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Compulsive Buying: Earlier Illicit Drug Use, Impulse Buying, Depression, and Adult ADHD Symptoms

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Abstract

This longitudinal study examined the association between psychosocial antecedents, including illicit drug use, and adult compulsive buying (CB) across a 29-year time period from mean age 14 to mean age 43. Participants originally came from a community-based random sample of residents in two upstate New York counties. Multivariate linear regression analysis was used to study the relationship between the participant's earlier psychosocial antecedents and adult CB in the fifth decade of life. The results of the multivariate linear regression analyses showed that gender (female), earlier adult impulse buying (IB), depressive mood, illicit drug use, and concurrent ADHD symptoms were all significantly associated with adult CB at mean age 43. It is important that clinicians treating CB in adults should consider the role of drug use, symptoms of ADHD, IB, depression, and family factors in CB.

Keywords

compulsive buying; illicit drug use; impulse buying; public health; depression; attention deficit disorder with hyperactivity; longitudinal studies

1. Introduction

Compulsive buying (CB) is defined as a chronic, excessive, and repetitive purchasing behavior that manifests itself as a primary response to negative events or feelings (e.g., psychological stress) or uncontrolled urges; It is difficult to stop, and results in harmful consequences or impaired quality of life (O'Guinn and Faber, 1989; Black, 2012). CB has been reported worldwide (e.g., Koran et al., 2006; Horváth et al., 2013). Many studies suggest that more women than men are compulsive buyers. However, the reported gender difference could be an artifact (Black, 2007). Koran et al. (2006) reported that a nearly equal percentage of men and women met criteria for CB disorder (5.5% and 6.0%, respectively). Research has shown that the negative consequences of CB are not only economic in character, such as credit card misuse, debt, and financial problems (d'Astous 1990; Roberts,

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Conflict of Interest

The authors report no conflict of interest.

1998; Park and Burns, 2005; Ridgway et al., 2008; Joireman et al., 2010), but also psychological (e.g., emotional distress) and familial (e.g., marital conflict) (O'Guinn and Faber, 1989).

The appropriate classification of CB continues to be debated (Swan-Kremeier, et al., 2005; Black, 2007), but a likely description of CB is that it is a behavioral addiction (Lawrence, et al., 2014). In many respects, CB shares some features with substance abuse and dependence as well as other behavioral addictions, including pathological gambling (PG) (Hollander and Allen, 2006; Clark and Calleja, 2008; Grant et al., 2010; Black, et al., 2012). CB is motivated in part by internal triggers such as psychological symptoms (Kellett and Bolton, 2009). Elliott (1994) suggested that the prime functions of CB, as an addiction, are to repair mood, and to increase the ability to match perceptions of oneself with socially desirable or required appearances. This view was echoed by Valence et al. (1988), who proposed a conceptual framework, in which internal stress is the central factor. Internal stress provokes a spontaneous emotional reaction and pushes an individual to reduce the tension. Reduction of internal stress becomes the primary motivation for CB. DeSarbo and Edwards (1996) refer to this as "internal" CB. Depression is another important psychological symptom commonly present among compulsive buyers (Christenson et al., 1994; McElroy et al., 1994; Lejoyeux et al., 1996; Lejoyeux et al. 1997; Dittmar, 2004; Black, 2007). Lejoyeux and Weinstein (2010) reviewed the literature and found that one of the most commonly associated comorbidities of CB is depression. Individuals with depressive mood may depend on their CB to relieve themselves temporarily from their depressive state (Lejoyeux et al., 1996; Vogt et al., 2014). Indeed, Kyrios, et al. (2013) found that compulsive buyers were strongly motivated by emotional concepts. In addition, event induced depression, such as a natural disaster, can also lead to CB (Sneath, et al., 2009).

Another major trigger of CB is a lack of impulse control (Kellett and Bolton, 2009). Grant et al. (2010) indicated that the essential feature of behavioral addictions is the failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. According to Ridgway et al. (2008), CB is not only reflected as an individual's tendency to be preoccupied with buying, which is driven by internal stress or materialistic thoughts, but also due to a lack of impulse control over buying. Therefore, many also consider CB as an impulse control disorder (Christenson et al., 1994; McElroy et al., 1994; Williams and Grisham, 2012). Billieux and his colleagues (2008) demonstrated that, among four subtypes of impulsivity, urgency was a significant predictor of compulsive buying tendencies. Claes et al. (2010) found that compulsive buying was associated with a low level of self-control, even after controlling for depressive symptoms. Claes et al. (2011) found that CB was related to a lack of self-control, including a lack of inhibitory control, lack of activation control, and a lack of attentional control.

There are a few studies that have shown that substance use is associated with CB (Roberts and Tanner, 2000; Mitchell et al., 2002; Lejoyeux et al., 2006). For example, Roberts and Tanner (2000) found that self-report measures of illegal drug use were significantly associated with CB among teenagers (12–19 years). Mitchell et al. (2002) found that compulsive buyers were significantly more likely to have a lifetime history of substance abuse or dependence. However, relatively little is known about the nature of this association

(Lejoyeux and Weinstein, 2010). It is still unclear whether substance use is a trigger for CB or vice versa. CB may be a replacement for substance use or both may serve as an expression of another underlying factor. Unfortunately, since many of the studies are cross-sectional in nature, one is limited in the ability to make inferences regarding the time ordering of substance use and CB. In addition, several factors may serve to mediate the relationship between substance use and CB. For example, individuals who routinely use illicit drugs may develop psychological conditions (e.g., psychological symptoms), which may manifest themselves in a compulsive buyer's experiencing a "high", similar to that found in substance users (McElroy et al., 1994). Therefore, it is important to control for other factors, in order to understand the relationship between illicit drug use and CB.

Aims of the present study and hypotheses

Since an individual's CB usually develops over time (Roberts and Tanner, 2000) and the usual onset of CB is in late adolescence and the early 20's (Black, 2007), there has been a long-standing interest in understanding the development of CB from adolescence to adulthood (Kellett and Bolton, 2009). The main objective of this longitudinal study is to investigate the adolescent and concurrent psychosocial factors that are correlated with and predict CB in a community sample.

CB has been linked to harsh childhood and adolescence environments (Valence et al., 1988; McElroy, et al., 1994; DeSarbo and Edwards, 1996). Black et al. (1998) found that there was a higher degree of psychopathology (e.g., depression, alcohol and drug use disorder) among the relatives of compulsive buyers as compared with relatives of non-compulsive buyers. Rindfleisch, et al. (1997) found that young adults reared in disrupted families are more materialistic and exhibit higher levels of compulsive consumption than young adults reared in intact families. Baker et al. (2013) suggest that intangible family resources, like love and affection, provided by the youth's parents tend to decrease the excessive consumption orientations of materialism and CB later in life.

Even though research has shown that a harsh childhood and adolescent family environment may serve as antecedents of CB, there are few studies designed to investigate the mechanisms operating between earlier family environmental experiences and adolescent experiences and later CB (Baker et al., 2013). The present study addresses this gap. The theoretical framework guiding the present longitudinal study is Family Interactional Theory (FIT, Brook, et al., 1990). FIT emphasizes how intrafamilial mechanisms in adolescence, such as identification with parents, are mediated by the adolescent's personality and behaviors (e.g., impulsive buying tendency, depressive mood, and substance use), which, in turn, are associated with the individual's CB in adulthood. FIT is a multidimensional conceptual model, explaining the development of substance use and addiction over time by postulating a developmental sequence of influences from multiple domains on the individual's behavior. According to FIT, the primary developmental context is the family. The major mechanisms linking the domains within FIT are social modeling, attachment, and the emulation of and identification with values and behaviors of parental figures as a result of this attachment. The resulting conflict-free relationship between parent and adolescent results in a close mutual attachment and, ultimately, an identification of the adolescent with

the parent and with the conventional values and behaviors modeled by the parent. Attachment to and identification with conventional and well-adjusted parents, in turn, are related to the development of conventional personal attributes and behaviors. Research in the literature has shown that a parental relationship characterized by identification was associated with the youngster's better impulse control (Brook, et al., 1990), less depressive mood (Brook, et al., 1990), and less substance use (Brook, et al., 1990). In a related context, lack of affectional identification increases the probability of developing stronger materialistic attitudes (Kasser and Ryan, 1993; Kassar, et al., 1995), which were found to be strongly associated with CB (O'Guinn and Faber, 1989; Dittmar, 2005). In the present study, we are expanding FIT which was originally developed to explain the antecedents of substance use and psychopathology and applying the framework to the study of CB.

The present study adds to previous research in three important ways. First, our study is guided by FIT within a developmental context. Second, the present study focuses on the association between earlier illicit drug use and adult CB, while controlling for other important factors. Third, this is one of the first longitudinal studies that focuses on the association between earlier and concurrent psychosocial factors, such as identification with parents, depressive mood, impulse buying (IB), and symptoms of attention deficit hyperactivity disorder (ADHD), and adult CB. As regards the relationship between earlier IB and adult CB, several researchers suggest IB is directly associated with self-regulation dysfunction (Rook, 1987; Vohs and Faber, 2007). Thus, IB is considered as the initial stage of a continuum leading to CB (d'Astous, 1990; DeSarbo and Edwards, 1996). This view is supported by the empirical study of Sun and his colleagues (2004). Since impulsivity is a defining feature of ADHD symptoms (American Psychiatric Association, 2000), we also examined the association between concurrent ADHD symptoms and CB.

On the basis of the studies in the literature and FIT, we hypothesize that: (1) Individual earlier psychological symptoms (i.e., depressive mood) were associated with adult CB; (2) Early IB and adult ADHD symptoms, both of which reflect aspects of an impulsivity trait (Bratko, et al., 2013; Black, et al., 2012, respectively), were associated with adult CB; (3) Early illicit drug use was associated with adult CB; and (4) Early family risk factors (i.e., low identification with parents) were associated with adult CB via other psychosocial variables cited above.

2. Methods

2.1 Participants and Procedure

Data on the participants in this study came from a community-based random sample residing in one of two upstate New York counties (Albany and Saratoga) first assessed in 1983. The participants' mothers were interviewed about the participants in 1975 (T1) to assess psychosocial development among youngsters. The sampled families were generally representative of the population of families in the two upstate New York counties. There was a close match of the participants on family income, maternal education, and family structure with the 1980 census. Interviews of the participants were conducted in 1983 (T2, $N=756$), 1985–1986 (T3, $N=739$), 1992 (T4, $N=750$), 1997 (T5, $N=749$), 2002 (T6, $N=673$), 2007 (T7, $N=607$), and 2012–2013 (T8, $N=528$). The mean ages (SDs) of participants at the

follow-up interviews were 14.1 (2.8) at T2, 16.3 (2.8) at T3, 22.3 (2.8) at T4, 27.0 (2.8) at T5, 31.9 (2.8) at T6, 36.6 (2.8) at T7, and 43.0 (2.8) at T8, respectively.

Extensively trained and supervised lay interviewers administered interviews in private. Written informed consent was obtained from participants and their mothers in 1983, 1985–1986, and 1992, and from participants only in 1997, 2002, 2005–2006, and 2012–2013. The Institutional Review Board of the New York University School of Medicine authorized the use of human subjects in this research study. Earlier waves of the study were approved by the Institutional Review Boards of the Mount Sinai School of Medicine and New York Medical College. Additional information regarding the study methodology is available in prior publications (e.g., Brook et al., 1986).

2.2.1. T8 CB—At T8, the participants responded to 10 questions scored on a five-point scale: strongly disagree (1) to strongly agree (5); Cronbach's $\alpha = .91$; modified from Valence et al., 1988). Among these 10 items, 5 items relate to the tendency to spend: (1) "I feel others would be horrified if they knew of my spending habits" (2) "When I have money, I cannot help but spend part or the whole of it" (3) "I am often impulsive in my buying behavior" (4) "As soon as I enter a shopping center, I have an irresistible urge to go into a shop to buy something" (5) "I have often bought a product that I did not need, while knowing I had very little money left." There are 3 items that relate to the reactive aspect/compulsion/drive or urge to spend: (1) "For me, shopping is a way of facing the stress of my daily life and of relaxing" (2) "I sometimes feel that something inside of me pushes me to go shopping" (3) "There are times when I have a strong urge to buy (clothing, electronics, etc.)." There are also two items that reflect post-purchase guilt: (1) "At times, I have felt somewhat guilty after buying a product, because it seemed unreasonable" (2) "There are some things I buy that I do not show to anybody for fear of being perceived as irrational in my buying behavior." The mean of the 10 items was used in the analysis.

2.2.2. T8 Attention Deficit Hyperactivity Disorder (ADHD) Symptoms—At T8, the participants responded to questions with regards to their ADHD symptoms (Kessler et al., 2005). There are 6 items scored on a five-point scale: never (0) to very often (4); $\alpha = .80$; i.e. (1) "How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?" (2) "How often do you have difficulty getting things in order when you have to do a task that requires organization?" (3) "How often do you have problems remembering appointments or obligations?" (4) "When you have a task that requires a lot of thought, how often do you avoid or delay getting started?" (5) "How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?" and (6) "How often do you feel overly active and compelled to do things, like you were driven by a motor?" The mean of the 6 items was used in the analysis.

2.2.3. T7 Illicit Drug Use—At T7, illicit drug use was assessed with two items. The participants responded to questions with regard to their marijuana use and illicit drug use other than marijuana (e.g., heroin, PCP, LSD, cocaine, etc.) during the last 5 years before the interview (none (1); 1–2 times (2); 3–5 times (3); 6–9 times (4); 10–19 times (5); 20–39 times (6); and 40+times (7) (Johnston et al., 2006). The mean of the standardized scores of marijuana use and other illicit drug use was used in the analysis.

2.2.4. T3 and T7 IB—At T3 and at T7, one question with regards to the participants' IB was asked, i.e., “When I go to the store, I often come home with things I had not intended to buy” [False (1) – True (4)] (modified from Wood, 1998).

2.2.5. T3 and T7 Depressive Mood—At T3 and at T7, depressive mood was assessed with 5 items ($\alpha=0.76$; e.g., “Over the last few years, how much were you bothered by feeling low in energy or slowed down?”, Derogatis et al., 1974). For each time (T3 and T7), the mean of the 5 items was used in the analysis.

2.2.6. T3 Identification with Parents—The T3 identification with parents scale consists of T3 identification with mother (14 items, $\alpha=.85$) and T3 identification with father (14 items, $\alpha=.80$). Each measure consists of maternal/paternal admiration, (Brook et al., 1990; 5 items; e.g., “How much do you admire your mother/father in her/his role as mother/father?”) maternal/paternal emulation, (Brook et al., 1990; 5 items; e.g., “How much do you want to be like your mother/father in your role as a parent?”) and maternal/paternal similarity (Brook et al., 1990; 4 items; e.g., “How similar do you think you actually are to your mother/father in terms of personality?”) The mean of the 14 items was used in the analysis.

2.2.7. Demographic Variables—Demographic variables were: Gender, T8 age, T8 marital status (married=1), T8 household income, T8 educational level, and T2 family income (see Table 1 for the specific coding).

2.3. Analysis

The participants who did not participate in the study at T8 ($N = 228$) were excluded from the analyses. There was a higher percentage of females (55.9% in the sample of 528 participants vs. 40.5% in the sample of 228 participants; $\chi^2(1) = 16.3$, p -value < 0.001) and greater T2 family income (8.8 (SD=2.5) vs. 8.4 (SD=2.7); $t = 2.05$, p -value < 0.05) among the participants. There were no associations between those included in the analysis ($N = 528$) as compared with those who were excluded ($N = 228$) from it with respect to age ($t = 0.19$, p -value = 0.85), T3 depressive mood ($t = -0.18$, p -value = 0.86), T3 impulsive buying behavior ($t = -1.47$, p -value = 0.14), and T3 identification with parents ($t = -0.50$, p -value = 0.62).

SAS was used to perform linear regression analyses to investigate the associations between earlier and concurrent psychosocial factors and adult CB ($N=528$). The dependent variable was T8 CB. We conducted the analyses in three steps. First, we conducted bivariate linear regression analyses of T8 CB on each of the psychosocial factors. Second, multivariate linear regression analyses of T8 CB were conducted by including 13 independent variables (i.e., gender, T2 family income, T3 depressive mood, T3 IB, T3 identification with parents, T7 illicit drug use, T7 depressive mood, T7 IB, T8 ADHD symptoms, T8 household income, T8 educational level, T8 marital status, and T8 age). Third, to examine the gender differences in the association between the psychosocial variables and T8 CB, we added 12 interaction terms (e.g., gender x T7 illicit drug use) to the list of independent variables at the second step. We also report the results for males and females separately.

3 Results

Table 1 presents the mean (*SD*) or percentage (%) of the dependent and independent variables used in the present study. Table 2 presents the results of the linear regression analyses. As shown in Table 2, the bivariate linear regression analysis indicated that all of the psychosocial variables were associated with T8 CB ($p < .05$). The multivariate linear regression analysis ($R^2 = .32$) indicated that T7 illicit drug use [standardized regression coefficient (*S.R.C.*) = .08; partial $R^2 = .0051$], T7 IB (*S.R.C.* = .23; partial $R^2 = .0444$), T7 depressive mood (*S.R.C.* = .15; partial $R^2 = .0168$), and T8 ADHD symptoms (*S.R.C.* = .34; partial $R^2 = .1025$) were significantly associated with T8 CB, while males on average had lower T8 CB than females (*S.R.C.* = -.10; partial $R^2 = .0093$). T8 concurrent household income, educational level, and marital status were not significantly associated with T8 CB ($p > .05$). In addition, the interactive analysis indicated that there was no gender difference in the association between the psychosocial variables and T8 CB ($p > .05$).

4 Discussion

In line with FIT, family factors in adolescence (i.e., identification with parents) have strong bivariate associations with an individual's adult CB, such that individuals who have a greater identification with parents in adolescence may engage in less CB in adulthood. This finding is in accord with Muensterberger (1994), who suggests that the process of CB can function as a reenactment of the original attachment bond between parent and child in an attempt to repair the childhood experience of an insecure attachment. Correlation analyses indicated that earlier identification with parents was also significantly ($p < .05$) associated with other psychosocial variables measured in the present study (e.g., illicit substance use, IB, depressive mood, and ADHD symptoms) (data not shown). Thus, the results of the correlation analyses and our multivariate analyses indicated that the association between low adolescent identification with parents and adult CB was mediated, by other psychosocial variables, at age 37 (e.g., substance use, IB, depression).

To our knowledge, this is the first longitudinal study to examine the association between earlier illicit substance use and later CB while controlling for other important psychosocial variables. In support of our hypotheses, the findings indicate that greater illicit substance use at age 37 is associated with greater CB at age 43. The associations between earlier illicit substance use and later CB remained significant even after controlling for a wide range of possible confounding factors, such as earlier depressive mood, IB, low identification with parents in adolescence, and current ADHD symptoms. Currently, there is a dearth of research on substance use and CB. In an earlier paper, Marks (1990) indicated that CB may represent a behavioral non-chemical addiction. According to Marks (1990), CB and substance dependence have a number of common features such as craving, symptoms of withdrawal, and a compulsive drive or urge to spend.

The evidence from studies of neurobiology suggests that CB is similar in its neurocircuitry to other addictions such as substance use disorders. Studies (Knutson and Bossaerts, 2007; Raab et al., 2011) using event-related functional magnetic resonance imaging (fMRI) found significant differences between non-compulsive ("normal") and compulsive buyers in

various brain regions. Specifically, Raab et al. (2011) found that compulsive buyers show a higher activity in the ventral striatum (nucleus accumbens) during the presentation of purchasable products. Similarly, several investigations have found that drug use, nicotine dependence, and pathological gambling were associated with higher levels of activity in the nucleus accumbens simply from looking at a syringe, a cigarette or a gaming machine, respectively (Volkow et al., 2002; Berridge, 2003; Reuter et al., 2005). The development of an addictive syndrome therefore may place people with the syndrome at increased risk for their continuing addictive behaviors and for developing new addictive behaviors (Shaffer et al., 2004). Therefore, it is possible that both illicit drug use and CB activate similar reward mechanisms, which involve immediate relief of stress, anxiety, and depression. Despite these possibilities, at present, the etiology of CB is not known, although as with other complex behavioral disturbances, it may have contributions from developmental, neurobiological, and cultural factors.

In the present study, we also examined behavioral factors other than earlier illicit substance use which may be related to CB. In accord with DeSarbo and Edwards (1996), we found that earlier IBs are correlated with later CB at T8. It is possible that, similar to other types of addictions (e.g., substance use), there is a stepwise transition across stages of a continuum of behavior from normal, through problematic, to addiction, with different factors affecting different stages in the addiction process. Thus, there are special key experiences, i.e., IB, to which the propensity to CB can be traced. This association may also imply that both of these buying behaviors reflect an individual's impulsivity trait. Both IB and CB have been found to be related to the trait of impulsivity. Several investigators have reported that compulsive buyers compared to normals are more impulsive (DeSarbo and Edwards, 1996; Lejoyeux, et al., 2002). Three components of impulsivity related to CB have been identified (Whiteside and Lynam, 2001; Billieux et al., 2008). They include urgency, lack of premeditation, and lack of perseverance. A high level of urgency, lack of premeditation, and lack of perseverance make it difficult for individuals to constrain their buying impulses and refrain from impulsive behavior.

According to Lejoyeux and Weinstein (2010), this suggests that compulsive buying is a behavioral problem with features of low impulse control. In a related vein, we found that impulsivity as reflected in ADHD symptoms contributes to adult CB, as individuals act on the spur of the moment and do not think of the long-term consequences of their behavior (e.g., they may experience subsequent depression). ADHD symptoms are often characterized by a lack of impulse control and impulsivity. At present, there is a dearth of literature on the role of ADHD symptoms in CB. However, Black et al. (2012) reported that CB was associated with higher levels of impulsivity.

In the present analysis, earlier depressive mood was associated with later CB. This is consistent with the work of several researchers who noted that depression is present among compulsive buyers (Christenson et al., 1994; McElroy et al., 1994; Black DW, 2007; Lejoyeux and Weinstein 2010). It is possible that buying among some individuals is due to the presence of aversive emotions and results in a decrease in their feelings of negative emotions. In accord with the theory developed by Valence et al. (1988), internal stress such as depressive mood provokes a spontaneous action and pushes an individual to reduce

tension. Relief from this stress becomes the primary motivation for CB. One possibility is that low self-esteem mediates the relation between depressive mood and CB. Several investigators have reported that depressive mood is related to low self-esteem (Battle, 1978). Low self-esteem has been found to correlate with both depressive mood and CB (Hanley and Wilhelm, 1992). CB may be associated with a temporary increase of self-esteem. Buying something also helps such people feel better about themselves. Several investigators have found that the link between depressive mood and CB is attenuated by the administration of antidepressants (McElroy et al., 1991).

In the present study, we did not find significant gender differences in the associations between psychosocial factors and CB, despite the fact that we found that females as compared with males had higher scores on a measure of CB. In community samples as well as clinical samples (Christenson et al., 1994), women as compared with men are more likely to be compulsive shoppers (Dittmar, 2005; Black, 2007; Black et al., 2012). However, Koran et al. (2006) reported that an equal percentage of men and women manifested CB. Weinstein et al. (2015) also found there were no gender differences in CB. Our findings indicated similar patterns for males and females as reflected by the associations between impulsive buying behavior, substance use, depressive mood, and concurrent ADHD symptoms and adult CB. Except for gender, the bivariate associations between other demographic factors (e.g., age, current educational level, family income, and marital status) and adult CB were not maintained after controlling for several psychosocial factors in this study. Thus, these bivariate associations may be mediated by the presence of psychosocial factors, such as IB, depressive mood, and/or ADHD symptoms. For example, low family income may be associated with symptoms of ADHD which in turn are correlated with CB.

Although this research provides an important advance in comprehending key constructs believed to be central to CB, some limitations should be noted. First, the present study relies on self-reported measures, which may be problematic in terms of their reliability and validity. However, many of the measures are reliable and have predictive validity (Brook, et al., 1990). Second, the earlier IB measures consisted of only one item at T3 and one item at T7. Third, past ADHD symptoms were not assessed. Fourth, in the present study, we included earlier measures of depressive mood rather than a recent one in order to focus on the developmental pathways to CB. However, current depressive mood would also have been an important correlate of CB. Fifth, this study is limited because the sample was comprised of predominantly white participants. Related to this, about 50% of the participants lived in the Albany/Saratoga areas at T8. Therefore, the findings may not be generalizable to racial/ethnic minority groups or individuals living in other parts of the country. CB may operate differently across racial and ethnic groups. Sixth, it is not possible to infer causality based on the results of the present study. Specifically, the fact that illicit substance use (as compared with non-use) precedes CB does not necessarily mean that illicit drug use causes CB. Seventh, future research should take into consideration how genetic factors and social contexts affect CB.

Despite these limitations, this study has several strengths. First, the participants were followed from the second to the fifth decade of life. The age range of this study spans several developmental stages. Second, the study takes a life-course perspective, which

allows us to time-order the associations between illicit substance use and other psychosocial variables and CB, unlike cross-sectional studies. Third, we considered a wide array of variables, such as age, gender, SES, marital status, ADHD symptoms, earlier depressive mood, IB, illicit drug use, identification with parents, and SES of family of origin, all of which may be related to adult CB.

5 Conclusions

In sum, this longitudinal study is the first to examine the precursors of CB covering a period of 30 years. The findings provide empirical evidence that earlier identification with parents, illicit drug use, depressive mood, IB, and current ADHD symptoms are directly and/or indirectly associated with adult CB. Regarding treatment, it is important that clinicians treating CB in adults should consider the role of illicit drug use, symptoms of ADHD, impulsivity, and depression. Future studies should investigate the role these factors, such as illicit drug use, may play in the treatment of individuals who manifest CB.

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Table 1Descriptive Statistics (*N*=528)

Variables	Coding	Mean (SD) or %
Compulsive Buying (2012–2013)	Strongly disagree (1) – Strongly agree (5)	1.81 (0.83)
Gender	Female (0) – Male (1)	45% (Male)
Family Income of Origin (1983)	Under \$2,000 (0) – \$50,000 or over (12)	8.81 ^a (2.43)
Depressive Mood (1985–1986)	Not at all (0) – Extremely (4)	1.05 (0.64)
Impulsive Buying (1985–1986)	False (1) – True (4)	2.61 (0.99)
Identification with Parents (1985–1986)	Not at all (0) – Extremely (4)	3.45 (0.68)
Illicit Drug Use (Mean of Marijuana and Other Illicit Drug) (2007)	None (1) – 40+ times (7)	1.68 (1.24)
Depressive Mood (2007)	Not at all (0) – Extremely (4)	1.04 (0.77)
Impulsive Buying Behavior (2007)	False (1) – True (4)	2.50 (0.90)
ADHD Symptoms (2012–2013)	Never (0) – Very Often (4)	1.14 (0.70)
Household Income (2012–2013)	\$1–\$10,000 (1) – > \$250,000 (12)	7.52 ^b (2.45)
Educational Level (2012–2013)	Less than a high school diploma (1) – Doctoral degree or equivalent (6)	3.27 ^c (1.29)
Marital Status (Married=1) (2012–2013)	Not currently married (0) – Married (1)	70% (Married)
Age (2012–2013)	Years	43.01 (2.78)

Note:

^a about \$20,000;^b about \$75,000;^c about Associate's Degree.

Table 2

Linear Regressions: Psychosocial Factors Related To Compulsive Buying (CB) Among Men and Women in their Early Forties (N=528).

Independent Variables	S.R.C. (Bivariate analysis)	S.R.C. (Multivariate analysis)	Partial R ²
Gender (Male=1)	-0.17***	-0.10**	.0093
Family Income of Origin (1983)	-0.14***	-0.06	.0032
Depressive Mood (1985–1986)	0.17***	0.02	.0002
Impulse Buying (1985–1986)	0.11*	0.04	.0016
Identification with Parents (1985–1986)	-0.11*	0.05	.0017
Illicit Drug Use (Mean of Marijuana and Other Illicit Drug) (2007)	0.12**	0.08*	.0051
Depressive Mood (2007)	0.32***	0.15***	.0168
Impulsive Buying (2007)	0.36***	0.23***	.0444
ADHD Symptoms (2012–2013)	0.42***	0.34***	.1025
Household Income (2012–2013)	-0.13**	0.08	.0037
Educational Level (2012–2013)	-0.13**	-0.06	.0026
Married (Married=1) (2012–2013)	-0.10*	-0.03	.0008
Age (2012–2013)	-0.10*	-0.07	.0040
R ²	-	0.32	-

Note:

S.R.C.= Standardized Regression Coefficient;

* p<0.05;

** p<0.01;

*** p<0.001;

All of the independent variables were included in the equation of the multivariate linear regression analyses.