Impulsive Behaviors in Patients With Pathological Buying

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Aim: To investigate impulsive behaviors in pathological buying (PB). *Methods:* The study included three groups matched for age and gender: treatment seeking outpatients with PB (PB+), treatment seeking psychiatric inpatients without PB (PB−), and a healthy control group (HC). PB was assessed by means of the Compulsive Buying Scale and by the impulse control disorder (ICD) module of the research version of the Structured Clinical Interview for DSM-IV (SCID-ICD). All participants answered questionnaires concerning symptoms of borderline personality disorder, self-harming behaviors, binge eating and symptoms of attention deficit and hyperactivity disorder (ADHD). In addition, comorbid ICDs were assessed using the SCID-ICD. *Results:* The PB+ and PB− groups did not differ with regard to borderline personality disorder or ADHD symptoms, but both groups reported significantly more symptoms than the HC group. Frequencies of self-harming behaviors did not differ between the three groups. Patients with PB were more often diagnosed with any current ICD (excluding PB) compared to those without PB and the HC group (38.7% vs. 12.9% vs. 12.9%, respectively, $p = .017$). *Discussion:* Our findings confirm prior research suggesting more impulsive behaviors in patients with and without PB compared to healthy controls. The results of the questionnaire-based assessment indicate that outpatients with PB perceive themselves equally impulsive and self-harm as frequently as inpatients without PB; but they seem to suffer more often from an ICD as assessed by means of an interview.

Keywords: pathological buying, impulsivity, borderline personality, self-harm, attention deficit, hyperactivity disorder, binge eating

INTRODUCTION

Pathological buying (PB) is characterized by a maladaptive preoccupation with buying and shopping resulting in repetitive purchasing of consumer goods to relief stress, to escape from negative feelings such as anxiety, depression, tension, or boredom, and to enhance a poor sense of self (McElroy, Keck, Pope, Smith, & Strakowski, 1994; Müller, Mitchell, & de Zwaan, 2015; Schlosser, Black, Repertinger, & Freet, 1994). PB may occur in bricks-and-mortar-based stores as well as via paper catalogs, TV-shopping channels, or via the Internet. The products that are bought are mostly not used and patients quickly lose interest in the purchased items. Nevertheless, the desire to shop and buy reoccurs, which leads to further excessive, inappropriate buying sprees while losing control over buying. Patients with PB usually spend far beyond their means, which can cause distress and also indebtedness, interference with occupational and social functioning, family break-ups, and occasionally even unlawful behavior (e.g., pretending the ability to pay and fraud) (McElroy et al., 1994; Schlosser et al., 1994). Although prevalence estimates of PB in population-based studies showed relatively high prevalence rates, ranging from 5% to 8%, with higher rates in young adults (e.g., Koran, Faber, Aboujaoude, Large, & Serpe, 2006; Maraz, von den Brink, & Demetrovics, 2015; Mueller et al., 2010; Müller, Trotzke, Mitchell, de Zwaan, & Brand, 2015; Neuner, Raab, & Reisch, 2005; Otero-López & Villardefrancos, 2014), PB remains neglected or minimized in clinical practice.

Previous research has clearly highlighted the role of impulsivity in PB. Impulsivity is considered a multifaceted construct characterized by acting rashly without considering future consequences (Barratt, 1985; Cyders & Smith, 2008), novelty seeking (Cloninger, 1994), and approach behavior triggered by a high sensitivity to rewarding stimuli (Gray, 1970). Questionnaire-based data from volunteers suggested high positive correlations between PB and positive/negative urgency (the tendency to act rashly while in positive/negative mood) (Billieux, Gay, Rochat, & Van der Linden, 2010; Rose & Segrist, 2014) and impulsivity (Black, Shaw, McCormick, Bayless, & Allen, 2012; Vogt, Hunger, Pietrowsky, & Gerlach, 2015; Williams & Grisham, 2012). A few studies that investigated impulsivity in PB using behavioral tasks produced mixed results. While individuals with PB performed worse in some tasks (e.g., Cambridge Gambling Task and Iowa Gambling Task) indicating a higher approach tendency and more

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impulsive decision making (Derbyshire, Chamberlain, Odlaug, Schreiber, & Grant, 2014; Trotzke, Starcke, Pedersen, Müller, & Brand, 2015; Voth et al., 2014), other performance-based tasks (e.g., Game of Dice Task and Stroop Task) did not show significant differences between individuals with PB and healthy controls (Black et al., 2012; Trotzke et al., 2015; Vogt et al., 2015). These findings indicate that individuals with PB perceive themselves as more impulsive than their healthy counterparts when assessed by means of self-reports; however, this difference was not always reflected in the performance on behavioral tasks (Vogt et al., 2015).

There also exists robust empirical support for the comorbidity of PB with other impulsive disorders. Findings from convenience samples recruited in fitness centers suggested a significant positive relationship between PB and exercise dependence (Lejoyeux, Avril, Richoux, Embouazza, & Nivoli, 2008) and hypersexuality (Müller, Loeber, Söchtig, Te Wildt, & De Zwaan, 2015). With regard to clinical samples, prior studies found a positive association between PB and eating disorders of the binge eating/purging type (Claes, Bijttebier, Mitchell, de Zwaan, & Mueller, 2011; Fernández-Aranda et al., 2006; Jiménez-Murcia et al., 2015; Mueller et al., 2009), substance use disorders (Di Nicola et al., 2015; Lejoyeux, Kerner, Thauvin, & Loi, 2006; Mitchell et al., 2002), pathological gambling (Black et al., 2015; Grant & Kim, 2003), excessive Internet use (Claes et al., 2012; Mazhari, 2012; Mueller et al., 2010), and other impulse control disorders (ICDs) such as intermitted explosive disorder (Christenson et al., 1994; Mueller et al., 2009). Also, studies concerning the relationship between PB and attention deficit and hyperactivity disorder (ADHD) indicated a high comorbidity between both conditions in community (Brook, Zhang, Brook, & Leukefeld, 2015) as well as patient samples with PB (Black et al., 2012).

In terms of cluster B personality disorders, symptoms of PB showed positive correlations with borderline personality disorder (BPD) symptoms in patients seen in an internal medicine clinic (Sansone & Wiederman, 2012), in an obstetrics/gynecology clinic (Sansone, Chang, Jewell, Sellbom, & Bidwell, 2013), and in shopping mall visitors (Maraz et al., 2015). Earlier studies in treatment-seeking patients with PB reported BPD prevalence rates ranging from 15% to 20% (Mueller et al., 2009; Schlosser et al., 1994). Despite the overlap between PB and BPD, self-harming behaviors that are common in BPD, has rarely been examined in patients with PB. Sansone and Wiederman (2012) investigated a large sample of primary care patients and found more self-harming behaviors in participants who engaged in excessive spending. As far as we know, only Jiménez-Murcia et al. (2015) explored self-harming behaviors in patients with PB, and reported a prevalence rate of 26.7%. Furthermore, it is noteworthy that patients with PB also suffer from high comorbidity with depressive and anxiety disorders, obsessive–compulsive disorder, and hoarding disorder (for review, see Müller, Mitchell, et al., 2015).

As mentioned above, several studies investigated impulsive behavior in patients with PB compared to healthy controls (Black et al., 2015; Trotzke et al., 2015; Vogt et al., 2015; Voth et al., 2014) or patients with another impulsive disorder (Jiménez-Murcia et al., 2015; Williams, 2012). For example, Jiménez-Murcia et al. (2015) found commonalities in impulsivity features (i.e., novelty seeking) between patients with PB, gambling disorder, and bulimia

nervosa. To our knowledge, no study to date compared treatment-seeking patients with PB with patients seeking treatment for any mental disorder but PB in terms of impulsive behaviors. The comparison is of interest as it addresses the question of whether patients suffering from PB are generally more impulsive than those without PB. Therefore, this study aimed at investigating similarities and differences in impulsive behaviors between patients seeking treatment for PB and age and gender matched treatment-seeking patients with different psychiatric disorders. In addition, both groups were compared with healthy controls who had never been involved in psychotherapy. The groups were compared with respect to the following impulse-related conditions: BPD, ADHD, binge eating, and ICDs. We hypothesized that both clinical groups (PB+, PB−) will report more impulsive behaviors than healthy controls and that the number of impulsive behaviors will be higher in patients with PB than in those without PB. Given the lack of information about the prevalence of self-harming behaviors in individuals with PB, we additionally explored the presence of self-harming behaviors in the three groups.

METHODS

Participants

The data of the treatment-seeking outpatients with PB (PB+) and of the healthy control group (HC) were gathered from another study that investigated temperament features in PB (Voth et al., 2014). For this study, we collected additional data from consecutive patients without PB (PB−) who were treated at a psychotherapy unit. Each group included 31 participants. The groups were matched for age and gender (i.e., 25 females and 6 males). Exclusion criteria were bipolar disorder, psychosis, and insufficient knowledge of the German language. Exclusion criteria for the healthy controls and the treatment-seeking inpatients were symptoms of PB as measured with the Compulsive Buying Scale (see the following).

Measures

All participants provided information about age, gender, marital status, and education. Information concerning psychiatric disorders of patients with PB and without PB was taken from the patients' charts.

The Compulsive Buying Scale (CBS; Faber & O'Guinn, 1992; German version: Mueller et al., 2010) was used to screen for current PB. The scale includes nine items that assess motivational and financial aspects of PB. Lower CBS scores indicate more PB, the cut-off for PB was found to be equal or below −1.09 (Mueller et al., 2010). Cronbach's α of the CBS in the present sample was 0.95.

A modified version of the ICD module of the research version of the Structured Clinical Interview for DSM-IV (SCID-ICD; First, 2002) was used to assess current PB and other current ICDs (i.e., intermitted explosive disorder, kleptomania, trichotillomania, dermatillomania, gambling disorder, pathological internet use other than online shopping, non-paraphilic hypersexual behavior, and excessive exercise). The interviews were conducted face-to-face by

four doctoral students (one MD and three PhD students) who were experienced in working with psychiatric patients. All assessors were trained in a standardized format beginning with observations of life interviews. Afterward, they conducted a series of interviews that were reviewed by the last author. During the whole study period, all assessors were under continuous supervision by the last author.

The 23-item Borderline Symptom List (BSL-23; Bohus et al., 2009; Wolf et al., 2009) was administered to quantify current BPD symptoms. Cronbach's α of the BSL in the present sample was 0.95. The questionnaire consists of 11 supplementary items that were used to assess the presence/absence of potential self-harming behaviors during the past week, such as cutting/burning/strangling/head banging, suicidal ideation, suicide attempts, vomiting, high-risk behavior (e.g., driving too fast, running around on the roofs of high buildings, and balancing on bridges), alcohol/drug consumption, medication intake without prescription or more than prescribed, uncontrolled rages, and regrettable uncontrollable sexual encounters. Non-suicidal self-injury (NSSI) was assessed based on a combination of an affirmative answer on the first supplementary item ("I hurt myself by cutting, burning, strangling, head banging, etc.") and a negative response to the third supplementary item ("I tried to commit suicide."). This approach followed the suggestions that NSSI constitutes any direct form of self-harming behavior in the absence of suicidal intent (Claes & Vandereycken, 2007).

The ADHD index of the Connors Adult Attention Deficiency Hyperactivity Disorder Rating Scale, self-report short version (CAARS S:S; Conners et al., 1999; German version: Christiansen et al., 2011) was used to assess current ADHD symptoms (range 0–36). Cronbach's α of the ADHD index (12 items) was 0.84.

Item 15 of the German version of the Eating Disorder Examination-Questionnaire (EDE-Q; "Over the past 28 days, on how many days have episodes of overeating occurred [i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time]?") (Hilbert, Tuschen-Caffier, Karwautz, Niederhofer, & Munsch, 2007) was used to assess the number of binge eating episodes within the last 28 days.

Statistical analyses

All analyses were performed by means of IBM Statistical Package for Social Sciences (SPSS, version 23.0).

Descriptive statistics were generated for all variables. One-way analyses of variance were used to compare the three groups with regard to continuous measured variables. Comparisons of the three groups with respect to categorical variables were performed by means of the χ^2-test statistic. Fisher's exact test was used when one or more of the cells had an expected frequency of five or less. Statistical significance was defined as $p < .05$.

Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. After being informed about the aims of the study, all participants provided written informed consent. The research protocol was approved by the Institutional Ethics Committee of the Hannover Medical School.

RESULTS

Sociodemographic variables and pathological buying

Table 1 displays the results of the sociodemographic variables for each of the three groups. Since the groups were matched by age and gender (25 females and 6 males in each group), no group differences were found with regard to these variables. The groups also did not differ with respect to partnership status. In terms of education, the HC group reported on average more years of education than both clinical groups. The rate of those participants who acquired a school diploma qualifying for university admission was higher in the HC group compared to the other groups.

As expected, the PB+ group showed significantly lower CBS means (indicating more PB) than the other two groups $[M_{PB+} = -5.07, SD_{PB+} = 1.60$ vs. $M_{PB-} = 2.24, SD_{PB-} = 1.17$ vs. $M_{HC} = 2.03, SD_{HC} = 1.16, F_{(2, 90)} = 305.41, p < .001]$. While all patients of the PB+ group scored below the proposed CBS cutoff for PB, none of the participants of the other two groups reported CBS scores on a pathological level. Similarly, the diagnosis of current PB using the SCID-ICD was confirmed in all patients of the PB+ group. None of the patients of the PB− group and none of the participants of the HC− group met the diagnostic criteria for PB according to the SCID-ICD.

Table 1. Sociodemographic characteristics

	Patients with PB (n = 31)	Patients without PB (n = 31)	Healthy control group (n = 31)	Group comparison
Age, years (M, SD)	40.65 (11.2)	40.58 (10.3)	40.06 (10.3)	$F = (2, 92), p = .975$
Partnership status				
Married/living in a couple relationship (N, %)	10 (32.2)	13 (41.9)	10 (32.2)	$F = 9.035, df = 6, p = .172$
Single (N, %)	11 (53.5)	13 (41.9)	11 (53.5)	
Widowed, divorced, separated (N, %)	10 (32.3)	3 (9.7)	10 (32.3)	
Other (N, %)	0 (0.0)	2 (6.5)	0 (0.0)	
≥12 school years (N, %)	10 (32.3)[A]	12 (38.7)[A]	20 (64.5)[B]	$\chi^2 = 7.29, df = 2, p = .026$

Note. Values with different superscripts are significantly different.

Psychiatric diagnoses

While 6 of the 31 patients of the PB+ group had no comorbid psychiatric disorder, all 31 patients of the PB- group were diagnosed with at least one psychiatric disorder (any disorder: 80.6% vs. 100%, $\chi^2 = 6.64$, $df = 1$, $p = .010$). Table 2 provides more detailed information about the occurrence of specific clinical (Axis-I) and personality disorders (Axis-II) in each group. The PB+ group did not differ from the PB- group with respect to specific clinical (Axis-I) or personality (Axis-II) disorders.

Impulsive behaviors

As can be seen in Table 3, the PB+ and the PB- group reported more BPD features and adult ADHD symptoms than healthy controls, but they (PB+ vs. PB-) did not differ significantly from each other. No differences between the three groups emerged with respect to the number of binge eating episodes or the presence of self-harming behavior.

Figure 1 demonstrates the distribution of specific ICDs across the groups. PB+ patients were more often diagnosed with at least one current ICD (other than PB) than those without PB or healthy controls (38.7% vs. 12.9% vs. 12.9%, $\chi^2 = 8.15$, $df = 2$, $p = .017$). The prevalence rates of dermatillomania and intermittent explosive disorder were relatively high among PB+ patients compared to the other groups, whereas only the group difference concerning dermatillomania reached statistical significance (exact $p < .05$). None of the participants met the criteria for current kleptomania, and none of the healthy controls fulfilled the criteria for

Table 2. Prevalence of Axis-I and personality disorders among patients with pathological buying (PB+) and without pathological buying (PB-)

	PB+ ($n = 31$) N (%)	PB- ($n = 31$) N (%)	Group comparison
Axis-I disorders			
Any depressive disorder	18 (58.1)	18 (58.1)	$\chi^2 = 8.881$, $df = 4$, $p = .064$
Any anxiety disorder	3 (9.7)	3 (9.7)	
Any somatoform disorder	1 (3.2)	2 (6.4)	
Any eating disorder	3 (9.7)	8 (25.8)	
Personality disorders			
Borderline	1 (3.2)	4 (12.9)	$\chi^2 = 3.970$, $df = 4$, $p = .410$
Narcissistic	1 (3.2)	1 (3.2)	
Avoidant	–	1 (3.2)	
Obsessive–compulsive	1 (3.2)	–	

Table 3. Self-reported impulsive symptoms and self-harming behaviors

	Patients with PB ($n = 31$)	Patients without PB ($n = 31$)	Healthy control group ($n = 31$)	Group comparison
Number of binge eating episodes within last 28 days[a] (M, SD)	3.29 (7.58)	3.87 (8.82)	0.74 (2.78)	$F(2, 90) = 1.80$, $p = .171$
ADHD index[b] (M, SD)	14.55 (6.99)[A]	15.83 (6.62)[A]	7.42 (3.29)[B]	$F(2, 89) = 18.33$, $p < .001$
Borderline symptom list-23 (M, SD)	1.12 (0.96)[A]	1.31 (0.73)[A]	0.23 (0.30)[B]	$F(2, 90) = 20.14$, $p < .001$
Any self-harming behavior[c] (N, %)	9 (29.0)	11 (35.5)	7 (22.6)	$\chi^2 = 1.25$, $df = 2$, $p = .535$
Cutting/burning/strangling/ headbanging[b] (N, %)	2 (6.5)	4 (12.9)	–	
Suicidal ideation (N, %)	2 (6.5)	2 (6.5)	–	
Suicide attempts (N, %)	1 (3.2)	1 (3.2)	–	
Vomiting (N, %)	5 (16.1)	2 (6.5)	–	
High-risk behavior (N, %)	3 (9.7)	4 (13.3)	–	
Got drunk (N, %)	4 (12.9)	1 (3.2)	6 (19.4)	
Drug use (N, %)	1 (3.2)	1 (3.2)	–	
Medication without prescription/ more than prescribed (N, %)	–	3 (9.7)	1 (3.2)	
Uncontrolled rages (N, %)	3 (9.7)	4 (12.9)	–	
Regrettable uncontrollable sexual encounters (N, %)	2 (6.5)	–	1 (3.2)	

Note. Values with different superscripts are significantly different.
[a]Measured with the Eating Disorder Examination-Questionnaire.
[b]Measured with the Connors Adult Attention Deficiency Hyperactivity Disorder Rating Scale.
[c]Measured with the supplementary items of the Borderline Symptom List-23.
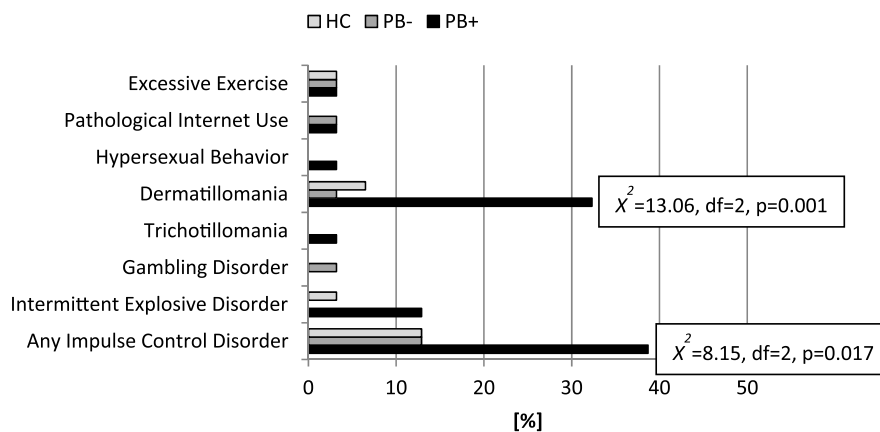
Figure 1. Prevalence rates of current impulse control disorders in patients with pathological buying (PB+), without pathological buying (PB−), and healthy controls (HC)

pathological internet use, hypersexual behavior, trichotillomania, or gambling disorder.

DISCUSSION

The findings of this study indicate that treatment-seeking patients exhibit more impulsive behaviors than healthy controls. Furthermore – at least in the present sample – treatment outpatients with PB did not perceive themselves as more impulsive than inpatients without PB; but they were more often diagnosed with a comorbid ICD than both healthy controls and inpatients not suffering from PB. In contrast to the comparable level of impulsivity measured via questionnaires in the clinical groups (PB+ and PB−), the clinical interview revealed a higher prevalence of any current ICD in patients with PB. This result is only partly in line with our hypothesis as we had expected that patients with PB will show more impulsive behaviors as measured via questionnaires and clinical interview than the two other groups.

Several reasons for the mixed results merit discussion. First, the applied questionnaires certainly measured other aspects of impulsivity (i.e., binge eating, ADHD, borderline symptoms, and self-harm) than the clinical interview for ICDs. Therefore, our interview-based data rather complement than confirm the questionnaire-based findings. Second, it is important to bear in mind that the BSL-23, the CAARS, and the EDE-Q are continuous measures with dimensional (quantitative) outcomes, whereas the clinical interview produced categorical outcomes, namely, psychiatric diagnoses. The third consideration pertains to the different answer format of the self-report questionnaires and the interview (Harris & Brown, 2010). In the BSL-23 and the CAARS, participants responded by selecting predetermined answer alternatives (i.e., frequencies). In contrast to these highly structured questionnaires, the clinical interview encouraged participants to provide more detailed information and clarification about the particular symptoms. On the other hand, participants might have been more willing to provide honest information that was not socially desirable such as frequencies of self-harming

behaviors by answering questionnaires. In terms of interviews, the lack of data on inter-rater reliability limits the interpretation of the data. Moreover, we did not ensure rater blindness. Hence, although interviewers in our study were experienced assessors trained in diagnosing ICDs, we cannot rule out that the interview-based results were influenced by assessors' subjectivity.

It is also noteworthy that the PB+ and PB− groups did not differ significantly with regard to clinical and personality disorder diagnoses (see Table 2). This may have also contributed to the lack of differences in questionnaire outcomes between the two groups.

According to Black et al. (2015), PB belongs to a spectrum of "behaviorally defined" conditions that share the main feature of "behavioral dyscontrol that places the individual in conflict with other persons or society" (p. 273). Therefore, the high occurrence of ICDs in the PB+ group is not surprising given the shared characteristics of PB and other ICDs such as repetitive failures to resist an impulsive act or behavior that may be harmful to self or others. The lack of differences in the self-perception of being impulsive between clinical groups might indicate that the level of urge (i.e., impulse) is the same in patients with different psychological problems, but that patients with PB are unable to resist the urge and therefore develop maladaptive behaviors. Similarly to other addictive behaviors, this phenomenon may be caused by deficits in top-down control, particularly by diminished ventral striatal activity during anticipatory phases of reward processing (Potenza, 2014) that hints to a neurobiological component of PB. Recent research by Horváth, Büttner, Belei, and Adigüzel (2015) considering diminished self-control in PB supports this idea. Individuals with PB possess the goal to control their buying behavior, but they are not able to manage their impulses for longer periods (Horváth et al., 2015). For them, the urges to buy are much stronger and occur more frequently than in prudent consumers. Though, the successful coping of buying impulses requires continuous self-control efforts. As a consequence, self-control resources may earlier become depleted in this patient group (Muraven & Baumeister, 2000).

The present study is not without limitations. As already mentioned above, the interview-based findings were

restricted by the lack of rater blindness and the absence of information on inter-rater reliability. Unfortunately, the time course or onset of ICDs was not assessed. Hence, it is unknown whether comorbid ICDs developed prior to or after PB accelerated to a clinical level. In terms of questionnaires, we used self-ratings referring to specific impulsive conditions but not to trait impulsivity. We cannot exclude that measures of general trait impulsivity would have produced different results. Furthermore, the sample sizes of the three groups were relatively small. The lack of power could explain the relatively low rates of self-harming behaviors in all three groups and the lack of significant group differences, accordingly. Moreover, the applicability of our results is constricted to treatment seeking, mostly female in- and outpatients. Last but not least, the cross-sectional design prevents us from making any causal interpretation. Therefore, our results should be viewed as preliminary.

CONCLUSIONS

Taken together, our findings suggest that in treatment-seeking patients, the presence of PB may be associated with a higher risk for comorbid ICDs but not necessarily for other impulsive or self-harming behaviors. Because ICDs appear common in individuals with PB, it seems important to screen for ICDs in this population (Grant, Levine, Kim, & Potenza, 2014; Müller et al., 2011). Otherwise, they may remain untreated which could worsen the treatment outcome. Future retrospective or longitudinal studies should examine the chronological order in which the disorders appear and how they influence each other. Moreover, further research is required to examine the possible underlying neurobiological reasons for impaired impulse control in patients with PB.

REFERENCES

Barratt, E. S. (1985). Impulsiveness subtraits: Arousal and information processing. In J. T. Spence & C. E. Izard (Eds.), *Motivation, emotion and personality* (pp. 137–8). North-Holland: Elsevier.

Billieux, J., Gay, P., Rochat, L., & Van der Linden, M. (2010). The role of urgency and its underlying psychological mechanisms in problematic behaviours. *Behaviour Research and Therapy, 48*(11), 1085–1096. doi:10.1016/j.brat.2010.07.008

Black, D. W., Coryell, W., Crowe, R., Shaw, M., McCormick, B., & Allen, J. (2015). The relationship of DSM-IV pathological gambling to compulsive buying and other possible spectrum disorders: Results from the Iowa PG family study. *Psychiatry Research, 226*(1), 273–276. doi:10.1016/j.psychres.2014.12.061

Black, D. W., Shaw, M., McCormick, B., Bayless, J. D., & Allen, J. (2012). Neuropsychological performance, impulsivity, ADHD symptoms, and novelty seeking in compulsive buying disorder. *Psychiatry Research, 200*(2–3), 581–587. doi:10.1016/j.psychres.2012.06.003

Bohus, M., Kleindienst, N., Limberger, M. F., Stieglitz, R. D., Domsalla, M., Chapman, A. L., Steil, R., Philipsen, A., & Wolf, M. (2009). The short version of the Borderline Symptom List (BSL-23): Development and initial data on psychometric properties. *Psychopathology, 42*(1), 32–39. doi:10.1159/000173701

Brook, J. S., Zhang, C., Brook, D. W., & Leukefeld, C. G. (2015). Compulsive buying: Earlier illicit drug use, impulse buying, depression, and adult ADHD symptoms. *Psychiatric Research, 228*(3), 312–317. doi:10.1016/j.psychres.2015.05.095

Christiansen, H., Kis, B., Hirsch, O., Philipsen, A., Henneck, M., Panczuk, A., Pietrowsky, R., Hebebrand, J., & Schimmelmann, B. G. (2011). German validation of the Conners Adult ADHD Rating Scales-Self-Report (CAARS-S) I: Factor structure and normative data. *European Psychiatry, 26*(2), 100–107. doi:10.1016/j.eurpsy.2009.12.024

Christenson, G. A., Faber, R. J., de Zwaan, M., Raymond, N. C., Specker, S. M., Ekern, M. D., Mackenzie, T. P., Crosby, R. D., Crow, S. J., Eckert, E. D., Mussel, M. P., & Mitchell, J. E. (1994). Compulsive buying descriptive characteristics and psychiatric morbidity. *Journal of Clinical Psychiatry, 55,* 5–11.

Claes, L., Bijttebier, P., Mitchell, J. E., de Zwaan, M., & Mueller, A. (2011). The relationship between compulsive buying, eating disorder symptoms, and temperament in a sample of female students. *Comprehensive Psychiatry, 52*(1), 50–55. doi:10.1016/j.comppsych.2010.05.003

Claes, L., Müller, A., Norré, J., Assche, L., Wonderlich, S., & Mitchell, J. E. (2012). The relationship among compulsive buying, compulsive Internet use and temperament in a sample of female patients with eating disorders. *European Eating Disorders Review, 20*(2), 126–131. doi:10.1002/erv.v20.2

Claes, L., & Vandereycken, W. (2007). Self-injurious behavior: Differential diagnosis and functional differentiation. *Comprehensive Psychiatry, 48*(2), 137–144. doi:10.1016/j.comppsych.2006.10.009

Cloninger, C. R. (1994). Temperament and personality. *Current Opinion in Neurobiology, 4*(2), 266–273. doi:10.1016/0959-4388(94)90083-3

Conners, C. K., Erhardt, D., Epstein, J. N., Parker, J. D. A., Sitarenios, G., & Sparrow, E. (1999). Self-ratings of ADHD

symptoms in adults I: Factor structure and normative data. *Journal of Attention Disorders, 3*(3), 141–151. doi:10.1177/108705479900300303

Cyders, M. A., & Smith, G. T. (2008). Emotion-based dispositions to rash action: Positive and negative urgency. *Psychological Bulletin, 134*(6), 807–828. doi:10.1037/a0013341

Derbyshire, K. L., Chamberlain, S. R., Odlaug, B. L., Schreiber, L. R., & Grant, J. E. (2014). Neurocognitive functioning in compulsive buying disorder. *Annals of Clinical Psychiatry, 26*(1), 57–63.

Di Nicola, M., Tedeschi, D., De Risio, L., Pettorruso, M., Martinotti, G., Ruggeri, F., Swiekosz-Lenart, K., Guglilmo, R., Callea, A., Ruggeri, G., Pozzi, G., Giannantonio, M., & Janiri, L. (2015). Co-occurrence of alcohol use disorder and behavioral addictions: Relevance of impulsivity and craving. *Drug and Alcohol Dependence, 148,* 118–125. doi:10.1016/j.drugalcdep.2014.12.028

Faber, R. J., & O'Guinn, T. C. (1992). A clinical screener for compulsive buying. *Journal of Consumer Research, 19,* 459–469. doi:10.1086/209315

Fernández-Aranda, F., Jiménez-Murcia, S., Álvarez-Moya, E. M., Granero, R., Vallejo, J., & Bulik, C. M. (2006). Impulse control disorders in eating disorders: Clinical and therapeutic implications. *Comprehensive Psychiatry, 47*(6), 482–488. doi:10.1016/j.comppsych.2006.03.002

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. (2002). *Structured clinical interview for DSM-IV Axis I disorders* (Research Ed.). New York, NY: Biometrics Research Department, New York State Psychiatric Institute.

Grant, J. E., & Kim, S. W. (2003). Comorbidity of impulse control disorders in pathological gamblers. *Acta Psychiatrica Scandinavica, 108*(3), 203–207. doi:10.1034/j.1600-0447.2003.00162.x

Grant, J. E., Levine, L., Kim, D., & Potenza, M. N. (2014). Impulse control disorders in adult psychiatric inpatients. *American Journal of Psychiatry, 162*(11), 2184–2188. doi:10.1176/appi.ajp.162.11.2184

Gray, J. A. (1970). The psychophysiological basis of introversion–extraversion. *Behaviour Research and Therapy, 8*(3), 249–266. doi:10.1016/0005-7967(70)90069-0

Harris, L. R., & Brown, G. T. L. (2010). Mixing interview and questionnaire methods: Practical problems in aligning data. *Practical Assessment, Research & Evaluation, 15*(1), 1–19. Retrieved from http://pareonline.net/getvn.asp?v=15&n=1

Hilbert, A., Tuschen-Caffier, B., Karwautz, A., Niederhofer, H., & Munsch, S. (2007). Eating disorder examination-questionnaire. *Diagnostica, 53*(3), 144–154. doi:10.1026/0012-1924.53.3.144

Horváth, C., Büttner, O. B., Belei, N., & Adigüzel, F. (2015). Balancing the balance: Self-control mechanisms and compulsive buying. *Journal of Economic Psychology, 49,* 120–132. doi:10.1016/j.joep.2015.05.004

Jiménez-Murcia, S., Granero, R., Moragas, L., Steiger, H., Israel, M., Aymami, Ń., Gómez-Peña, M., Sauchelli, S., Agüera, Z., Sánchez, I., Riesco, N., Penelo, E., Menchón, J. M., & Fernández-Aranda, F. (2015). Differences and similarities between bulimia nervosa, compulsive buying and gambling disorder. *European Eating Disorder Review, 23*(2), 111–118. doi:10.1002/erv.2340

Koran, L. M., Faber, R. J., Aboujaoude, E., Large, M. D., & Serpe, R. T. (2006). Estimated prevalence of compulsive buying behavior in the United States. *The American Journal of Psychiatry, 163*(10), 1806–1812. doi:10.1176/ajp.2006.163.10.1806

Lejoyeux, M., Avril, M., Richoux, C., Embouazza, H., & Nivoli, F. (2008). Prevalence of exercise dependence and other behavioral addictions among clients of a Parisian fitness room. *Comprehensive Psychiatry, 49,* 353–358. doi:10.1016/j.comppsych.2007.12.005

Lejoyeux, M., Kerner, L., Thauvin, I., & Loi, S. (2006). Study of impulse control disorders among women presenting nicotine dependence. *International Journal of Psychiatry in Clinical Practice, 10*(4), 241–246. doi:10.1080/13651500600650000

Maraz, A., von den Brink, W., & Demetrovics, Z. (2015). Prevalence and construct validity of compulsive buying in shopping mall visitors. *Psychiatry Research, 228*(3), 918–924. doi:10.1016/j.psychres.2015.04.012

Mazhari, S. (2012). Association between problematic Internet use and impulsive control disorders among Iranian university students. *Cyberpsychology, Behavior, and Social Networking, 15*(5), 270–273. doi:10.1089/cyber.2011.0548

McElroy, S. L., Keck, P. E., Jr., Pope, H. G., Jr., Smith, J. M., & Strakowski, S. M. (1994). Compulsive buying: A report of 20 cases. *Journal of Clinical Psychiatry, 55*(6), 242–248.

Mitchell, J. E., Redlin, J., Wonderlich, S., Crosby, R., Faber, R., Miltenberger, R., Smyth, J., Stickney, M., Gosnell, B., Burgard, M., & Lancaster, K. (2002). The relationship between compulsive buying and eating disorder. *International Journal of Eating Disorders, 32*(1), 107–111. doi:10.1002/eat.10053

Mueller, A., Mitchell, J. E., Black, D. W., Crosby, R. D., Berg, K., & de Zwaan, M. (2010). Latent profile analysis and comorbidity in a sample of individuals with compulsive buying disorder. *Psychiatry Research, 178*(2), 348–353. doi:10.1016/j.psychres.2010.04.021

Mueller, A., Mühlhans, B., Silbermann, A., Müller, U., Mertens, C., Horbach, T., Mitchell, J. E., & de Zwaan, M. (2009). Compulsive buying and psychiatric comorbidity. *Psychotherapie, Psychosomatik, Medizinische Psychologie, 59*(8), 291–299. doi:10.1055/s-2008-1067438

Müller, A., Loeber, S., Söchtig, J., Te Wildt, B., & De Zwaan, M. (2015). Risk for exercise dependence, eating disorder pathology, alcohol use disorder and addictive behaviors among clients of fitness centers. *Journal of Behavioral Addictions, 4*(4), 273–280. doi:10.1556/2006.4.2015.044

Müller, A., Mitchell, J. E., & de Zwaan, M. (2015). Compulsive buying. *The American Journal of Addictions, 24,* 132–137. doi:10.1111/ajad.12111

Müller, A., Rein, K., Kollei, I., Jacobi, A., Rotter, A., Schütz, P., Hillemacher, T., & de Zwaan, M. (2011). Impulse control disorders in psychiatric inpatients. *Psychiatry Research, 188*(3), 434–438. doi:10.1016/j.psychres.2011.04.006

Müller, A., Trotzke, P., Mitchell, J. E., De Zwaan, M., & Brand, M. (2015). The pathological buying screener: Development and psychometric properties of a new screening instrument for the assessment of pathological buying symptoms. *PLoS One, 10*(10), e0141094. doi:10.1371/journal.pone.0141094

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*(2), 247–259. doi:10.1037/0033-2909.126.2.247

Neuner, M., Raab, G., & Reisch, L. A. (2005). Compulsive buying in maturing consumer societies: An empirical re-inquiry. *Journal of Economic Psychology, 26*(4), 509–522. doi:10.1016/j.joep.2004.08.002

Otero-López, J. M., & Villardefrancos, E. (2014). Prevalence, sociodemographic factors, psychological distress, and coping strategies related to compulsive buying: A cross-sectional study in Galicia, Spain. *BMC Psychiatry, 14*(1), 101. doi:10.1186/1471-244X-14-101

Potenza, M. N. (2014). Non-substance addictive behaviors in context of DSM-5. *Addictive Behaviors, 39,* 1–2. doi:10.1016/j.addbeh.2013.09.004

Rose, P., & Segrist, D. (2014). Negative and positive urgency may both be risk factors for compulsive buying. *Journal of Behavioral Addictions, 3*(2), 128–132. doi:10.1556/JBA.3.2014.011

Sansone, R. A., Chang, J., Jewell, B., Sellbom, M., & Bidwell, M. (2013). Compulsive buying and borderline personality symptomatology. *Journal of Personality Disorders, 27*(2), 260–268. doi:10.1521/pedi_2012_26_038

Sansone, R. A., & Wiederman, M. W. (2012). Spending too much: Relationships with borderline personality symptomatology. *International Journal of Psychiatry in Clinical Practice, 16*(4), 316–318. doi:10.3109/13651501.2012.693186

Schlosser, S., Black, D. W., Repertinger, S., & Freet, D. (1994). Compulsive buying: Demography, phenomenology, and comorbidity in 46 subjects. *General Hospital Psychiatry, 16*(3), 205–212. doi:10.1016/0163-8343(94)90103-1

Trotzke, P., Starcke, K., Pedersen, A., Müller, A., & Brand, M. (2015). Impaired decision making under implicit but not under explicit conditions in patients with pathological buying: Behavioral and psychophysiological evidence. *Psychiatry Research, 229*(1–2), 551–558. doi:10.1016/j.psychres.2015.05.043

Vogt, S., Hunger, A., Pietrowsky, R., & Gerlach, A. L. (2015). Impulsivity in consumers with high compulsive buying propensity. *Journal of Obsessive-Compulsive and Related Disorders, 7,* 54–64, doi:10.1016/j.jocrd.2015.10.002

Voth, E. M., Claes, L., Georgiadou, E., Selle, J., Trotzke, P., Brand, M., de Zwaan, M., & Müller, A. (2014). Reactive and regulative temperament in patients with compulsive buying and non-clinical controls measured by self-report and performance-based tasks. *Comprehensive Psychiatry, 55*(7), 1505–1512. doi:10.1016/j.comppsych.2014.05.011

Williams, A. D. (2012). Comparison of emotion regulation deficits and impulsivity in pathological gamblers and compulsive buyers. *Gambling Research, 23*(2), 3.

Williams, A. D., & Grisham, J. R. (2012). Impulsivity, emotion regulation, and mindful attentional focus in compulsive buying. *Cognitive Therapy and Research, 36*(5), 451–457. doi:10.1007/s10608-011-9384-9

Wolf, M., Limberger, M. F., Kleindienst, N., Stieglitz, R. D., Domsalla, M., Philipsen, A., Steil, R., & Bohus, M. (2009). Kurzversion der Borderline-Symptom-Liste (BSL-23): Entwicklung und Überprüfung der psychometrischen Eigenschaften. [Short version of the borderline symptom list (BSL-23): Development and psychometric evaluation]. *Psychotherapie, Psychosomatik, Medizinische Psychologie, 59*(8), 321–324. doi:10.1055/s-0028-1104598