



An exploration of the associations among positivity, general distress and internet addiction: The mediating effect of general distress



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ABSTRACT

The aim of the present study was to examine the relationships between positivity and general distress (including depression, anxiety, stress) and internet addiction and the mediating effects of general distress. The theoretical model was examined with 392 volunteers who were university students. Participants filled out the Positivity Scale (POS), Depression, Anxiety, Stress Scale (DASS) and Short Form of Young's Internet Addiction Test (YIAT-SF). The results revealed that there were significant associations among positivity, general distress and internet addiction. According to the results of mediation analysis using structural equation modelling and bootstrapping, depression fully mediated the positivity-internet addiction relationship, whilst anxiety and stress partially mediated it. Bootstrap analysis indicated that positivity exerted a significant indirect effect on internet addiction through depression. Overall, the results implied the potential therapeutic effect of positivity which leads to a direct decrease in general distress and an indirect decrease in internet addiction through general distress. In addition, internet addiction may be considered as a secondary problem rather than a primary disorder. The results provide opportunities to design psychological interventions focused on improving positivity which may lead to a decrease in general distress which involves a mechanism preventing individuals from applying a positive reinforcement process.

1. Introduction

1.1. Internet addiction

Increasing the time spent on unqualified activities in cyber environments causes changes in the psychosocial behaviours of individuals. As a result of these changes, healthy and pathological internet use concepts have been developed. Davis (2001) While healthy internet use enables effective display of various cognitive and social skills (collecting and disseminating information, choosing, reading, communicating, sharing) Caplan (2002), overuse of the internet is a syndrome that affects the social, psychological and professional lives of individuals (Caplan, 2005). In the literature, concepts such as internet dependency, compulsive internet usage, problematic internet usage, and internet use disorder are used to refer internet addiction Huang et al., 2014; Odacı and Çikrikci, 2017; Odacı and Çikrikçi, 2014). The term internet addiction is used in the current study. Internet addiction is defined as a behaviour that affects the ability of the user to control online presence, which can be caused by social, professional, and relational problems (Kuss et al., 2014). Internet addiction, including the inability to control the use of the internet, can cause functional impairment in the daily activities of individuals (Nie et al., 2017).

1.2. Internet addiction and positivity

Positivity is conceptualized as the main determinant of subjective well-being (Kozma et al., 2000). The causal context underlying the positivity theory is based on the views of Aaron Beck (1967). According to this view, negative thinking at the centre of social cognitive evaluation processes among depressed individuals is the most important cause of the pathological condition. A similar view suggests that positivism allows individuals to develop positive perspectives about themselves, their lives and their future (Caprara et al., 2009; 2010). In a more simple way, positive and negative thought patterns may directly influence individuals' selves, their lives and their future (Alessandri et al., 2012). Unlike other conceptual inferences, positivity does not only orient itself to the future, but it also cares about the self-reference system that automatically occurs in human experiences. Briefly, positivity is conceptualized as a general system in which the tendency of positive thinking towards different areas of life, such as self, life and future, dominates (Caprara et al., 2010).

The cognitive behavioural model in pathological or problematic internet use may be considered to explain the link between positivity and internet addiction (Davis, 2001). The irrational beliefs associated with the self and the world can lead to the addictive use of the internet.

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It has been reported that individuals with maladaptive cognitions related to life tend to move away from problematic and negative emotions by diversion to the internet (Caplan, 2002; 2005). Davis' generalized internet addiction model, which allows us to distinguish between generalized and specific pathological internet addiction model, relates internet addiction to social interaction applications on the internet. According to this model, factors such as social isolation perception, low social support and loneliness contribute to the development of generalized internet addiction model. At the same time, certain personality traits, psychopathological symptoms and maladaptive cognitions are accepted as predisposing factors for the development of generalized internet addiction model (Brand et al., 2014). There are many studies in the literature reporting the associations between internet addiction and depression (Dieris-Hirche et al., 2017; Lin et al., 2018; Zhao et al., 2017), shyness (Ang et al., 2017; Huan et al., 2014), personality traits (Lu et al., 2017; Munno et al., 2017; Zhou et al., 2017), and maladaptive cognitions (Han et al., 2017; Park et al., 2017). Psychopathologies, which are influenced by maladaptive cognitions, have a strong connection with internet addiction. Although the existence of a negative association between internet addiction and well-being components is well known (Mei et al., 2016; Odaci and Çikrikçi, 2014; Stead and Bibby, 2017), the lack of empirical research makes it difficult to outline a clear cause-and-effect relationship between these two structures. A recent longitudinal study revealed that internet addiction is a determinant of life satisfaction. According to this study, internet addiction reduces the life satisfaction of individuals (Yu and Shek, 2017).

In the current study, the relationship between positivity as a well-being component (Caprara et al., 2012) and internet addiction will be explored. As the link between positivity and internet addiction is structured, it is thought that, unlike maladaptive cognitions, adaptive cognitions can be taken as a factor to prevent the emergence of internet addiction. Brand et al. (2014) proposed a new model of generalized internet addiction model which infers that some specific cognitions are related to the control processes effective in sustaining the development of the addictive internet use. Positive reinforcement in the control process strengthens the healthy use of the internet, whereas negative reinforcement leads to individuals addicted to the internet. In the present study, positivity was considered as a predisposing factor in applying positive reinforcement for the development of adaptive cognitions and control processes in the generalized internet addiction model. The first hypothesis working towards this point of view is presented.

Hypothesis 1. Positivity is significantly associated with internet addiction.

1.3. Depression, anxiety and stress as mediators

Depression is simply defined as a negative emotion state manifesting as pessimistic mood, negative attitudes and irrational beliefs. One end of the spectrum has a pessimistic and irritable mood, while at the other end there is a risk of psychomotor retardation and suicide along with psychotic and somatic components (Kendall et al., 1987). Depression is also considered as an adaptation process that is applied to reduce the negative impact of insufficiency (for instance, problem solving, social support, grief, resourcefulness) that can be considered important for the individual (Beck and Bredemeier, 2016). Anxiety, which has a critical prescription for sustaining life, is defined as a state of arousal manifested by a person's physical, emotional and mental changes, against a non-objective danger (concern of problem). Moreover, anxiety is a reaction to concern or problem. Anxiety acts as an internal cognitive alarm. Thus, if the bad situation cannot be handled immediately, the anxiety will handle the situation until the person is ready. The increased intensity of the anxiety will also make it harder to ignore the situation (Spielberger et al., 1970). Stress is a psychological condition that almost all people are exposed to and difficult to identify.

Stress is the response to events (Selye, 1976). Stress is not affected by the event or situation. The meanings attributed by an individual to these events or situations provide the basis for stress formation (Folkman, 2013). In other words, stress is the physiological and psychological attempts to cope with the challenges of the life stressors (Odaci and Çikrikçi, 2017).

Although there are studies that examine the relationship between psychopathology, particularly general distress, and internet addiction (Bakarman, 2017; Burleigh et al., 2017; Chou et al., 2017; Sharifpour et al., 2017; Gholamian et al., 2017; Lu et al., 2017), there is no consensus on the etiological context between these constructs. While some studies claim that psychopathology causes internet addiction, other studies consider internet addiction as a secondary problem that causes other psychopathologies. For instance, Romer et al., (2013) stated that excessive use of the internet may increase the symptoms of depression, while Ko et al., (2014) assessed internet addiction as a consequence of psychopathology. The current study will attempt to contribute to understanding the associations between internet addiction and general distress with a cross-sectional design and beneficial explanation of general distress as a predictor of internet addiction.

According to generalized internet addiction model, it is considered that general distress may have a decisive effect on the control processes. Control processes consist of positive and negative reinforcement parameters (Brand et al., 2014). It is assumed that an individual who uses the internet so as to get rid of internal negative emotions might use the internet excessively due to the general distress which does not enable positive reinforcement to be applied. According to another theory (self-medication hypothesis of addiction), addictive behaviours are a maladaptive response to cope with general distress experiences (cited in Zhao et al., 2017). In other words, individuals who are disturbed by general distress can use the internet to cope with stressors and difficult situations. Therefore, it is suggested that changes in levels of general distress may be determinants of internet addiction.

It is thought that the increase in the levels of well-being by manipulating cognitive structures may have a relaxing effect on the variables that are related to cognitive processes. Hence, if the level of well-being of the individual can be increased, there may be a decrease in the pathology level. According to this study, individuals who can adjust the level of positivity by making cognitive evaluations can change their general distress levels with similar cognitive processes. The positivity and general distress interaction expressed in this study can be associated with the reinforcement processes that cause internet addiction. Positive developments at the level of positivity can also lead to positive developments in individuals' general distress levels and protect the individual, who activates the positive reinforcement process, from internet addiction.

In the present study, the effect of general distress on internet addiction was investigated. Individual with general distress would be prone to develop negative thoughts about self, life and future, as mentioned above. There are no studies that have examined general distress in terms of positivity and internet addiction. The determination of the effects of positivity on internet addiction through general distress represents the originality and novelty of the current research. Given that positivity might enable positive thinking and rational evaluations as to the life, it may also positively affect the internet addiction by decreasing the level of general distress. Overall, the current paper examined how general distress is associated with positivity and internet addiction. It is hypothesized that general distress – which is considered predisposing factor for internet addiction – may be affected by positivity. It is assumed that the effect of positivity on internet addiction can be reduced or eliminated when general distress is included in such a model. Consequently, the dimensions of general distress (depression, anxiety, and stress) are assessed as mediating variables. From this point, it was hypothesized that depression, anxiety and stress mediate the relationship between positivity and internet addiction.

Hypothesis 2. Depression, anxiety and stress have mediator roles in the

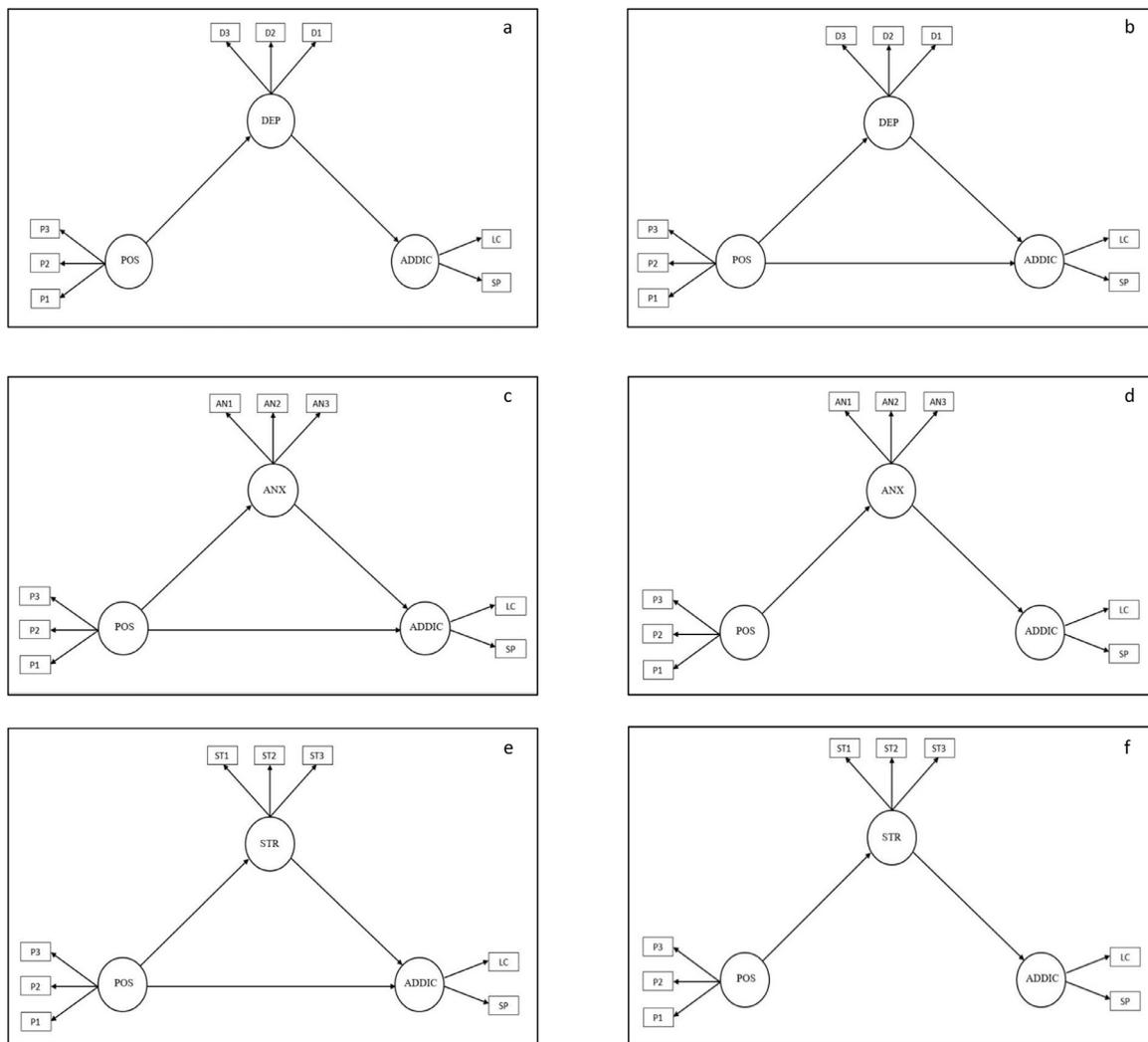


Fig. 1. Hypothesized conceptual models. Fig. 1a, 1c and 1e represents full mediation models for depression, anxiety and stress, respectively, whereas Fig. 1b, 1d and 1f demonstrates the partial mediation models.

Note: POS = Positivity; ADDICT = Internet Addiction; DEP = Depression; ANX = Anxiety; STR = Stress; D1, D2, D3 = Parcels of Depression; AN1, AN2, AN3 = Parcels of Anxiety; ST1, ST2, ST3 = Parcels of Stress; P1, P2, P3 = Parcels of Positivity; LC = Loss of Control; SP = Social Problems.

relationship between positivity and internet addiction.

2. Method

2.1. Research design

In the current study, it was hypothesized that depression, anxiety and stress have mediation roles in the relationship between positivity and internet addiction. Several mediation models were applied to test the study hypothesis in a correlational structure. In correlational design, the associations between behavioural patterns and indicatives of behaviour may be explored (Cohen, Manion and Morrison, 2007; McMillan and Schumacher, 2006). In line with the study aims, hypothesized mediation models based on the mediation roles of depression, anxiety and stress in the relationship between positivity and internet addiction were developed (Fig. 1).

2.2. Sample

Data were collected from 392 volunteers who were university students from one public university located in northeastern Turkey. The university students in the sample attend the faculty of Education.

Because of incomplete data ($n = 12$), 12 questionnaires were excluded from the analysis. Thus, the final sample consisted of 380 university students, 214 female (56.3%) and 166 male (43.7%). The ages of the sample varied from 18 to 32 years ($M = 20.25$, $SD = 2.17$). Two hundred and thirty-four students were in 1st year (61.6%), 38 in 2nd year (10%), 56 in 3rd year (14.7%) and 52 in 4th year (13.7%). The majority of the sample reported they owned a smartphone ($N = 325$, 85.5%). Additionally, all of the sample with smartphones had an internet packet linked to their GSM line.

2.3. Procedure

The ethical standards of the institutional research committee approved the data collection process. Permission was gathered for the application of necessary measures for the current study. Signed consent forms, verifying the participants understood the aim of the study, were obtained from each student. Participants were informed about the research and data collection process. A diverse application session was applied for students. Research participation was ensured on a voluntary basis. The data collection process using paper-and-pencil questionnaires lasted for around 30 min for each class.

2.4. Measures

2.4.1. Internet addiction

Internet addiction was assessed with a Short Form of Young's Internet Addiction Test (YIAT-SF) consisting of 12 items in two sub-domains named *loss of control and craving/social problems* ((Pawlikowski et al., 2013; Young, 1998). The sample items in YIAT-SF are as follows: "How often do you find that you stay on-line longer than you intended?" (loss of control), "How often do you choose to spend more time on-line over going out with others?" (craving/social problems). Participants rated how well each item described them using a 5-point Likert scale ranging from 1 ("rarely") to 5 ("always") with a total score range between 12 and 60. Higher scores refer to higher internet addiction. YIAT-SF was translated into Turkish by Kutlu et al., (2016). The Turkish form of YIAT-SF revealed adequate construct validity (RMSEA = 0.07, CFI = 0.95, AGFI = 0.90) and internal reliability (Cronbach's alpha = 0.91; Kutlu et al., 2016). Within the current study, Cronbach's alpha for YIAT-SF was 0.80.

2.4.2. Positivity

Positivity was assessed with a Positivity Scale (PS) consisting of 8 items (Caprara et al., 2012). A representative item is "I look forward to the future with hope and enthusiasm". Items were rated on a 5-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree") with a total score range between 8 and 40. Higher scores refer to higher positivity. The PS was translated into Turkish by Çikrikçi et al., (2015). The Turkish form of PS demonstrated sufficient construct validity (RMSEA = 0.06, CFI = 0.95, SRMR = 0.04, GFI = 0.97) and internal reliability (Cronbach's alpha = 0.73; Çikrikçi et al., 2015). In this study, Cronbach's alpha for PS was 0.78.

2.4.3. Depression, anxiety and stress

General distress was assessed with a Depression Anxiety Stress Scale (DASS-21) consisting of 21 items (Lovibond and Lovibond, 1995). DASS-21 contains three 7-item self-report scales measuring depression, anxiety and stress, respectively. The sample items in DASS-21 are as follows: "I felt that life was meaningless" (depression), "I felt I was close to panic" (anxiety), "I found it difficult to relax" (stress). Items were rated on a 4-point Likert scale from 0 ("did not apply to me at all") to 3 ("applied to me very much, or most of the time"). Ratings range between 0 and 21 for depression, anxiety and stress. The short form of DASS-42 was used in the present study. The DASS-42 was first translated into Turkish by Akin and Çetin (2007). DASS-21 is the shortened version of DASS-42. In present study, the reliability and validity analysis of the short form of DASS-21 in Turkish sample was explored by using items in DASS-42. Within the current study, DASS-21 had sufficient construct validity (RMSEA = 0.05, GFI = 0.91, SRMR = 0.05, CFI = 0.92) and internal reliability (Cronbach's Alphas = for depression 0.72, for anxiety 0.70, for stress 0.73).

2.5. Data analysis

There are several procedures in the data analysis process. To achieve the research objectives, the data needed to be organized. In the data organization process, various assumptions including missing value analysis, extreme value analysis, normal distribution and linearity analysis were performed (Field, 2013).

Structural equation modelling (SEM) with maximum likelihood estimation was used to evaluate the hypothesized conceptual models using IBM AMOS Graphics. In the current study, although it may be possible to examine a comprehensive mediation model involving depression, anxiety, stress, positivity and internet addiction, separate analyses were performed to explore how depression, anxiety and stress were related to positivity and internet addiction. Additionally, item parcelling method was applied to improve normality and reliability of the study measures by means of reducing the numbers of observed

variables (Alhija and Wisenbaker, 2006).

To perform the model selection, the following indices of the goodness-of-fit were examined: χ^2/df , Comparative Fit Indices (CFI), Tucker and Lewis index (TLI), Goodness of Fit Index (GFI), Bentler-Bonett Normed Fit Index (NFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Akaike's Information Criterion (AIC), and Expected Cross-Validation Index (ECVI). RMSEA, one of the absolute fit indices, is the most used fit index with values below 0.05 supporting an excellent fit to the data. Additionally, there appears to be adequate fit if χ^2/df is less than 5, CFI, TLI, GFI, NFI are greater than 0.90, and SRMR is less or equal than 0.05 (Kline, 2011; Tabachnick and Fidell, 2006). AIC and ECVI are frequently used in the comparison of conceptual hypothesized models. There is no agreed range for AIC and ECVI indices. However, they always take values greater than zero. It is assumed that the model with low AIC and ECVI values indicates good fit to the data. The bias corrected and accelerated (BCa) values of RMSEA and ECVI fit indices were presented. BCa intervals make the correction for bias and skewness in the distribution of the bootstrap estimates (Burnham and Anderson, 2004).

Consequently, large samples have to be studied to calculate the indirect effects of the mediator variable. At this stage, the examination of confidence intervals using bootstrapping is recommended (Preacher and Hayes, 2008). In this study, bootstrapping based confidence intervals (N = 10,000) were examined as recommended by Preacher and Kelley (2011). The absence of a zero between lower and upper confidence intervals leads to the result that the mediation test is significant.

3. Results

3.1. Preliminary analysis

To investigate associations among the study variables, firstly, zero-order correlations were calculated. Table 1 shows correlations among the variables, means, standard deviations, skewness and kurtosis values. As a result of correlation analysis, there appeared to be significant associations between internet addiction and depression ($r = 0.25$, $p < .01$; %95 CI [.15, 0.36]), anxiety ($r = 0.22$, $p < .01$; %95 CI [.12, 0.32]), stress ($r = 0.19$, $p < .01$; %95 CI [.09, 0.29]) and positivity ($r = -0.23$, $p < .01$; %95 CI [-0.34, -0.12]). Additionally, there were significant associations between positivity and depression ($r = -0.50$, $p < .01$; %95 CI [-0.57, -0.41]), anxiety ($r = -0.28$, $p < .01$; %95 CI [-0.37, -0.17]), and stress ($r = -0.25$, $p < .01$; %95 CI [-0.34, -0.15]).

3.2. Measurement model

In the present study, DASS-21 was used to evaluate depression, anxiety and stress. Due to the structure of DASS-21, the total score from the whole tool cannot be computed. Therefore, the scores for depression, anxiety and stress were assessed separately. In other words, each of three subscales of DASS-21 was accepted as a single measure in the measurement model and structural model. Firstly, the analysis of measurement model for depression was applied. The measurement model for depression includes three latent variables (depression, positivity and internet addiction) and eight observed variables. The measurement model revealed sufficient fit to the data: $\chi^2_{(df=17, N=380)} = 17.95$, $p > .05$; $\chi^2/df = 1.05$, CFI = 0.99, TLI = 0.99, GFI = 0.99, NFI = 0.97; RMSEA = 0.01 90% BCa (0.01, 0.04); SRMR = 0.02. Additionally, factor loadings in the measurement model for depression were all significant and ranged from 0.45 to 0.78. Secondly, the measurement model for anxiety was explored. Similar to the measurement model for depression, the measurement model for anxiety contains three latent variables (anxiety, positivity and internet addiction) and eight observed variables. The measurement model

Table 1
Means, standard deviations, skewness, kurtosis and bivariate correlations among variables.

Variable	Descriptive		Correlations																
	M	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
(1) D1	2.37	1.27	0.26	-0.43	1														
(2) D2	2.29	1.56	0.45	-0.46	0.35**	1													
(3) D3	2.76	1.95	0.47	-0.53	0.34**	0.54**	1												
(4) AN1	1.75	1.35	0.87	0.72	0.15**	0.19**	0.21**	1											
(5) AN2	1.68	1.37	0.70	0.01	0.17**	0.25**	0.22**	0.22**	1										
(6) AN3	2.98	1.91	0.53	-0.04	0.28**	0.27**	0.36**	0.32**	0.46**	1									
(7) ST1	2.54	1.23	0.36	0.04	0.28**	0.37**	0.29**	0.27**	0.31**	0.37**	1								
(8) ST2	1.97	1.42	0.62	0.05	0.28**	0.30**	0.34**	0.23**	0.31**	0.42**	0.42**	1							
(9) ST3	3.69	1.91	0.25	-0.12	0.33**	0.30**	0.32**	0.22**	0.21**	0.42**	0.34**	0.40**	1						
(10) P1	10.60	2.34	-0.39	-0.12	-0.32**	-0.33*	-0.38**	-0.18**	-0.17**	-0.18**	-0.16**	-0.25**	-0.20**	1					
(11) P2	10.18	2.44	-0.35	0.07	-0.29**	-0.34**	-0.37**	-0.16**	-0.20**	-0.20**	-0.17**	-0.23**	-0.14**	.58**	1				
(12) P3	7.37	1.89	-0.51	-0.31	-0.23**	-0.28**	-0.31**	-0.11*	-0.19**	-0.13**	-0.11*	-0.15**	-0.01	.55**	.50**	1			
(13) LC	16.27	4.30	0.19	-0.35	0.15**	0.08	0.09	0.06	0.10	0.13**	0.06	0.27**	0.08	-0.09	-0.16**	-0.12*	1		
(14) SP	11.33	4.01	0.79	-0.01	0.19**	0.23**	0.27**	0.13**	0.21**	0.18**	0.10*	0.17**	0.05	-0.18**	-0.18**	-0.22**	.43**	1	

Note: D1, D2, D3 = Parcels of Depression; AN1, AN2, AN3 = Parcels of Anxiety; ST1, ST2, ST3 = Parcels of Stress; P1, P2, P3 = Parcels of Positivity; LC = Loss of Control; SP: Social Problems.

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

demonstrated adequate fit to the data: $\chi^2_{(df=17, N=380)} = 15.56, p > .05$; $\chi^2/df = 0.91$, $CFI = 1.00$, $TLI = 1.00$, $GFI = 0.99$, $NFI = 0.97$; $RMSEA = < 0.01$ 90% BCa (0.01, 0.04); $SRMR = 0.02$. The factor loadings of all indicators in the measurement model for anxiety were all significant and ranged from 0.42 to 0.84. Finally, the measurement model for stress was examined. As a result of measurement model analysis, acceptable fit indices were obtained which enables assessment of the model: $\chi^2_{(df=17, N=380)} = 41.27, p < .001$; $\chi^2/df = 2.42$, $CFI = 0.96$, $TLI = 0.94$, $GFI = 0.97$, $NFI = 0.94$; $RMSEA = 0.06$ 90% BCa (0.03, 0.08); $SRMR = 0.04$. The factor loadings in the model were all significant and ranged from 0.53 to 0.79. As a consequence, the results suggested that all observed variables significantly represent their respective latent variables.

3.3. Structural model

To explore whether the hypothesized conceptual models (Fig. 1) are efficient, a series of structural equation models were applied with AMOS. For investigation of the mediation roles of depression, anxiety and stress, a two-stage approach was adopted. In the first stage the full mediation values were examined, while in the second stage the partial mediation values were investigated. The mediation analysis started with depression. Firstly, the full mediation model (Model 1 see Fig. 1a) including a mediator, depression, and no direct path from positivity to internet addiction was examined. After that, model 1 was revealed fit to the data well in line with recommended standards: $\chi^2_{(df=18, N=380)} = 18.50, p > .05$; $\chi^2/df = 1.02$, $CFI = 0.99$, $TLI = 0.99$, $GFI = 0.99$, $NFI = 0.98$; $RMSEA = 0.009$ 90% BCa (0.001, 0.047); $SRMR = 0.029$; $AIC = 54.50$, $ECVI = 0.14$ 90%BCa (0.142, 0.182). Secondly, partial mediation was tested (Model 2 see Fig. 1b). Model 2 showed sufficient fit to the data: $\chi^2_{(df=17, N=380)} = 17.95, p > .05$; $\chi^2/df = 1.05$, $CFI = 0.99$, $TLI = 0.99$, $GFI = 0.99$, $NFI = 0.98$; $RMSEA = 0.01$ 90% BCa (0.01, 0.05); $SRMR = 0.02$; $AIC = 55.95$, $ECVI = 0.14$ 90%BCa (0.142, 0.182). In model 2, the path between positivity and internet addiction was not significant ($\beta = -0.07, p = > 0.05$; 90% BCa = -0.24, 0.09). To determine which model is more effective to explain the mediation role of depression, model 1 (Fig. 1a) and model 2 (Fig. 1b) were compared. It was decided that model 1 was more effective than model 2, though model 2 had higher values. In other words, depression fully mediated the relationship between positivity and internet addiction (Fig. 2a).

Model 3 (Fig. 1c) and model 4 (Fig. 1d) were tested to determine the mediation role of positivity in the relationship between anxiety and internet addiction. The full mediation model (model 3) with the three endogenous latent variables was significant: $\chi^2_{(df=18, N=380)} = 23.90, p > .05$; $\chi^2/df = 1.32$, $CFI = 0.99$, $TLI = 0.99$, $GFI = 0.98$, $NFI = 0.96$; $RMSEA = 0.029$ 90% BCa (0.001, 0.058); $SRMR = 0.042$; $AIC = 59.90$, $ECVI = 0.158$ 90%BCa (0.142, 0.203). The alternative mediation model (partial mediation, model 4) was also significant: $\chi^2_{(df=17, N=380)} = 15.65, p > .05$; $\chi^2/df = 0.91$, $CFI = 1.00$, $TLI = 1.00$, $GFI = 0.99$, $NFI = 0.97$; $RMSEA = < 0.001$ 90% BCa (< 0.001, 0.043); $SRMR = 0.024$; $AIC = 53.56$, $ECVI = 0.141$ 90%BCa (0.145, 0.176). Although the full mediation model (model 3, Fig. 1c) revealed acceptable fit, the alternative model (partial mediation, model 4, Fig. 1d) was a significantly better fit compared to the full mediation model. It was also seen that the AIC and ECVI values are lower in model 4 ($AIC = 53.56$, $ECVI = 0.141$) than in model 3 ($AIC = 55.90$, $ECVI = 0.158$). As a consequence of these results, anxiety was selected as having a partial mediation role in the relationship between positivity and internet addiction (Fig. 2b).

The same data analysis strategy was used again for stress. Again, the full mediation model without direct path from positivity to internet addiction (model 5, Fig. 1e) revealed inadequate fit: $\chi^2_{(df=18, N=380)} = 47.12, p < .001$; $\chi^2/df = 2.61$, $CFI = 0.95$, $TLI = 0.92$, $GFI = 0.96$, $NFI = 0.92$; $RMSEA = 0.065$ 90% BCa (0.043, 0.088); $SRMR = 0.055$; $AIC = 83.12$, $ECVI = 0.219$ 90%BCa (0.176, 0.283).

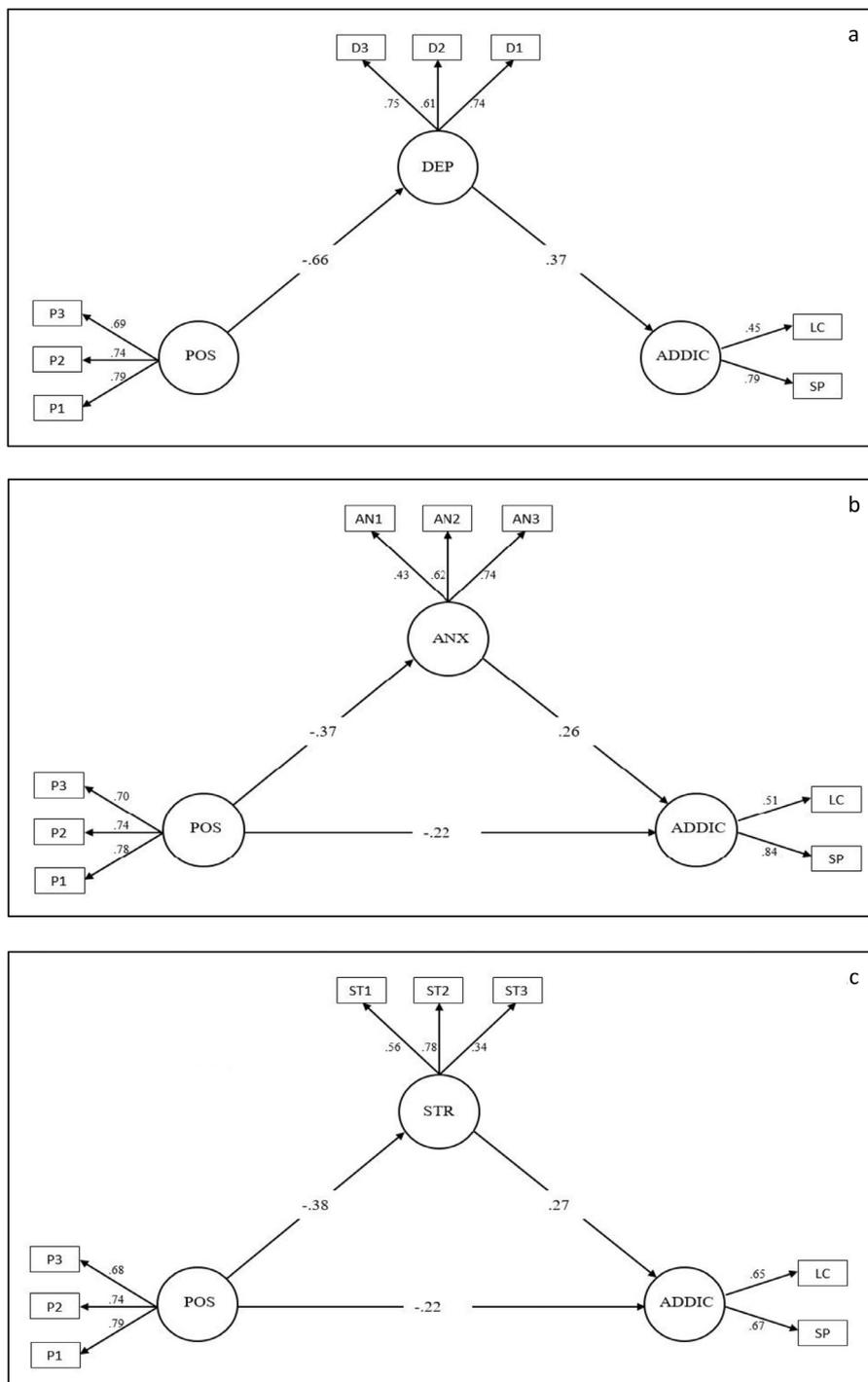


Fig. 2. Mediation models from POS to IA through depression, anxiety and stress. Note: POS = Positivity; ADDICT = Internet Addiction; DEP = Depression; ANX = Anxiety; STR = Stress; D1, D2, D3 = Parcels of Depression; AN1, AN2, AN3 = Parcels of Anxiety; ST1, ST2, ST3 = Parcels of Stress; P1, P2, P3 = Parcels of Positivity; LC = Loss of Control; SP: Social Problems.

The alternative model with a direct path from positivity to internet addiction (partial mediation, model 6, Fig. 1f) had more acceptable fit to the data: $\chi^2_{(df=17, N=380)} = 41.27, p < .001; \chi^2/df = 2.42, CFI = 0.96, TLI = 0.94, GFI = 0.97, NFI = 0.94; RMSEA = 0.061$ 90% BCa (0.038, 0.085); $SRMR = 0.041; AIC = 79.27, ECVI = 0.209$ 90% BCa (0.169, 0.269). It was also seen that the AIC and ECVI values are lower in model 6 ($AIC = 79.27, ECVI = 0.209$) than in model 5 ($AIC = 83.12, ECVI = 0.219$). As a consequence of these results, stress was chosen to have a partial mediation role in the relationship between stress and internet addiction (Table 2, Fig. 2c).

3.4. Bootstrapping

In the present study, 10,000 bootstrap samples with 95% bias-corrected confidence intervals were generated so as to gather certain estimates. Bootstrap estimates of indirect and direct effects were assessed by means of the bootstrapping process. In the present study, it was found that depression (fully mediated by positivity; $b = -0.24$ 95% BCa [-0.35, -0.15]), anxiety (partially mediated by positivity, $b = -0.15$ 95% BCa [-0.25, -0.08]) and stress (partially mediated by positivity, $b = -0.15$ 95% BCa [-0.24, -0.08]) have mediation roles

Table 2
Direct and indirect effects of among latent variables.

MV*	Model pathways	Effect	95% BCa (10,000 bootstraps)		S.E.	C.R.	p
			Lower	Upper			
DEP	Direct effect						
	POS→DEP	-0.66	-0.73	-0.57	0.05	8.93	<.001
	DEP→ADDICT	0.37	0.22	0.50	0.17	2.77	.005
	Indirect Effect						
	POS→DEP→ADDICT	-0.24	-0.35	-0.15	-	-	-
ANX	Direct effect						
	POS→ANX	-0.37	-0.49	-0.24	0.02	4.28	<.001
	ANX→ADDICT	0.26	0.12	0.42	0.40	2.51	.012
	POS→ADDICT	-0.22	-0.39	-0.11	0.10	2.43	.015
	Indirect Effect						
	POS→ANX→ADDICT	-0.15	-0.25	-0.08	-	-	-
STR	Direct effect						
	POS→STR	-0.38	-0.49	-0.26	0.03	4.75	<.001
	STR→ADDICT	0.27	0.05	0.44	0.38	2.89	.004
	POS→ADDICT	-0.22	-0.39	-0.03	0.13	2.59	.009
	Indirect Effect						
	POS→STR→ADDICT	-0.15	-0.24	-0.08	-	-	-

Note: POS: Positivity, DEP: Depression, ANX: Anxiety, STR: Stress, Addict: Internet Addiction.

* MV: Mediator variables.

in the relationship between positivity and internet addiction.

3.5. Alternative models

Because of the cross-sectional nature of data, alternative models (four models) including associations among study variables were developed and tested (see Table 3). To determine which model shows best fit, the Akaike's Information Criterion (AIC) and Expected Cross-Validation Index (ECVI) were used (Burnham and Anderson, 2004). In the determination process, the rule that the lower the AIC and ECVI the better the model was followed. When alternative models were tested, it was assumed that the hypothesized models reveal the lowest values in AIC and ECVI. As shown in Table 3, alternative models did not show better fit than the hypothesized models.

4. Discussion

While efforts have been made to determine the psychopathological causes of internet addiction, some researchers tend to investigate the effects of internet addiction on psychopathology (Chou et al., 2017; Gholamian et al., 2017; Lu et al., 2017). In these studies, traditional psychology approach focusing on psychopathology has been embraced. As the relationship between internet addiction and positive psychology components is investigated, only the positive psychology approach is adopted. This study combines positive emotional components and their explanatory role on psychopathology and internet addiction. Therefore, the main aim of the present study was to examine the mediation role of general distress (depression, anxiety and stress) in the relationship between positivity and internet addiction. This is the first study to

Table 3
Indices of alternative models.

Model	Pathways	χ^2/df	CFI	TLI	RMSEA[90% Bca]	SRMR	AIC	ECVI
Alt. Mod. 1	POS→DEP→ANX→STR→ADDICT	2.78	0.90	0.88	0.069[0.057, 0.080]	0.061	265.01	.69
Alt. Mod. 2	POS→DEP→ANX→ADDICT	2.23	0.94	0.92	0.057[0.041, 0.073]	0.055	141.10	.37
Alt. Mod. 3	POS→DEP→STR→ADDICT	3.12	0.92	0.89	0.075[0.060, 0.090]	0.060	175.70	.46
Alt. Mod. 4	POS→ANX→STR→ADDICT	2.05	0.95	0.93	0.053[0.036, 0.069]	0.043	134.26	.35
Alt. Mod. 5	DEP→POS→ADDICT	1.64	0.98	0.97	0.049[0.001, 0.006]	0.044	65.52	.17
Alt. Mod.6	ANX→POS→ADDICT	1.47	0.98	0.97	0.045[0.001, 0.006]	0.051	62.56	.17
Alt. Mod.7	STR→POS→ADDICT	2.70	0.95	0.92	0.069[0.041, 0.089]	0.049	57.78	.22

Note. POS: Positivity, DEP: Depression, ANX: Anxiety, STR: Stress, ADDICT: Internet Addiction

explore the associations among positivity, general distress and internet addiction. To achieve the research aims two hypotheses were tested. The results obtained in the research confirm the hypothesis 1, that is, positivity is significantly associated with internet addiction. In the associations between positivity and internet addiction, general distress was mediator so that hypothesis 2 was confirmed.

The results of the present study revealed that positivity was directly related to internet addiction and indirectly related to internet addiction through anxiety and stress. In other words, the association between positivity and internet addiction was partially mediated by anxiety and stress. Within the scope of the current study, the mediating effect of depression in the relationship between positivity and internet addiction was also examined. As a result of mediation analysis, depression mediated the relationship between positivity and internet addiction. Some possible processes underlying the mediation effect of general distress in the relationship between positivity and internet addiction are discussed below.

The association between positivity and internet addiction was fully mediated by depression and partially mediated by anxiety and stress. In other words, positivity had a negative indirect effect on internet addiction through depression, whereas there were direct effects in the relationship between positivity and internet addiction via anxiety and stress as mediators. These results indicate that positivity with mediators (depression, anxiety, and stress) may have diverse effects on internet addiction. Additionally, these results may be interpreted as showing that the increase in the level of positivity ensures a decrease in the level of anxiety and stress, and also positivity directly predicts internet addiction. As for depression, the increase in the level of positivity enables a decrease in the level of depression which allows for a decrease in internet addiction. These results include the interaction of psychopathology and positive feelings. Historically, it was accepted that negative emotions caused in psychopathology in human functioning (Berrios, 1996). Similarly, the lack of positive emotions including positive mood states resulted in psychopathology. Several empirical studies revealed that the lack of positive emotions is related to psychopathological symptoms such as depression (Carl et al., 2017), anxiety (Blanco and Joormann, 2017), schizophrenia (Watson and Naragon-Gainey, 2010), etc.

Moreover, psychopathology is very common among the general population (Wittchen et al., 2011). Fuller-Thomson et al., (2016) stated that focusing on positive functioning may be the newest and most worthy way to comprehend the structure of psychopathology. Similarly, Vazquez (2017) hypothesized that in psychopathology-focused studies, recovery does not always occur with the symptoms remaining. There is an impressive study that shows the effects of positive emotions on the recovery from psychopathology. According to this study, doctors focus on symptoms for recovery, while the patients focus on being satisfied with life and themselves (Demyttenaere et al., 2015). Generally, it was supposed that the tendency of POS has a key role in developing and utilizing positive emotions. Positivity, the main determinant of subjective well-being, is a tendency to assess all aspects of life that are already positive (Diener et al., 2000). In this context, it was assumed that positivity has several mechanisms to get rid of negative emotions

and psychopathology. A recent study showed that the positive emotion regulation process had a therapeutic structure to decrease depression and anxiety symptoms (Carl et al., 2017).

In the literature, there is a consensus on the negative significant relationship between subjective well-being (SWB) and internet addiction (Ferrara et al., 2017; Lai et al., 2015; Yu and Shek, 2017). In these studies, it is still a topic of debate as to which variable (subjective well-being or internet addiction) is determinative. In the present study, it was hypothesized that psychopathology caused internet addiction. People lacking positivity, which may lead to general distress, might feel themselves vulnerable to general distress and then use the internet in order to get rid of negative emotions. That is to say that internet may be a way in which an individual with dysfunctional attitudes and cognitive distortions may escape having to cope with negative emotions (Caplan, 2003). Given the generalized internet addiction model, it is well known that psychopathology, such as depression, anxiety and stress (general distress), may be considered potential predisposing factors in the development and maintenance of internet addiction. With regard to the generalized internet addiction model, maladaptive and negative emotions cause the emergence of internet addiction. In the present study, general distress can be assessed as maladaptive and negative emotions. Furthermore, the negative association between general distress and internet addiction and the indirect effects of positivity on internet addiction through general distress may indicate that general distress has a mechanism which leads to addictive internet use or prevents internet addiction. A study examining the mediation effects of mental health problems including depression and anxiety on internet addiction considered mental health problems as predisposing variables of internet addiction (Chou et al., 2017). Similarly, Lu et al., (2017) stated that mental health disorders may be effective on internet addiction. The results of the present study are in line with the previous research. Individuals with psychopathological disorders might be prone to use the internet (Wu et al., 2016). Because of the nature of psychopathology involving maladaptive and negative emotions (Lu et al., 2017), irrational cognitions (Blanco and Joormann, 2017), and the lack of social skills (Chou et al., 2017), individuals with depression, anxiety, etc. may prefer online experiences rather than face to face interactions (Caplan, 2003). It seems clear that general distress is one of the highest indicators of the emergence of internet addiction. As a result of the present study, it was assumed that an attempt to increase the level of positivity may lead to a decrease in general distress. In this phase, the reinforcement process may be considered in the emergence of internet addiction. It was assumed that an individual with psychopathology cannot actuate the positive reinforcement process which prevents them from excessive use of the internet. Therefore, they may be potential internet addicts. Lai et al., (2015) proposed and tested a hypothesis suggesting that general distress interferes with positive cognitions which enables the self-regulation process. The self-regulation process is a crucial factor in the positive reinforcement process that is a preventive cognitive structure against internet addiction. Hence, if individuals lose their self-regulation ability due to general distress, the positive reinforcement process may not work effectively; at least it may not be sufficient for them to be an internet addicts. Briefly, it was determined that positivity has a latent structure to reduce the level of general distress and internet addiction by means of significant effects of positive reinforcement and the control process.

4.1. Limitations and practical implications

This cross-sectional study has some limitations that should be addressed. First, to achieve the research hypothesis, the mediation analysis using structural equation modelling was conducted with cross-sectional data. The research design of the present study limited the causal associations among positivity, general distress and internet addiction. Second, due to the current structure of the study design and results, it is impossible to explore the maintenance and associations of

the variables (positivity, general distress, internet addiction) over a period of time. To determine the long-term effect of general distress in the relationship between positivity and internet addiction, conducting future research with longitudinal and experimental design will enable researchers to investigate the change caused by positivity in internet addiction with general distress in greater detail. Third, because of the fact that the sampling was designed using the convenience sample approach, the results of the current study should not be generalized. Future research conducted with diverse samples would be effective in explaining the mechanism of the study variables, particularly how reinforcement processes are affected by general distress and positivity, and would contribute to the external validity of the present results. Fourth, the indicators of general distress (depression, anxiety, and stress) emerged as significant mediators which accounts for the negative relationship between positivity and internet addiction. Diverse mediation models with different variables are needed to fully comprehend the underlying mechanism between positivity and internet addiction. Fifth, the sample of present study was not balanced in accordance with grade level. The last limitation is that the present study was completed in accordance with the quantitative approach and the data were collected exclusively using self-reported measures. Self-reported measure may have several limitations. One of the limitations is response bias. Although the consent form has been signed by the participants, some of the respondents may not be volunteer for the research and respond sincerely. The other limitation is social desirability. Some participants may reflect themselves as someone else. Extreme and midpoint response style are among the other limitations. Future research conducted with different research approaches would clarify the reflections of positivity on general distress and internet addiction. Internet addiction is seen as a serious situation in the clinical setting. The results of present study suggest that decreases in the level of well-being may be related to the negative reinforcement processes that cause internet addiction. Therefore, psychologists can focus on increasing the levels of positivity and decreasing general distress while struggling with cognitions that lead individuals to use unhealthy internet. Eventually, internet addiction is a general structure consisting of different addictive online behaviours. Since the measure used in this study cannot evaluate different online behaviours, future studies should be conducted with different specific addictive online behaviours so as to understand the associations among study variables.

5. Conclusions

The present study demonstrated the negative association between positivity and internet addiction, as well as the mediating effect of general distress between them. Anxiety and stress were considered partial mediators, whereas the association between positivity and internet addiction was fully mediated by depression. It is clear that future attempts are needed to understand how depression regulates internet addiction. It is assumed that research in social sciences cannot reach its ultimate aim unless it can be included in real life. In other words, it is expected that the present research should present instructive methods to cope with internet addiction. For experts and practitioners in internet addiction, it is recommended that future studies should be conducted with respect to the dimensions of positive psychology, which will increase positive moods and emotions of internet addicts. While these studies are conducted, the necessary importance should be given to positive emotions and moods, which influence control and reinforcement processes that play a crucial role in the development and maintenance of internet addiction. The most risky groups in terms of internet addiction are adolescents aged 12–18 (Kaltiala-Heino et al., 2004). Psychotherapy programs should be organized by experts especially considering the effects of mood states on internet addiction among adolescents. In this phase, the experts should develop their skills by attending courses focused on addiction and internet addiction.

Compliance with ethical standards

Conflict of interest

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Ethical approval

All procedures performed in studies involving human participants 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.

Supplementary materials

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