Title

An Examination of Adults on Antipsychotic Medication at Risk for Metabolic Syndrome: A Comparison with Obese and Eating Disorder Populations

Journal

European Eating Disorders Review, 21(2)

ISSN

1072-4133

Authors

Stiles-Shields, Colleen
Bogue, Cynthia
Le Grange, Daniel
et al.

Publication Date

2013-03-01

DOI

10.1002/erv.2200

Peer reviewed

BRIEF REPORT

An Examination of Adults on Antipsychotic Medication at Risk for Metabolic Syndrome: A Comparison with Obese and Eating Disorder Populations

Colleen Stiles-Shields*, Cynthia Bogue, Daniel Le Grange & Daniel Yohanna

Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, Chicago, IL, USA

Abstract

Little research has explored how eating disorders (ED) may be involved in the increased risk for metabolic syndrome in adults on antipsychotic medication. This pilot study compared participants on antipsychotic medication with obese and ED samples with respect to demographic and psychosocial factors. Participants (antipsychotic medication $n = 12$; obese $n = 12$; ED $n = 12$), were adults presenting to an outpatient psychiatry department (83.3% women; M age = 45.75 ± 11.5). Analysis of variance, analysis of covariance and chi-square tests were used to compare the samples. Participants on antipsychotic medications had a significantly lower mean body mass index than the obese ($p < .001$) and ED ($p < .05$) samples, as well as significantly lower Restraint Total scores ($p < .05$) and subjective binge episode frequency ($p < .05$) than the ED sample. The lack of significant differences that occurred between the antipsychotic medication sample and two eating disorder samples significantly different from one another indicates that this population may have unique symptomology and treatment needs. Copyright © 2012 John Wiley & Sons, Ltd and Eating Disorders Association.

Keywords

antipsychotic medication; metabolic syndrome; obesity; binge eating

***Correspondence**

Colleen Stiles-Shields, M.A., Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 S Maryland Ave, MC 3077, Chicago, IL, 60637.
Tel: 773 834–1007, Fax: 773 702–9929.
Email: cshields@yoda.bsd.uchicago.edu

The following research is not associated with any sponsors or grant numbers.

Published online 31 August 2012 in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/erv.2200

Adults that take antipsychotic medication are at increased risk for symptoms of metabolic syndrome (ADA, APA,, & AACE, 2004; Gothefors, Adolfsson, & Attval, 2010; Khazaal, Billieux, & Fresard, 2009; Meyer & Stahl, 2009; Narang, Mostafa, & Parlapalli, 2010; Remington, 2006). Metabolic syndrome is defined by the presence of at least three of the following conditions: blood pressure greater than 130/85 mmHg, serum triglycerides level of greater than 150 mg/dL, serum glucose level of greater than 110 mg/dL, waist circumference greater than 102 cm in men and 88 cm in women, and high-density lipoprotein cholesterol level of less than 40 mg/dL in men and 50 mg/dL in women; having a body mass index (BMI) over 25 (i.e. being overweight or obese) is also an associated risk factor (Ford, Giles, & Dietz, 2002). Metabolic syndrome is of concern as its symptoms indicate increased risk for conditions such as cardiovascular disease, type II diabetes mellitus and a decreased life expectancy (Grundy et al., 2005).

Weight gain and obesity are prevalent in populations taking second generation antipsychotic medication (Khazaal et al., 2009; Malhotra et al., 2012; Remington, 2006). Perhaps for this reason, other factors, such as symptoms of eating disorders (ED), have not been explored in relation to this population's increased risk for metabolic syndrome. Outside of attempts to use antipsychotic medications as a means of weight gain in patients with anorexia nervosa (McKnight & Park, 2010; Mehler-Wex, Romanos, Krirchheiner, & Schulze, 2008), limited research is available to identify ED comorbidity within this population (Miotto, Pollini, & Restaneo, 2010). Initial findings indicate that over half of patients with schizophrenia and a BMI greater than or equal to 28 exhibit binge eating symptomology (Khazaal, Fresard, & Borgeat, 2006) and that disordered eating is higher in a sample of Egyptian adults with schizophrenia than controls (Fawzi & Fawzi, 2012). Additionally, clozapine and olanzapine have been indicated to increase risk of ED symptomology (Bromel, Blum, & Ziegler, 1998; Gebhardt, Haberhausen, & Krieg, 2007). It is important to identify the health behaviours and possible ED symptomology of this population so that effective interventions can be developed.

The purpose of the current study is to compare demographic, psychosocial and ED variables of a pilot sample of adults on antipsychotic medication at risk for metabolic syndrome to similarly aged, treatment-seeking samples of obese adults and adults with diagnoses of eating disorder not otherwise specified, binge eating disorder subtype (EDNOS-BED). Consistent with previous findings that both ED symptoms and obesity are present in samples of adults on antipsychotic medication (Khazaal et al., 2009; Remington, 2006), we hypothesized that the sample on antipsychotic medication would not significantly differ from the obese or EDNOS-BED samples in terms of BMI or ED symptoms.

Methods

Participants

Participants were adults ($n = 36$), aged 24 to 66 years (M age = 45.75 ± 11.5 years), presenting for an initial ED evaluation at The University of Chicago Medicine's Eating Disorders Program or for a Healthy Eating and Activity Learning (HEAL) education curriculum at the University of Chicago Medicine's Department of Psychiatry and Behavioral Neuroscience. Participants had a mean BMI of 40.6 ± 9.3 and composed of mostly women (83.3%; $n = 30$), Caucasians (44.4%; $n = 16$) and African Americans (44.4%; $n = 16$). Twelve participants met the criteria of Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV TR; American Psychiatric Association, 2000) for EDNOS-BED; 12 participants were obese (BMI > 30) and did not meet any DSM-IV TR criteria for an ED; 12 participants were patients of the University of Chicago Medicine's Department of Psychiatry and Behavioral Neuroscience on antipsychotic medication and at risk for metabolic syndrome that participated in the HEAL programme. The 12 participants on antipsychotic medication had diagnoses of Bipolar Disorder Not Elsewhere Classified, Chronic Paranoid Schizophrenia, Chronic Schizo-Affective Disorder, Paranoid Schizophrenia and Unspecified Schizophrenia; this sample was also prescribed at least one of the following medications at assessment: Aripirazole, Clozapine, Haloperidol, Fluphenazine, Risperidone, Clorpromazine, Perphenazine and Olanzapine.

Procedure

Participants completed questionnaires during a baseline assessment. All data were collected before the start of treatment. Written informed consent for patients over 18 years of age was obtained. This study was approved by The University of Chicago's Institutional Review Board.

Physical assessment

Participants' weight and height were measured by a trained research assistant or licensed nurse using a calibrated digital or balance-beam scale and stadiometer. All patients were weighed in light, indoor clothing.

Measures

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) is a self-report questionnaire that assesses the cognitive and behavioural symptoms of EDs. Cognitive symptoms of EDs (e.g. fear of weight gain, overevaluation of shape and weight) are assessed for the past 28 days using a 7-point Likert scale, with higher scores indicating more severe eating-related psychopathology. Global scores reflect the overall severity of ED symptoms, including dietary restraint, eating concerns, shape concerns and weight concerns. Frequency of self-induced vomiting, laxative misuse, diuretic misuse, driven exercise, fasting, objective binge eating (OBE; eating episodes involving the consumption of an objectively large amount of food accompanied by a sense of loss of control), subjective binge eating (SBE; eating episodes involving an amount of food that is not objectively large but is considered excessive by the respondent, accompanied by a sense of loss of control) and objective overeating episodes (OOE; eating episodes involving the consumption of an objectively large amount of food without the sense of loss of control) is assessed for 1 month prior to assessment. EDE-Q scores have demonstrated high test–retest reliability (Luce & Crowther, 1999; Reas, Grilo, & Masheb, 2006), and the subscale scores on the EDE-Q have demonstrated good internal consistency (Peterson et al., 2007).

The Beck Depression Inventory I (BDI; Beck, 1987) is a 21-item self-report questionnaire designed to assess depressive symptoms. Scores range from 0 to 63, with scores over 18 indicating moderate to severe depressive symptoms. The BDI has good psychometric properties (Barrera & Garrison-Jones, 1988; Kashani, Sherman, Parker, & Reid, 1990) and has been utilized in multiple studies of samples with (Jackson, Grilo, & Masheb, 2000; Lock et al., 2010; Zaitsoff, Celio Doyle, Hoste, & le Grange, 2008) and without (Niendam et al., 2006; Weeks & Heimberg, 2005) EDs.

Data analysis

Analysis of variance and chi-square analyses were used to compare participants on antipsychotic medication, participants

Table 1 Demographic and health information of sample of adults on antipsychotic medication

Measure		
		Mean ± SD
Age (years)		49.75 ± 10.99
BMI		32.95 ± 5.39
BMR		1603 ± 180.7
Waist circumference (inches)		40.94 ± 5.63
Glucose (60–109 mg/dL)		98.08 ± 16.49
Cholesterol (120–199 mg/dL)		172.67 ± 36.77
HDL Cholesterol (40–80 mg/dL)		58.58 ± 19.80
Triglycerides (30–149 mg/dL)		97.58 ± 30.75
LDL Cholesterol (60–129 mg/dL)		94.58 ± 32.97
	n	%
Gender		
Male	2	16.7
Female	10	88.3
Ethnicity		
Caucasian	2	16.7
Minority	10	88.3
Activity level		
Low	5	41.7
Light	2	16.7
Moderate	4	33.3
High	1	8.3

Note: BMI, body mass index; BMR, basal metabolic rate; mg/dL, milligrams per deciliter; HDL, High-density lipoprotein; LDL, low-density lipoprotein.

with EDNOS-BED and obese participants on basic demographic features. Analyses of covariance (ANCOVAs), controlling for ethnicity, race and BMI were used to compare participants on antipsychotic medication with participants having EDNOS-BED on continuous measures of eating-related and general psychopathology. ANCOVAs, controlling for ethnicity and BMI were used to compare participants on antipsychotic medication with obese participants on continuous measures of eating-related and general psychopathology. We considered including other covariates as well, such as race; however, none of these variables significantly contributed to the models and were therefore removed from the analyses. Comparisons of the EDNOS-BED and obese samples also occurred in order to confirm that, consistent with previous findings (Mussell et al., 1996; Specker, de Zwaan, Raymond, & Mitchell, 1994), significant differences exist between the two comparison groups. ANCOVAs, controlling for BMI, were used to compare participants with EDNOS-BED and obese participants on continuous measures of eating-related and general psychopathology.

Results

The 12 participants on antipsychotic medication at risk for metabolic syndrome were mainly women (88.36%; $n = 10$; Table 1) and minorities (88.36%; $n = 10$). The majority were obese (M BMI $= 32.95 \pm 5.4$) and engaged in low activity levels (i.e. little to no exercise; 41.7%; $n = 5$). Participants also endorsed OOEs (M frequency $= 3.45 \pm 6.6$), OBEs (M frequency $= 2.27 \pm 6.0$), SBEs (M frequency $= 1.64 \pm 1.9$), self-induced vomiting (M frequency $= 1.27 \pm 4.2$), and driven exercise (M frequency $= 3.20 \pm 9.4$) in the 28 days prior to assessment. The participants on antipsychotic medication had significantly lower average BMIs than the obese sample ($p < .001$) and the EDNOS-BED sample ($p < .05$). Significant differences in ethnicity were also present between the antipsychotic medication sample and the obese sample ($p < .05$) and the EDNOS-BED sample ($p < .05$).

Comparison of antipsychotic medication and eating disorder not otherwise specified, binge eating disorder subtype samples

The EDNOS-BED sample had significantly higher Restraint Total scores [$F(4, 22) = 3.40$; $p < .05$; Table 2] and frequency of SBEs in the 28 days prior to assessment [$F(4, 19) = 4.21$; $p < .05$] than the antipsychotic medication sample. No other significant differences were present. The EDNOS-BED sample denied any occurrence of self-induced vomiting, whereas participants on antipsychotic medication endorsed this compensatory behaviour and denied any laxative misuse.

Comparison of antipsychotic medication and obese samples

No significant differences were present between the antipsychotic medication and the obese samples. The obese sample denied any occurrence of self-induced vomiting or driven exercise, whereas participants on antipsychotic medication endorsed both compensatory behaviours and denied any laxative misuse.

Comparison of eating disorder not otherwise specified, binge eating disorder subtype and obese samples

The EDNOS-BED sample had significantly higher Eating Concern Total scores [$F(2, 23) = 3.53$; $p < .05$], Shape Concern Total scores

Table 2 Distribution of demographic and psychosocial variables by group

Variables	Sample on antipsychotic medication ($n = 12$)		Overweight and obese sample ($n = 12$)		EDNOS sample ($n = 12$)		Test statistic
	Mean ± SD		Mean ± SD		Mean ± SD		
Age (years)	49.75 ± 10.99		45.67 ± 12.87		41.83 ± 9.88		$F(2, 35) = 1.47$; $p = .25$
BMI	32.95 ± 5.39		49.28 ± 5.60		39.70 ± 8.32		$F(2, 35) = 18.70$; $p = .000$
Race (n %)							
Caucasian	2	16.7	6	50.0	8	66.7	$\chi^2(2, N = 36) = 6.3$; $p = .043$
Minority	10	88.3	6	50.0	4	33.3	
BDI total score	14.64 ± 9.06		11.33 ± 5.94		18.83 ± 9.10		$F(4, 34) = 1.26$; $p = .308$
EDE-Q weight concern total	2.53 ± 1.64		2.70 ± 1.06		3.90 ± 1.31		$F(4, 34) = 2.77$; $p = .045$
EDE-Q shape concern total	3.38 ± 1.92		3.04 ± 1.21		4.44 ± 1.15		$F(4, 34) = 2.90$; $p = .038$
EDE-Q restraint total	1.05 ± 1.20		1.93 ± 1.9		3.05 ± 1.42		$F(4, 34) = 3.66$; $p = .015$
EDE-Q eating concern total	1.96 ± 1.44		1.17 ± 1.21		2.65 ± 1.54		$F(4, 34) = 1.99$; $p = .122$
EDE-Q global score	2.23 ± 1.36		2.21 ± 0.98		3.51 ± 1.10		$F(4, 34) = 3.18$; $p = .027$
OOE	3.45 ± 6.55		3.60 ± 4.53		8.08 ± 8.64		$F(4, 32) = 2.84$; $p = .043$
OBE	2.27 ± 5.95		2.73 ± 4.41		8.73 ± 7.74		$F(4, 32) = 3.22$; $p = .024$
SBE	1.64 ± 1.91		1.18 ± 2.71		4.78 ± 5.93		$F(4, 30) = 4.03$; $p = .011$
Self-induced vomiting	1.27 ± 4.22		0		0		$F(4, 30) = 0.48$; $p = .750$
Laxative misuse	0		0.70 ± 2.21		0.78 ± 2.33		$F(4, 30) = 0.97$; $p = .440$
Driven exercise	3.20 ± 9.44		0		1.22 ± 2.44		$F(4, 27) = 1.27$; $p = .312$

Note: EDNOS, eating disorder not otherwise specified; BMI, body mass index; BDI, Beck Depression Inventory; EDE-Q, Eating Disorders Examination Questionnaire; OOE, objective overeating episode; OBE, objective bulimic episode; SBE, subjective bulimic episode.

[$F(2, 23) = 4.01$; $p < .05$], EDE-Q Global scores [$F(2, 23) = 4.48$; $p < .05$], as well as higher frequencies of OOEs [$F(2, 21) = 7.19$; $p < .01$], OBEs [$F(2, 21) = 8.37$; $p < .01$], and SBEs [$F(2, 19) = 6.58$; $p < .01$].

Discussion

The purpose of this study was to examine the demographic, psychosocial and ED symptomology of a sample of adults on antipsychotic medication at risk for metabolic syndrome and to compare this group to similarly aged, treatment-seeking samples of obese adults and adults with diagnoses of EDNOS-BED. Consistent with our hypothesis, there were very few significant differences between the antipsychotic medication sample and the EDNOS-BED and obese samples in psychosocial and ED symptomology. However, the antipsychotic medication sample had significantly lower BMIs than both the obese and the EDNOS-BED groups. Additionally, the EDNOS-BED groups had significantly higher Restraint Total scores and SBE frequencies.

The lower BMIs of the participants on antipsychotic medication are likely due to the fact that the sample was recruited for being at risk for symptoms of metabolic syndrome. Therefore those with BMIs below 30 (i.e. overweight or normal weight) were not excluded from the sample. The lower Restraint Total scores and frequencies of SBEs compared with the EDNOS-BED group may indicate that, as this sample was not actively engaged in weight loss activities or self-identify as having EDs, they are less likely to experience distress in regards to their ability to limit their food consumption or experience loss of control during an episode of eating that does not involve consuming an objectively large amount of food.

To our knowledge, this is the first study to examine an adult, American sample on antipsychotic medication at risk for metabolic syndrome in demographic, psychosocial and ED symptoms. Understanding the differences and similarities this population has to obese and ED samples provides insights into prevention and treatment interventions for the many serious health sequelae of metabolic syndrome. There were several strengths to this analysis, specifically diverse samples assessed with well-validated measures. Yet limitations also warrant acknowledgment. Our sample sizes were quite limited; future studies should explore the characteristics of this population with larger samples.

In summary, consistent with previous findings (Mussell et al., 1996; Specker et al., 1994), the obese and EDNOS-BED samples were significantly different in many variables of ED severity, yet the antipsychotic medication sample had very few significant differences from either group. Our findings indicate that adults on antipsychotic medication at risk for metabolic syndrome comprise a unique population. Future research should examine psychosocial variables and ED symptomology with larger samples to identify effective prevention and treatment interventions for this population.

REFERENCES

ADA, APA, & AACE. (2004). Consensus development conference on antipsychotic drugs and obesity and diabetes. *Diabetes Care*, *27*(2), 596–601.

American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders: DSM-IV-TR (4th edn). Washington, DC: American Psychiatric Association.

Barrera, M., & Garrison-Jones, C. V. (1988). Properties of the beck depression inventory as a screening instrument for adolescent depression. *Journal of Abnormal Child Psychology*, *16* (3), 263–273. doi: 10.1007/bf00913799

Beck, A. T. (1987). Beck Depression Inventory. San Antonia, TX: Psychological Corporation.

Bromel, T., Blum, W. F., & Ziegler, A. (1998). Serum leptin levels increase rapidly after initiation of clozapine therapy. *Molecular Psychiatry*, *3*, 76–80.

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*, *16*, 363–370.

Fawzi, M. H., & Fawzi, M. M. (2012). Disordered eating attitudes in Egyptian antipsychotic naive patients with schizophrenia. *Comprehensive Psychiatry*, *53*(3), 259–268.

Ford, E., Giles, W., & Dietz, W. (2002). Prevalence of the metabolic syndrome among US adults: Findings from the third National Health and Nutrition Examination Survey. *JAMA: The Journal of the American Medical Association*, *287*, 356–359.

Gebhardt, S., Haberhausen, M., & Krieg, J.-C. (2007). Clozapine/olanzapine-induced recurrence or deterioration of binge eating-related eating disorders. *Journal of Neural Transmission*, *114*, 1091–1095.

Gothefors, D., Adolfsson, R., & Attval, S. (2010). Swedish clinical guidelines-prevention and management of metabolic risk in patients with severe psychiatric disorders. *Nordic Journal of Psychiatry*, *64*(5), 294–302.

Grundy, S. M., Cleeman, J. I., Daniels, S. R., Donato, K. A., Eckel, R. H., Franklin, B. A., et al. (2005). Diagnosis and management of the metabolic syndrome. *Circulation*, *112*(17), 2735–2752. doi: 10.1161/circulationaha.105.169404

Jackson, T. D., Grilo, C. M., & Masheb, R. M. (2000). Teasing history, onset of obesity, current eating disorder psychopathology, body dissatisfaction, and psychological functioning in binge eating disorder. *Obesity*, *8*(6), 451–458.

Kashani, J. H., Sherman, D. D., Parker, D. R., & Reid, J. C. (1990). Utility of the Beck Depression Inventory with clinic-referred adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *29*(2), 278–282. doi: 10.1097/00004583–199003000–00018

Khazaal, Y., Billieux, J., & Fresard, E. (2009). A measure of dysfunctional eating-related cognitions in people with psychotic disorders. *Psychiatric Quarterly Journal*, *81*, 49–56.

Khazaal, Y., Fresard, E., & Borgeat, F. (2006). Binge eating symptomatology in overweight and obese patients with schizophrenia: A case control study. *Annals of General Psychiatry*, *5*(15), doi:10.1186/1744-859X-5-15

Lock, J., Le Grange, D., Agras, W. S., Moye, A., Bryson, S. W., & Jo, B. (2010). Randomized clinical trial comparing family-based treatment with adolescent-focused individual therapy for adolescents with anorexia nervosa. *Archives of General Psychiatry*, *67*(10), 1025–1032. doi: 10.1001/archgenpsychiatry.2010.128

Luce, K., & Crowther, J. H. (1999). The reliability of the eating disorder examination: Self-report questionnaire version (EDEQ). *International Journal of Eating Disorders*, *25*, 349–351.

Malhotra, A. K., Correll, C. U., Chowdhury, N., Muller, D., Gregerson, P., Lee, A., et al. (2012). Association between common variants near the Melanocortin 4 Receptor Gene and severe antipsychotic drug-induced weight gain. *Archives of General Psychiatry*. doi: 10.1001/archgenpsychiatry.2012.191

McKnight, R. F., & Park, R. J. (2010). A typical antipsychotics and anorexia nervosa: A review. *European Eating Disorders Review*, *18*. doi: 10.1002/erv.988

Mehler-Wex, C., Romanos, M., Krirchheiner, J., & Schulze, U. (2008). Atypical antipsychotics in severe anorexia nervosa in children and adolescents-review and case reports. *European Eating Disorders Review*, *16*, 100–108. doi: 10.1002/erv.843

Meyer, J., & Stahl, S. (2009). The metabolic syndrome and schizophrenia. *Acta Psychiatrica Scandinavia*, *119*, 4–14.

Miotto, P., Pollini, B., & Restaneo, A. (2010). Symptoms of psychosis in anorexia and bulimia nervosa. *Psychiatry Research*, *17*, 237–243.

Mussell, M. P., Peterson, C. B., Weller, C. L., Crosby, R. D., de Zwaan, M., & Mitchell, J. (1996). Differences in body image and depression among obese women with and without binge eating disorder. *Obesity Research*, *4*(5), 431–439.

Narang, P., Mostafa, E. R., & Parlapalli, R. (2010). Antipsychotic drugs. *Psychiatry*, *7*(10), 25–29.

Niendam, T. A., Bearden, C. E., Johnson, J. K., McKinley, M., Loewy, R., O'Brien, M., et al. (2006). Neurocognitive performance and

functional disability in the psychosis prodrome. *Schizophrenia Research*, *84*(1), 100–111. doi: 10.1016/j.schres.2006.02.005

Peterson, C. B., Crosby, R. D., Wonderlich, S. A., Joiner, T., Crow, S. J., Mitchell, J. E., et al. (2007). Psychometric properties of the eating disorder examination-questionnaire: Factor structure and internal consistency. *International Journal of Eating Disorders*, *40*(4), 386–389. doi: 10.1002/eat.20373

Reas, D. L., Grilo, C. M., & Masheb, R. M. (2006). Reliability of the Eating Disorder Examination-Questionnaire in patients with binge eating disorder. *Behaviour Research and Therapy*, *44*(1), 43–51. doi: 10.1016/j.brat.2005.01.004

Remington, G. (2006). Schizophrenia, anti-psychotics, and the metabolic syndrome: Is there a silver lining? *The American Journal of Psychiatry*, *163*, 1132–1134.

Specker, S., de Zwaan, M., Raymond, N., & Mitchell, J. (1994). Psychopathology in subgroups of obese women with and without binge eating disorder. *Comprehensive Psychiatry*, *35*(3), 185–190. doi: 10.1016/0010–440x(94)90190–2

Weeks, J. W., & Heimberg, R. G. (2005). Evaluation of the psychometric properties of the Beck Depression Inventory in a non-elderly adult sample of patients with generalized anxiety disorder. *Depression and Anxiety*, *22*(1), 41–44. doi: 10.1002/da.20068

Zaitsoff, S. L., Celio Doyle, A., Hoste, R. R., & le Grange, D. (2008). How do adolescents with bulimia nervosa rate the acceptability and therapeutic relationship in family-based treatment? *International Journal of Eating Disorders*, *41*(5), 390–398. doi: 10.1002/eat.20515