

Review Article

Cognitive Bias Modification and Eating Disorders in the Elderly: A Brief Review

Libben MR^{1*} and Nortage R²¹Department of Psychology, University of British Columbia, Canada²Department of Biology, University of South Florida, USA

***Corresponding author:** Libben MR, Department of Psychology, University of British Columbia, Okanagan, ASC 284 3187 University Way, Kelowna, BC, V1V-1V7, Canada

Received: June 02, 2020; **Accepted:** June 22, 2020;**Published:** June 29, 2020**Abstract**

The current paper provides a brief overview of the occurrence of eating disorders (EDs) among older adults, and older females in particular. We discuss the medical risks associated with EDs in advanced age and provide an overview of studies investigating recent prevalence rates. We highlight the limited research focusing on predictive and etiological factors contributing to EDs among older adults, as well as the lack of investigation into the relationship between cognitive biases and ED onset/maintenance in the elderly. Finally, we discuss the evidence supporting the role of cognitive biases in EDs and suggest methods of cognitive bias assessment and cognitive bias modification as tools to further our understanding of EDs in advanced age.

Keywords: Eating disorder; Older adult; Cognitive bias; Cognitive bias modification

Abbreviations

ED: Eating Disorder

Introduction

Eating disorders (EDs) are characterized by a serious disturbance in eating behavior and a preoccupation with food, body image and weight. Eating pathology is generally considered to affect female adolescents and young adults, however, there has been increasing evidence for the continuation, recurrence and onset of EDs among older individuals [1,2]. Given the morbidity and mortality risks associated with EDs [3], and the increasing demographic shift towards an older population [2], the identification and treatment of EDs among the elderly is a critical area of investigation. Here we briefly review the literature on EDs in advanced age, highlight the importance of investigating cognitive factors related to EDs and make recommendations for the use of cognitive bias assessment and modification programs targeting eating pathology among the elderly.

Eating Disorders in Old Age

EDs are associated with significant health consequences and the highest mortality rates of any psychiatric disorder [3]. In old age these risks are exacerbated due to increased vulnerability to cardiac arrhythmias and arrest [4] and the increased mortality rates related to dieting and low weight [5]. Additionally, EDs in old age are associated with increased risk for osteopenia, osteoporosis and compromised immune response [2,4,6]. Finally, cognitive impairments related to reduced caloric intake may be increased among older individuals [7].

Prevalence reports for EDs among older females have only recently been investigated, and vary between studies. In a Canadian sample, Gadalla et al., [8] reported that disordered eating was present in 2.6% of women aged 50-64 years old, and in 1.8% of women over 65 years old. Mangweth-Mazek et al., [9] surveyed 475 Austrian women aged 60-70 years old found that 3.8% met diagnostic criteria for an ED and 4.4% reported single symptoms corresponding to an

ED. More recently, in American samples, Thompson & Bardone-Cone [10] reported a 6% rate for EDs among a community group of 97 women (aged 65-90 years old), Gagne et al., [11] found that 13% of their internet-based sample (1849 women over 50 years old) endorsed ED symptoms, and Midlarsky et al., [12] found that 11.84% of a sample of 245 women aged 60-90 years old met criteria for an ED. Variance between the prevalence reports above may stem from multiple factors including demographic and socio-cultural sample differences, but are likely also influenced by the limited knowledge concerning factors that contribute to, and are exhibited with, EDs among older adults.

There is conflicting evidence as to the degree to which the etiology of EDs in advanced age overlaps with manifestation of eating pathologies in younger populations. While there is a significant relationship between body dissatisfaction and risk for EDs in young adults [13-16], as well as evidence that body dissatisfaction remains stable across the lifespan [9,17-19], there has been inconsistent evidence as to the role that body dissatisfaction plays in the occurrence of EDs later in life [20]. Furthermore, in a study that investigated the relationship between concerns about aging and a drive for thinness, the authors found a direct correlation between apprehension about the effects of aging on appearance and preoccupation with weight, diet and exercise [18]. Conversely, other studies investigating predictors of eating pathology have found greater consistency among factors contributing to ED onset and maintenance across the lifespan. For example, Midlarsky et al., [21] found that, similar to younger samples, eating pathology in women 60-90 years old was predicted by socio-cultural pressures to be thin, maladaptive perfectionism, and depression.

Cognitive Bias and Eating Disorders

One area that has been under-investigated, with respect to the etiology of EDs in older adults, is the role of cognitive biases. Existing models of EDs suggest that attention and interpretation biases towards food and body shape information play a central role

in the development and maintenance of pathological eating behavior [22-25]. Within an experimental setting, cognitive biases involve preferential processing of salient stimuli (e.g., food, body shape information and negative self-assessment) over neutral cues [26]. This preferential processing is largely outside of conscious control and influences subsequent behavior (e.g., food consumption) and thoughts (e.g., body dissatisfaction [27,28]). Cognitive biases among younger individuals with EDs have been found in studies using the modified Stroop task [29-35], the dichotic listening task [36], and the dot probe task [38,39]. These biases have been found to occur both among individuals meeting clinical threshold for EDs [32,37,39] and those at risk for an ED [27,40,41]. While the studies listed above have served to establish the role of biased cognition in the manifestation and maintenance of EDs in younger populations, the degree to which cognitive biases contribute to EDs later in life is unknown. Delineating this relationship will be critical in both furthering our understanding of EDs in advanced age as well as informing current (e.g., cognitive behavioral therapy) and new (e.g., cognitive bias modification, see below) treatment techniques. Furthermore, there are advantages associated with examining biased cognition as a means of understanding EDs across the lifespan. For example, methods aimed at assessing attention and interpretation bias typically rely on objective measurements based on reaction times. As such, when taking into account slowed motor responses, they are less subject to age-related confounds that can be associated with self-report measures (e.g., age related decreases in appetite, changes in energy etc.).

With respect to treatment, knowledge regarding the impact of cognitive biases on EDs has recently led to the development of cognitive bias modification techniques that have shown promise in the reduction of ED related symptoms. Cognitive bias modification relies on computerized training programs to alter patterns of attention (e.g., the dot-probe task and tasks requiring speeded responses away from negative information) and interpretive biases (e.g., presentation of ambiguous scenarios where a positive interpretation is reinforced) associated with different forms of psychopathology [42-44]. Reductions in symptom severity have been observed post-cognitive bias modification training among individuals suffering from depression [45], anxiety [46] and addiction [47]. Based on these promising results, cognitive bias modification paradigms have recently been tested to address eating pathology in younger populations [48-52]. Findings include improvement in appearance satisfaction among female undergraduate students with EDs [48,49] decreases in negative interpretations of social stimuli [51] and potential reductions in food avoidance behaviors in anorexia nervosa [52]. Although cognitive bias modification has not been investigated among older adults with EDs, Murphey et al., [53] published a study investigating the feasibility of administering a computer-based cognitive bias modification paradigm aimed at improving positive affect for a group of 77 community-based older adults aged 60-80 years. The study showed high compliance with an overall increase in the vividness of positive prospective imagery following cognitive bias modification training in the test group. Murphey et al.'s results are important given potential concerns about the applicability of cognitive bias modification techniques to older adults, including comfort with computerized interventions and cognitive suitability. Ultimately, the cost-effective and automatized nature of these interventions may

have important implications for the treatment of eating disorders in general, and specific applications to older populations.

Conclusion

In conclusion, although EDs are generally considered a disorder of female youth, recent studies have demonstrated that prevalence rates for EDs in older populations are comparable to other stages of life. Furthermore, these rates are likely to increase with the projected rise in frequency of EDs within the general population, and with the increase in the older demographic. Given the significant health and mortality risks associated with EDs, and the increase in these risks when EDs occur in old age, research focusing on furthering our understanding of EDs later in life is critical. For example, cognitive biases are considered to be an important factor contributing to ED onset and maintenance, but have yet to be researched among older adults. Furthering our understanding of the relationship between cognitive bias and EDs in advanced age may have important implications for the creation of developmentally appropriate treatment and assessment techniques.

References

1. Beck D, Casper R, Andersen A. Truly late onset of eating disorders: A study of 11 cases averaging 60 years of age at presentation. *Int J Eat Disord*. 1996; 20: 389-395.
2. Maine M, Samuels KL, Tantillo M. Eating disorders in adult women: biopsychosocial, developmental, and clinical considerations. *Advances in Eating Disorders*. 2015; 2: 133-143.
3. Arcelus J, Mitchell AJ, Wales J, Nielsen S. Mortality Rates in Patients With Anorexia Nervosa and Other Eating Disorders: A Meta-analysis of 36 Studies. *Arch Gen Psychiatry*. 2011; 68: 724-731.
4. Mehler PS, Andersen AE. *Eating disorders: A guide to medical care and complications*. Baltimore, MD: Johns Hopkins University Press. 2010.
5. Miller SL, Wolfe RR. The danger of weight loss in the elderly. *The Journal of Nutrition, Health & Aging*. 2008; 12: 487-491.
6. Zerbe KJ. *Women's mental health in primary care*. Philadelphia, PA: WB Saunders Company. 1999.
7. Lewis DM, Cachelin FM. Body image, body dissatisfaction, and eating attitudes in midlife and elderly women. *Eating Disorders: The Journal of Treatment and Prevention*. 2001; 9: 29-39.
8. Gadalla TM. Eating disorders and associated psychiatric comorbidity in elderly Canadian women. *Arch Womens Ment Health*. 2008; 11: 357-362.
9. Mangweth-Matzek B, Rupp CI, Hausmann A, Assmayr K, Mariacher E, Kemmler G, et al. Never too old for eating disorders or body dissatisfaction: a community study of elderly women. *Int J Eat Disord*. 2006; 40: 193.
10. Thompson KA, Bardone-Cone AM. Disordered eating behaviors and attitudes and their correlates among a community sample of older women. *Eat Behav*. 2019; 34: 101301.
11. Gagne DA, Von Holle A, Brownley KA, Runfola CD, Hofmeier S, Branch KE, et al. Eating disorder symptoms and weight and shape concerns in a large web-based convenience sample of women ages 50 and above: Results of the Gender and Body Image (GABI) study. *International Journal of Eating Disorders*. 2012; 45: 832-844.
12. Midlarsky E, Marotta AK, Pirutinsky S, Morin RT, McGowan JC. Psychological predictors of eating pathology in older adult women. *Journal of Women & Aging*. 2018; 30: 145-157.
13. Forman M, Davis WN. Characteristics of middle-aged women in inpatient treatment for eating disorders. *Eating Disorders*. 2005; 13: 231-243.
14. Jaeger B, Ruggiero GM, Edlund B, Gomez-Perretta C, Lang F, Mohammadkhani P, et al. Body dissatisfaction and its interrelations with

- other risk factors for bulimia nervosa in 12 countries. *Psychotherapy and Psychosomatics*. 2001; 71: 54-61.
15. Tylka TL. The relation between body dissatisfaction and eating disorder symptomatology: An analysis of moderating variables. *Journal of Counseling Psychology*. 2004; 51: 178-191.
16. Woodside BD, Staab R. Management of psychiatric comorbidity in anorexia nervosa and bulimia nervosa. *CNS Drugs*. 2006; 20: 655-663.
17. Peat CM, Peyrerl NL, Muehlenkamp JJ. Body Image and Eating Disorders in Older Adults: A Review. *The Journal of General Psychology*. 2008; 135: 343-358.
18. Gupta MA. Concerns about aging and a drive for thinness: A factor in the biopsychosocial model of eating disorders? *International Journal of Eating Disorders*. 1995; 18: 351-357.
19. Webster J, Tiggemann M. The relationship between women's body satisfaction and self-image across the life span: The role of cognitive control. *The Journal of Genetic Psychology*. 2003; 164: 241-252.
20. Tiggemann, M. Body image across the adult life span: Stability and change. *Body Image*. 2004; 1: 29-41.
21. Midlarsky E, Marotta AK, Pirutinsky S, Morin RT, McGowan JC. Psychological predictors of eating pathology in older adult women, *Journal of Women & Aging*. 2018; 30: 145-157.
22. Brooks S, Prince A, Stahl D, Campbell I, Treasure J. A systematic review and meta-analysis of cognitive bias to food stimuli in people with disordered eating behaviour. *Clin Psychol Rev*. 2011; 31:37-51.
23. Vitousek K, Orimoto L. Cognitive-behavioral models of anorexia nervosa, bulimia nervosa, and obesity. Dobson IKS, Kendall PC, editors. In: *Psychopathology & cognition* San Diego: Academic Press. 1993; 191-242.
24. Vitousek K, Hollon SD. The investigation of schematic content and processing in eating disorders. *Cognitive Therapy & Research*. 1990; 14: 191-214.
25. Williamson DA, Muller SL, Reas DL, Thaw JM. Cognitive bias in eating disorders: Implications for theory and treatment. *Behaviour Modification*. 1999; 23: 556-577.
26. Mathews A, MacLeod C. Cognitive vulnerability to emotional disorders. *Annu Rev Clin Psychol*. 2005; 1: 167-195.
27. Misener K, Libben M. Examination of the Relationship Between Attentional Biases and Body Dissatisfaction: An Eye-Tracking Study. *Cogn Ther Res*. 2020; 44: 581-595.
28. Kakoschke N, Kemps E, Tiggemann M. Attentional bias modification encourages healthy eating. *Eat. Behav*. 2014; 15: 120-124.
29. Ben-Tovim D, Walker M. Further evidence for the Stroop test as a quantitative measure of psychopathology in eating disorders. *International Journal of Eating Disorders*. 1991; 10: 609-613.
30. Cooper M, Anastasiades P, Fairburn C. Selective processing of eating-, shape-, and weight related words in persons with bulimia nervosa. *Journal of Abnormal Psychology*. 1992; 101: 352-355.
31. Cooper M, Fairburn C. Selective processing of eating, weight and shape related words in patients with eating disorders and dieters. *British Journal of Clinical Psychology*. 1992; 31: 363-365.
32. Dobson K, Dozois, D. Attentional biases in eating disorders: A meta-analytic review of Stroop performance. *Clinical Psychology Review*. 2004; 23: 1001-1022.
33. Jones-Chesters M, Monsell S, Cooper P. The disorder-salient Stroop effect as a measure of psychopathology in eating disorders. *International Journal of Eating Disorders*. 1998; 24: 65-82.
34. Rofey DL, Corcoran KJ, Tran GQ. Bulimic symptoms and mood predict food relevant Stroop interference in women with troubled eating patterns. *Eating Behaviors*. 2004; 5: 35-45.
35. Stormark KM, Torkildsen O. Selective processing of linguistic and pictorial stimuli in females with anorexia and bulimia nervosa. *Eating Behaviors*. 2004; 5: 27-33.
36. Schotte DEM, Richard J, Turner ML. A dichotic listening analysis of body weight concern in bulimia nervosa. *International Journal of Eating Disorders*. 1990; 9: 109-113.
37. Rieger E, Schotte D, Touyz S, Beumont P, Griffiths R, Russell J. Attentional biases in eating disorders: A visual probe detection procedure. *International Journal of Eating Disorders*. 1998; 23: 199-205.
38. Shafran R, Lee M, Cooper A, Palmer RL, Fairburn CG. Attentional bias in eating disorders. *Int J Eat Disord*. 2007; 40: 369-380.
39. Boon B, Vogelzang L, Jansen A. Do restrained eaters show attention toward or away from food, shape and weight stimuli? *European Eating Disorders Review*. 2000; 8: 51-58.
40. Misener K, Libben M. Risk for eating disorders modulates interpretation bias in a semantic priming task. *Body Image*. 2017; 21:103-106.
41. Jiang MY, Vartanian LR. A review of existing measures of attentional biases in body image and eating disorders research. *Aust J Psychol*. 2018; 70: 3-17.
42. MacLeod C, Koster EHW, Fox E. Whither cognitive bias modification research? Commentary on the special section articles. *Journal of Abnormal Psychology*. 2009; 118: 89-99.
43. Mathews A, Mackintosh B. Induced emotional interpretation bias and anxiety. *Journal of Abnormal Psychology*. 2000; 109: 602-615.
44. MacLeod C, Mathews A. Cognitive bias modification approaches to anxiety. *Annual Review of Clinical Psychology*. 2012; 8: 189-217.
45. Watkins ER, Baeyens CB, Read R. Concreteness training reduces dysphoria: Proof-of-principle for repeated cognitive bias modification in depression. *Journal of Abnormal Psychology*. 2009; 118: 55-64.
46. Bar-Heim Y. Research review: Attention Bias Modification (ABM): A novel treatment for anxiety disorders. *The Journal of Child Psychology and Psychiatry*. 2010; 51: 859-870.
47. Wiers RW, Gladwin TE, Hogmann W, Salemink E, Ridderinkhof RK. Cognitive Bias Modification and Cognitive Control Training in Addiction and Related Psychopathology: Mechanisms, Clinical Perspectives, and Ways Forward. *Clinical Psychological Science*. 2013; 1: 192-212.
48. Matheson E, Wade T, Yiend J. A new cognitive bias modification technique to influence risk factors for eating disorders. *Int J Eat Disord*. 2018; 51: 959-967.
49. Matheson E, Wade T, Yiend J. Utilising cognitive bias modification to remedy appearance and self-worth biases in eating disorder psychopathology: A systematic review. *Journal of Behavior Therapy and Experimental Psychiatry*. 2019; 65.
50. Yiend J, Parnes C, Shepherd K, Roche M, Cooper M. Negative Self-Beliefs in Eating Disorders: A Cognitive-Bias-Modification Study. *Clinical Psychological Science*. 2014; 2.
51. Cardi V, Esposito M, Bird G, Rhind C, Yiend J, Schifano S, et al. A preliminary investigation of a novel training to target cognitive biases towards negativesocial stimuli in anorexia nervosa. *Journal of Affective Disorders*. 2015; 188: 188-193.
52. Mercado D, Schmidt U, O'Daly OG, Campbell IC, Werthmann J. Food related attention bias modification training for anorexia nervosa and its potential underpinning mechanisms. *J Eat Disord*. 2020; 8.
53. Murphey SE, O'Donoghue MC, Drasich E, Blackwell S, Nobre AC, Holmes E. Imagining a brighter future: The effect of positive imagery training on mood, prospective mental imagery and emotional bias in older adults. *Psychiatric Research*. 2015; 30: 36-43.