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ORIGINAL ARTICLE

Internet Addiction and Aggression: The Mediating Roles of Self-Control and Positive Affect

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Abstract
Internet addiction has been associated with increased engagement in aggressive behavior, although the individual characteristics that may elevate the risk for these problematic behaviors are unknown. The current study investigated whether self-control and subjective well-being (indexed by positive and negative affect) mediated the association between Internet addiction and aggression among a sample of 284 Israeli-Palestinian students attending grades 9–12 across ten state schools in Israel. Internet addiction was positively associated with aggressive behaviors ($r = 0.33$, $p < 0.01$) but negatively associated with self-control ($r = -0.34$, $p < 0.01$) and positive affect ($r = -0.36$, $p < 0.01$). Similarly, aggressive behaviors were negatively related to self-control ($r = -0.38$, $p < 0.01$) and positive affect ($r = -0.34$, $p < 0.01$). Notably, self-control and positive affect each mediated the positive association between Internet addiction and aggressive behavior, with self-control and positive affect being protective factors. Thus, the current findings provide theoretical insight into individual characteristics that may exacerbate an individual's risk for problematic behavior and may encourage intervention approaches to target key skills (e.g., self-control) among adolescents who may be prone to addictive or aggressive behaviors.

Keywords Internet addiction · Aggression · Self-control · Positive affect

The Internet has become integrated into modern life in terms of both professional responsibilities (e.g., email) and personal enjoyment (e.g., gaming). In 2013, 45% of individuals across 21 emerging and developing countries, including the United States and Canada, major Western European countries, developed countries in Asia-Pacific (Australia, Japan, and South Korea), and Israel (Poushter 2016), reported using the Internet. Recent studies have also estimated that 65.4 million Arab individuals use the Internet, which also represents a significant increase within the past decade (Khazaal et al. 2011; Upadhyay et al. 2017). Increased Internet

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accessibility has been associated with an addictive presentation for some individuals (Cheng and Li 2014). Internet addiction has been defined as an excessive, compulsive, and uncontrollable use of the Internet which causes significant distress and impairments in daily functioning (Kalaitzaki and Birtchnell 2014).

Internet addiction has been related to a number of psychological impairments among adolescents, such as anxiety (Azher et al. 2014), depression (Yao et al. 2014), decreased cognitive ability (Jorgenson et al. 2016), greater delinquency (Tsai et al. 2009), and lower levels of well-being and life satisfaction (Van den Eijnden et al. 2008). One of the most concerning associations with Internet addiction is aggression (Kim 2013; Kumar and Singh 2014; Liu et al. 2011). However, it is unclear why Internet addiction may be related to increased aggression, and this association warrants empirical investigation. Thus, the current study examines possible mediators that may contribute to this association in a high-risk sample.

Internet Addiction

Internet addiction broadly describes excessive or poorly controlled preoccupations, urges, and behaviors related to Internet use, leading to impairment or distress (Shaw and Black 2008). The detrimental consequences of Internet addiction may be especially relevant in adolescents and young adults, as greater exposure to the Internet has been associated with identity formation, brain development, academic achievement, social skills, emotion regulation, and symptoms of depression, anxiety, and hostility (Stavropoulos et al. 2017). Theoretical models of Internet addiction may also explain why adolescents and young adults may be at higher risk for developing Internet addiction. According to Davis (2001), an individual may be at greater risk for Internet addiction based on distal (e.g., pre-existing psychopathology) and proximal (e.g., negative cognitions that reinforce compulsive use) factors (Griffiths et al. 2016), both of which would be developing during adolescence. Another theoretical model is the displacement theory, which posits that compulsive engagement with social network platforms on the Internet, which are especially popular among adolescents, prevents individuals from participating in real-life social interactions and negatively impacts the person's well-being (Ostovar et al. 2016).

In order to evaluate the scope of this problem, meta-analyses have been carried out to estimate the global prevalence of Internet addiction and to determine high-risk demographic groups. Cheng and Li (2014) examined 80 studies across 31 countries and found that the global prevalence of Internet addiction was 6.0%, and the highest rate was in the Middle East (10.9%). This prevalence is comparable to the high rates of Internet addiction that have been reported among individuals from Southeast Asian countries (13.6%) (Fumero et al. 2018). However, while prior research has examined risk factors for Internet addiction among Southeast Asian samples (for a review, see Koo and Kwon 2014), risk factors have not been clearly delineated in Middle Eastern individuals.

The prevalence of and risk factors for Internet addiction may be particularly important to examine among adolescents and young adults living in Middle Eastern countries. For instance, 40% of university students in Jordan and 17.6% of Qatar adolescents met the criteria for Internet addiction (Al-Gamal et al. 2016; Bener and Bhugra 2013). As a comparison, rates of Internet addiction among various countries in Asia have been estimated between 2% and 18% (Pontes et al. 2015), suggesting that those living in Middle Eastern countries have a particularly elevated prevalence of Internet addiction. Thus, this population represents a high-risk group that necessitates specific investigation.

Internet Addiction and Aggression

Aggression has historically been defined in numerous ways to include acts of physical, emotional, and sexual violence (Bandura 1973; Volavka 2002). The current study adopts Buss and Perry's (1992) definition of aggression, i.e., physical violence as behavior linked to hostile thoughts, misconceptions, and negative feelings (Bandura et al. 2001), as this conceptualization emphasizes the physical acts of violence that have been most frequently studied with respect to their relationship with Internet addiction. For instance, Kim (2013) found that the frequency of Internet use and severity of Internet addiction were related to increased scores on a measure of aggression. This finding was supported in a meta-analysis of prior research among Korean individuals (Koo and Kwon 2014). Further, adolescents who met the phenotype for Internet addiction seemed to exhibit more aggressive dispositions, compared with those without Internet addiction (Lim et al. 2015; Munteanu et al. 2009).

The influence of mass media has been closely associated with adolescent violence (Browne and Hamilton-Giachritsis 2005), such that media violence viewing has been repeatedly related to increased aggressive behavior (Cantor 2000). The increased presence and use of modern technologies such as the Internet allows for both passive viewing of violence and active participation, such as when playing video games. Violent video games have also been reported to negatively impact social and emotional functioning in adolescents (Bushman and Anderson 2001). The general aggression model posits that both personal characteristics and situational variables contribute to the individual's internal state of aggression and influence whether that person acts in an aggressive manner (Anderson and Bushman 2002).

The Internet represents a saturated means for observing violence, akin to video games. In contrast to acting as simulated characters in video games, Internet users usually interact with other people in a chat room or through interactive online gaming, which is a more interpersonal interaction that may be an outlet for aggressive behavior. Adolescents may be at especially high risk for engaging in violence on the Internet, as there are few restrictions on their access. In addition, youth have become a valuable target of the commercial market (Montgomery 2000). Internet technologies and activities are increasingly designed to attract adolescents. Thus, understanding how the Internet influences aggressive behavior in adolescents is important in order to revise or develop preventive strategies for adolescent violence and Internet addiction.

Further, it is unknown whether certain individual characteristics may explain this association, such that these traits may simultaneously predispose a person to be more likely to engage in compulsive Internet use and be aggressive. In prior research, greater self-control and positive affect have both been found to be protective factors against a broad array of risky behaviors, including Internet addiction (Agbaria et al. 2017) and aggression (Agbaria 2014a, b; Agbaria and Daher 2015; Agbaria et al. 2012). Thus, these features may be mediators in the relationship between Internet addiction and aggression.

Self-Control

Self-control can reflect one's ability to delay or abstain from an immediately rewarding behavior in favor of a behavior that is consistent with one's long-term goals (Thoresen and Mahoney 1974). Rosenbaum (1998) describes self-control as a system of goal-oriented cognitive skills that enable people to achieve their objectives, manage negative thoughts and

emotions, delay gratification, and cope with stressful situations. Self-control has been associated with greater problem-solving and cognitive processing skills in children, as well as less aggressive behaviors (Blair et al. 2004; Gyurak and Ayduk 2008; Weisbrod 2007). Broadly, self-control skills may be associated with more moderate thoughts and emotional states, which may contribute to positive well-being and decreased risk for aggression, anxiety, and other psychopathological symptoms (Agbaria et al. 2012).

With respect to the current study population of Arab young adults living in Israel, a recent study demonstrated that self-control was a protective factor against aggression among Arab adolescents (Agbaria and Natur 2018). Within this population, higher levels of self-control have been associated with a constellation of positive outcomes, including diminished risk of addictive behaviors (e.g., alcohol, smoking, and drug use) (Agbaria et al. 2017), greater success in social relationships, more adaptive emotional responses to stressful situations, less self-reported psychopathology (Agbaria 2013; Agbaria 2014a, b; Agbaria and Daher 2015; Agbaria et al. 2012; Hamama et al. 2008; Walter et al. 2010), better psychological and social adjustment (Agbaria 2019), and higher subjective well-being (Agbaria et al. 2012). Recent studies have also demonstrated a negative relationship between self-control and Internet addiction (Ismail and Zawahreh 2017; Shirinkam et al. 2016).

Notably, several studies have examined the nature of the relationships between Internet addiction, aggression, and self-control in an array of demographic samples. While some studies showed a direct relationship between aggression and facets of Internet addiction (e.g., video game addiction) (Madran and Çakılcı 2014) or between Internet addiction and low self-control (Meerkerk et al. 2010; Reed et al. 2015), other studies demonstrated a more complex relationship. Do and Lee (2011) provided preliminary evidence that Internet addiction was indirectly related to aggression among adolescents, and suggested that self-control was a relevant mediator. Teng et al. 2014 further found that aggression was directly related to Internet addiction, and this relationship was also mediated by low self-control. However, it is unknown how these associations may be manifested among Arab young adults living in Israel, which is one novel focus of the present work.

Positive and Negative Affect

Another individual characteristic that may relate to the association between Internet addiction and aggression is one's experience of positive and negative affect, which contributes to subjective well-being. Subjective well-being includes elements such as happiness and life satisfaction and encompasses both cognitive and emotional domains (Diener 1984; Veenhoven 1991). Positive and negative affect are key contributors to the emotional domain of subjective well-being, as individuals subconsciously evaluate the balance between experiencing good and bad feelings on a continuous basis (Myers and Diener 1995), with well-being perceived to be higher when positive affect outweighs negative affect (Bender 1997).

Numerous studies have demonstrated that increased experience of positive affect is associated with higher self-control and lower engagement in risky, addictive behaviors (Agbaria et al. 2017; Aspinwall 1998; Isen and Reeve 2005) and aggressive behavior (Agbaria 2013; Agbaria and Natur 2018; Agbaria and Natur 2018). Notably, subjective well-being, reflecting a greater experience of positive versus negative affect, has been related to lower risk of Internet addiction (Mei et al. 2016; Nie et al. 2017; Odacı and Çıkrıkçı 2014; Suresh et al. 2018). Conversely, a meta-analysis by Tokunaga (2017) demonstrated that facets of negative affect

(e.g., depression, loneliness) were associated with elevated risk of Internet addiction. Interestingly, Afroz (2016) observed that Internet addiction may negatively impact the subjective well-being of students, whereas another study of university students revealed that negative affect predicted a greater likelihood of Internet addiction (Koç 2017), which may suggest a reciprocal causal relationship between Internet addiction and subjective well-being.

Several theoretical models have provided insight into why the experience of increased positive and decreased negative affect may reduce the likelihood of engagement in risky or addictive behaviors. For instance, Waters (2006) reiterated that risk-related decision-making relies more heavily on subjective influences (e.g., one's emotions) than on objective facts related to a particular situation. The broad effects of positive and negative affect on risk behaviors (for a review see Isen 2000) have been nuanced in recent research through examination of the differential effects of specific discrete emotions, such as fear, anger, or happiness (Lerner and Keltner 2001). The Appraisal Tendency Framework (ATF; Han et al. 2007; Lerner and Keltner 2000, 2001) proposed a general theoretical model describing emotion-specific impacts on decision-making.

The ATF posits that each emotion is characterized by a unique appraisal pattern on central appraisal dimensions (e.g., pleasantness, certainty, control) (Smith and Ellsworth 1985) and assumes that discrete emotions activate a cognitive predisposition to appraise future events in line with the central appraisal dimensions that triggered the emotion (Lerner and Keltner 2000). This cognitive predisposition for future appraisals is called appraisal tendency and reflects the carryover effects by which emotions influence subsequent judgments and decision-making. Decision-making can be particularly reinforced when the emotion's central appraisal content is thematically linked to the decision-making topic (Lerner and Keltner 2001). In the context of risk-related decision-making, the appraisal dimensions of (1) certainty and (2) control are thought to be particularly influential, as high appraisals of these dimensions have been related to negative affect (Lerner and Keltner 2000). Lazarus (1991) suggested that this pattern of appraisal may not only increase an adolescent's predisposition from increased negative affect, but also generate maladaptive coping responses, such as aggressive behaviors.

The Current Study

The current study examines the role of individual characteristics (self-control and positive/negative affect) that may mediate the relationship between Internet addiction and aggression. Based on prior research, four study hypotheses were defined: (1) Internet addiction will be negatively associated with self-control and positive affect; (2) aggressive behavior will be negatively associated with self-control and positive affect; (3) self-control will mediate the association between Internet addiction and aggressive behavior; and (4) positive affect will mediate the association between Internet addiction and aggressive behavior (Fig. 1).

This study focuses on the unique population of Israeli-Palestinian adolescents, who may represent a high-risk sample for exhibiting Internet addiction given the elevated prevalence among Middle Eastern countries (Al-Gamal et al. 2016; Bener and Bhugra 2013). Further, this sample may face significant developmental challenges that may increase vulnerability for diminished self-control and subjective well-being. Specifically, Israeli-Palestinian students live in a state that defines itself as a Jewish state, and they exist within the spectrum of Israelization and Palestinization, which are often contradictory processes. These individuals seem to be at greater risk for a multitude of vulnerabilities, such as depression (Agbaria 2014a, b),

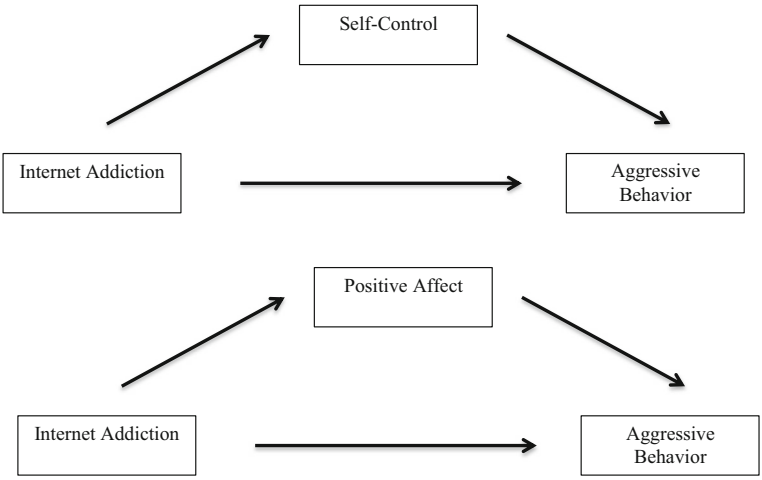

Fig. 1 Hypothesized mediation models

aggression (Agbaria 2013; Agbaria and Daher 2015), test anxiety (Agbaria and Bdier 2019a, b), lower levels of personal and social adjustment (Agbaria 2019), and higher levels of risky behaviors (Agbaria et al. 2017). As such, this population warrants specific attention to explore individual characteristics that may explain the relationship between Internet addiction and aggression, as this may inform interventional efforts for this high-risk population.

Methodology

Participants

The study was approved by the Chief Scientist from the Ministry of Education. Data were collected in adherence to regulations according to detailed instructions in the APA Edition VI (2006). A parental consent form was initially distributed to potential participants, and 95% of distributed forms were signed and returned. The questionnaires were distributed in classrooms by the researchers, and data were collected anonymously with no identifying information. After the purpose of the study was explained to the participants, responses were collected and stored. All participants received Arab-language questionnaires.

Arab adolescents ($n = 284$) in grades 9–12 (47.3% male, 52.7% female) were recruited through convenience sampling techniques from ten state schools in Israel. The breakdown by grade was as follows: 22.2% of the participants were from ninth grade, 28.1% from tenth grade, 24.8% from eleventh grade, and 24.9% from twelfth grade. The sample population identified as Muslim, mostly defined as traditional (Dwairy 1998), and the majority of individuals were living at a lower-than-average socioeconomic status between the second and fourth decile (Central Bureau of Statistics, 2013a, Table B1).

Measures

Each of the measures was translated from English and Hebrew into Arabic and pilot-tested by five Arab professional experts in psychology, counseling, Arabic language, and education.

They evaluated the clarity and relevance of the questions and translation that was done by the researchers and with the help of the professional experts. After completion of the translated draft of the questionnaires, the questionnaires were back-translated into English by an independent expert in translation. The translated version was then pilot-tested among 20 students and further refined for clarity according to their comments. The content of all instruments used in the study was validated by Arab scholars and used previously in other published studies. None of the questions on any of the measures were altered for content.

Personal Details Questionnaire This questionnaire consisted of questions that asked about the participant's personal and family background, grade, gender, and date of birth.

Internet Addiction Questionnaire The 20-item Internet Addiction Test (IAT) was developed by Young (1998). It measures characteristics and behaviors associated with compulsive use of the Internet that include compulsivity, escapism, and dependency. Questions also assess problems related to personal, occupational, and social functioning stemming from Internet use. Participant responses to each statement are based on a Likert scale ranging from 1 and 5 to indicate the extent to which they endorse that particular behavior. The IAT conceptualizes Internet addiction as an impulse-control disorder, and uses the term "Internet" to refer to all types of online activity. The IAT is the most widely used Internet addiction scale in the world and has been translated into several languages including English, Chinese, French, Italian, Turkish, and Korean. In a previous study in an Arab population, a Cronbach's alpha of $\alpha = 0.81$ was reported (Agbaria and Bdier 2019a, b). In order to test validity and reliability coefficients, content validity was assessed by specialists in psychology, and all the items of the scale were accepted. All the items loaded in factor analysis >0.40, with Cronbach's alpha value $\alpha = 0.89$.

Positive and Negative Affect Schedule for Children – PANAS-C Questionnaire This questionnaire was developed by Watson et al. (1988), and it was adapted for children and adolescents by Laurent et al. (1999). The questionnaire includes ten items for self-characterization describing positive feelings (happy, calm, without fear, etc.) and ten items for self-characterization describing negative feelings (sad, nervous, guilty, etc.). Each participant was asked to evaluate to what extent they had experienced these feelings over the past 2 weeks, on a five-level Likert scale ranging from "very little" (1) to "very much" (5). Scoring reflected two composite scores summing the questions for positive and negative affect separately. Internal consistency for positive affect ($\alpha = 0.84$) and negative affect ($\alpha = 0.74$) was good (Ronen and Seeman 2007). In a previous study of Arab adolescents (Agbaria et al. 2012), good internal consistency for both composite scores was also observed ($\alpha = 0.79$ for both). In order to test validity and reliability coefficients, all the items loaded in factor analysis >0.40. All of the negative affect items were reverse-scored, and the total score yielded a Cronbach's alpha of 0.77.

Adolescents Self-Control Scale The questionnaire was originally developed by Rosenbaum (1980) with the objective of measuring individual differences in skills of self-control. The questionnaire was adapted for children and adolescents by Rosenbaum and Ronen (1991) and includes 32 items expressing different parameters in self-control skills, including delay of gratification, overcoming pain, planning abilities, and use of independent instructions. Participants were asked to evaluate each of the items on a six-point Likert scale from 1 (very uncharacteristic of me) to 6 (very characteristic of me). Example items were: "I frequently find it difficult to overcome my anger on my own" and "I cannot stop thinking about mistakes I committed in the past." Internal consistency

was found to be good among adults and adolescents ($\alpha = 0.87$) (Rosenbaum 1998) and acceptable among children ($\alpha = 0.69$). In a previous study of Arab adolescents, internal consistency was good ($\alpha = 0.78$) (Agbaria and Daher 2015). In order to test validity and reliability coefficients, all the items loaded in factor analysis >0.40. All of the negative affect items were reverse-scored, and the total score yielded a Cronbach's alpha of 0.78.

Aggression Questionnaire (AGQ) The AGQ was developed by Buss and Perry (1992) to evaluate different elements in adolescents' tendency to engage in aggressive behavior towards others. The questionnaire includes 28 items examining four elements of violence: physical violence (8 items), verbal violence (5 items), anger (7 items), and hostility (8 items). Example items were: "most of my friends say I like to argue and fight a lot" and "I break things when I am angry." Responses were based on a five-point Likert scale ranging from 1 (very much disagree) to 5 (very much agree). In a previous study of Arab adolescents, internal consistency was found to be good ($\alpha = 0.84$) (Agbaria and Daher 2015). In order to test validity and reliability coefficients, all the items loaded in factor analysis >0.40. All of the negative affect items were reverse-scored, and the total score yielded a Cronbach's alpha of 0.81.

Statistical Analysis

Descriptive statistics were examined for all study variables, and correlations between these variables were then tested (hypotheses 1 and 2). Hypotheses 3 and 4 were tested with a stepwise multiple regression model that specified gender and age as predictors of aggressive behavior (AGQ total score) in step 1, and self-control (adolescent self-control scale), positive affect (PANAS-PA) and Internet addiction (IAT total score) as independent variables in step 2. This regression technique was selected in order to understand the influence of each independent variable on aggression total scores while accounting for the associations of the others. The potential mediating roles of self-control and positive affect were examined by Sobel tests. Multicollinearity was assessed for variables in the regression model and was not found to be significant.

Results

Table 1 details the descriptive statistics of the study variables, and Table 2 illustrates the correlations between these variables.

Consistent with the first study hypothesis, the IAT total score correlated positively with the AGQ total score ($r = 0.33$, $p < 0.01$). In support of the second hypothesis, IAT total scores were negatively related to scores on the adolescent self-control scale ($r = -0.34$, $p < 0.01$) and PANAS-PA ($r = -0.34$, $p < 0.01$). Further, consistent with the third study hypothesis, AGQ total scores were negatively associated with scores on the adolescent self-control scale ($r = -0.38$, $p < 0.01$) and PANAS-PA ($r = -0.36$, $p < 0.01$).

Portions of the study hypotheses were also confirmed in the stepwise linear regression (Table 3). In support of part of the first study hypothesis, IAT total scores were positively related to AGQ total scores ($\beta = 0.22$, $p < 0.01$). Consistent with the second hypothesis, scores on the adolescent self-control scale were negatively associated with AGQ total scores ($\beta = -0.19$, $p < 0.01$). In support of the third study hypothesis, PANAS-PA was negatively associated with AGQ total scores ($\beta = -0.24$, $p < 0.01$).

Table 1 Descriptive statistics of study variables ($n = 284$)

Variable	Mean	SD	Median	Range	Reliability
Self-control	3.79	1.33	3.51	5	0.78
Aggression	2.21	1.24	2.33	4	0.81
Internet addiction	3.66	1.94	2.45	4	0.89
Positive affect	3.90	1.22	3.70	4	0.77

The fourth and fifth research hypotheses explored the mediating effects of self-control, positive affect, and negative affect in the association between Internet addiction and aggressive behavior. The method suggested by Baron and Kenny (1986) was used to evaluate mediation effects, which describes four conditions that need to be met in order to determine mediation:

1. Significant relationship between the initial IV and DV (X → Y)
2. Significant relationship between the initial IV and the mediator (X → m)
3. Significant relationship between the mediator and the DV in the presence of the IV (M/X → Y).
4. Insignificant relationship between the initial IV and DV in the presence of the mediator (X/M → Y)

The model was applied to each of the two mediating variables:

To provide a more formal assessment of mediation effects, Sobel's (1982) test was also conducted. This test assesses whether the indirect effect of the IV on the DV via the mediator is significantly different from zero.

Table 4 displays the results of the regression analysis and Sobel's test for mediation. In a model specifying IAT scores as the IV, positive affect as a mediator, and aggressive behavior as the DV, the standardized beta coefficient was less in Eq. 3 ($\beta = 0.22$) than in Eq. 2 ($\beta = 0.29$). Inspection of the results of Sobel's test ($Z = 2.51$, $p < 0.01$) confirms this finding and indicates that positive affect acted as a mediator between Internet addiction and aggressive behavior. In a model specifying IAT scores as the IV, self-control as a mediator, and aggressive behavior as a dependent variable, the standardized beta coefficient was less in Eq. 3 ($\beta = 0.17$) than in Eq. 2 ($\beta = 0.26$). Inspection of the result of Sobel's test ($Z = 2.71$, $p < 0.01$) confirms this finding and indicates that self-control acted as a mediator between Internet addiction and aggressive behavior. In sum, the results of the mediation analysis revealed that both positive affect and self-control emerged as mediators between Internet addiction and aggressive behavior. It is important to emphasize that social support and self-control emerged as partial rather than full mediators of the relationship

Table 2 Correlations among study variables ($n = 284$)

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Age	–					
(2) Gender	–	–				
(3) Aggression	0.07	−0.19*	–			
(4) Self-control	0.07	0.03	−0.38**	–		
(5) Positive affect	0.15	0.12	−0.34**	0.39**	–	
(6) Internet addiction	0.09	−0.17*	0.34**	−0.34**	−0.36**	–

*$p < 0.05$, **$p < 0.01$

Table 3 Stepwise regression model predicting aggressive behavior ($n = 284$)

	β (standardized coefficient)	B (unstandardized coefficient)	SE	Adjusted *R*-squared
Step 1				−0.001
Gender	−0.04	−0.05	0.11	
Age	0.08	0.04	0.07	
Step 2				0.38**
Positive affect	−0.24	−0.22**	0.10	
Self-control	−0.19	−0.17**	0.11	
Internet addiction	0.22	0.19**	0.10	

*$p < 0.05$, **$p < 0.01$

between positive affect and self-control. That is, the mediating variables reduced but did not eliminate the links between Internet addiction and aggressive behavior.

Discussion

The current work demonstrated that Internet addiction was related to increased aggressive behavior among Israeli-Palestinian adolescents and also revealed that self-control and positive affect were significant mediators that may contribute to the nature of this relationship. Broadly, the present research adds to prior findings among other populations in Israel and around the globe which have demonstrated that self-control and positive affect are protective factors for decreasing risky and addictive behaviors (Agbaria et al. 2017; Do and Lee 2011; Madran and Çakılcı 2014; Nie et al. 2017; Odacı and Çıkrıkçı 2014; Suresh et al. 2018; Teng et al. 2014)

Internet Addiction and Aggressive Behavior

Consistent with prior research (Kim 2013; Koo and Kwon 2014; Lim et al. 2015; Munteanu et al. 2009), there was a positive association between Internet addiction and greater engagement in aggressive behavior. This finding also aligns with previous studies demonstrating a general relationship between Internet addiction and an array of negative psychological outcomes (Cardak 2013; Goel et al. 2013; Koc 2011). The current work built upon prior literature

Table 4 Regression analysis for self-control and positive affects as mediators between Internet addiction and aggression

IV	Mediator	DV	Step 1	Step 2	Step 3	Δβ	Z
Internet addiction	Self-control	Aggression	$\Delta R^2 = 0.03^{**}$ $\beta = 0.24$	$\Delta R^2 = 0.04^{**}$ $\beta = 0.26$	$\Delta R^2 = 0.10^{**}$ $\beta = 0.17$	0.05	2.71**
Internet addiction	Positive affects	Aggression	$\Delta R^2 = 0.05^{**}$ $\beta = 0.28$	$\Delta R^2 = 0.05^{**}$ $\beta = 0.29$	$\Delta R^2 = 0.11^{**}$ $\beta = 0.22$	0.02	2.51**

Step 1: Mediator regressed on independent variable

Step 2: Dependent variable regressed on independent variable

Step 3: Dependent variable regressed on independent variable and mediator. β standardized beta coefficient; $\Delta\beta$ change in standardized beta from regression Eq. 2 to regression Eq. 3 (Baron and Kenny 1986). Z test of whether indirect effect of independent variable on dependent variable via mediator is significantly different from zero (Sobel 1982)

* $p < 0.05$, ** $p < 0.01$

(Fumero et al. 2018; Koo and Kwon 2014; Tokunaga 2017) to more closely examine individual characteristics (self-control and positive/negative affect) that may elucidate why Internet addiction has been closely related to greater aggression, but did so in a unique, high-risk population of Israeli-Palestinian adolescents.

Self-Control Skills

In agreement with the results of prior work (Agbaria 2014a, b; Agbaria et al. 2017; Ozden and Koksoy 2009; Stuart and Holtzworth-Munroe 2005), high levels of self-control skills were related to lower instances of aggressive behavior. Also consistent with previous research (Ismail and Zawahreh 2017; Shirinkam et al. 2016), high levels of self-control skills were associated with fewer indicators of Internet addiction. Importantly, consistent with prior work (Do and Lee 2011; Madran and Çakılcı 2014; Meerkerk et al. 2010; Reed et al. 2015; Teng et al. 2014), self-control skills were found to be a full mediator of the relationship between Internet addiction and aggressive behavior, suggesting that this is a key individual characteristic that may protect a person from developing Internet addiction.

One possible explanation for this finding may pertain to the manner in which self-control skills are utilized, such that adolescents who are more proficient in identifying negative automatic thoughts, using distractions, and finding alternative solutions are more likely to choose controlled, planned, adaptive, and less impulsive behavior. Another explanation could relate to Dodge's (1996) model of social information processing (Crick and Dodge 1996; Dodge and Coie 1987), which suggests that an individual's interpretation of social and internal cues is a key factor influencing the processing of information. Thus, those whose interpretations of environmental cues are consistent with self-control skills may be more likely to engage in controlled, adaptive behavior and less likely to participate in aggressive behavior. Broadly, it seems that self-control may be a key individual skill that protects against the development of both Internet addiction and aggressive behavior.

Positive Affect

The current findings replicated prior research showing a negative relationship among adolescents between positive affect with aggressive behavior (Agbaria 2013; Agbaria 2014a, b; Agbaria and Natur 2018; Farrell and Bruce 1997) and Internet addiction (Nie et al. 2017; Odacı and Çıkrıkçı 2014; Suresh et al. 2018). It may be that a greater experience of positive affect, such as one's inherent level of happiness, is beneficial for promoting flexible thinking in a manner that leads to more efficient problem-solving, self-control, thinking ahead, and caution in risky situations (Aspinwall 1998; Isen and Reeve 2005). In other words, positive feelings may contribute to less impulsive and more controlled and planned behavior. In addition, previous studies (Arsenio et al. 2000) have revealed that positive feelings reduce frustration and anxiety, which suggests that happy adolescents can more effectively cope with frustration through utilization of advanced social and interpersonal skills.

Positive affect was a full mediator for the relationship between Internet addiction and aggressive behavior. This finding aligns with previous studies in Israeli-Palestinian samples that have emphasized the importance of positive affect as a protective factor that may decrease negative psychological outcomes (Agbaria 2019; Agbaria and Bdier 2019a, b; Agbaria et al. 2017). One possible explanation for the mediating role of positive affect may pertain to the ATF, which posits that positive affect may decrease one's engagement in problematic behavior (e.g., compulsive Internet use, aggressive behavior) through high appraisals in the domains of certainty and control. Further,

according to Lazarus' (1991) theory of stress and coping, this problematic behavior may be reinforced over time, as these negative emotional states become triggers for future maladaptive responses (Carver and Harmon-Jones 2009; Lerner and Tiedens 2006). In contrast, individuals who interpret environmental cues in a manner consistent with positive affect may be less prone to experiencing problematic symptoms such as Internet addiction and aggressive behavior.

Limitations and Future Research

A number of factors limit the generalizability of this research, such as the fairly homogeneous nature of the current sample. Therefore, future work should include greater representation of more diverse religious and cultural groups. Further, the use of only self-report questionnaires may be subject to reporting bias and may also rely heavily on an individual's perception of their own self-control skills and emotional experience. In future studies, it may be helpful to supplement these self-reports with other sources of information, such as secondary reports from peers or parents. It may also be helpful to examine the potential mediating roles of other psychosocial factors in these relationships, given the number of comorbidities that may be present in this sample, such as depression (Agbaria 2014a, b), aggression (Agbaria 2013; Agbaria and Daher 2015), test anxiety (Agbaria and Bdier 2019a, b), lower levels of personal and social adjustment (Agbaria 2019), and higher levels of risky behaviors (Agbaria et al. 2017). In addition, the current research is cross-sectional, and thus conclusions cannot be drawn related to causality, including interpretations of mediation analysis. An ideal follow-up study to the present work would employ a longitudinal design to follow youth over time in order to understand the temporal associations between Internet addiction, aggressive behavior, self-control, and subjective well-being. Lastly, future research may consider evaluating whether psychosocial treatments targeting compulsive Internet use in prior studies (for a review, see Yeun and Han 2016) may also be efficacious for reducing Internet addiction among the current population of Israeli-Palestinian adolescents.

Summary

In conclusion, the current findings demonstrate that higher levels of self-control skills and subjective well-being (greater experience of positive versus negative affect) may mediate the link between Internet addiction and increased aggressive behavior among Israeli-Palestinian adolescents in Israel. The present work not only contributes to the theoretical understanding of key individual characteristics that may decrease one's risk of exhibiting compulsive Internet use and aggressive behavior, but also provides insights that may have practical implications. For instance, early intervention efforts for youth at risk for addictive or aggressive behavior may target the development of self-control skills and promote strategies that may increase subjective well-being (e.g., coping with negative affect).

Compliance with Ethical Standards

Conflict of Interest There are no conflicts of interest.

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