33%) randomly selected by using a simple random sampling technique. Based on the analysed responses of 500 participants, which were female (168) at 33% and male (332 at 66%), all were responded to, and the response rate was recorded at 100%. Profound addiction to the Internet was found in 95% CI (Lower Bound 3.47 and Upper Bound 3.60), depression was found in 95% CI (Lower Bound 3.47 and Upper Bound 3.66) and psychological resilience appeared in 95% CI (Lower Bound 3.75 and Upper Bound 3.85).

Instrumentation

The instrument "Internet Addiction" was adopted from Siste (2021) along with three dimensions: silence (no. of items 7), neglect of duty (no. of items 5), and loss of control (no. of items 6), rated on a 5-point Likert scale developed by Kimberly Young. The psychological resilience tool adopted from Frigborg (2003) consisted of 45 items covering five dimensions: personal competence (16 items), social competence (12 items), social support (9 items), family coherence (5 items), and personal structure (4 items) rated on a 5-point Likert scale. Moreover, the depression inventory adopted from Sharif et al. (2011) covers three factors: cognitive/emotional along with 29 items; academic motivation with 7 items; and lethargy with 9 items, rated on a 6-point Likert rating scale.

Results and Interpretation:

Table 1.0: Results of Demographic Section

Sr.	Demographic Items		Frequency	Percentage
1	**Gender**			
		Male	332	66%
			168	33%
	Female			
1	**Age Group**			
		18-22 years	354	39%
		23-27 years	141	59%
		28-32 years	5	2%
3	**Qualification**			
		Bachelor Hon's	296	59%
		Masters 16 years	124	24%
		Masters 18 years	72	14%
		PhD	8	1.6%
4	**Sector**			
			104	21%
	Public		369	79%
		Private		
5	**Profession**			
		Students	263	53%
			120	24%
	Professional		113	22%
		Both		
6	**Experience**			
		0-4	360	72%
		5-9	136	27%
		10-14	4	.8%
		Total (N)	**500**	**100%**

Survey based quantitative data were collected from the number of 500 respondents from the public and private universities. The demographics results shown that male students represent 332 (66%) of the total respondents where female made (168) 33% contribution to the data collection process. It was also found that the highest percentage of these respondents 18-22, the 59% respondents were aged between 23-27 years while individual who are 28-32 are lowest in the percentage. These demographic results have been summarized in Table 1.0 shared above: Deviation and mean values of the constructs of the intended study based on the views shared by the sample participants are demonstrated in Table 2.0 below. Mean and standard deviation values of the predictor variable Internet Addiction ($\mu = 3.5388$, $\sigma = 0.69960$) with dimensions Silence ($\mu = 3.5062$, $\sigma = 0.81425$), Neglect of Duty ($\mu = 3.5268$, $\sigma = 0.84075$), and Loss of Control ($\mu = 3.6028$, $\sigma =$

0.76354). Depression was found with a mean of $\mu = 3.5683$, $\sigma = 0.76354$, with the dimensions cognitive ($\mu = 3.4250$, $\sigma = 1.15637$), academic motivation ($\mu = 3.6680$, $\sigma = 1.38617$), and lethargy ($\mu = 3.7138$, $\sigma = 1.21380$). The final construct of psychological resilience showed a mean value equal to $\mu = 3.8045$, $\sigma = 0.56119$, dimensions found with mean and standard deviation: personal competence ($\mu = 3.8002$, $\sigma = 0.84423$), social competence ($\mu = 3.7555$, $\sigma = 0.71425$), family coherence ($\mu = 3.8053$, $\sigma = 0.69487$), social support ($\mu = 3.8071$, $\sigma = 0.65723$), and personal structure ($\mu = 3.9172$, $\sigma = 1.14508$).

KMO Indexes for Sample Appropriateness

Table 2.0 shows the outcomes of exploratory factor analysis (EFA) based on the collected data sets from the different private and government universities' participants. For the variable, Internet addiction, the recorded index of the KMO test came out to be 0.866 (p-value < 0.05). Likewise, the KMO index of depression was approached at 0.917 (p-value < 0.05), and the KMO value for psychological resilience was found to be 0.749 (p-value < 0.05). It shows data is more significant for analysis when the value is closer to 1, which is adequate for analysis and supports the suitability of the sample-driven data.

Reliability Analysis

Reliability analysis was conducted to determine the inter-item consistency of each construct (measuring instrument) based on their derived Cronbach's alpha coefficients among participants studying at various universities in Punjab. The findings of the analysis, as demonstrated in Table 2.0, confirmed that the Internet addiction construct reliability coefficient $\alpha = 0.915$. Simultaneously, the reliability alpha value for depression was recorded as $\alpha = 0.937$. For psychological resilience, the coefficient of reliability was approached at $\alpha = 0.843$.

Correlation Analysis

Correlation analysis was directed to assess the significance level of the association or relationship among all three variables considered for the intended research study. Based on the analysis, it was established that Internet addiction held a slightly significant positive relationship with the depression of these university students, i.e., r (9.35%), at a significance p-value < 0.01, i.e., $p = 0.000$. This revealed a slightly positive relationship between internet addiction and depression among the students studying at universities. Based on the results of the dimensions of Internet addiction, silence ($r = 67.7\%$), neglect of duty ($r = 62.7\%$), and loss of control ($r = 52.6\%$) have a have a correlation with depression, respectively, at a significance p-value < 0.01 i.e., $p = 0.000$ in universities with depression. Likewise, the association between Internet addiction and personal competence has shown a moderate positive relationship

(r =.230**, p-value < 0.01, i.e., p = 0.000), social competence appears to have a highly insignificant relationship with Internet addiction (r =.070, p-value < 0.01), family coherence has a moderately significant relationship with Internet addiction (r =.152**, p-value < 0.01), social support is found to be moderately related to Internet addiction (r =.144**, p-value < 0.01), and the personal structure of the student remains in relationship with Internet addiction (r =.155**, p-value < 0.01).

Table 2.0: Correlation between Internet Addiction, Depression and Psychological Resilience

Construct	Internet Addiction	Depression	Psychological Resilience
Internet Addiction	-----	.505**	.218**
Depression	.505**	-----	0.065**
Psychological Resilience	218**	0.065**	-----
N	500	500	500
Mean	3.5388	3.5683	3.8045
Std. Deviation	0.69960	0.76354	0.56119
Reliability	0.937	0.915	0.843
KMO Index	0.866	0.917	0.749

** p value < 0.01

Table 3.0: Goodness of Fit Measure

SRMR (<0.10)	**RMSEA** (<0.08)			**CFI** (>0.90)	**TLI** (>0.90)	**RFI**
	LO 90	**PCLOSE**	**HI 90**			
0.20	0.20	.000	0.29	**.759**	**.757**	**.679**

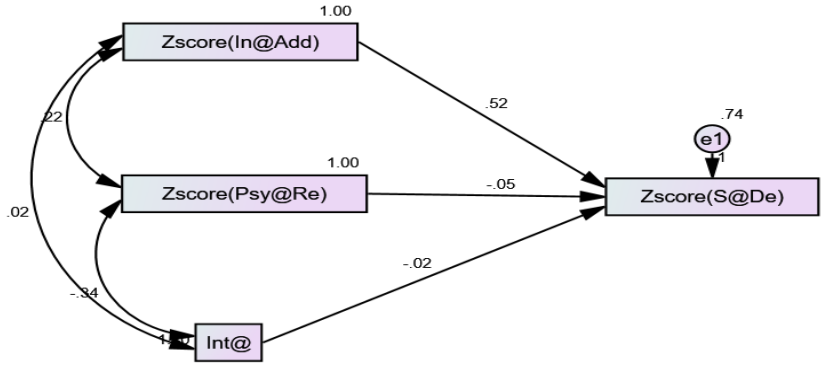
A model that was derived from the EFA was set up and tested. The SRMR < 0.10, RMSEA < 0.20, AGFI > 0.85, CFI >0.759, TLI >0.757 and RFI > 0.67 used to evaluate the overall fitness of the model. As shown in Table 3.0, all the goodness of fit measures does not meet their respective criterion.

Structural Equation Model Analysis

		Estimate	S.E.	C.R.	P	Label
Depression <—	**Internet Addiction**	.517	.040	13.038	***	Statistically Significant
Depression <—	**Psychological Resilience**	-.053	.041	-1.280	.201	Insignificant
ZS@De <—	**Interaction**	-.016	.034	-.467	.641	Insignificant

Figure 2.0 presented above gives a fused illustration of the regression weight used to extract results in the form of a basic and interaction model. In order to determine the direct effects of Internet addiction with an interaction with Internet addiction and psychological resilience over again on depression among students in their universities, upon hierarchical regression weight, a model appears with interaction analysis. The constructs "Internet Addiction," "Depression," and "Psychological Resilience" were validated and confirmed with a moderating analysis of the full "Structural Equation Model.".

Results of the model showed that the predictor variable Internet addiction (β = 0.516, p-value = 0.00) had a significant direct effect on the criterion variable depression (β = -0.047, p-value = 0.234). Pervasively, the moderating or contingency variable Psychological Resilience revealed a direct, insignificant effect on the depression of university students. It is showing evidence of the inconsequential and negligible contingent role of the moderating variable, psychological resilience. Allowing for the interactional model with interaction affiliation between independent (*x*) and moderating/contingency (z), it is portrayed that there is no statistically significant moderating effect on depression among students.



Discussion

Due to excessive use of the Internet, internet addiction has been identified as one of the most pressing public health issues (Jerald J. & Block M.D., 2008). It has been conceptualised as similar to impulsive control or addictive disorders; excessive usage, mood swings, tolerance, and negative repercussions are commonly adopted criteria (Ko et al., 2005). In order to do that, this study assessed the moderating role of psychological resilience in the relationship between internet addiction and depression among Pakistani university students. Similar studies have shown the high comorbidity relationship of depression with internet addiction (Kim et al., 2006). Unfortunately, depression and internet addiction were demonstrated to frequently co-occur (Lai et al., 2015).

A confirmatory factor analysis (CFA) was executed to check for model goodness of fit. The normed chi-square was 704.4, and the RMSEA was 0.685, which was not statistically significant ($p < .01$). The next step was to examine composite reliability as well as convergent reliability, average variance extracted (AVE), and the squared inter-construct correlation. The composite reliabilities ranged from.82 to.90, which is considered statistically significant. The AVE measurement of the convergent validity of the model constructs showed above.50, which means statistically good. The loadings of the constructs Internet Addiction contain 0.866 (p-value < 0.05), Depression (p-value < 0.05) found with 0.917, and Psychological Resilience reported 0.749 (p-value < 0.05).

Pervasively, the direct relationship between Internet addiction and depression was found among university students. As though, adolescents also reported a high risk of depression due to excessive usage of the internet (Chi et al., 2019). Despite previous studies suggesting that Internet addiction may be strongly associated with depression (Kowalski RM et al., 2014), Further, the addiction to mobile phones has been reported to have a high incidence among students in higher education (Feng et al., 2022). The H1 was supported in the assessed study by Zhao et al. (2022). It has been observed that the direct effects of Internet addiction with an interaction with Internet addiction and psychological resilience over and over again affect depression among students in their universities, but the contingency variable psychological resilience unveiled a direct and insignificant effect on the depression of university students. It showed the negligible contingent role of the moderating variable, psychological resilience. But Santos et al. (2021) considered resilience to be a protective element among the negative consequences of mental health. In addition, resilience is supposed to be an important factor in facing different forms of victimisation (Grych J., 2015). Following these arguments, previous studies found a moderating role for psychological resilience between addiction or victimisation and psychological symptoms. Like Hamby et al. (2018) reported, the lower the level of maltreatment and anxiety among victims' depression, the higher their level of resilience.

Conclusion

Following the above discussion, growing literature has revealed that internet addiction is a risk factor (Chi et al., 2019) that may cause various psychological and behavioural problems among university students, such as loneliness, depression, academic failure, interpersonal relationships, and so on (Kim et al., 2006). The association between the internet and depression among university students is important because it is harmful (Bernardi S., 2009). The statistical evidence of this current study suggests a relationship between internet addiction and depression among Pakistani university

students. On the other hand, studies identified protective factors to avoid the occurrence of negative symptoms such as resilience (Bilic V, 2014). But the evidence of this study suggests there is no moderating role of psychological resilience in the relationship between internet addiction and depression among Pakistani university students.

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