**Adolescents’ compulsive sexual behavior: The role of personality, attachment orientations, cognitive-related mechanisms and psychopathology**

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**Abstract**

**Background and aims:** The roots of compulsive sexual behavior disorder (CSBD) may be traced to a person’s history of interactions with others, background measures (gender, religiosity, and personality dispositions and attachment orientations), cognitive measures (rumination, reﬂection and emotion regulation), and psychopathology (depression and anxiety). While research has indicated that personality dispositions that formed through interactions with cognition-related processes are associated with a general vulnerability to mental disorders, the mechanisms leading to CSBD among adolescence have not yet been understood. In the present study, I present a model of CSBD in adolescence by transdiagnostic approach, aimed at revealing the possible processes linking person’s background measures to this behavior.

**Methods:** The sample included 350 high-school Israeli students (148 boy, 202 girl) age 16-18 (*M* = 17.20, *SD* = 0.96).

**Results:** Findings indicated that there are direct effects and indirect effects via cognition-related processes and/or psychopathology that are predictors of a disposition toward CSBD among adolescents.

**Discussion:** I discuss implications of the findings for understanding of the theoretical model and the development of CSBD.

Keywords: Compulsive sexual behavior disorder; psychopathology; Rumination; Reﬂection; Emotion regulation

**Adolescents’ compulsive sexual behavior: The role of personality, attachment, cognitive-related mechanisms and psychopathology**

The World Health Organization (WHO), in the 11th edition of the International Classification of Diseases (ICD-11), has included Compulsive Sexual Behavior as a disorder. CSBD is characterized by an extensive pornography use and masturbation, use of paid sexual services, and risky sexual behaviors and/or intense preoccupation with sex. These behaviors often lead to impaired social or occupational functioning, distress, and negative affect (Chen, Jiang, Luo, Kraus, & Bőthe, 2021; Koos et al., 2021). To date, CSBD was mostly studied among adults (see for review: Grubbs et al., 2020) with only few studies addressing predisposition toward CSBD among adolescents (e.g., Adelson et al., 2012; De Crisce, 2013; Efrati, 2020). These studies defined CSBD among children and adolescents (Adelson et al., 2012; De Crisce, 2013), revealed the existence of clinical CSBD among adolescents (Efrati & Dannon, 2018), and explored the profile of adolescents with CSBD (e.g., Efrati, 2018a; Efrati & Gola, 2018a).

CSBD among adolescents may be related to their personality (Efrati, 2018; Efrati and Gola, 2018a), religiosity (Efrati, 2019), familial atmosphere and/or relationship with parents (Efrati & Gola, 2019a), Metacognition (Efrati et al., 2020; 2021), psychopathology (Efrati and Dannon, 2018) but to date, no studies found transdiagnostic research that predict CSBD. In the present research, I adopted transdiagnostic approach which takes into account the effects of cognitive-related mechanisms and psychopathology and examines whether background measures and personality disposition via two-step mediation processes: cognitive-related mechanisms, and psychopathology are linked with the severity of CSBD symptoms among adolescents.

**The big five personality dispositions**

One of the most used personality classifications is known as the Five Factor Model (FFM; McCrae, & Costa, 1994). This classification emerged out of a series of attempts to understand the organization of trait descriptors in the natural language (Goldberg, 1993; John OP, & Srivastava, 1999; McCrae et al., 2000). Structural analyses of these descriptors consistently revealed five broad factors: extraversion (outgoing/energetic vs. solitary/reserved), agreeableness (friendly/compassionate vs. challenging/ detached), conscientiousness (efficient/organized vs. easy-going/careless), neuroticism (sensitive/nervous vs. secure/confident), and openness to experience (inventive/curious vs. consistent/cautious). This structure has proven to be remarkably robust, with the same five factors observed in both self- and peer-ratings (McCrae, & Costa, 1987), in analyses of both children and adults (Digman, 1997), and across a wide variety of languages and cultures (Allik, 2005; McCrae, & Costa, 1997). The big five personality traits have been extensively studied in relation with CSBD (for review see: Efrati, Krause and Kaplan, 2022), though less literature is available on its relationship with CSBD among adolescence (Efrati & Gola, 2018a).

Efrati and colleagues (2022) revealed that people with CSBD score low on agreeableness and conscientiousness and high on neuroticism. It seems that people with CSBD tend to be more spontaneous, careless, and less reliable (i.e., low conscientiousness), to place self-interest above getting along with others (i.e., low agreeableness), and to show emotional instability and experience negative emotions, such as anger, anxiety, and/or depression (i.e., high neuroticism). Previous research found that individuals with CSBD were significantly more neurotic and less agreeable than abstaining adolescents (Efrati & Gola, 2018a). Therefore, the first aim of the current study is to examine personality dispositions as a predictor of CSBD among adolescence.

**Attachment orientations**

Attachment orientations are shaped during infancy via intimate interactions with caregivers in times of need (see Mikulincer & Shaver, 2016, see for a detailed account). When caregivers lend support and care and the needs for comfort and security are consistently satisfied, the infant develops a secure bond toward the attachment figure (i.e., attachment security), which is characterized by a view of the self as lovable and of others as dependable. Secure people are more social and tend to develop healthy ties with family members, friends, and romantic partners.

At times, however, parental support is insufficient and as a result, infants might develop insecure attachment orientations that are classified along two dimensions, referred to as attachment anxiety and avoidance (Brennan, Clark, & Shaver, 1998; Collins, & Allard, 2004). If infants’ needs are not sufficiently met by caregivers and the availability of support and care is uncertain, fear of abandonment is developed alongside an anxiety of being rejected. Individuals with this attachment orientation are called anxiously attached and are characterized by an unfulfilled hunger for affection regardless of the amount of affection they receive (Birnbaum, Reis, Mikulincer, Gillath, & Orpaz , 2006). If infants’ needs are not fulfilled and met with cold and distancing caregiving, infants will view others as untrustworthy and undependable and develop attachment avoidance orientation. These individuals do not trust the goodwill of others and prefer to emotionally distance themselves from intimate relationships (Smith, Murphy, & Coats, 1999).

In previous research the links between attachment orientations and CSBD are consistent and stronger in effect size (Efrati, 2018; Efrati & Gola, 2018a; Weinstein, Katz, Eberhardt, Cohen, & Lejoyeux, 2015; Zapf, Greiner, & Carroll, 2008; Gilliland, Star, Hansen & Carpenter, 2015; Crocker, 2015; Giordano, Cashwell, Lankford, King, & Henson, 2017; Ciocca et al., 2021; Kircaburun et al., 2021; Efrati, & Amichai-Hamburger, 2021). Specifically, attachment insecurity (both anxiety and avoidance) relates to greater likelihood of CSBD and higher symptoms severity of CSBD. Thus, it seems that attachment insecurity that relates to various social dysfunctions, greater distress and emotion dysregulation, is a predisposition for CSBD. Therefore, the second aim of the current study is to examine attachment insecurities have transdiagnostic characteristics (Ein-Dor & Doron, 2015; Ein-Dor, Viglin, & Doron, 2016) and should be explored as they related to CSBD.

**Cognitive-related process: Rumination and Cognitive emotional regulation**

Although thought personality disposition and attachment orientation a have been highlighted as important in the prediction of CSBD among adults, limited studies have been undertaken on exploring the correlates of personality disposition and attachment orientation, especially among adolescents. In this research, I examine one key factor that might be associated with personality disposition and attachment orientation — rumination and cognitive emotional regulation.

Rumination is the tendency to repeatedly analyze one’s problems, concerns, and feelings of distress without taking action to rectify them (Nolen-Hoeksema, 1991; Watkins, 2008; Nolen-Hoeksema & Watkins, 2011). The literature (as reviewed in Ehring & Watkins, 2008) and a meta-analysis (Aldao, Nolen-Hoeksema, & Schweizer, 2010) show that rumination predicts a number of types of psychopathology (i.e., it demonstrates multifinality), as well as prospectively predicting symptoms and diagnoses of major depression (see meta-analyses by Aldao et al., 2010; Luca, 2019). Symptoms of anxiety (Gustavson et al., 2018), substance abuse (Moreno-Mansilla et al., 2021; Memedovic et al., 2019), alcohol use (Mollaahmetoglu et al., 2021), and eating disorders are also predicted by rumination (Aldao et al., 2010; Caselli et al., 2010; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Thus, rumination is a transdiagnostic factor involved in the development and maintenance of negative affect associated with various emotional disorders. Therefore, I hypothesized that adolescents who are highly aware of the aversive aspects of themselves and their experiences (as are adolescents who ruminate), turn to escapist behaviors such as CSBD.

CSBD might also be connected to the adolescents' emotional regulation strategies. Over the past few decades, there has been increased recognition that learning how to manage or regulate emotions (Matthews, Webb, & Sheppes, 2021), in a socially appropriate and adaptive manner, is important for healthy psychological development (Cole, Michel, & Teti, 1994; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Southam-Gerow & Kendall, 2002). Emotion regulation involves intrinsic and extrinsic processes responsible for managing one’s emotions toward goal accomplishment (Thompson, 1994), and these processes can be conscious or unconscious, automatic or effortful (Cole et al., 1994; Gross & Thompson, 2007; Thompson, 1994), and include skills and strategies for monitoring, evaluating, and modifying emotional reactions. Two main emotion regulation strategies are cognitive reappraisal, a cognitive change strategy that involves redefining a potentially emotion-eliciting situation in such a way that its emotional impact is changed; and expressive suppression, a form of response modulation involving the inhibition of ongoing emotion-expressive behavior (Gullone & Taffe, 2012). Emotion regulation has been linked to negative health behaviors such as Internet gaming disorder (Wu et al., 2020), substance use disorder (Cavicchioli et al., 2019), and gambling (Rogier, & Velotti, 2018). Evidence also suggests that poor emotion regulation (i.e., excessive use of suppression and less frequent use of reappraisal) may be a significant predictor of low sexual satisfaction, sexual system dysfunction (both hyper and deactivations) and consumption of porn (porn-related distress, excessive use and control difficulty) among adults (Pepping, Cronin, Lyons, & Caldwell, 2018). Efrati and Gola (2018b) have found that members of Sexaholic Anonymous groups (all adults) employ more suppression of sexual thought, which paradoxically increase CSBD. Similar results were obtained by Efrati (2019) who found that religious people employ more suppression of sexual thought, which paradoxically increase individualized CSBD. Therefore, I hypothesize that adolescents with difficulties in cognitive emotion regulation (reappraisal and suppression) could develop CSBD as part of an abnormal development that “settles” upon personality, religion, and gender characteristics.

In addition, CSBD is more pronounced among religious adults (Grubbs, Perry, Wilt, & Reid, 2019) and adolescents (Efrati, 2019; Efrati & Dannon, 2018) than secular ones. Therefore, it might be expected that secular adolescents will tend to delay sexual involvement for a longer time than do those with levels of religiosity (Hardy & Raffaelli, 2003) but, religion adolescents may represent more CSBD behavior in the context of moral incongruence arising from moral disapproval of sexual behavior (Grubbs, Perry, Wilt, & Reid, 2019; Mestre-Bach et al., 2021; Smaniotto, Le Bigot, & Camps, 2021).

Finally, adolescents’ gender might be an important factor affecting with personality characteristics and cognitive-related process on CSBD. Specifically, boys have higher attentional bias toward sexual cues and tend to have higher prevalence of CSBD (e.g. Efrati & Gola, 2018a; Efrati, Kolubinski, Caselli, & Spada, 2020; Efrati & Amichai-Hamburger, 2021). Thus, I expect that strongly for boys than girls and religion would be linked to severity of CSBD.

**The current study**

In the current study, and in line with previous research on CSBD among adolescents, I hypothesized that person’s background measures (gender, religiosity, and personality dispositions, attachment orientation), cognitive-related processes and psychopathology as predictors of the development of CSBD. Recent theories and research in psychiatry and clinical psychology have highlighted the potential value of a transdiagnostic approach to psychiatric disorders and its theoretical and clinical advantages over disorder-specific models ([Mansell, Harvey, Watkins, & Shafran, 2009](#_ENREF_92); Cludius, Mennin, & Ehring, 2020; Munguía et al., 2021). In the present study I sought to take this approach one step forward, add information to what is already known about the development of behavior disorders, especially in theory, and focus on CSBD. To do so, I designed a multi-dimensional model (Figure 1) that includes a person’s background measures and cognitive-related processes. The model will refer to the mechanisms by which a person’s background measures (direct effects) cause the CSBD symptoms with which they are associated and examine why a given disposition leads to in different adolescents or to different CSBD symptoms within the same person over time (indirect effects).

[Figure 1]

In the present study I expect to find direct relationships between these measures and the development of CSBD. Because cognitive measures are related to psychopathology (Gullone & Taffe, 2012; Nolen-Hoeksema & Watkins, 2011; Abramovitch, Short, & Schweiger, 2021), I expect to find indirect relationships between personality, cultural, and cognitive measures and the development of a disposition toward CSBD in adolescents.

**Method**

**Participants**

This study population included 350 high-school Israeli students (148 boy, 202 girl) age 16-18 (*M* = 17.20, *SD* = 0.96). When asked about their religious observance, 121 (34.6%) defined themselves as secular, and 229 (65.4%) reported various degrees of religiosity.

**Measures**

**Attachment orientation.** We used the Hebrew version of the Experiences in Close Relationships Scale (ECR; Brennan et al., 1998; translated by Mikulincer & Florian, 2000) to assess attachment styles. The ECR is a 36- item scale that assesses the two main dimensions of adult attachment styles – attachment anxiety and avoidance. Participants rated the degree to which each statement described them on a 7-point scale (1 – not at all,  
7 – very much). In the current sample, Cronbach’s alphas were high for the 18 anxiety items (0.91) as well as the 18 avoidance items (0.83). Thus, we computed two scores by averaging the items on each subscale.

**The Big Five Inventory Questionnaire** (BFI; John, Donahue, & Kentle, 1991). To assess the Big Five personality trait, we used the Hebrew version (Etzion & Laski, 1998) of the BFI (also see John & Srivastava, 1999). The 44 items in the questionnaire describe five personality constructs: extraversion (8 items, e.g., “Like to talk a lot”), agreeableness (9 items, e.g., “Helpful and not selfish in relation to others”), openness to experiences (10 items, e.g., “Original, invents new ideas”), consciousness (9 items, e.g., “Does a thorough job”), and neuroticism (8 items, e.g., “Can be stressed out”). Participants were asked to rate the degree to which each statement describes them on a 5- point scale (1 – strongly disagree, 5 – strongly agree), with Cronbach’s alpha 0.67–0.78.In current study,because I use adolescent's sample (see Efrati 2018), I focus on three dimensions: extraversion, neuroticism, and openness to experience.

**The Individual-based Compulsive Sexual Behavior scale** (I-CSB; Efrati & Mikulincer, 2018). The I-CSB was developed to assess distinct aspects of CSB, such as sexual fantasies, obsessive sexual thoughts, and spending a great deal of time watching pornography. The I-CSB is a selfreport questionnaire with 24 items measuring the following factors: Unwanted consequences (e.g., “I feel that my sexual fantasies hurt those around me”); lack of control (e.g., “I waste lots of time with my sexual fantasies”); negative affect (e.g., “I feel bad when I don’t manage to control my sexual urges”); and affect regulation (e.g., “I turn to sexual fantasies as a way to cope with my problems”). Using a 7-point Likert scale, participants were asked to rate the degree to which each statement is descriptive of their feelings (1 – not at all, 7 – very much). The questionnaire was successfully used in previous research on non-clinical populations of adults and adolescents (Efrati & Gola, 2019a). Cronbach’s alphas were 0.84 for unwanted consequences, 0.88 for lack of control, 0.87 for negative affect, and 0.85 for affect regulation. We also computed a total I-CSB score by averaging the 24 I-CSB items (Cronbach’s alpha = 0.93).

**Rumination and reﬂection** were measured with the 24-item *Rumination*-*Reﬂection Questionnaire* (RRQ; see Trapnell & Campbell, 1999, p. 293, for the items). The scale contains 12-item scales for rumination and reﬂection. The perception of self-other similarity was measured with three items: ‘‘I'm similar to people in general”, “Overall, I have a lot in common with other people,” and “In general, I'm very different from other people” (reverse-scored). Participants responded on a 7-point Likert scale (1 – *strongly disagree,* 7 – *strongly agree*). It should be noted here that previous research typically measured self-other similarity with single-item scales (e.g., Srull & Gaelick, 1983; Trapnell & Campbell, 1999). The self-other similarity items always appeared after both the RRQ and the word-recognition measure. Alpha was .85 for rumination and .88 for reflection.

**The Emotion Regulation Questionnaire for Children and Adolescents** (ERQ–CA). This scale, developed by Gullone and Taffe (2012), was based on the ERQ questionnaire (Gross & John, 2003). The scale contains 10-item scales for assessing the ER strategies of cognitive reappraisal (CR) (6 items) and expressive suppression (ES) (4 items). Items are rated on a 5-point Likert response scale (1 – strongly disagree, 5 – strongly agree), with higher scores indicating greater use of the corresponding ER strategy. Examples of such statements are “When I want to feel happier, I think about something different” (Item 1). “I control my feelings by not showing them” (Item 6). we used the Hebrew version (Efrati & Amichai-Hamburger, 2020). Alpha was 0.79 for Reappraisal and 0.72 for Suppression.

**Depression and Anxiety.** The Brief Symptom Inventory is a shortened (53 items) version of the SCL-90-R, and was found appropriate for the Israeli population (Gilbar & Ben-Zur, 2002). It is a well-tried instrument for assessing psychological distress, with good psychometric properties (Derogatis & Melisaratos, 1983), The Inventory is composed of nine symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Each item is scored on a 5-point scale (0 – *not at all,*4 – *extremely*). In the current study, we used the 12 items of the scales measuring depression and anxiety. The average for all items on each scale is the participant’s score, with higher scores indicating higher rates of depression and anxiety. In the present study, Cronbach’s alpha was .84 for the depression scale and .82 for the anxiety scale.

**Procedure**  
The study was presented as a research project on CSBD among 14–18-year-old adolescents. The participants constituted a convenience sample. They were recruited from a variety of sources (postings on bulletin boards and in online forums). Questionnaires were uploaded to Qualtrics – an online platform for questionnaires – and distributed by  
several research assistants. Parents of adolescents who agreed to participate in the study were contacted via email and/or phone, and were asked to review the questionnaires and sign an informed parental consent form, which was sent back to the research assistants by email. Upon agreement, a link for the online survey was sent to the adolescent who was assured as to the anonymity of the survey. Participants were then asked to complete the survey in private, in a quiet room in their home (without the presence of others). Following an informed consent form, questionnaires were presented in random order (personality dispositions, cognitive measures, psychopathology and CSBD). All questionnaires were in Hebrew – the native language in Israel. Lastly, an online debriefing was given, and participants were thanked for their participation. The procedure was approved by Institutional Review Board (IRB).

**Results**

**Descriptive statistics**

To examine the pattern of associations between the main study measures, we conducted a series of Pearson correlations. Coefficients, means and standard deviation are presented in Table 1.

[Table 1 here]

**Examination of the theoretical model**

To examine the premise that the links between a person’s background measures (gender, religiosity, and personality dispositions) and his or her level of CSBD are mediated by cognitive-related processes and psychopathology, we used Hayes, Preacher, and Myers’s (2011) multiple-step mediation methodology (see Figure 1 for a schematic illustration of the model). Specifically, we used structural equation modelling (SEM) to examine (1) whether the background measures [gender (1 = girl, 0 = boy), religiosity (1 = religious, 0 = secular), and personality dispositions ­– Extraversion, Neuroticism, Openness to experience, Attachment anxiety, Attachment avoidance] directly affected CSBD controlling for cognitive-related processes (Rumination, Reflection, Reappraisal, Suppression) and psychopathology (Depression, Anxiety); (2) whether the background measures indirectlyaffected CSB via cognitive-related processes (i.e., Step 1 mediators); (3) whether the background measures indirectlyaffected CSB via psychopathology (i.e., Step 2 mediators); and (4) the background measures indirectlyaffected CSBD via a 2-step mediation process – cognitive-related processes (Step 1) and psychopathology (Step 2). To examine whether these indirect paths were significant we employed bias-corrected bootstrap analyses (with 5000 subsamples). To estimate the model, we used MPlus 6.1 (Muthén & Muthén, 2010). A model has high fit to the observed data if the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) are greater than .95 and the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR) are lower than .05. Overall, 0.1% of the data were missing. Little's Missing Completely At Random (MCAR) tests indicated that the data were MCAR [*χ2*(24) = 7.80, *p* = .99]. Accordingly, missing data were handled with the multiple imputation procedure ([MI; Rubin, 2009](#_ENREF_1)). Unstandardized coefficients and bootstrap solutions are presented in Table 2, and summed standardized results are presented in Figure 2.

[Table 2, Figure 1, Figure 2]

The model was estimated in two steps. First, we estimated the fit of the complete model that comprised all proposed paths. The analysis revealed that the model had inadequate fit to the observed data, *χ²*(10, *N* = 350) = 30.30, *p* = .0008, *CFI* = .98, *TLI* = .87, *RMSEA* = .08, *90% CI* (.05, .11), 7% probability for *RMSEA* lower than .05, *SRMR* = .05. Next, we estimated a nested model from which we omitted paths with significance higher than .10 (i.e., retaining significant and marginally significant paths; 22 paths were dropped). The nested data had an excellent fit to the observed data, *χ²*(32, *N* = 350) = 42.62, *p* = .08, *CFI* = .99, *TLI* = .98, *RMSEA* = .03, *90% CI* (.00, .05), 90% probability for *RMSEA* lower than .05, *SRMR* = .04.

**Direct effects.** The model indicated that three background measures directly affected CSBD after controlling for people's cognitive-related processes (Step 1 mediators) and psychopathology (Step 2 mediators). Specifically, boys, on average, had a higher CSB score than girls, and religious adolescents, on average, had higher CSBD score than secular adolescents. In addition, the higher participants' openness to experience, the higher their CSBD scores.

**Indirect effects via cognitive-related processes or psychopathology (1-step mediation processes).** The model revealed that the tendency for reappraisal mediated the links between four background measures – gender, Extraversion, Openness to experience, and Attachment anxiety – and CSBD. Specifically, girls, on average, had a greater tendency for Reappraisal than boys. Higher scores on Extraversion, Openness to experience, and/or Attachment anxiety were also linked with a greater tendency for Reappraisal. This greater tendency, in turn, was related to higher scores on CSBD. In other words, adolescents who tend to be higher on Reappraisal (girls, and those high on Extraversion, Openness to experience, or Attachment anxiety) are more prone to CSBD. However, it should be noted that the indirect effect of gender is much weaker than its direct effect on CSBD, which corroborates the overall finding that boys are, on average, higher on CSBD than girls.

**Indirect effects via cognitive-related processes and psychopathology (2-step mediation processes).** In keeping with the main study premise, the model indicted that the links between adolescent's background measures (gender, religiosity, and personality dispositions) and their level of CSBD are mediated by several 2-step mediation processes via cognitive-related tendencies and psychopathology. Specifically, we found that the tendency to ruminate and to reflect increase anxiety-related symptoms that, in turn, increase the level of CSBD. The specific mediation paths were those in which the background measures were related with a greater tendency to ruminate and/or to reflect. As can be seen in Table 2 and Figure 2, higher scores on extraversion, openness to experience, and/or attachment anxiety were linked with greater tendency to ruminate. Higher scores on openness to experience, and/or attachment anxiety were also associated with a greater tendency to reflect. Religious adolescents also tended, on average, to reflect more than secular adolescents. In other words, adolescents who tend to be higher on ruminate and/or reflection (religious adolescents, and those high on extraversion, openness to experience, or attachment anxiety) are more prone to CSBD because rumination and reflection are associated with greater anxiety-related symptom severity.

**Discussion**

While the majority of research has attempted to understand the mechanisms of CSBD (Gola et al., 2020; Sassover, & Weinstein, 2020; Grubbs et al., 2020), the personal factors affecting CSBD (Zilberman et al., 2018; Efrati, Krause and Kaplan, 2022) and/or treatments for CSBD (Efrati & Gola, 2018c; Griffin, Way, & Kraus, 2021), the present study is an attempt to investigate by transdiagnostic approach, the development of CSB among adolescents. Specifically, I explored whether person’s background measures (gender, religiosity, and personality dispositions, attachment orientation), cognitive-related processes and psychopathology were associated with the severity of adolescents' CSBD.

**The direct effects of religiosity, gender, and personality disposition on CSBD**

In keeping with predictions, three background measures directly affected CSBD after controlling for people's cognitive-related processes and psychopathology. Specifically, boys reported higher severity of CSBD than girls. This finding is in line with research showing that adolescent boys were found to have higher levels of sexual arousal than girls (Mitchell et al., 2012; Herbenick et al., 2020) and higher attentional bias toward sexual cues and tend to have higher severity of CSBD (e.g. Efrati & Gola, 2018a; Efrati, Kolubinski, Caselli, & Spada, 2020; Efrati & Amichai-Hamburger, 2021). More specifically, analyses indicated that religious adolescents reported a higher severity of CSBD than secular adolescents (Efrati, 2019; Efrati & Dannon, 2018). This points to the relationship between religiosity and CSBD. For example, higher tendency for suppression of sexual thoughts may lead to CSBD (Efrati, 2019; Efrati et al., 2021). The higher prevalence among religious adolescents is also associated with the incongruence between normal sexual desires and urges and the explicit moral standards against sexual-related thoughts and behaviors imposed by religious figures (e.g., the Jewish rabbi) and texts (e.g., the Bible and the Jewish Talmud). Finally, I found that the higher participants' openness to experience, the higher severity of CSBD. This finding is in line with research showing that openness to experience positively contributed to scores of CSBD (Shimoni et al., 2018; Soraci et al., 2021; Zilberman et al., 2018).

**Indirect effects via cognitive-related processes or psychopatholog**y **(1-step mediation processes)**

Aside from examining direct effects, in the current study I examined an important factor of indirect effects via cognitive-related processes or psychopathology. Results indicated that girls, on average, had a greater tendency for reappraisal than boys. Higher scores on extraversion, openness to experience, and/or attachment anxiety were also linked with a greater tendency for reappraisal. This greater tendency, in turn, was related to higher scores on CSBD. As expected, my findings support Gullone and Taffe (2012) who found a significant positive relationship between adolescents and two personality measures – extraversion and openness to experience. To my surprise, and in contrast to previous studies (Gross & John, 2003; Gullone & Taffe, 2012), I found that on average, girls had a greater tendency for reappraisal than boys (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008). Moreover, unexpectedly, I found a relationship between anxious attachment and reappraisal who related to higher scores on CSBD. This finding may be explained by Ford, & Troy (2019) who argue that people are often unable to use reappraisal successfully, and even when they are successful, using reappraisal to feel better is not always functional. Reappraisal involves reconsidering the meaning of a situation, thus requiring people to engage with their stressful experiences, which can be a vulnerable position (Sheppes, 2014). This vulnerability in the context of sexuality can be explain by cultural aspect - girl sexuality as a tabu (Naezer, & van Oosterhout, 2021). In other words, girls who tend to use reappraisal unsuccessfully because of the tabu of sex, they may subsequently face cumulative risk to CSBD if they continue attempting reappraisal.

**Indirect effects via cognitive-related processes and psychopathology (2-step mediation processes)**

In keeping with the main study premise, I found that the tendency to ruminate and to reflect increase anxiety-related symptoms that, in turn, increase the level of CSBD. This finding is in line with research showing that sense of vulnerability among people with CSBD is fueled by feelings of self-rumination on negative outcomes (Reid et al., 2014) that may often arise because CSBD involves the consumption of porn and cybersex that commonly comprise humiliation and degradation of women (Efrati et al., 2019). People with a high tendency to ruminate while confronting distress are characterized by repetitively and passively focusing on one’s negative emotions and failures, as well as their consequences. Therefore, it is considered as the most common impaired emotional regulation strategy, as it exacerbates a person's distress (Nolen-Hoeksema et al., 2008) and may prone to development of CSBD. In addition, adolescents who tend to be higher on ruminate and/or reflection (religious adolescents, and those high on extraversion, openness to experience, or attachment anxiety) are more prone to CSBD because rumination and reflection are associated with greater anxiety-related symptom severity. These findings correspond with previous studies that show openness to experience and extraversion may also be associated with increased sensation seeking, risk-taking behaviors, and vulnerability to psychopathology (Struijs et al., 2021; Chiappelli et al., 2021). Openness to experience and extraversion encompasses facets including fantasy, imagination, and willingness to explore new ideas, it is possible that openness could be related to depression and anxiety through greater rumination on negative experiences and attentiveness to negative feelings. Moreover, the association between attachment anxiety and rumination consistent with the response style theory (Liu et al. 2021; Nolen-Hoeksema et al. 2008) and previous studies indicating the disruptive effect of rumination (Garnefski and Kraaij 2014; Genet and Siemer 2012). By religion, there are two possible explanations for this finding. One possibility is that because sex and sexuality is a tabu in religious communities, rumination and/or reflection in context of sexuality lead to more distress who may cause - 'rebound effect' - suppression of sexual thoughts may paradoxically lead to CSBD (Efrati, 2019; Efrati et al., 2021). An alternative is that because sex and sexuality is a tabu in religious communities, rumination and/or reflection cause more negative emotions (e.g. shame) and failures, the way that adolescent may coping to reduce negative emotions is by escape to CSBD. Finally, in keeping with previous, research found that internalizing (depression and anxiety) were link to CSBD (Efrati and Gola, 2019b).

**Limitations and future studies**

The results of the current study should be considered in light of its limitations. The study was based on self-report measures, which may have been subject to response bias. This is especially relevant for items that address intimate subjects, such compulsive sexual behavior disorder. Because the design was cross-sectional, causal relations between the study variables could not be inferred. Longitudinal studies are necessary to determine the directionality of the associations between psychological, cognitive, psychopathological, and cultural characteristics in CSBD. Finally, the research population was comprised of Jewish adolescents from the general population of Israel. Future studies should examine various other ethnic, cultural and clinical populations to ascertain the replicability and generalizability of the findings.

Despite these limitations, the current study has revealed multi-dimensional model that includes a person’s background measures and cognitive-related processes by transdiagnostic approach. The theoretical model addressed the mechanisms by which a person’s background measures (direct effects) cause the CSBD symptoms with which they are associated and examined why a given disposition leads to in different adolescents or to different CSBD symptoms within the same person over time (indirect effects).

**Clinical implication**

Lastly, the field might benefit from research on novel therapies for CSBD. One promising avenue for therapy is known as the third wave cognitive and behavioral therapies that represent the newest generation of psychotherapies (Brown, Gaudiano, & Miller, 2011; Hayes, 2004). Traditional first and second wave therapies focus on observing, predicting, and modifying behavior (Skinner, 1953) and identifying and reappraising distorted thinking patterns (Beck, 1976), respectively. Conversely, third wave therapies aim to promote acceptance instead of change of negative internal sensations and thoughts, and explore the context, processes, and functions of how a person relates to internal experiences rather than their content (Brown et al., 2011; Hayes & Hofmann, 2017; Hayes, 2004). The most known and utilized third wave treatments include Acceptance and Commitment Therapy, Dialectical Behavior Therapy, Mindfulness-Based Cognitive Therapy, Functional Analytic Psychotherapy, and Metacognitive Therapy (Hayes & Hofmann, 2017). Although these treatments are promising, only limited research has been conducted to appraise their effectiveness on CSBD (Holas, Draps, Kowalewska, Lewczuk, & Gola, 2020). Further work focusing on transdiagnostic approach of CSBD, particularly with regards to multiple measures, could improve research on third wave treatments and increase the likelihood for better treatment outcomes for treatment seeking individuals.

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Table 1

*Correlation Coefficients, Means, and Standard Deviation of the Main Study Measures*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | Extraversion | – |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Neuroticism | -.09 | – |  |  |  |  |  |  |  |  |  |  |
| 3 | Openness | .21\*\*\* | -.05 | – |  |  |  |  |  |  |  |  |  |
| 4 | Attach anxiety | -.05 | .50\*\*\* | .08 | – |  |  |  |  |  |  |  |  |
| 5 | Attach avoidance | -.33\*\*\* | .25\*\*\* | -.08 | .24\*\*\* | – |  |  |  |  |  |  |  |
| 6 | Rumination | -.02 | .51\*\*\* | .19\*\*\* | .55\*\*\* | .16\*\* | – |  |  |  |  |  |  |
| 7 | Reflection | .03 | .06 | .49\*\*\* | .22\*\*\* | -.01 | .42\*\*\* | – |  |  |  |  |  |
| 8 | Reappraisal | .16\*\* | .04 | .21\*\*\* | .19\*\*\* | -.05 | .16\*\* | .15\*\* | – |  |  |  |  |
| 9 | Suppression | -.31\*\*\* | .08 | .03 | .22\*\*\* | .45\*\*\* | .18\*\* | .02 | .17\*\* | – |  |  |  |
| 10 | Depression | -.11\* | .55\*\*\* | .06 | .52\*\*\* | .31\*\*\* | .57\*\*\* | .20 | .04 | .23\*\*\* | – |  |  |
| 11 | Anxiety | -.08 | .53\*\*\* | .03 | .44\*\*\* | .26\*\*\* | .48\*\*\* | .24\*\*\* | .05 | .18\*\* | .69\*\*\* | – |  |
| 12 | CSBD | .01 | .11\* | .22\*\*\* | .21\*\*\* | .13\* | .22\*\*\* | .19\*\*\* | .09 | .12\* | .22\*\*\* | .22\*\*\* | – |
|  | *Mean* | 3.27 | 3.02 | 3.53 | 3.34 | 3.47 | 3.41 | 3.49 | 3.09 | 2.54 | 1.59 | 1.07 | 2.51 |
|  | *Standard deviation* | .63 | .74 | .67 | 1.20 | .93 | .70 | .79 | .72 | .78 | .91 | .83 | 1.13 |

*Note*. \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001. Attach = attachment. CSBD= compulsive sexual behavior disorder.

Table 2

*Direct and Indirect Effects Linking Background Measures with CSBD and Their Level of Significance*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CSBD | | |  |  |
| UL 95% CI | LL 95% CI | Effect |  |  |
| .33 | -.01 | .15 | Depression | Direct effect |
| .38 | .02 | .20\* | Anxiety |  |
| .37 | -.02 | .17 | Rumination |  |
| .33 | .04 | .18\* | Reappraisal |  |
| -.64 | -1.04 | -.84\*\*\* | Gender |  |
| .98 | .60 | .79\*\*\* | Religiosity |  |
| .04 | -.27 | -.13 | Extraversion |  |
| .36 | .03 | .19\* | Openness to experience |  |
| .08 | .01 | .03\* | Gender -> Reappraisal | Indirect 1-step effects |
| .08 | .01 | .03\* | Extraversion -> Reappraisal |  |
| .09 | .01 | .04\* | Openness to experience -> Reappraisal |  |
| .05 | .01 | .02\* | Attachment anxiety -> Reappraisal |  |
|  |  |  |  | Indirect 2-step effects |
| .04 | .01 | .02\* | Extraversion -> Ruminate -> Anxiety |  |
| .04 | .01 | .02\* | Openness to experience -> Ruminate -> Anxiety |  |
| .02 | .01 | .01\* | Attachment anxiety -> Ruminate -> Anxiety |  |
| .01 | .01 | .02\* | Openness to experience -> Reflection -> Anxiety |  |
| .01 | .01 | .01\* | Attachment anxiety -> Reflection -> Anxiety |  |
| .01 | .01 | .01\* | Religiosity -> Reflection -> Anxiety |  |
|  | | |  | R-square |

*Note*. CI = bias-corrected confidence interval. CIs not including 0 are significant in 0.05.

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*Figure 1*. Schematic illustration of the proposed model linking background measures with CSB via two-step mediation processes: cognitive-related mechanisms (Step 1), and psychopathology (Step 2)

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*Figure 2*. The complete model linking background measures with CSB via two-step mediation processes: cognitive-related mechanisms (Step 1), and psychopathology (Step 2)