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Pathways to sex addiction: Relationships with adverse childhood experience, attachment, narcissism, self-compassion and motivation in a gender-balanced sample

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**Pathways to Sex Addiction: Relationships with Adverse Childhood Experience,
Attachment, Narcissism, Self-Compassion and Motivation in a Gender-Balanced
Sample**

Reference

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Abstract

Research about sex addiction and its relationships with other constructs remains unexplored. We recruited a gender-balanced sample (53 men, 51 women) who responded to measures of sex addiction, adverse childhood experience, adult attachment, narcissism, self-compassion and motivation. Sex addiction was found to be statistically significantly associated with these constructs. Anxious attachment statistically significantly mediated the relationship between adverse childhood experience and sex addiction and the relationship between narcissism and sex addiction. Self-compassion did not statistically significantly moderate the relationship between anxious attachment and sex addiction. Therapeutic approaches targeting attachment and narcissism such as relation-based or mindfulness-based interventions are recommended.

Keywords: attachment, narcissism, adverse childhood experience, self-compassion, motivation

Introduction

Although a scientific definition for sex addiction is open to debate (Karila et al., 2014), it is generally accepted that sex addiction is a manifestation of a neurological disorder. This disorder is characterised by acute sexually arousing fantasies, urges or behaviours that persist over a period of at least six months, causing distress and impairment in the professional, social, and personal life of the individual, despite repeated attempts to cut back or stop (American Society of Addiction Medicine, 2011; Stein, Black & Pienaar, 2000). Although sex addiction is not currently recognised as a diagnosable disorder in the current psychiatric taxonomy, in its basic form, compulsive sexual behaviour is recognised as a mental health disorder, listed in the International Classification of Diseases 11th Revision (ICD-11), a global standard for diagnosis created by the World Health Organization (Grant et al., 2014). The diagnosis of this mental health disorder is not negligible. While prevalence varies due to different definitions, it is estimated around 10% of adult population currently suffer from this disorder (Andreassen et al., 2018; Carnes, 1991; Cooper, Delmonico & Burg, 2000), which was boosted by the advent of the internet (3-5% in the pre-internet era; Carnes, 1991). A large-scale study ($n=9,265$) reported that about 20% of adults recognised their sexual addictive behaviours using cybersex (Cooper et al., 2000). About 85% of college counsellors reported that they worked with at least one sex addiction client in the previous year (Giordano & Cashwell, 2018), and members of the American Association for Marriage and Family Therapists reported that they worked with an average of four cybersex addiction clients in the previous year (Goldberg, Peterson, Rosen, & Sara, 2008). Despite its predominance and seriousness, research into this disorder has been thin (Carnes et al., 2012). Compared with other neuropsychiatric disorders, treatment for sex addiction is still underdeveloped (Rosenberg, Carnes & O'Connor, 2014; Yau & Potenza, 2015). Although this may be due to a lack of a general consensus about how sex addiction should be defined,

diagnosed, understood, and assessed (Reid, 2016), the elucidating relationships between sex addiction and other constructs would be helpful to find alternative solutions to this symptom.

While some recent studies focused on female patients (McKeague, 2014), previous research on sex addiction focused predominantly on men (Aaron, 2012). For example, Raymond, Coleman and Miner's study (2003) recruited only 8% of female participants and Carries and Delmonico's study (1996) recruited 20%. Given the high prevalence of sexual problems in females (e.g., 35% of sexual dysfunction [Sarwer & Durlak, 1996]; 34% sexual pain disorders [Kinzl, Traweger & Biebl, 1995]; 20% of sex addicts [Carnes et al., 2012]), it is important to investigate this disorder in both male and female populations (Aaron, 2012).

Adverse Childhood Experience

Etiological research into sex addiction indicates that adverse childhood experience, namely trauma, may lead to a later diagnosis of sex addiction (Earle & Earle, 1995; Sussman, 2007). Indeed, various addictions (e.g., substance) are related to trauma (Wiechelt & Straussner 2015). Among sex addicts, the rate of those who have had traumatic experiences (e.g., sexual abuse) in their childhood is alarmingly high (Carnes, 1991; Griffee et al., 2012). In Carnes' pioneering work (1991), almost all sex addicts (97%) reported exposure to traumatic childhood experience - a substantially higher percentage than other types of addictions (e.g., 54% in substance [Konstenius et al., 2017]; 74% in gambling [Schwaninger et al., 2017]) and nonclinical population (3-60%; Heath, Bean & Feinauer, 1996; Kinzl et al., 1995). In a study by Tedesco and Bola, (1997), of 45 individuals who identified as sex addicts (24 male, 21 female), 96% ($n=43$) reported having experienced childhood sexual abuse. In a study about compulsive cybersex, Schwartz and Southern (2007) reported 76% of women and 58% of men were the victims of abuse in childhood (21 female, 19 male). A study with 539 undergraduate students found a relationship between childhood abuse and

later disposition toward compulsive sexual behaviours (Perera, Reece, Monahan, Billingham, & Finn, 2009). Adverse childhood experience enhances long-term hyperarousal, which victims may attempt to neutralise by engaging in addictive behaviours (van der Kolk, 1989) including exposing themselves to a situation reminiscent of the original trauma (van der Kolk et al., 2005) (H1a). If sex addicts engage with a sexual activity in order to neutralise their past adverse experience, they may not intrinsically enjoy the sexual activity, thus report a low level of intrinsic motivation.

H1a: Sex addiction would be positively associated with adverse childhood experience.

Intrinsic and Extrinsic Motivation

Intrinsic and extrinsic motivation are types of motivation described in the self-determination theory (Deci & Ryan 1985), which upholds that human beings have an inherent tendency to integrate their psychological energy into an identity that is cohesive with their social structure. Intrinsic motivation occurs when an individual engages with an activity for inherent satisfaction (i.e., the activity itself is a reward), while extrinsic motivation occurs when engagement in an activity is motivated by external rewards such as money and/or recognition. Sex addiction often entails individuals neglecting their health and derive no pleasure from their sexual experiences (Goodman, 2001; Rosenberg et al., 2014). The forging of neural pathways and addictive responses explains the addict's relentless and self-destructive yearning (O'Brien, Volkow & Li, 2006), in order to have a sense of normalcy (Solomon, 1980). Neuro-imaging tests among sex addicts found their sexual desire dissociated from their inherent liking (i.e., pleasure gained from acquisition of a reward), in line with incentive salience theories of addiction, where the enhanced wanting is distinct from liking of salient rewards (Voon et al., 2014). Addiction changes their inherent liking (i.e., intrinsic motivation) to aberrant wanting (i.e., extrinsic motivation) (Robinson & Berridge,

2008). These findings suggest that sex addiction would be more related to extrinsic motivation for sex than intrinsic motivation (H1b).

H1b: Sex addiction would be positively associated with extrinsic motivation.

Attachment

One definition of sex addiction refers to a pathological attachment disorder (Carnes, 1991), as disordered or insecure attachment is another key precursor of sex addiction. Sex addicts have twice the rate of anxious attachment than non-addicts (over 90% in sex addicts and under 45% in non-addicts; Aaron, 2012; Faisandier, Taylor & Salisbury, 2012; Leedes, 1999), and anxious attachment is a key predictor of sex addiction in men (Zapf, Griener & Carroll, 2008). Attachment style refers to an individual's response to levels of anxiety and avoidance in relationships (Bowlby, 1969) where effective co-regulation is supported by secure attachment (Bowlby, 1982). Sexuality and attachment are strongly linked as both contribute to distress regulation (Birnbaum, 2015). Attachment theory relates to early life relationships (e.g., childhood experience, as aforementioned) including affect regulation (Schore & Schore, 2007). Caregivers soothe their infant's emotional distress, helping the infant to learn how to self-soothe. If the infant does not receive soothing from their caregivers, they do not learn to self-soothe. As they mature, they will try to control their emotion using external stimulants such as sex (Benfield, 2018). The majority of sex addicts have either anxious or avoidant attachment style (Bigras, Godbout, Hebert & Sabourin, 2017). Fearful avoidant (an attachment style with high anxiety and high avoidance) is the most prevalent style among sex addicts (Jore, Green, Adams & Carnes, 2016). Among 100 heterosexual and homosexual men and women, while both anxious and avoidant attachment styles were positively related to sexual compulsivity, anxious attachment style was more strongly related (Weinstein, Katz, Eberhardt, Cohen, & Lejoyeux, 2015).

Adult attachment theory suggests that interpersonal rules learned in one's early childhood relationships build a foundational model for intimate relationships in adulthood (Mikulincer & Shaver, 2016). Indeed, adult attachment impacts on emotional self-regulation and behaviours in intimate relationships (Gillath & Shaver, 2007). Adults with adverse childhood experience tend to have anxious attachment and sexual compulsion (Aaron, 2012). Anxious adult attachment mediated the relationship between adverse childhood experience and mental health problems (Widoma, Czajaa, Kozakowskib & Chauhana, 2018). (H2). Anxiously attached persons are more likely to view sex as a coping strategy with their mental distress (Schachner & Shaver, 2004), implying a correlation between sex addiction, anxious attachment and extrinsic motivation for sex.

H2: Anxious adult attachment would mediate the relationship between adverse childhood experience and sex addiction (Adverse Childhood Experience → Anxious Adult Attachment → Sex Addiction).

H1c: Sex addiction would be positively associated with anxious adult attachment.

Narcissism

Historically, there is a link between sexuality and narcissism (Levy, Ellison, & Reynoso, 2011; Widman and McNulty, 2011). Individuals with narcissism have been found to have abundant sexual emotions (Ellis, 1898), and seek more physical pleasure from sexual behaviours, leading to self-admiration (Walder, 1925). Recent research echoes this, indicating that sex addiction is positively related to narcissism (Andreassen et al., 2018; Kafka, 2010; Kasper, Short & Milam, 2015; Raymond, Coleman & Miner, 2003), leading to identify specific aspects of narcissism linked to sexuality, i.e., sexual narcissism (Kasper et al., 2015). This combination leads to engaging with many sexual partners (Widman & McNulty, 2010) and internet pornography (Kasper et al., 2015). For example, Kasper et al. (2015) noted that

the duration of engaging with internet pornography was related to narcissism, and the levels of narcissism between participants who use internet pornography (currently and previously) and those who do not were significantly different among 257 adults in America. A large-scale study ($n=23,533$) in Norwegian adults ($M_{age}=35.8$, $SD_{age}=13.3$, $RNG_{age}=16-88$ years; 65% female and 35% male) reported that an association between narcissism and sex addiction (Andreassen et al., 2018) (H1d).

Narcissism has also been found related to attachment (Ahmadi et al., 2013; Bennet, 2006; Moemeni et al., 2011). A study among 200 Iranian students (100 males and 100 females) identified correlative and predictive relationships between narcissism (outcome) and adult attachment (predictor) (Ahmadi et al., 2013). A failure to establish a stable psychological foundation in childhood has been highlighted as a notable cause of narcissism (e.g., inflated self-image, lack of empathy, and exploitation of others; Sharifi, 2000). Anxious adult attachment mediated the relationship between narcissism and social media addiction (Lee, 2017). However, these mediatory relationships have not been explored with sex addiction (H3).

H1d: Sex addiction would be positively associated with narcissism.

H3: Anxious adult attachment would mediate the relationship between narcissism and sex addiction (Narcissism \rightarrow Anxious Adult Attachment \rightarrow Sex Addiction).

Self-Compassion

Self-compassion, being kind toward oneself when facing difficulties (Neff, 2003), is related to lower levels of mental health problems (Raes, 2011; Neff, Hsieh, & Dejitterat, 2005), and many other positive psychological constructs including happiness, optimism, positive affect, wisdom, personal initiative (Neff, Rude, & Kirkpatric, 2006). Self-compassion has been related to many types of addictions: e.g., food (Rainey, Furman, &

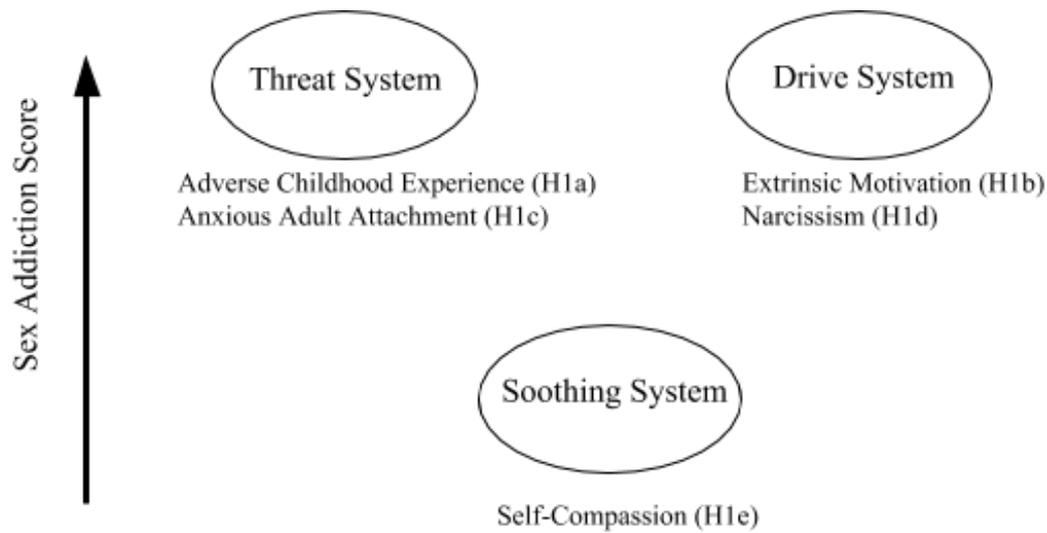
Gearhardt, 2018), substances (Phelps et al., 2018), the internet (Akin & Iskender, 2011), and gambling (Shonin, Van Gordon & Griffiths, 2013). However, any relation to sex addiction is underexplored (H1e). Indeed, Reid, Temko, Moghaddam, and Fong (2014) found negative correlations between self-compassion and hypersexuality in male clinical patients in the US, yet more comprehensive populations (e.g., female, non-US) need to be researched. Self-compassion is deemed to moderate the relationship between anxious adult attachment and addictions by enhancing self-regulation of emotions: those who are able to regulate mental distress by themselves are less likely to suffer from a high level of addiction (Khantzian, 1997; Miron et al., 2014). Self-compassion (i.e., high affect self-regulation) may reduce the impact of anxious adult attachment (i.e., low affect self-regulation) on sex addiction (Pascuzzo, Moss & Cyr, 2015) (H4).

H1e: Sex addiction would be negatively associated with self-compassion.

H4: Self-compassion would moderate relationship between anxious attachment and sex addiction.

The model of the three emotion regulatory systems in compassion focused therapy claims that self-compassion emerges by accessing our soothing system, which relates to being content with one's own life, instead of our threat system (anxiety-based affects regarding survival) and drive system (excitement-centred affects relating to wanting and consuming), both of which can lead to addiction (Gilbert, 2009; 2014; 2015). By cultivating our soothing mind, we are able to turn off our threat and drive systems (Gilbert, 2009). Adverse childhood experience and anxious adult attachment are predominantly related to our threat system, while extrinsic motivation and narcissism are related to our drive system (Gilbert, 2014; 2015). Figure 1 summarised all variables in this study.

Figure 1. A summary of the studied variables using the three emotion regulatory systems (Gilbert, 2009).



Aims and Hypotheses

This study aimed to explore relationships between sex addiction, adverse childhood experience, motivation, adult attachment, narcissism, and self-compassion. Four hypotheses were tested.

H1: Sex addiction would be positively associated with (a) adverse childhood experience, (b) extrinsic motivation, (c) anxious adult attachment, (d) narcissism, and negatively associated with (e) self-compassion.

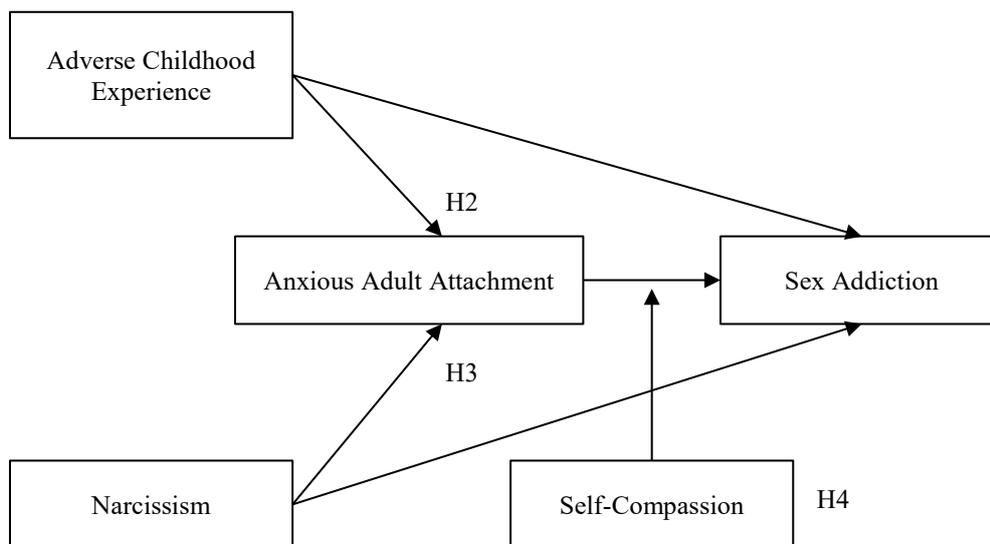
H2: Anxious adult attachment would mediate the relationship between adverse childhood experience and sex addiction (Adverse Childhood Experience → Anxious Adult Attachment → Sex Addiction).

H3: Anxious adult attachment would mediate the relationship between narcissism and sex addiction (Narcissism → Anxious Adult Attachment → Sex Addiction).

H4: Self-compassion will moderate relationship between anxious adult attachment and sex addiction.

Figure 2 summarises H2, 3, and 4.

Figure 2. Our theoretical model: Anxious adult attachment mediating the relationships between adverse childhood experience and sex addiction (H2), and narcissism and sex addiction (H3), while self-compassion moderating the effects of anxious attachment on sex addiction (H4).



Methods

Participants

Participants, aged 18 years or older, were recruited from the researchers' professional network of online communities among sex addiction therapists worldwide, who announced this study in their clinics, providing a short URL to participate to the study: no paper responses were collected for the security reasons. We did not exclude non-clinical population because the definition and diagnosis of sex addiction are still debated (Reid, 2016), therefore

we explored the degree of sex addiction, instead of the dichotomous nature of diagnosis. Of 115 adults who agreed to participate, 104 (53 males and 51 females; $RNG_{age}=20-70$, $M_{age}=46.33$, $SD_{age}=12.69$ years) completed measures assessing their levels of sex addiction, adverse childhood experience, attachment, narcissism, self-compassion, and motivation. The majority of participants were either British or North American: 42 were British, 34 were American; seven Canadian; five Bermudian; four Swedish; three Maltese, two Irish, and one each of Australian, Barbadian, Lebanese, Polish, Spanish, and unreported, respectively. The majority of participants (93) identified their ethnicity as white, eight as black, one as American Indian or Alaska Native, and two were unreported. A high proportion (64/115) were either married or in a domestic relationship; 18 were single (never married), 18 divorced, two separated, and two unreported. Several participants worked in healthcare and on a full-time contract: 50 in healthcare, six in education, five in insurance, five in communication, five in retail, four in government, four in hospitality, three in manufacturing, three in legal, two in banking/finance, construction, and energy respectively, and the remaining 13 in other fields such as advertising or church ministry. On average, the participants had been in the field for 16.56 years ($SD=11.55$), and 82 were full-time workers. The average weekly working hours of the whole sample was 39.57 hours ($SD=12.22$). Thirty-six were staff or equivalent, 26 were presidents or self-employed, 23 managers, 13 senior managers, and the remaining of six included religion staff and healthcare assistants. Fifty-five had never been diagnosed as having sex addiction, and did not believe they were sex addicts, 25 had received a diagnosis, 19 had never been diagnosed, but felt they might have been addicted, and the remaining five reported having been diagnosed in the past. Eighty-seven stated they had someone to talk to when mentally distressed, seventeen did not.

Instruments

Sex addiction was measured using the adjusted version of *PATHOS* (Preoccupied, Ashamed, Treatment, Hurt others, Out of control and Sad), is a six-item self-report scale, assessing the level of sex addiction (Carnes et al., 2012). The original *PATHOS* employed a dichotomous yes/no response format, however the adjusted version employed a Likert-scale (1='Strongly Disagree' to 5='Strongly Agree') as a continuum response is more suitable for clinical diagnoses (Carvalho et al., 2015). Six items include 'Do you often find yourself preoccupied with sexual thoughts?' and demonstrate high internal consistency ($\alpha=.77-.94$; Carvalho et al., 2015).

Adverse Childhood Experience Questionnaire (ACE), a ten-item self-report measure, identifying childhood experiences of abuse and neglect in their first 18 years of life (Felitti et al., 1998). Items include 'Did a parent or other adult in the household often swear at you, insult you, put you down, or humiliate you? Or act in a way that made you afraid that you might be physically hurt?', which are responded in a dichotomous yes/no response format. Internal consistency was high ($\alpha>.80$, Bruskas, 2013; Dube et al., 2003; Murphy, 2014).

Revised Adult Attachment Scale (RAAS); Collins, 1996), an eighteen-item self-report measure, evaluates attachment style of adults in their close relationships in general, categorising into three attachment styles: close, dependent, and anxious, six items each. The close attachment style subscale refers to how comfortable a person feels about closeness to other people (e.g., 'I find it relatively easy to get close to people'). The dependent subscale is about how confident a person is to depend on others to be available when needed (e.g., 'I find it difficult to allow myself to depend on others'). These are regarded as a secure attachment (Collins, 1996). Lastly, the anxious subscale relates to how worried a person is about being rejected (e.g., 'I often worry that other people don't really love me'). Items are responded on a five-point Likert-scale (1='Not at all characteristic of me' to 5='Very characteristic of me'). RAAS demonstrated high internal consistency ($\alpha\geq.78$, Collins, 1996).

Narcissistic Personality Index (NPI), a 16-item self-report measure, asks a participant to choose a statement that describes their feelings about themselves better among two statements (e.g., 'I like to be the center of attention' or 'It makes me uncomfortable to be the center of attention'; Ames, Rose & Anderson, 2006). In each pair, one of them is narcissism-consistent (coded '1', while narcissism-inconsistent items are coded '0'), and is summed at the end. NPI demonstrated relatively high internal consistency ($\alpha=.68-.72$; Ames et al., 2006).

Self-Compassion Scale-Short Form (SCS-SF; Raes, Pommier, Neff, & Van Gucht, 2011), a 12-item self-report measure, is a shortened version of the 26-item Self-Compassion Scale (Neff, 2003), evaluating the degree of one's self-compassion, i.e., how kind one can be towards oneself in difficulty times (Neff, 2003). Items include 'I try to be understanding and patient towards those aspects of my personality I don't like.', responded on a five-point Likert-scale from '1' being 'Almost never' to '5' being 'Almost always'. Internal consistency was high ($\alpha \geq 0.86$; Raes et al., 2011).

Situational Motivation Scale (SIMS; Guay, Vallerand & Blanchard, 2000), a 16-item self-report measure, examines the levels of four types of motivation (four items each): intrinsic motivation, identified regulation, external regulation, and amotivation, in the order of the level of self-determination from high to low (Deci & Ryan, 1991). These motivation types are based on self-determination theory, proposing our natural proclivity to synthesise our psychological energy into a true sense of sense adjusting to its environment (Deci & Ryan, 1985). An intrinsically motivated person engages in a certain activity, because they find that activity inherently interesting (Deci, 1971, e.g., 'Because I think that this activity is interesting'). Identified regulation and external regulation are types of extrinsic motivation, where a person is driven to be engaged with a certain activity because of external rewards (e.g., money, fame, status). Identified regulation recognises the value of a certain activity, however still considers it as a means to an end (Guay et al., 2000, e.g., 'Because I am doing it

for my own good'), and external regulation is activated by an obligation that a person is motivated either to obtain rewards or to avoid sanctions (Kotera, Adhikari & Van Gordon, 2018a, e.g., 'Because I am supposed to do it'). Lastly, an amotivated person has no motivation at all to initiate a certain activity (Kotera et al., 2018a, e.g., 'There may be good reasons to do this activity, but personally I don't see any'). Each item is responded on a seven-point Likert-scale (1='Corresponds not at all' to 7='Corresponds exactly'). Internal consistency of each type of motivation was high (intrinsic $\alpha \geq .87$; identified regulation $\alpha \geq .67$; external regulation $\alpha \geq .75$; amotivation $\alpha \geq .77$; Guay et al., 2000).

Procedure

Once participants accessed the URL, the consent form was presented, followed by the online scales. After participants completed the scales, the debrief was introduced. To protect participants, information about available mental health support was provided. Ethical approval was obtained from the University's research ethics committee.

Cross-sectional design was used for this study. First data were screened for outliers, then correlation analyses were conducted after examining the assumption of normality (H1). Path analyses were conducted to test H2 and 3. Lastly, moderation analysis was performed (H4).

Results

Descriptive Statistics

Table 1 summarises descriptive statistics for all the outcome measures. Using the outlier labelling rule (Hoaglin & Iglewicz 1987), no outlier was detected. Skewness and kurtosis values raised no issue. Cronbach's alpha for all the scales demonstrated good internal consistency ($\alpha \geq .68$).

Table 1. Descriptive statistics: Sex addiction, adverse childhood experience, adult attachment, narcissism, self-compassion, and motivation of 104 adults

Scale or Subscale (range)	M	SD	Skewness	Kurtosis	α
Sex Addiction (1-5)	2.55	1.06	.39	-.83	.82
Adverse Childhood Experience (0-10)	2.93	2.82	.72	-.54	.84
Close Attachment (1-5)	3.20	.70	-.33	.40	.68
Dependent Attachment (1-5)	2.65	.90	.08	-.43	.86
Anxious Attachment (1-5)	2.65	.95	.23	-.63	.83
Narcissism (0-16)	3.42	3.73	1.47	2.21	.85
Self-Compassion (1-5)	2.85	0.76	-.33	-.29	.96
Intrinsic Motivation (1-7)	4.83	1.38	-.69	.54	.90
Internal Regulation (1-7)	4.31	1.41	-.32	-.23	.83
External Regulation (1-7)	2.73	1.46	.78	-.03	.85
Amotivation (1-7)	2.85	1.59	.50	-.87	.87

Relationships of Sex Addiction and Other Constructs

Assessed by Shapiro-Wilk ($p > .05$), scores for many scales (sex addiction, adverse childhood experience, close adult attachment, anxious adult attachment, narcissism, self-compassion, intrinsic motivation, external regulation, and amotivation) were not normally distributed, thus all the scores were square-root-transformed.

Table 2. Correlations between sex addiction, adverse childhood experience, adult attachment, narcissism, self-compassion, and motivation among 104 (53 males and 51 females).

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Gender (0=F, 1=M)	-												
2	Age	.50**	-											
3	Sex Addiction	.44**	.27**	-										
4	Adverse Childhood Experience	-.13	-.07	.21*	-									
5	Close Attachment	.22*	.19	-.23*	-.29**	-								
6	Dependent Attachment	.37**	.27**	-.05	-.31**	.69**	-							
7	Anxious Attachment	-.04	-.12	.40**	.33**	-.48**	-.58**	-						
8	Narcissism	.19*	.20*	.35**	.27**	.004	-.01	.16	-					
9	Self-Compassion	.17	.13	-.31**	-.38**	.63**	.59**	-.50**	-.11	-				
10	Intrinsic Motivation	.15	.09	.10	-.10	.21*	.21*	-.08	.14	.09	-			
11	Internal Regulation	-.01	.04	-.21*	-0.14	.17	.15	-.09	.05	.24*	.80**	-		
12	External Regulation	.13	.09	.33**	.04	-.34**	-.36**	.37**	.15	-.37**	-.04	-.13	-	
13	Amotivation	.15	.18	.41**	-.05	-.15	-.11	.22*	.08	-.24*	-.30**	-.51**	.51**	-

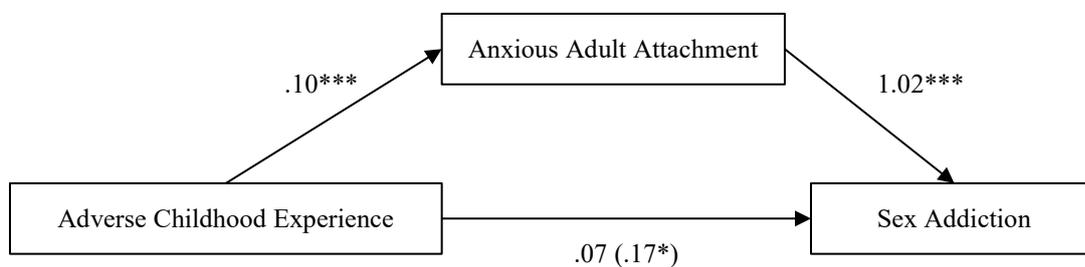
* $p < .05$; ** $p < .01$

Table 2 summarised the results of correlation analyses. Sex addiction was positively associated with gender, age, adverse childhood experience, anxious adult attachment, narcissism, external regulation, and amotivation, while negatively associated with close adult attachment, self-compassion, and internal regulation. H1 was supported. Further, gender was positively related to sex addiction, close and dependent adult attachment, and narcissism. Age was positively related to sex addiction, dependent adult attachment, and narcissism.

Adverse Childhood Experience and Narcissism as Mediator between Anxious Adult Attachment and Sex Addiction

Secondly, path analyses were conducted, using model 4 in the Process macro version 3 (parallel mediation model; Hayes, 2017), to examine whether anxious adult attachment would mediate the relationship between adverse childhood experience (predictor variable) and sex addiction (outcome variable) (H2).

Figure 3. Parallel mediation model: Adverse childhood experience as a predictor of sex addiction, mediated by anxious adult attachment. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.



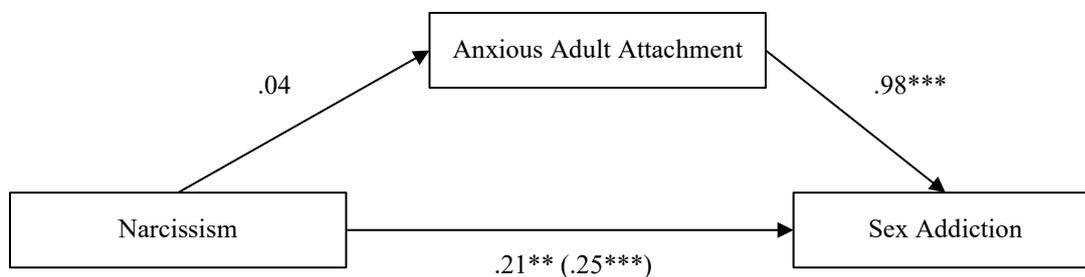
* $p < .05$; ** $p < .01$; *** $p < .001$. Direct effects (Total effects)

There was a significant indirect effect of adverse childhood experience on sex addiction through anxious adult attachment, $b = .10$, BCa CI [.03, .19], which explained 17% of the variance in sex addiction, and accounted for 59% of the total effect, indicating a large effect (Figure 3). The direct effect of adverse childhood experience on sex addiction, controlling for anxious adult attachment, was not significant, $b = .07$, $t(101) = .91$, $p = .36$, implying that adverse childhood experience did not directly predict the variance in sex addiction, forming a full mediation. The total effect of adverse childhood experience on sex addiction, including

anxious adult attachment, was significant, $b=.17$, $t(102)=2.18$, $p=.03$. Controlling for anxious adult attachment, 4% of the variance in sex addiction was explained by adverse childhood experience. H2 was supported.

Next, mediation of anxious adult attachment between narcissism (predictor variable) and sex addiction (outcome variable) was tested (H3).

Figure 4. Parallel mediation model: Narcissism as a predictor of sex addiction, mediated by anxious adult attachment. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.



* $p<.05$; ** $p<.01$; *** $p<.001$. Direct effects (Total effects)

There was not a significant indirect effect of narcissism on sex addiction through anxious adult attachment, $b=.04$, BCa CI $[-.01, .11]$ (Figure 4). The direct effect of narcissism on sex addiction, controlling for anxious adult attachment, was significant, $b=.21$, $t(101)=3.31$, $p=.001$, implying that narcissism directly predicted the variance in sex addiction. The path between anxious adult attachment and sex addiction was significant, $b=.98$, $t(101)=4.10$, $p<.001$, forming a partial mediation. The total effect of narcissism on sex addiction, including anxious adult attachment, was significant, $b=.25$, $t(102)=3.72$, $p<.001$. Controlling for

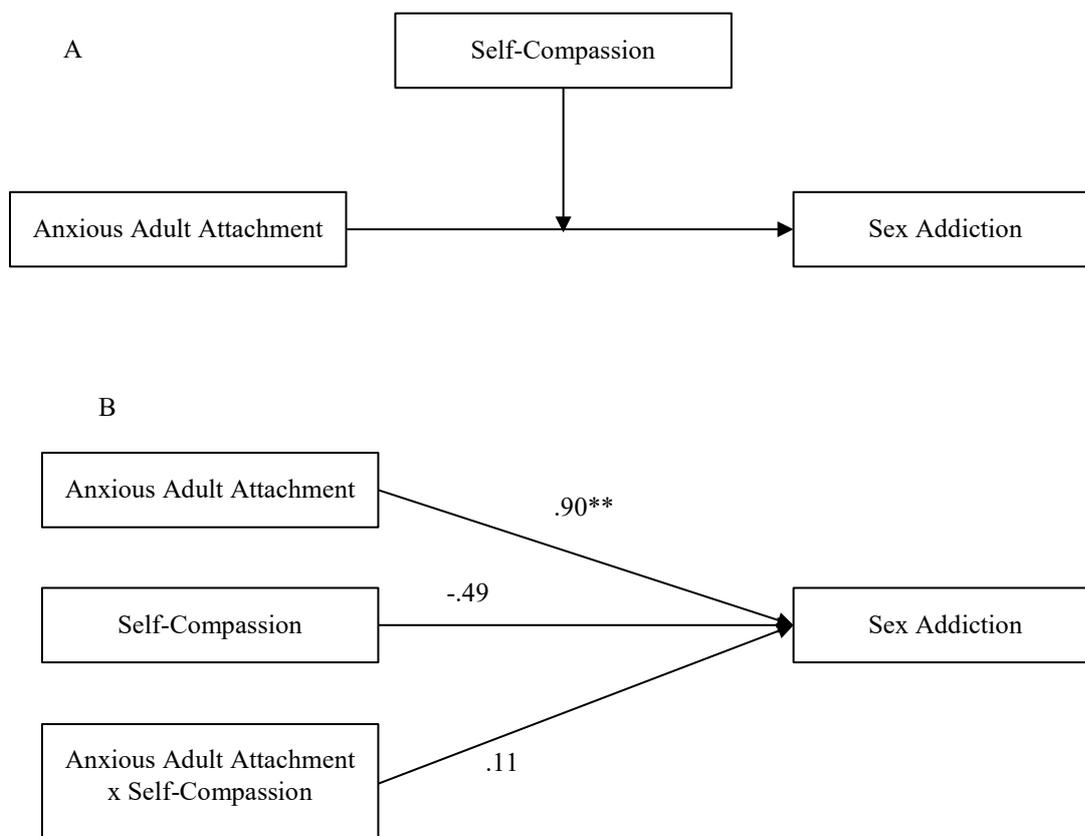
anxious adult attachment, 12% of the variance in sex addiction was explained by narcissism.

H3 was partially supported.

Self-Compassion as a Moderator between Anxious Adult Attachment and Sex Addiction

Anxious adult attachment and self-compassion, as well as the interaction between them were entered to predict sex addiction, using the model 1 in the Process macro version 3 (panel A in Figure 5; Hayes, 2017) (H4). To avoid multicollinearity issues, the predictor variables were centred prior to regression analyses.

Figure 5. Moderation of the effect of self-compassion on sex addiction by anxious adult attachment: conceptual diagram (panel A) and statistical diagram (panel B).



* $p < .05$; ** $p < .01$; *** $p < .001$

The interaction effects of anxious adult attachment and self-compassion as predictors of sex addiction were not significant, indicating that self-compassion did not moderate the relationship between anxious adult attachment and self-compassion (Panel B in Figure 2). H4 was not supported.

Discussion

This study aimed to explore the relationship between sex addiction and five other factors: adverse childhood experience, adult attachment, narcissism, motivation, and self-compassion. Sex addiction was associated with (H1a) adverse childhood experience, (H1b) extrinsic motivation, (H1c) anxious adult attachment, (H1d) narcissism, and (H1e) self-compassion. Anxious adult attachment completely mediated the relationship between adverse childhood experience and sex addiction (H2), and partially mediated the relationship between narcissism and sex addiction (H3). Lastly, self-compassion did not moderate the relationship between anxious adult attachment and sex addiction (H4).

One salient finding of our study was that, in contrast to previous literature (Earle & Earle, 1995; Sussman, 2007), adverse childhood experience did not directly predict sex addiction. Anxious adult attachment mediated the relationship between adverse childhood experience and sex addiction. Likewise, contrary to previous addiction studies (Akin & Iskender, 2011; Phelps et al., 2018; Rainey et al., 2018; Shonin et al., 2013), self-compassion did not moderate the relationship between anxious adult attachment and sex addiction. The impact of anxious adult attachment on sex addiction was not influenced by the level of self-compassion.

These findings suggest useful implications for practice. Currently the standard approach to sex addictions is based on cognitive behavioural therapy (CBT; Birchard, 2015),

which has little emphasis on attachment and emotional regulation (McKinney, 2013). Treatment for sex addiction could be more effective by focusing on patients' attachment, instead of or in addition to exploring their trauma. Indeed, application of attachment theory into clinical practice is still underdeveloped (Mikulincer & Shaver, 2016), although a few interventions have been examined for the treatment of sex addiction. For example, the relational depth moments were suggested as a useful construct to help sex addiction patients by addressing their insecure attachment (Woehler, Giordano & Hagedorn, 2018). Based on the synchronicity of the depth of relationship between counsellors and clients (i.e., their evaluations of relational connection with one another were similar; Cooper, 2012; Frzina, 2012), relational depth was characterised by i) a profound contact between the counsellor and client, ii) authenticity in both the counsellor and client, and iii) valuing one another's experience (Woehler et al., 2018). Therapeutic approaches focusing on the relational depth moments would be beneficial to sex addiction clients, protecting their insecure attachment. As recommended in Woehler et al.'s case study (2018), future research needs to examine whether such an intervention would be effective for sex addiction clients.

Additionally, sex addiction therapists who have at least five years of experience using attachment-informed interventions (n=6 from the UK, US, and Australia) noted the strengths of this approach as regulation of emotion and psychological distance, and support for the clients building relationships outside the therapy room (Benfield, 2018). Attachment-informed interventions could help clients develop ways of relating to others at a deep level without sexualisation, which is the usual way in which sex addicts tolerate to others (Benfield, 2018). Further investigation into attachment in sex addiction therapy, for example erotic transference, is needed.

Another key implication for clinical practice can come from the significant relationship between narcissism and sex addiction, consistent with previous research (e.g.,

Andreassen et al., 2018). Narcissism was associated with, and directly predicted sex addiction in our sample. This suggests that treatment of sex addiction can benefit from identifying and addressing narcissism. Although there has been little research on the role of narcissism in the treatment of sex addiction, it is worthwhile to examine approaches that are effective to reduce narcissism in relation to sex addiction. Indeed, while appraisal of the mechanism of narcissism has been relatively advanced (Ogrodniczuk, 2013), evaluation of treatment for narcissism is scarce (Kealy, Goodman, Rasmussen, Weideman & Ogrodniczuk, 2017). Several approaches have been suggested: self-psychology (Gehrie, 2011), attachment-oriented (Bennett, 2006; Eagle, 2011), transference-focused (Kernberg, Yeomans, Clarkin, & Levy, 2008), and CBT (Freeman & Fox, 2013). Kealy et al.'s study (2017) exploring 34 psychotherapists' perspective on optimal approaches for narcissism, reported that relational, alliance-building approach was considered likely to be the most successful because this approach could support narcissists' poor self-regulation assisted by therapists' reassurance and advice. Furthermore, second-generation mindfulness-based interventions (SG-MBIs) may be helpful to reduce sex addicts' narcissism (Van Gordon, Shonin & Griffith, 2016). One of the primary notions in the SG-MBIs is ontological addiction (i.e., inconceivable beliefs about how human beings think they exist, addiction to which can lead to mental distress and impairments in life; Van Gordon et al., 2018) is similarly characterised in the DSM's definition of narcissistic personality disorder (American Psychiatric Association, 2013). Indeed, meditation training (based on the first-generation mindfulness-based interventions) did not improve narcissism: rather it increased the mind-reading score, suggesting an increase of narcissism among narcissists because some guidance might have been misinterpreted by narcissists, for example, non-judgement towards mind-wandering might have been misinterpreted as a permission to exclusively focus on their self-inflating beliefs, while non-narcissists interpreted it to let go of their self-criticism (Ridderinkhof, de

Bruin, Brummelman & Bögels, 2017). SG-MBIs may help reduce narcissism in sex addicts. These approaches should be examined in treatment for sex addiction.

Though this study offers new valuable understanding of sex addiction, several limitations need to be considered. First, the sample size was relatively small. Second, participants were recruited through opportunity sampling. These limitations suggest needs for larger-scale generalisable studies in sex addiction. Third, the psychological constructs in this study were measured using self-report measures, which might limit its accuracy for social desirability bias (Latkin, Edwards, Davey-Rothwell & Tobin, 2017). Fourth, as noted in previous research (Zapf et al., 2008), the causal direction of these related psychological constructs has not been evaluated. In the future, longitudinal data would help appraise the temporal patterning of the observed relationships.

Despite the high prevalence in both males and females, research into sex addiction in a balanced-sample is still underdeveloped. Therefore, this study examined its relationship with relevant constructs: adverse childhood experience, motivation, adult attachment, narcissism, and self-compassion. Contrary to our hypothesis, anxious adult attachment fully mediated the relationship between adverse childhood experience and sex addiction. Anxious adult attachment had an impact on sex addiction, rather than adverse childhood experience. Narcissism was shown to have a direct impact on sex addiction. Anxious adult attachment and narcissism were deemed to be key constructs impacting sex addiction. Treatment targeting these constructs, such as relation-based approach and the SG-MBIs, is suggested as an effective solution for these symptoms. Further, a larger-scale and longitudinal study is needed to elucidate the causal direction of these relationships.

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