

CHEW AND SPIT (CHSP): AN INVESTIGATION INTO A RELEGATED EATING DISORDER SYMPTOM

Phillip Aouad

Supervisors: Professor Stephen Touyz; Professor Phillipa Hay; Dr. Nerissa Soh

Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy
(Psychology)

School of Psychology
Faculty of Science
The University of Sydney, NSW, Australia
2019

Keywords

Anorexia Nervosa; Bulimia Nervosa; Chew and Spit; CHSP; Clinical Psychology; Eating Disorders; Eating Disorders Not Otherwise Specified; Other Specified Feeding and Eating Disorders; Phenomenology; Prevalence; Purging Disorder; Rumination; Systematic Review

Abstract

Chew and Spit (CHSP) is characterised by individual's spitting out food after it has been chewed, as a means to control weight or body shape. Chew and Spit, as a symptom, was removed from the DSM-5 following the recategorization of Eating Disorders Not Otherwise Specified (EDNOS; DSM-IV) into Other Specified Feeding and Eating Disorders (OSFED) and Unspecified Feeding and Eating Disorders (UFED). It is speculated that one possible reason for this removal was due to the dearth in scholarly knowledge surrounding CHSP behaviour. Prior to 2018, studies had focused on clinical eating disorder samples to examine CHSP, of which not many studies exist, despite evidence suggesting the behaviour may be present in other 'at-risk' sub-samples. In order to begin to comprehensively examine CHSP, a systematic review was conducted, followed by point-prevalence studies in both adults and adolescents, and a phenomenological study to determine the lived-experience of CHSP on individuals lives. The systematic review found six themes which arose from existing literature using clinical samples. Themes included CHSP appearing in younger individuals, increased pathological eating, increased negative emotions, some feelings of loss on control, appearing transdiagnostic (occurs along the eating disorder spectrum), and possibly being a marker of eating disorder severity. Prevalence studies determined that CHSP had a 0.4% and 12% point-prevalence rate in adults and adolescents respectively, and was associated with other eating disorder behaviours such as laxative abuse, restrictive eating, and purging. Moreover, the prevalence studies highlighted that CHSP was associated with lower quality of life scores. Finally, the phenomenological study found that CHSP may be highly addictive, and associated with maladaptive coping mechanisms, where individual's try to sooth themselves through the repetitive behaviour of CHSP. Overall CHSP appeared to be more prevalent than expected, especially in adolescents. Additionally, distress and implied impaired functioning emphasized the adverse effects of CHSP on individuals. The studies contained in this theses highlight that CHSP as a symptom needs to be given serious consideration for inclusion back in to diagnostic manuals. Moreover, future research should focus on studying CHSP in other groups at risk of developing eating disorders, as well as possible treatment options for patients who have CHSP as a primary disorder.

Summary

The DSM-5 is used to categorize eating disorder (ED) symptoms into diagnoses that are then used to refer individuals for treatment. The most widely recognized diagnoses are Anorexia Nervosa (AN), which is typically associated with the behaviour of extreme calorie restriction due to fear of gaining weight; Bulimia Nervosa (BN) and its attendant behaviour of bingeing and purging (BP), that is eating large quantities of food followed by compensatory behaviour such as vomiting or over-exercise; and Binge Eating Disorder (BED) characterised by the consumption of large amounts of food in a relatively short period of time, without compensatory behaviour. However, all eating disorders have one feature in common, that is they are associated with significant psychological distress related to food, eating, or body weight or shape. However, the less recognized symptom of Chew and Spit (CHSP) has specifically been identified in both AN and BN (and associated subtypes), as well as other diagnoses such as Other Specified Feeding or Eating Disorder (OSFED) or Eating Disorder Not Otherwise Specified (EDNOS). Of those with an EDNOS diagnosis, it has been estimated that between 35% and 65% may engage in CHSP. CHSP is the pathological behaviour of chewing an enjoyable, often calorie dense and high starch food then spitting it out before swallowing it. Regardless of the patient's diagnosis, the premise of an ED is weight control, typically intended to alter the physiology of the individual, and CHSP is one method being employed by some people with eating disorders. As of the DSM-5, CHSP is no longer listed as a symptom associated with feeding or eating disorders, and reasons for its removal have not been made clear. Studies that have examined CHSP as a secondary behaviour to more commonly diagnosed eating disorders, have suggested that CHSP may be common among individuals with eating disorders. However, there is a dearth in knowledge as to the prevalence and impacts of CHSP in wider community samples, and little has been studied about the impacts that CHSP could have, if engaged in on a regular basis.

Therefore, there remains a pressing need to further develop our understanding of CHSP as a disordered eating behaviour. To show validity for clinicians to screen for CHSP behaviour, and to empirically examine and provide evidence toward considering including CHSP included back into future revisions of the DSM, this dissertation aims to: 1) determine what is currently known about CHSP in academic

literature, and to develop a clearer understanding of the current evidence base surrounding the behaviour; 2) determine if CHSP is a prevalent issue among adults, who appeared to be under represented in studies that were included in the systematic review; 3) determine if CHSP is a prevalent issue among adolescents, who are known to be more at risk of eating disordered behaviour; and 4) determine the personal impacts on psychological, physiological, and social wellbeing, through lived experiences of individuals who engage in CHSP.

In order to explore the above aims, this dissertation presents four studies that will explore existing literature, the prevalence of the disorder using large community samples of both adults (n=3000) and adolescents (n=5000), and the underlying phenomenology of CHSP behaviour. Findings of the systematic review, which examined studies that focused on CHSP behaviour, indicate that CHSP appears in younger sufferers; may be transdiagnostic, although often seen in restrictive-type eating disorders; may be a marker of eating disorder severity; associated with increased pathological eating; associated with increased negative emotions; and associated with some loss of control. However, the findings of the systematic review were limited to studies that had investigated CHSP in eating disorder samples with no studies examining the prevalence of CHSP larger community samples. Findings of the prevalence studies highlighted that CHSP has a point-prevalence of 0.4% in adults and 12% point-prevalence in adolescents. It was also determined that CHSP is associated with other eating disordered behaviours such as purging, restricting, and laxative abuse. Moreover, findings from both the adult and adolescent prevalence studies suggest that CHSP is associated with lower quality of life compared to those who do not engage in the behaviour. Additionally, the phenomenological study highlighted a number of functions CHSP appears to serve, most notably is that CHSP is often an addictive yet comforting behaviour used as self-soothing strategy. The studies mentioned herein, while in their infancy, provide compelling evidence to study CHSP further, and begin to offer a solid foundation for future research into CHSP and its recognition as an eating disorder symptom in future DSM revisions. Future research should examine the behaviour more closely and aim at gaining further insight into CHSP, and working toward developing tailored treatment for the behaviour, which can present as a primary disorder.

Author Attribution Statement

Chapter 2 of this thesis is published as: Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): A systematic review. *Journal of Eating Disorders*, 4(1), 23. doi: 10.1186/s40337-016-0115-1

Chapter 3 of this thesis is published as: Aouad, P., Hay, P., Soh, N., & Touyz, S. (2018). Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. *International Journal of Eating Disorders*, 51(8), 968-972. doi: 10.1002/eat.22873

Chapter 4 of this thesis is currently under peer-review as: Aouad, P., Hay, P., Soh, N., Touyz, S. & Mitchison, D., (under peer review). Chew and Spit (CHSP) in a Large Adolescent Sample: Prevalence, Impact on Health-Related Quality of Life, and Relation to Other Disordered Eating Features. *Eating Disorders: Journal of Treatment and Prevention*.

Chapter 5 of this thesis is currently under peer-review as: Aouad, P., Morad, A., Hay, P., Soh, N., Touyz, S. & Rhodes, P., (under peer review). Chew and Spit (CHSP) in a Large Adolescent Sample: Prevalence, Impact on Health-Related Quality of Life, and Relation to Other Disordered Eating Features. *Eating Behaviors*.

For all above mentioned chapters I have been first author and was responsible for literature searching, data analysis, and drafting of manuscripts.

Name: Phillip Aouad

Signature: _____

Date: 19th August 2019

Table of Contents

Keywords	i
Abstract	ii
Summary	iii
Table of Contents	v
List of Figures	vii
List of Tables	viii
List of Abbreviations	ix
List of Publications and Conference Presentations Mentioned in the Dissertation *	x
1.1 Peer-Reviewed Publicaitons	x
1.2 Conferences and Abstracts	x
Statement of Original Authorship	xi
Acknowledgements	xii
Dedication	xiii
Chapter 1: Introduction	1
1.1 Background	1
1.2 Context & General Review of Eating Disorder Literature	1
1.3 Purpose, Significance, and Aims	15
1.4 Thesis Outline	16
Chapter References	18
Chapter 2: Systematic Review (Study 1)	23
2.1 Abstract	25
2.2 Background	26
2.3 Methods	27
2.4 Results	31
2.5 Discussion	35
2.6 Conclusion	38
Chapter References	40
Chapter 3: Adult Prevalence (Study 2)	45
3.1 Abstract	47
3.2 Introduction	48
3.3 Method	48
3.4 Results	50
3.5 Discussion	53
Chapter References	56

Chapter 4: Adolescent Prevalence (Study 3)	59
4.1 Abstract	61
4.2 Introduction	62
4.3 Method	63
4.4 Results	68
4.5 Discussion	74
Chapter References	77
Chapter 5: Phenomenological Analysis (Study 4)	81
5.1 Abstract	83
5.2 Special Acknowledgement	84
5.3 Introduction	85
5.4 Method	86
5.5 Results	91
5.6 Discussion	98
Chapter References	101
Chapter 6: Discussion and Conclusions	105
6.1 Summary of Results and Synthesis	105
6.2 Strengths and Limitations	109
6.3 Clinical Implications, and Recommendations	110
6.4 Future Directions of Research	111
6.5 Conclusions	112
Chapter References	113
Appendices	119
Appendix A Ferrer and Speechley (2009) Quality Index Scores for included studies in systematic review	119
Appendix B Questions Included in the Health Omnibus Survey (HOS) 2016 to assess eating behaviour	121
Appendix C CHSP Phenomenological Interview Schedule	123

List of Figures

Figure 1: Direct quote of Eating Disorder Not Otherwise Specified (EDNOS) DSM-IV Diagnostic Criteria (APA, 2000. P.505) with Chew and Spit as a listed symptom (point 5) in bold.....	3
Figure 2: Direct quote of Anorexia Nervosa (AN) DSM-5 Diagnostic Criteria (APA, 2013. p.338-339).....	5
Figure 3: Direct quote of Bulimia Nervosa (BN) DSM-5 Diagnostic Criteria (APA, 2013. p.345).....	6
Figure 4: Direct quote of Binge-Eating Disorder (BED) DSM-5 Diagnostic Criteria (APA, 2013. p.350).....	7
Figure 5: Direct quote of Other Specified Feeding or Eating Disorder (OSFED) DSM-5 Diagnostic Criteria (APA, 2013. P.353) with no mention of Chew and Spit as a listed symptom.....	8
Figure 6: Direct quote of Unspecified Feeding or Eating Disorder (UFED) DSM-5 Diagnostic Criteria (APA, 2013. P.354) with no mention of Chew and Spit as a listed symptom	9
Figure 7: Search string used for database searching	28
Figure 8: Flow diagram highlighting selection process of included articles.....	30

List of Tables

Table 1: Inclusion criteria for literature relating to ‘Chew and Spit’	29
Table 2: Summary of included studies on CHSP (findings and conclusions of studies in discussion section of this review)	32
Table 3: Demographic and Notable Features between all participants with CHSP (n=13) and without CHSP (n=3034).....	51
Table 4: Eating Disorder symptoms related to those that CHSP.....	52
Table 5: 2x2 Chi-square test results for association between any CHSP in the 28 days prior to the study and other eating disorders	69
Table 6: Associations between CHSP frequency in the 28 days prior to the study, age, and gender in the sample (n=5111).....	71
Table 7: Results of mixed effects linear regressions for the effects of CHSP (yes vs no) and CHSP frequency categories on psychological distress, HRQoL emotional, HRQoL social and HRQoL physical.....	73
Table 8: Participant Key Characteristics	88
Table 9: Ferrer and Speechley (2009) Quality Index Scores for included studies in systematic review	120

List of Abbreviations

All abbreviations have been noted in text, where applicable and appropriate.

List of Publications and Conference Presentations Mentioned in the Dissertation*

1.1 PEER-REVIEWED PUBLICATIONS

Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): A systematic review. *Journal of Eating Disorders*, 4(1), 23. doi: 10.1186/s40337-016-0115-1

Aouad, P., Hay, P., Soh, N., & Touyz, S. (2018). Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. *International Journal of Eating Disorders*, 51(8), 968-972. doi: 10.1002/eat.22873

Aouad, P., Hay, P., Soh, N., Touyz, S. & Mitchison, D., (under peer review). Chew and Spit (CHSP) in a Large Adolescent Sample: Prevalence, Impact on Health-Related Quality of Life, and Relation to Other Disordered Eating Features. *Eating Disorders: Journal of Treatment and Prevention*.

Aouad, P., Morad, A., Hay, P., Soh, N., Touyz, S. & Rhodes, P., (under peer review). Chew and Spit (CHSP): An Interpretative Phenomenological Analysis (IPA). *Eating Behaviors*.

1.2 CONFERENCES AND ABSTRACTS

Australia and New Zealand Academy of Eating Disorders (ANZAED) 2016 - Chew and Spit (CHSP): A systematic review

Australia and New Zealand Academy of Eating Disorders (ANZAED) 2017 - Chew and Spit (CHSP): Prevalence of a “forgotten” disordered eating symptom.

Body Image and Related Disorders (BIRD) 2017 – CHSP prevalence and relation to other eating disorders: Preliminary Findings

Australia and New Zealand Academy of Eating Disorders (ANZAED) 2018 - Chew and Spit (CHSP): Prevalence of a “forgotten” disordered eating symptom.

International Conference on Eating Disorders (ICED) 2019 – Chew and Spit Prevalence in Adolescents: Impact on Health Related Quality of Life and its relation to other ED features

London Conference on Eating Disorders 2019 – Chew and Spit and Sexuality in Adolescents.

* For a full list of publications and conferences during PhD candidature (not necessarily related to the works mentioned here in) please contact Phillip Aouad (phillip.aouad@sydney.edu.au).

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: _____

Date: 31st August 2019

Acknowledgements

My heartfelt appreciation goes to Prof. Stephen Touyz, Prof. Phillipa Hay, & Dr. Nerissa Soh who offered me ongoing support, constant encouragement, and clear guidance from the start of my Ph.D. journey. I wish I could thank you enough for putting up with me and my late night emails. Without you I would not be submitting this thesis and I hope and look forward to continuing to work together as colleagues. I would also like to thank Prof. Paul Rhodes, Dr. Haider Mannan, Dr. Deborah Mitchison, and my dear friend Mr. Arshia Morad whose input, comments, expertise, and guidance were invaluable to helping me grow, just that little bit, and the field of eating disorders. Further I would like to thank Dr. Kristin Stedal and Dr. Camilla Lindvall, from Oslo University Hospital, who took a vested interest in this topic, and who I look forward to working with soon in order to explore CHSP further in another population, we have ball rolling and I hope it doesn't stop.

To all participants who took part in the studies mentioned, and specifically to those that are struggling with CHSP, my heart goes out to you. I cannot thank you enough for allowing me to be part of your journey and experiences. None of the research mentioned in this document could have existed without you. I hope we can take our understanding of CHSP further and begin to uncover ways to overcome it. I have the utmost respect for you all and hope that one day, as a result of our joint efforts, we can bring CHSP to the forefront of clinical, academic, and public awareness.

I would also like to express my gratitude to my family (Mum, Dad, Candice and Tony) for their moral support, warm encouragements, and understanding during perhaps one of the busiest periods of my life so far. Words cannot express how thankful I am for you and how much I love you all.

My partner, who supported me while also managing a Ph.D. of their own! I hope I can support and love you the same way you did me during the final leg of this journey.

If there is anyone I have forgotten to thank in this section, I apologise. But please know that I am appreciative of your support and the role you had in this journey.

P.S. Thank you KissPNG .com (and according to the information provided, by extension Apple Inc.) for providing the emoji's used on the next page [for personal use].

Dedication



Chapter 1: Introduction

1.1 BACKGROUND

Since the introduction of the DSM-5 (APA, 2013) and the removal of the Eating Disorders Not Otherwise Specified (EDNOS) category from the DSM-IV (APA, 2000), a number of symptoms that used to appear in the DSM no longer do (APA, 2013). One such behaviour that was removed was Chew and Spit (CHSP; see figures 1, 5, & 6 for comparison of criteria), which is characterised by recurrent episodes of masticating food, and expelling it before swallowing (Aouad, Hay, Soh, & Touyz, 2016). Reasons for the removal of CHSP from the DSM-5 may be related to a number of factors including: a lack of understanding of the topic, the impact it has on individuals, how common it is on a populous scale, and its clinical significance. Moreover, CHSP does not appear in the World Health Organisation International Classification of Disease (ICD) version 10 (1992) nor version 11 (2018), meaning that clinicians are less likely to consider screening for the behaviour. However, CHSP is far more prevalent than previously expected and could carry a number of psychological health implications for those that engage in the behaviour. In order to address the paucity of knowledge in CHSP, this dissertation will examine the existing literature, investigate the prevalence of CHSP in large size adult and adolescent community samples, and examine the phenomenology and personal impacts of the behaviour through lived experiences of individuals who CHSP.

1.2 CONTEXT & GENERAL REVIEW OF EATING DISORDER LITERATURE

1.2.1 The Difference Between Disordered Eating (DE) & Eating Disorders (ED)

Disordered Eating

Disordered Eating (DE) can constitute a variety of eating behaviours that are considered abnormal or eating disordered in nature, but collectively do not meet diagnostic criteria (such as criteria for frequency or severity) for a particular DSM listed eating disorder (Grig, Bowman, & Redman, 1996). It can be argued that one or two instances of disordered behaviours may not be cause for concern. However, over time the culmination of psychological, physiological, and sometimes social

implications may compound to cause significant harm to an individual and may develop into a more serious condition if left unchecked (Franko, & Orosan-Weine, 1998; Pereira, & Alvarenga, 2007).

Disordered eating may be a serious indicator of the development of an eating disorder, and symptoms or behaviours can be just as distressing for the individual, with individuals exhibiting symptoms or behaviours that mirror that of other EDs (Ricciardelli, & McCabe, 2004). Dependant on the severity of disordered eating behaviour and depending on the secrecy of the individual surrounding the behaviour, disordered eating behaviour may go unnoticed or unchecked. Especially if the individual is not forthcoming about the distress they are feeling, or has never been asked about their behaviour specifically. The distress and maladaptive behaviours can continue to go unnoticed, and the effects may compound with the individual developing a number of disordered eating symptoms that may eventually constitute a clinically diagnosable eating disorder.

Such could be the case of CHSP. There is a clear need for the behaviour to be brought back into clinical awareness. However, before examining how CHSP fits into the context of EDs it is important to establish current understanding and clinical diagnostics of EDs more generally, as well as the complications they present.

Eating Disorders

According to the DSM-5 (APA, 2013) there are multiple categories of eating disorders or diagnoses. Eating disorders (EDs) which present most often include: Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge Eating Disorder (BED), Other Specified Feeding or Eating Disorders (OSFED), and Unspecified Feeding and Eating Disorders (UFED). From the implementation of DSM-5 (2013) some eating disorder categories have had significant changes. Perhaps the most notable is that DSM-IV (2000) was the last version of the diagnostic manual to use the category Eating Disorders Not Otherwise Specified (EDNOS), which in essence encompassed both OSFED and UFED categories (see Figure 1 for DSM-IV EDNOs diagnostic criteria) (APA, 2000, 2013). Additionally, DSM-5 (APA, 2013) saw the introduction of other specific ED categories including: Binge Eating Disorder (BED), Pica (eating non-food items), Avoidant/ Restrictive Food Intake Disorder (ARFID), and Rumination (regurgitation) Disorder as primary eating disorder categories in the Eating and Feeding Disorders chapter (APA, 2013). Previously, in DSM-IV, Pica and rumination

disorder were listed in the subsection on “Feeding and Eating Disorder of Infancy and Early Childhood”, in the “Disorders Usually First Diagnosed In Infancy, Childhood, or Adolescence” Chapter (APA, 2000).

307.50 Eating Disorder Not Otherwise Specified

The Eating Disorder Not Otherwise Specified category is for disorders of eating that do not meet the criteria for any specific Eating Disorder. Examples include:

1. For females, all of the criteria for Anorexia Nervosa are met except that the individual has regular menses.
2. All of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual's current weight is in the normal range.
3. All of the criteria for Bulimia Nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for a duration of less than 3 months.
4. The regular use of inappropriate compensatory behavior by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after the consumption of two cookies).
- 5. Repeatedly chewing and spitting out, but not swallowing, large amounts of food.**
6. Binge-eating disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of Bulimia Nervosa (*see p. 729 for suggested criteria*).

Figure 1: Direct quote of Eating Disorder Not Otherwise Specified (EDNOS) DSM-IV Diagnostic Criteria (APA, 2000. P.505) with Chew and Spit as a listed symptom (point 5) in bold

Eating Disorder Not Otherwise Specified (EDNOS)

EDNOS, specifically the “NOS” (Not Otherwise Specified) suffix aimed to encapsulate eating pathology that brought about clinically significant levels of distress for an individual, but which did not meet all necessary clinical diagnostic features of AN or BN (Fairburn, & Bohn, 2005). Fairburn and Bohn (2005) argue that because EDNOS (indeed all “atypical” or “not otherwise specified” categories in the DSM) intended to capture residual conditions, they are often neglected by research, even though NOS diagnoses make up the highest proportion of clinical presentations (Fairburn, & Bohn, 2005). Therefore, there is a need to consider EDNOS (and by extension the current OSFED and UFED categories) just as serious as more common eating disorder diagnoses.

Evolution of EDNOS into OSFED and UFED

Several key studies have highlighted the prevalence of EDNOS in clinical samples, which make up on average, 60% of total clinical presentations for eating disorder treatments (Fairburn and Bohn, 2005). In their study, Martin, Williamson, & Thaw (2000) used the Multiaxial Assessment for Eating Disorder Symptoms to diagnose patients. In total 175 patients were screened for DSM-IV related eating disorders, and included in the study. It was determined that approximately 19% (n= 33) had AN, 23% (n= 40) had BN, and almost 58% had EDNOS (n=102) including BED (Martin, Williamson, & Thaw, 2000). Similarly, Ricca and colleagues examined 189 outpatient females presenting to two ED clinics. EDNOS was diagnosed in 95 (50%) of the participant, and found no significant difference between the psychopathologies (including anxiety and depression) of individuals diagnosed with EDNOS compared to those with AN or BN. The authors argued that because EDNOS psychopathological profiles were similar enough that patients should be categorised into AN or BN subcategories of EDNOS (Ricca, Mannucci, Mezzani, Di Bernardo, Zucchi, Paionni, Placidi, Rotella, & Faravelli, 2001). Further, Turner and Bryant-Waugh (2004) assessed 200 participants for clinical eating disorders (based on DSM-IV criteria) using the Eating Disorder Examination (EDE). Of the 200, 190 had clinically diagnosable eating disorders. Out of all participants 11 (5.5%) had AN, 45 (22.5%) BN, and 134 EDNOS (67%).

In their study Fairburn, Cooper, Bohn, O'Connor, Doll, & Palmer (2007), expand on their earlier works (Fairburn, & Bohn, 2005) by suggesting that such findings as the above highlighted the need for the EDNOS category to be reclassified to include cases that closely related to BN or AN, which were not 'subthreshold', but rather characteristically "mixed". In the following few pages AN, BN, BED, OSFED, and UFED will be briefly examined along with their respective DSM-5 diagnostic criteria.

Anorexia Nervosa

Anorexia Nervosa (AN) is indicated by persistent and severe caloric intake restriction, often driven by intense fear of weight gain, which leads the individual to have significantly lower body weight than is to be expected for their growth rate, age, height, or sex (Mancuso, Newton, Bosanac, Rossell, Nesci, & Castle, 2015). In order to be diagnosed with Anorexia Nervosa, patients must meet specific criteria as outlined in the DSM-5 (APA, 2013):

Anorexia Nervosa

A. Restriction of energy intake relative to requirements, leading to a significantly low body weight in the context of age, sex, development trajectory, and physical health. *Significantly low weight* is defined as a weight that is less than minimally normal or, for children and adolescents, less than that minimally expected.

B. Intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain, even though at a significantly low weight.

C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

Coding note: The ICD-9-CM code for anorexia nervosa is 307.1, which is assigned regardless of the subtype. The ICD-10-CM code depends on the subtype (see below). *Specify* whether:

(F50.01) Restricting type: During the last 3 months, the individual has not engaged in re-current episodes of binge eating or purging behavior (i.e., self-induced vomiting or the mis-use of laxatives, diuretics, or enemas). This subtype describes presentations in which weight loss is accomplished primarily through dieting, fasting, and/or excessive exercise.

(F50.02) Binge-eating/purging type: During the last 3 months, the individual has engaged in recurrent episodes of binge eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas).

Specify If:

In partial remission: After full criteria for anorexia nervosa were previously met. Criterion A (low body weight) has not been met for a sustained period, but either Criterion B (intense fear of gaining weight or becoming fat or behavior that interferes with weight gain) or Criterion C (disturbances in self-perception of weight and shape) is still met.

In full remission: After full criteria for anorexia nervosa were previously met, none of the criteria have been met for a sustained period of time.

Specify current severity:

The minimum level of severity is based, for adults, on current body mass index (BMI) (see below) or, for children and adolescents, on BMI percentile. The ranges below are derived from World Health Organization categories for thinness in adults; for children and adolescents, corresponding BMI percentiles should be used. The level of severity may be increased to reflect clinical symptoms, the degree of functional disability, and the need for supervision.

Mild: BMI > 17 kg/m²

Moderate: BMI 16-16.99 kg/m²

Severe: BMI 15-15.99 kg/m²

Extreme: BMI < 15 kg/m²

Figure 2: Direct quote of Anorexia Nervosa (AN) DSM-5 Diagnostic Criteria (APA, 2013. p.338-339)

Bulimia Nervosa

Bulimia Nervosa (BN) is diagnosed when recurrent episodes of bingeing (as described below for Binge Eating Disorder) occur, but are followed by dangerous measures that try to compensate for the amount of food consumed and avoid weight gain. Such methods may include purging (vomiting), laxative misuse, excessive exercise, or prolonged periods of fasting. Bulimia Nervosa most notably occurs in the presence of overvaluation of body shape or weight (Regier, Kuhl, Kupfer, 2013). Figure 3 highlights specifically the diagnostic criteria of BN, which is specified in severity based on number of weekly binge and purge episodes.

Bulimia Nervosa

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

1. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most individuals would eat in a similar period of time under similar circumstances.
2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).

B. Recurrent inappropriate compensatory behaviors in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting; or excessive exercise.

C. The binge eating and inappropriate compensatory behaviors both occur, on average, at least once a week for 3 months.

D. Self-evaluation is unduly influenced by body shape and weight.

E. The disturbance does not occur exclusively during episodes of anorexia nervosa.

Specify if:

In partial remission: After full criteria for bulimia nervosa were previously met, some, but not all, of the criteria have been met for a sustained period of time.

In full remission: After full criteria for bulimia nervosa were previously met, none of the criteria have been met for a sustained period of time.

Specify current severity:

The minimum level of severity is based on the frequency of inappropriate compensatory behaviors (see below). The level of severity may be increased to reflect other symptoms and the degree of functional disability.

Mild: An average of 1-3 episodes of inappropriate compensatory behaviors per week.

Moderate: An average of 4-7 episodes of inappropriate compensatory behaviors per week.

Severe: An average of 8-13 episodes of inappropriate compensatory behaviors per week.

Extreme: An average of 14 or more episodes of inappropriate compensatory behaviors per week.

Figure 3: Direct quote of Bulimia Nervosa (BN) DSM-5 Diagnostic Criteria (APA, 2013. p.345)

Binge Eating Disorder

Binge Eating Disorder (BED) is associated with recurrent episodes of eating objectively large amounts of food in a relatively short (usually < two hours) period of time. This results in the individual feeling ill or uncomfortably full. Further to these physical feelings of discomfort is post-binge negative emotions, which leaves the individual experiencing marked levels of psychological distress, primarily shame and guilt (APA, 2013; Figure 4).

Binge-Eating Disorder

- A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
1. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most people would eat in a similar period of time under similar circumstances.
 2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).
- B. The binge-eating episodes are associated with three (or more) of the following:
1. Eating much more rapidly than normal.
 2. Eating until feeling uncomfortably full.
 3. Eating large amounts of food when not feeling physically hungry.
 4. Eating alone because of feeling embarrassed by how much one is eating.
 5. Feeling disgusted with oneself, depressed, or very guilty afterward.
- C. Marked distress regarding binge eating is present.
- D. The binge eating occurs, on average, at least once a week for 3 months. E. The binge eating is not associated with the recurrent use of inappropriate compensatory behavior as in bulimia nervosa and does not occur exclusively during the course of bulimia nervosa or anorexia nervosa.

Specify if:

In partial remission: After full criteria for binge-eating disorder were previously met, binge eating occurs at an average frequency of less than one episode per week for a sustained period of time.

In full remission: After full criteria for binge-eating disorder were previously met, none of the criteria have been met for a sustained period of time.

Specify current severity: The minimum level of severity is based on the frequency of episodes of binge eating (see below). The level of severity may be increased to reflect other symptoms and the degree of functional disability.

Mild: 1-3 binge-eating episodes per week.

Moderate: 4-7 binge-eating episodes per week.

Severe: 8-13 binge-eating episodes per week.

Extreme: 14 or more binge-eating episodes per week

Figure 4: Direct quote of Binge-Eating Disorder (BED) DSM-5 Diagnostic Criteria (APA, 2013. p.350)

Other Specified Feeding and Eating Disorders

Other Specified Feeding and Eating Disorders (OSFED) are determined when individuals experience significant distress and impairment in functioning, and may present with serious and life threatening feeding or eating disturbances that do not meet DSM-5 eating disorder diagnostic criteria (APA, 2013). This may include atypical AN, BN, or BED, or may include purging disorder, which is emesis in the absence of a binge episode (APA, 2013).

Other Specified Feeding or Eating Disorder

This category applies to presentations in which symptoms characteristic of a feeding and eating disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for any of the disorders in the feeding and eating disorders diagnostic class. The other specified feeding or eating disorder category is used in situations in which the clinician chooses to communicate the specific reason that the presentation does not meet the criteria for any specific feeding and eating disorder. This is done by recording “other specified feeding or eating disorder” followed by the specific reason (e.g., “bulimia nervosa of low frequency”). Examples of presentations that can be specified using the “other specified” designation include the following:

1. **Atypical anorexia nervosa:** All of the criteria for anorexia nervosa are met, except that despite significant weight loss, the individual’s weight is within or above the normal range.
2. **Bulimia nervosa (of low frequency and/or limited duration):** All of the criteria for bulimia nervosa are met, except that the binge eating and inappropriate compensatory behaviors occur, on average, less than once a week and/or for less than 3 months.
3. **Binge-eating disorder (of low frequency and/or limited duration):** All of the criteria for binge-eating disorder are met, except that the binge eating occurs, on average, less than once a week and/or for less than 3 months.
4. **Purging disorder:** Recurrent purging behavior to influence weight or shape (e.g., self-induced vomiting; misuse of laxatives, diuretics, or other medications) in the absence of binge eating.
5. **Night eating syndrome:** Recurrent episodes of night eating, as manifested by eating after awakening from sleep or by excessive food consumption after the evening meal. There is awareness and recall of the eating. The night eating is not better explained by external influences such as changes in the individual’s sleep-wake cycle or by local social norms. The night eating causes significant distress and/or impairment in functioning. The disordered pattern of eating is not better explained by binge-eating disorder or another mental disorder, including substance use, and is not attributable to another medical disorder or to an effect of medication.

Figure 5: Direct quote of Other Specified Feeding or Eating Disorder (OSFED) DSM-5 Diagnostic Criteria (APA, 2013. P.353) with no mention of Chew and Spit as a listed symptom

Unspecified Feeding and Eating Disorders

An Unspecified Feeding and Eating Disorder (UFED) is characterised by significant distress or impairment in the presence of feeding and disordered eating behaviours that significantly deviate from DSM-5 eating disorder diagnostic criteria (APA, 2013). As can be seen from the DSM-5 diagnostic criteria below (Figure 6), although UFED does not meet diagnostic criteria for a specific feeding or eating disorder, significant distress is still experienced by the individual.

Unspecified Feeding or Eating Disorder

This category applies to presentations in which symptoms characteristic of a feeding and eating disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for any of the disorders in the feeding and eating disorders diagnostic class. The unspecified feeding and eating disorder category is used in situations in which the clinician chooses not to specify the reason that the criteria are not met for a specific feeding and eating disorder, and includes presentations in which there is insufficient information to make a more specific diagnosis (e.g., in emergency room settings).

Figure 6: Direct quote of Unspecified Feeding or Eating Disorder (UFED) DSM-5 Diagnostic Criteria (APA, 2013, P.354) with no mention of Chew and Spit as a listed symptom

1.2.2 The Danger of Eating Disorders

Comorbidities

Eating disorders are very often associated with comorbidities such as anxiety, personality disorders, depression, substance abuse, and behavioural disorders (Hudson, Hiripi, Pope, & Kessler, 2007). A review of European epidemiological studies by Keski-Rahkonen, & Mustelin (2016) highlighted that from the 34 included studies, it was noted that over 70% of European's diagnosed with an eating disorder also have an underlying comorbidity (be it physical or mental). Most commonly present mental health comorbidities were affective (43%) and anxiety (53%) disorders, with substance use disorders making up 10% of the calculated sample (Keski-Rahkonen, & Mustelin, 2016). While the authors did not speculate how such comorbidities may impact individuals or their treatment outcomes, it can be drawn from the data presented in their paper that individuals with an eating disorder and associated comorbidity, are presented with greater barriers to recovery.

Swanson, Crow, Le Grange, Swendsen, & Merikangas (2011) further highlight comorbidity rates among eating disordered adolescents, noting that 88% of those diagnosed with BN, 55% with AN, and 83.5% with BED in their entire sample (N=123) had at least one comorbid psychiatric disorder across their current lifetime. Specifically, AN appeared to be associated with defiant disorder while BN and BED associated with a host of mood, anxiety, substance abuse, and behavioural disorders. More concerning, was the finding that all eating disorders were associated with suicidal ideation and BN and BED significantly associated with previous suicide attempts (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). The significant relationship between EDs and suicide attempt was confirmed by a recent meta-analytical study that included 14 studies, which found that eating disorders may be weak, but statistically significant predictors of suicide attempts (not death) (Smith, Velkoff, Ribeiro, & Franklin, 2019).

Both of the aforementioned studies did not appear to examine self-harm behaviour among eating disordered adolescents, which may have allowed further insight into the development of the often extreme behaviours used by individuals with eating disorders in a bid to maintain or control their weight. Individuals with eating disorders often resort to severe food and energy restriction, compulsive-exercise, bingeing (either in the presence or absence of purging), or other unhealthy behaviours (Fassino et al., 2002; American Psychiatric Association, 2013). Other mental health comorbidities often occur with eating disorders, including conditions such as depression, anxiety, obsessive-compulsive tendencies, or affective disorders (Hudson, Hiripi, Pope, & Kessler, 2007; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011; Wonderlich, & Mitchell, 1997) as previously noted.

Mortality

In addition to potential comorbidities, EDs are more often than not associated with severe methods to control weight, including prolonged and excessive food restriction, or extreme compensatory behaviours such as purging, laxative abuse, diet pill abuse, or excessive-exercising (APA, 2013). Such excessive, and often invisible or hidden behaviour, can have severe psychological and physiological ramifications and may lead to premature death (Crow, Peterson, Swanson, Raymond, Specker, Eckert, & Mitchell, 2009). Crow and colleagues (2009) retrospectively analysed longitudinal mortality data on 1885 patients aged 8-25 years old with either BN, AN,

or EDNOS. Marginal differences were found between crude mortality rates for BN (3.9%), AN (4.0%), and EDNOS (5.2%). However, the standardized mortality ratio, that is the number of deaths observed compared to expected number of deaths, was notably higher for individuals with EDNOS (1.81) compared to AN (1.70). The study further highlighted that individuals who had EDNOS were proportionally higher (3.5%) to die of medical complications compared to AN (2.3%) and BN (2.2%). Substance-abuse related deaths were also similar in EDNOS (0.6%) compared to AN and BN (0.6%) (Crow, Peterson, Swanson, Raymond, Specker, Eckert, & Mitchell, 2009).

A later longitudinal study conducted by Franko and colleagues (2013) followed 246 participants who were seeking treatment for AN. The study aimed to examine the mortality rates of eating disorders, and by extension assess the impacts eating disorders may have on individual's lives (Franko, Keshaviah, Eddy, Krishna, Davis, Keel, & Herzog, 2013). The study found that a lifetime prevalence of AN almost doubled the standardized mortality ratio (4.37) compared to BN (with no lifetime history of AN) (2.33), with risk of premature death peaking within the first 10-years of follow up (Franko et al., 2013). The authors found that alcohol and substance abuse were significant statistical predictors of premature deaths in individuals with eating disorders. Moreover, the authors further suggest that social adjustment had been linked to lowered mortality rate through depression and substance abuse (Franko et al., 2013). Further it was suggested that the quality of relationships, capacity to function, and the level of impairment (physiological and psychological) was vital to positive outcome measures for individuals with EDs (Franko et al., 2013).

The studies above highlight that significant psychological and physiological burdens are experienced by individuals who not only have AN and BN, but also atypical type eating disorders or eating behaviours that can cause significant impairment to functioning. Individuals who CHSP are no exception to this finding. The social, physical, and psychological ramifications of CHSP behaviour, coupled with other eating disorder features, need to be examined more closely in order to determine how to best support individuals who CHSP (Aouad et al., 2016, & 2018).

1.2.3 Chew and Spit (CHSP) in the Context of Pathological Eating

As previously highlighted, if left untreated disordered eating behaviours, especially in the presence of other comorbidities such as anxiety, depression, or affect

disorders may lead to serious problems during the course of the illness (Pereira, & Alvarenga, 2007). CHSP is one such disordered behaviour that appears to be associated with several social, biological, and physiological deficits (Aouad et al., 2016; 2018).

It is estimated that between 35% and 65% of people diagnosed with EDNOS may engage in CHSP (Fairburn, & Cooper 1984; Mitchell, Pyle, Hatsukami, & Eckert, 1988). Specifically, Mitchell, Pyle, Hatsukami, & Eckert (1988) reported 64.5% of their sample consisting of individuals with BN also engaged in CHSP as a means of weight and body shape control. Further to this, Fairburn and Cooper (1984) suggest that around 37% of individuals with BN will use CHSP at least once during the course of the illness, with 20% of their study's sample engaging in the behaviour at the time of the study. Such findings may suggest that CHSP is relatively common in eating disordered clinical samples. However, the literature does not focus on population representative samples, and neglects to take into consideration that CHSP may be a primary disordered behaviour for some individuals. The extant literature fails to examine the seriousness of the behaviour, nor does it recognise the physiological and psychological ramifications of CHSP. The scarcity of available literature on CHSP labels the behaviour as 'disordered' but does not examine the consequences, prevalence, phenomenology, or functions of the behaviour, which therefore portrays CHSP as either insignificant, harmless, or miniscule in comparison to more overt eating disordered behaviours.

Chew and Spit behaviour is often accompanied by a slew of eating disordered behaviours and features, and may be associated with purging, restricting, and excessive dieting (Aouad, Hay, Soh, & Touyz, 2018). As noted above, while there is a dearth of knowledge on CHSP, there is some brief mention of the behaviour in academic literature (Fairburn & Cooper, 1984; Mitchell, Hatsukami, Eckert, & Pyle, 1988; Russel, 1979), and as noted in the systematic review on CHSP (Aouad et al., 2016), the number of articles and approach to studying CHSP, has been very limited. Clinicians may see CHSP as a non-issue, which is relatively unimportant, however the findings that stem from the ensuing research paints a different picture.

Chew and Spit CHSP, as a compensatory or restrictive behaviour, has no academic or clinical consensus at the time of this writing. There is evidence suggesting that CHSP may be transdiagnostic (Guarda et al., 2004), which may be one reason why

CHSP has been overlooked and not considered a stand-alone disorder. Looking at ED history, several eating behaviours were also not considered as ‘disordered’ until they were brought to medical and social attention. Specifically, the conceptualization of eating disorders were, for centuries, anchored in pertinacious societal misconceptions about the illness, which lead to the death of many historically significant figures (Vemuri, & Steiner, 2007). Take for example Anorexia Nervosa (AN), which rudimentarily explained is self-starvation (DiNicola, 1990). The term Anorexia Nervosa was first coined by Dr. William Gull in the late 1870s, however it is believed that the behaviour dates back to early Christianity (Keel & Klump, 2003). Many incidences of self-starvation, and its associated effects, were attributed to either: perceived demonic possession, perceived divine strength and intervention, or as an act of contrition and virtuous devotion to a higher spiritual being (Keel, & Klump, 2003). The differences, associated symptoms, repercussions, and theoretical explanations for different types of eating disorders has been elucidated with the growing body of knowledge on current day eating disorders.

The point remains however, that Anorexia Nervosa was not seen as an issue until studied further and attention drawn to the behaviour in social and medical contexts. Perhaps not dissimilar to CHSP, due to the lack of knowledge surrounding the behaviour and its clinical status. People who engage in CHSP may feel in denial that CHSP represents eating pathology or believe that the behaviour does not warrant treatment as it is ‘safe’. There may be a heightened sense of shame and secrecy surrounding the behaviour, with individuals not forthcoming with their disclosure to health professionals and clinicians, unless specifically asked.

Secretive behaviours associated with shame are highlighted in online posts that individuals have made to various eating disorder websites, which highlight the lack of willingness to admit to the behaviour and to seek help for it (Dias 2003; Norris, Boydell, Pinhas, & Katzman, 2006; Brotsky, & Giles, 2007; Borzekowski, Schenk, Wilson, & Peebles, 2010). Examining such online forums and support sites dedicated to nutrition, ED support, bodybuilding, and health host pages about CHSP wherein individuals express feelings of guilt, disgust, obsession, anxiety, yet a desire for increased self-control (websites such as: findingbalance.com; bodybuilding.com; whyeat.net; anorexictoathletic.com; steadyhealth.com; scienceofeds.org; neurorexia.com; kidshealth.org; and caloriecount.com). Individuals appear to express

anxiety about the unknown effects of the behaviour, an obsession from feeling trapped in the cycle, and some fear of being caught engaging in CHSP. Online discussion forums such as the above also show that, for many individuals who CHSP, there is a widespread belief that control of one's weight is still possible despite engaging in CHSP. The findings mirror those highlighted in the phenomenological analysis, with the anxiety seeming to rise from questioning their own control over the behaviour, and the unknown effects of CHSP.

1.2.4 Brief Overview of CHSP and Gap in the Literature

Prior to the systematic review (Chapter 2) and prior to 2018 (Aouad et al., 2018; Chapter 3), research on CHSP was examined predominantly in individuals with pre-existing eating disorders. Mitchell and colleagues (1988) were among one of the earlier studies to specifically examine CHSP in an ED sample, specifically BN patients. The retrospective study of 25 patient case files, who were diagnosed with BN, found that all patients had admitted to engaging in CHSP behaviour, with almost half (48%, n=12) engaging in the behaviour several times a day. Patient psychopathology for other psychiatric conditions were not reported on in the study. In another study, Kovacs, Mahon, & Palmer (2001) found CHSP was prevalent in 22% of their sample (n=156). Participants diagnosed with AN and EDNOS showed higher levels of engaging in CHSP, and exhibited more severe eating pathology and relation to other eating disorder features such as body image distortion, vomiting, and restriction.

A study by Guarda, Couhlin, Cummings, Marinilli, Haug, Boucher, & Heinberg (2004) found that in the 301 participants admitted to ED treatment programs, over one-third indicated to having engaged in CHSP at least once in the month prior to admission. Perhaps more interestingly, was that the behaviour was associated with more restrictive behaviour, but actually appeared across the ED spectrum (Guarda et al., 2004). However, the authors did not appear to categorise patients according to ED diagnosis or DSM criteria.

Durkin and colleagues (2013) highlighted that CHSP may in fact be a cursory behaviour to developing a clinically diagnosable ED. However, the authors did not distinguish between CHSP being more in line with AN or BN, but did specify that the behaviour was less associated with EDNOS, which as will be seen in the systematic review and through subsequent studies, may not be entirely the case. Contrastingly, Makhzoumi and colleagues (2015), examined 324 partial in-patient individuals

receiving treatment for an ED. The authors noted that around 30% (n=107) indicated to having engaged in CHSP (either currently or prior to the study). Moreover, it was found that CHSP was significantly associated with loss of control, which is often seen in people with BN and BED, with approximately 10% of individuals who CHSP engaging in binge-like episodes (Makhzoumi, Guarda, Schreyer, Reinblatt, Redgrave, Coughlin, 2015).

Finally, Song, Lee, & Jung (2015) conducted a cross-sectional study, which examined the relationship to eating disorder type that CHSP was most closely related to (compensatory or restrictive). Of the 359 participants that took part in the study, over 24% appeared to use CHSP as a compensatory measure. However, CHSP behaviour appeared to span the entire ED spectrum, similar to the findings mentioned above by Guarda and colleagues (2004).

While each of the studies above attempted to, in some way, to explore CHSP in the context of an ED sample, it remains unclear exactly how prevalent the behaviour is in a wider population. Furthermore, existing studies have not considered the impacts that CHSP has on individual's psychological, physiological, and social well-being, with studies on the impact of CHSP, even in ED samples, lacking.

1.3 PURPOSE, SIGNIFICANCE, AND AIMS

As can be seen there remains a pressing need to further develop our understanding of CHSP as a disordered eating behaviour. To show validity for clinicians to screen for CHSP behaviour, and to begin to empirically examine and provide evidence toward consideration to have CHSP included back into future revisions of the DSM, this dissertation will examine the following: the current understanding of CHSP by a systematic review; the prevalence of CHSP in population representative samples; and the personal biopsychosocial impacts on individuals who engage in CHSP behaviour through a phenomenological analysis.

One of the potential reasons for the removal of CHSP from the DSM-5 may have been due to an underestimation of the prevalence of the behaviour. In this dissertation, the prevalence of CHSP in both adult and adolescent populations in a community sample is examined. By ascertaining the prevalence of the behaviour, it can be determined whether CHSP is in line with other eating disorder behaviours, and

therefore can begin to be considered for reintroduction into future versions of the DSM.

Another reason to investigate CHSP is to understand the secrecy and shame associated with the behaviour and the function that it serves to those who CHSP. To understand the perceived biopsychosocial impacts as well as the reasons why an individual may engage in CHSP behaviour, a phenomenological analysis offers a sound starting point to gain an insight from lived experiences. In conjunction with the prevalence studies, a clearer picture of who engages in the behaviour, and how this behaviour affects those who CHSP may provide the impetus required to bring this to medical and social attention and keeping CHSP in clinical awareness. The present lack of understanding of CHSP as a disordered eating behaviour impedes current attempts at developing clinically significant treatments for individuals with CHSP as a primary disorder. Therefore, the scope of this dissertation is situated at the centre of the disordered eating behaviour of CHSP.

Therefore the aims of the thesis are to: 1) To determine what is currently known about CHSP in academic literature, and to develop a clearer understanding of the current evidence base surrounding the behaviour; 2) To determine if CHSP is a prevalent issue among adults, who appeared to be under represented in studies that were included in the systematic review; 3) To determine if CHSP is a prevalent issue among adolescents, who are known to be more at risk of eating disordered behaviour; and 4) To determine the personal impacts on psychological, physiological, and social wellbeing, through lived experiences of individuals who engage in CHSP.

1.4 THESIS OUTLINE

To meet the above aims, the works presented will cover a comprehensive systematic review of the literature on CHSP (Chapter 2), followed by an examination of the prevalence in both adult (Chapter 3) and adolescent (Chapter 4) samples, and finally examine the phenomenological underpinnings (Chapter 5) of the disorder in the context of individuals lived experiences with CHSP, before providing and over all discussion, recommendations, and concluding remarks (Chapter 6).

While all works presented in this dissertation are, at the time of submission, either published or under review, readers are encouraged to view the behaviour as the sum of its parts. That is to primarily keep in mind that the works presented are among

the first known studies to begin examining CHSP in demographically-representative community samples. Moreover, they are also among the first to provide an opportunity for individuals who CHSP to unreservedly tell their stories, share their experiences and their concerns about the behaviour, and contribute to the body of knowledge on understanding a symptom that has, to date, been indefinitely removed from diagnostic manuals, when there is a clear need for its inclusion.

CHAPTER REFERENCES

- American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (DSM-IV; 4th. ed). *Washington, American Psychiatric Association*
- American Psychiatric Association (APA). (2013). Feeding and Eating Disorders. In *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Washington, DC: Author. doi: 10.1176/appi.books.9780890425596.dsm10
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): a systematic review. *Journal of eating disorders, 4*(1), 23. doi: 10.1186/s40337-016-0115-1
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2018). Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. *International Journal of Eating Disorders, 51*(8), 968-972. doi: 10.1002/eat.22873
- Austin, S. B., Nelson, L. A., Birkett, M. A., Calzo, J. P., & Everett, B. (2013). Eating disorder symptoms and obesity at the intersections of gender, ethnicity, and sexual orientation in US high school students. *American Journal of Public Health, 103*(2), e16-e22. doi: 10.2105/AJPH.2012.301150
- Borzekowski, D. L., Schenk, S., Wilson, J. L., & Peebles, R. (2010). e-Ana and e-Mia: A content analysis of pro-eating disorder web sites. *American journal of public health, 100*(8), 1526-1534. doi: 10.2105/AJPH.2009.172700
- Brotsky, S. R., & Giles, D. (2007). Inside the “pro-ana” community: A covert online participant observation. *Eating disorders, 15*(2), 93-109. doi: 10.1080/10640260701190600
- Cheng, Z. H., Perko, V. L., Fuller-Marashi, L., Gau, J. M., & Stice, E. (2019). Ethnic differences in eating disorder prevalence, risk factors, and predictive effects of risk factors among young women. *Eating behaviors, 32*, 23-30. doi: 10.1016/j.eatbeh.2018.11.004
- Crow, S. J., Peterson, C. B., Swanson, S. A., Raymond, N. C., Specker, S., Eckert, E. D., & Mitchell, J. E. (2009). Increased mortality in bulimia nervosa and other eating disorders. *American Journal of Psychiatry, 166*(12), 1342-1346. doi: 10.1176/appi.ajp.2009.09020247
- Dias, K. (2003). The ana sanctuary: Women’s pro-anorexia narratives in cyberspace. *Journal of International Women's Studies, 4*(2), 31-45. Available at: <http://vc.bridgew.edu/jiws/vol4/iss2/4>
- DiNicola, V. F. (1990). Anorexia Multiforme: Self-Starvation in Historical and Cultural Context: Part II: Anorexia Nervosa as a Culture-Reactive Syndrome1. *Transcultural Psychiatric Research Review, 27*(4), 245-286. doi: 10.1177/136346159002700401
- Durkin, N. E., Swanson, S. A., Crow, S. J., Mitchell, J., Peterson, C. B., & Crosby, R. (2014). Re-examination of chewing and spitting behavior: characteristics within and across eating disorder diagnoses. *Eating and Weight Disorders-*

Studies on Anorexia, Bulimia and Obesity, 19(3), 315-320. doi: 10.1007/s40519-013-0090-3

- Fairburn, C. G., & Cooper, P. J. (1984). Binge-eating, self-induced vomiting and laxative abuse: a community study. *Psychological Medicine*, 14(2), 401-410. doi: 10.1017/S0033291700003640
- Fairburn, C. G., Doll, H. A., Welch, S. L., Hay, P. J., Davies, B. A., & O'Connor, M. E. (1998). Risk factors for binge eating disorder: a community-based, case-control study. *Archives of general psychiatry*, 55(5), 425-432. doi: 10.1001/archpsyc.55.5.425
- Fairburn, C. G., & Bohn, K. (2005). Eating disorder NOS (EDNOS): an example of the troublesome “not otherwise specified”(NOS) category in DSM-IV. *Behaviour research and therapy*, 43(6), 691-701. doi: 10.1016/j.brat.2004.06.011
- Fairburn, C. G., Cooper, Z., Bohn, K., O'Connor, M. E., Doll, H. A., & Palmer, R. L. (2007). The severity and status of eating disorder NOS: implications for DSM-V. *Behaviour research and therapy*, 45(8), 1705-1715. doi: 10.1016/j.brat.2007.01.010
- Fassino, S., Pieró, A., Daga, G. A., Leombruni, P., Mortara, P., & Rovera, G. G. (2002). Attentional biases and frontal functioning in anorexia nervosa. *International Journal of Eating Disorders*, 31(3), 274-283. doi: 10.1002/eat.10028
- Franko, D. L., & Orosan-Weine, P. (1998). The prevention of eating disorders: Empirical, methodological, and conceptual considerations. *Clinical Psychology: Science and Practice*, 5(4), 459-477. doi: 10.1111/j.1468-2850.1998.tb00167.x
- Franko, D. L., Keshaviah, A., Eddy, K. T., Krishna, M., Davis, M. C., Keel, P. K., & Herzog, D. B. (2013). A longitudinal investigation of mortality in anorexia nervosa and bulimia nervosa. *American Journal of Psychiatry*, 170(8), 917-925. doi: 10.1176/appi.ajp.2013.12070868
- Grigg, M., Bowman, J., & Redman, S. (1996). Disordered eating and unhealthy weight reduction practices among adolescent females. *Preventive Medicine*, 25(6), 748-756. doi: 10.1006/pmed.1996.0115.
- Guarda, A. S., Coughlin, J. W., Cummings, M., Marinilli, A., Haug, N., Boucher, M., & Heinberg, L. J. (2004). Chewing and spitting in eating disorders and its relationship to binge eating. *Eating Behaviours*, 5(3), 231-239. doi: 10.1016/j.eatbeh.2004.01.001.
- Hudson, J. I., Hiripi, E., Pope Jr, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, 61(3), 348-358. doi: 10.1016/j.biopsych.2006.03.040
- Keel, P. K., & Klump, K. L. (2003). Are eating disorders culture-bound syndromes? Implications for conceptualizing their etiology. *Psychological bulletin*, 129(5), 747. doi: 10.1037/0033-2909.129.5.747

- Keski-Rahkonen, A., & Mustelin, L. (2016). Epidemiology of eating disorders in Europe: prevalence, incidence, comorbidity, course, consequences, and risk factors. *Current opinion in psychiatry*, 29(6), 340-345. doi: 10.1097/YCO.0000000000000278
- Kovacs, D., Mahon, J., & Palmer, R. L. (2002). Chewing and spitting out food among eating-disordered patients. *International Journal of Eating Disorders*, 32(1), 112-115. doi: 10.1002/eat.100
- Makhzoumi, S. H., Guarda, A. S., Schreyer, C. C., Reinblatt, S. P., Redgrave, G. W., & Coughlin, J. W. (2015). Chewing and spitting: A marker of psychopathology and behavioral severity in inpatients with an eating disorder. *Eating behaviors*, 17, 59-61. doi: 10.1016/j.eatbeh.2014.12.012
- Mancuso, S. G., Newton, J. R., Bosanac, P., Rossell, S. L., Nesci, J. B., & Castle, D. J. (2015). Classification of eating disorders: comparison of relative prevalence rates using DSM-IV and DSM-5 criteria. *The British Journal of Psychiatry*, 206(6), 519-520. doi: 10.1192/bjp.bp.113.143461
- Martin, C. K., Williamson, D. A., & Thaw, J. M. (2000). Criterion validity of the multiaxial assessment of eating disorders symptoms. *International Journal of Eating Disorders*, 28(3), 303-310. doi: 10.1002/1098-108X(200011)28:3<303::AID-EAT7>3.0.CO;2-I
- Mitchell, J. E., Pyle, R., Hatsukami, D., & Eckert, E. (1988). Chewing and spitting out food as a clinical feature of bulimia. *Psychosomatics*, 29(1), 81-84. doi: 10.1016/S0033-3182(88)72425-1
- Norris, M. L., Boydell, K. M., Pinhas, L., & Katzman, D. K. (2006). Ana and the Internet: A review of pro-anorexia websites. *International Journal of Eating Disorders*, 39(6), 443-447. doi: 10.1002/eat.20305
- Pereira, R. F., & Alvarenga, M. (2007). Disordered eating: identifying, treating, preventing, and differentiating it from eating disorders. *Diabetes Spectrum*, 20(3), 141-148. doi: 10.2337/diaspect.20.3.141
- Regier, D. A., Kuhl, E. A., & Kupfer, D. J. (2013). The DSM-5: Classification and criteria changes. *World Psychiatry*, 12(2), 92-98. doi: 10.1002/wps.20050
- Ricca, V., Mannucci, E., Mezzani, B., Di Bernardo, M., Zucchi, T., Paionni, A., Placidi, G., Rotella, C., & Faravelli, C. (2001). Psychopathological and clinical features of outpatients with an eating disorder not otherwise specified. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 6(3), 157-165. doi: 10.1007/BF03339765
- Ricciardelli, L. A., & McCabe, M. P. (2004). A biopsychosocial model of disordered eating and the pursuit of muscularity in adolescent boys. *Psychological bulletin*, 130(2), 179. doi:10.1037/0033-2909.130.2.179
- Rosenvinge, J. H., Martinussen, M., & Østensen, E. (2000). The comorbidity of eating disorders and personality disorders: a metaanalytic review of studies published between 1983 and 1998. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 5(2), 52-61. doi: 10.1007/BF03327480

- Russell, G. (1979). Bulimia nervosa: an ominous variant of anorexia nervosa. *Psychological medicine*, 9(3), 429-448. doi: 10.1017/S0033291700031974
- Smith, A. R., Velkoff, E. A., Ribeiro, J. D., & Franklin, J. (2019). Are eating disorders and related symptoms risk factors for suicidal thoughts and behaviors? A meta-analysis. *Suicide and Life-Threatening Behavior*, 49(1), 221-239. doi: 10.1111/sltb.12427
- Song, Y. J., Lee, J. H., & Jung, Y. C. (2015). Chewing and spitting out food as a compensatory behavior in patients with eating disorders. *Comprehensive psychiatry*, 62, 147-151. doi: 10.1016/j.comppsy.2015.07.010
- Striegel-Moore, R. H., & Bulik, C. M. (2007). Risk factors for eating disorders. *American psychologist*, 62(3), 181. doi: 10.1037/0003-066X.62.3.181
- Swanson, S. A., Crow, S. J., Le Grange, D., Swendsen, J., & Merikangas, K. R. (2011). Prevalence and correlates of eating disorders in adolescents: Results from the national comorbidity survey replication adolescent supplement. *Archives of general psychiatry*, 68(7), 714-723. doi: 10.1001/archgenpsychiatry.2011.22
- The National Eating Disorders Collaboration (2010). *Eating disorders prevention, treatment & management: An evidence review*. Sydney: NEDC.
- Turner, H., & Bryant-Waugh, R. (2004). Eating disorder not otherwise specified (EDNOS): profiles of clients presenting at a community eating disorder service. *European Eating Disorders Review: The Professional Journal of the Eating Disorders Association*, 12(1), 18-26. doi: 10.1002/erv.552
- Vale, B., Brito, S., Paulos, L., & Moleiro, P. (2014). Menstruation disorders in adolescents with eating disorders—target body mass index percentiles for their resolution. *Einstein (Sao Paulo)*, 12(2), 175-180. doi: 10.1590/S1679-45082014AO2942
- Vemuri, M., & Steiner, H. (2007). Historical and current conceptualizations of eating disorders: a developmental perspective. *Eating disorders in children and adolescents*, 3-11.
- Wonderlich, S. A., & Mitchell, J. E. (1997). Eating disorders and comorbidity: empirical, conceptual, and clinical implications. *Psychopharmacology Bulletin*, 33(3), 381.
- World Health Organization. (1992). *International statistical classification of diseases and related health problems: 10th Revision (ICD-10)*. Retrieved from <http://www.who.int/classifications/apps/icd/icd>.
- World Health Organization. (2018). *International statistical classification of diseases and related health problems: 11th Revision (ICD-11)*. Retrieved from <https://icd.who.int/browse11/l-m/en>
- Wiseman, M. C., & Moradi, B. (2010). Body image and eating disorder symptoms in sexual minority men: A test and extension of objectification theory. *Journal of Counseling Psychology*, 57(2), 154. doi: 10.1037/a0018937

Chapter 2: Systematic Review (Study 1)

This chapter is of works that has already been peer-reviewed and published, and appears in its entirety. Text formatting was amended to maintain uniformness throughout the dissertation, however referencing and citation styles are those adhered to by journal to which this work was submitted.

Cited As: Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): a systematic review. *Journal of eating disorders*, 4(1), 23. doi: 10.1186/s40337-016-0115-1

Chew and Spit (CHSP): A Systematic Review

Phillip Aouad

School of Medicine, University of Sydney, Sydney, Australia

paou2756@uni.sydney.edu.au

Nerissa Soh

School of Medicine, University of Sydney, Sydney, Australia

nerissa.soh@sydney.edu.au

Phillipa Hay

Centre for Health Research, School of Medicine, Western Sydney University,

Penrith, Australia

p.hay@westernsydney.edu.au

Stephen Touyz

School of Psychology, University of Sydney, Sydney, Australia

stephen.touyz@sydney.edu.au

2.1 ABSTRACT

Background: This systematic review is an evaluation of the empirical literature relating to the disordered eating behaviour Chew and Spit (CHSP). Current theories postulate that CHSP is a symptom exhibited by individuals with recurrent binge eating and Bulimia Nervosa.

Aims: The review aims to identify and critically assess studies that have examined the distribution of CHSP behaviour, its relationship to eating disorders, and its physical and psychosocial consequences.

Methods: A systematic database search, dated to January 2016 was conducted and nine clinical studies met the inclusion criteria.

Results: Findings indicated that the pathological action of chewing food but not swallowing is reported more often in those with restrictive type eating disorders, such as Anorexia Nervosa. CHSP may also be an indicator of overall severity of an eating disorder and often appears in younger individuals.

Conclusions: Conclusions were drawn based on clinical samples only and indicate that further research is needed to address gaps in knowledge regarding the physiological, psychological, social, and socioeconomic impact for those engaging in CHSP.

Keywords: Chew and Spit; CHSP; Oral Expulsion Syndrome; Eating Disorder, Anorexia, Bulimia, EDNOS, Abnormal Eating, C/S, Chewing and Spitting

2.2 BACKGROUND

Chew and Spit (CHSP) is the pathological behaviour of chewing a food, often of subjectively enjoyable quality as well as dense caloric content, and then spitting it out before swallowing as a means to avoid ingesting unwanted calories [1]. CHSP is an understudied weight control method possibly used as a binge eating compensatory behaviour employed by individuals with an eating disorder (ED).

The three most widely recognised ED diagnoses are Anorexia Nervosa (AN), typically characterised by behaviour of extreme calorie restriction, Bulimia Nervosa (BN) with its attendant behaviour of bingeing and purging (BP), and Eating Disorders Not Otherwise Specified (EDNOS) – including sub-threshold diagnoses of AN and BN – which has now been divided into Unspecified Feeding and Eating Disorders (UFED) and Other Eating and Feeding Disorders (OSFED) in the DSM-5 [2, 3, 4]. Although the behaviour of CHSP is not found in current diagnostic schemes, it has been identified across the spectrum of EDs and was present in former diagnostic criteria such as the DSM-IV [5].

Individuals other than those with an ED may also engage in CHSP for a variety of reasons. For example, individuals undergoing bariatric surgery, those with diabetes, and athletes adhering to strict dietary guidelines may use CHSP to ‘taste’ food while adhering to their prescribed meal plans or eating requirements [6, 7, 8]. Many people also report disordered eating and ED behaviours pre and post bariatric surgery and it is likely that ED behaviours, including CHSP, are under reported and not detected during surgical assessments [7, 9, 10, 11]. However, the psychological and physiological effects of CHSP have yet to be delineated in any population.

The physiological process of preparing to receive food, called the cephalic response, is linked to metabolic changes in the body. Some studies involving modified sham feeding have focused on specific hormones, such as insulin, obestatin, and ghrelin as part of the cephalic response [11, 12 14-18]. However, few studies involving sham feeding do so in the context of disordered eating [19-22]. Nor do sham-feeding studies focus on behaviour and psychological phenomenology, with specific studies into the influence of CHSP on metabolic responses being non-existent [20-26]. Empirical studies into the aetiology, psychological impacts, and physiological outcomes of CHSP would offer insight into an understanding of such processes in

individuals with broader EDs, diabetes, or who are prone to post-bariatric-surgery dumping (the quick passage of food from the stomach to the small intestine) [19].

Hypothesised outcomes of CHSP may include weight gain due to accidentally ingesting calories, psychological and emotional distress (such as shame and guilt), and other physiological sequelae (such as damage to teeth, stomach ulcers, and hormonal imbalances) [6-9]. In addition to the possible psychological and physiological effects of CHSP, social consequences such as social isolation and financial strain (as seen in individuals with BN) may result, especially if an individual is prone to frequent CHSP ‘binge’ type episodes [27, 28].

This systematic review aims to examine existing evidence, identify, and critically examine studies that have investigated the distribution of CHSP behaviour, its relationship to EDs, and physical and psychosocial consequences. As the literature is sparse, the search and eligibility criteria were broad. The review also aims to identify gaps in the knowledge as, to date, little appears to be known about CHSP within and outside of EDs, including its prevalence, distribution, and putative harmful physical or psychological effects.

2.3 METHODS

2.3.1 Search Strategy and Study Eligibility Criteria

The following electronic databases were searched: Medline, PubMed, Web of Science, the Cochrane Library, CINAHL, EMBASE, PsychInfo and Scopus using the search strings outlined in Figure 1. Searches were conducted using key words and repeated using MeSH categories where applicable. References of included studies were manually screened by title. The full text for any potentially eligible studies was sourced and assessed for eligibility.

Inclusion criteria for studies are listed on Table 1. Only peer-reviewed studies were considered for inclusion to ensure data integrity and maintain quality. Studies of non-human participants were excluded as were those pertaining to rumination and pica, which are categorized in the DSM-IV as two distinct disorders separate to CHSP [5]. CHSP is distinctive from rumination, which is the regurgitation of stomach contents that is either chewed and re-swallowed, or spat out; and can occur involuntarily – often seen in those with severe purging subtype eating disorders as a motivated and habitual behaviour – or voluntarily [28]. Likewise, pica involves the

ingestion of non-food items [28]. The definition of CHSP thus was limited to the conscious chewing and spitting out of food only without regurgitation of swallowed food. As commonly seen in eating disorders, symptoms may overlap. However, studies were excluded if they did not focus on CHSP specifically or were related to regurgitation or chewing and spitting non-food items [28].

Two authors (PA and NS) independently screened titles and abstracts of search results and full-text articles were retrieved of those studies that had potential to fit the inclusion criteria (Table 1). The two authors also assessed full-text articles to confirm that articles met to eligibility criteria. Disagreements were resolved through discussion, or referral to a third review author.

A flow diagram of the number of identified records is depicted in Figure 2; this diagram is in accordance with the PRISMA guidelines [29].

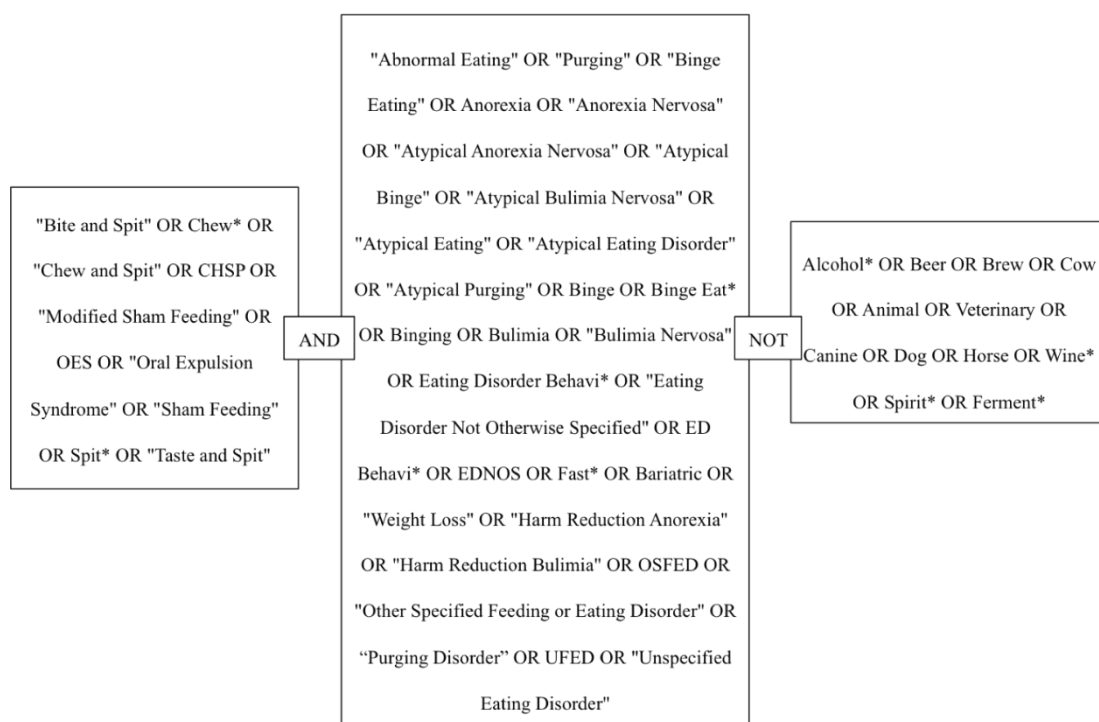


Figure 7: Search string used for database searching

<i>Criteria</i>	Condition
<i>Sample Population</i>	Humans Only (ED or Non-ED)
<i>Age Group</i>	Any
<i>Condition</i>	Participants must have a ‘lifetime history’ of CHSP (in conjunction with or without other ED behavior) and have exhibited the behavior previous to the study and not just as part of another study with modified sham feeding. The main focus of the study must be centered on chewing and spitting out of food only, not related to regurgitation of swallowed food.
<i>Study Type & Design</i>	All – including but not limited to RCTs, case studies and case series reports
<i>Outcome Measure</i>	Assesses or explores some impact (physiological, social, or psychological) resulting from CHSP
<i>Setting</i>	No restriction
<i>Date of Study</i>	All studies up to and including January 2016
<i>Publication Type & Availability</i>	Peer-reviewed and full-text only
<i>Language</i>	English only

Table 1: Inclusion criteria for literature relating to ‘Chew and Spit’

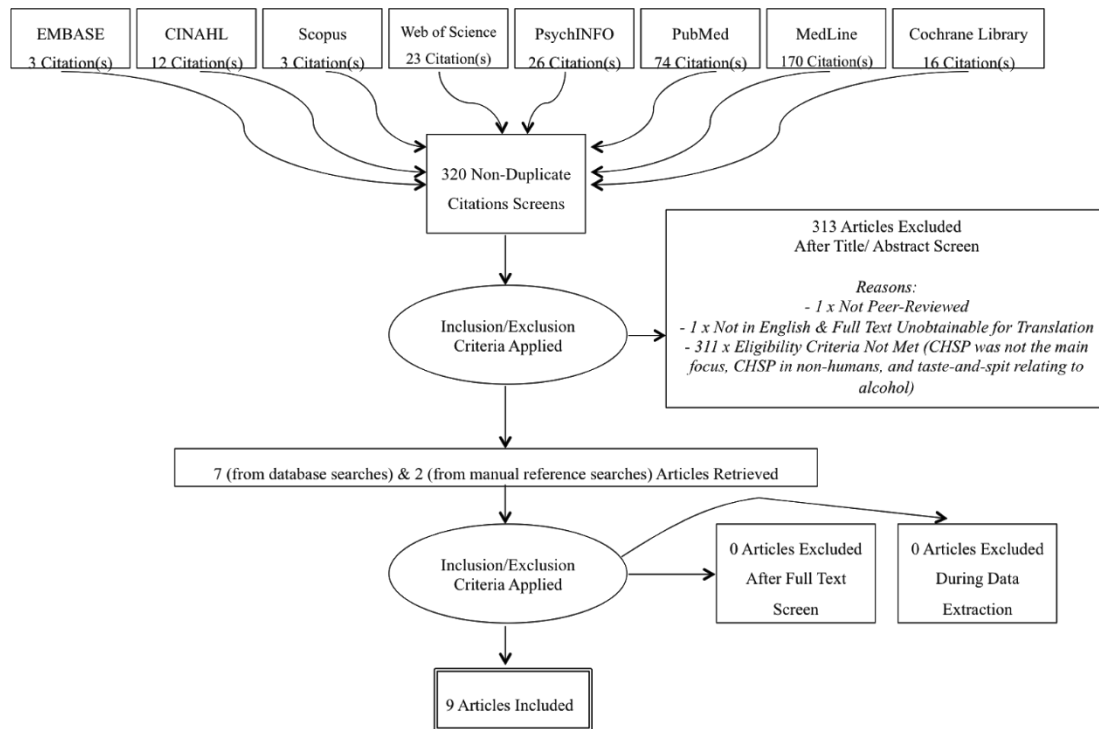


Figure 8: Flow diagram highlighting selection process of included articles [29]

2.3.2 Data Extraction

Data regarding the outcome measures symptomology, prevalence, psychological, social, or physiological impacts were extracted from the included studies. Data not directly related to CHSP were not included in the summary tables.

2.3.3 Quality Assessment

Study quality was assessed using a modified version of the Downs & Black Quality Index [30], as amended by Ferro and Speechley [31]. The quality index excludes items specifically related to intervention assessments such as those items assessing randomisation, dropouts, blinding, and intervention integrity (RCTs): none of the included studies were RCTs. The amended version of the quality index has 15 items, as opposed to the original 27, and dichotomously scores various items as 0 (Unable to determine / No) and 1 (Yes). This results in subscales assessing reporting (7 items), external validity (3 items), internal validity (4 items) and study power (1 item). The maximum score is 15 with higher scores (>10) indicating higher methodological quality [31, 32].

2.4 RESULTS

Of the 320 studies identified, only nine met the eligibility criteria for inclusion in the systematic review – six cross-sectional studies, and three case studies. The Quality Index Scores were modest: of the nine studies, only two studies scored 10 while all other studies scored ≤ 9 (Appendix A). Given the heterogeneity across studies, data are presented qualitatively. Table 2 summarises the methods of included studies, while the main findings of each study are summarised below.

Study	Aims	Participants	Methodology	Assessment Tool/s	Setting	Inpatient (IP)/ Outpatient (OP)/ Partial Outpatient (POP)
Song, Lee, Jung [29]	To investigate the relationship between CHSP and other ED related symptoms	359 Patients (Mean age = 23.2, SD = 6.6) diagnosed with EDs using DSM-IV-TR by a psychiatrist	Cross-Sectional Study. Results of ED patients who CHSP were compared to those who do not CHSP. ED symptoms compared included: EDs, Food Craving, Body Shape Dissatisfaction, Depression, Anxiety, and Obsessive Compulsive tendencies	Questionnaires including EDI-2, FCQ, BSQ, BDI, BAI, and MOCI	Mind & Mind ED Clinic presentations between 2010 and 2012 in Korea	Not Specified
Guarda, Coughlin, Cummings, Marinilli, Haug, Boucher and Heinberg [13]	To evaluate the prevalence and frequency of CHSP in trans-diagnostic ED patients	301 Patients (Mean age = 25, SD = 10) were diagnosed by trained interviewers using the structured clinical interview for DSM-IV	Cross-Sectional Study. Results of ED patients who CHSP were compared to those who do not CHSP. Questionnaires addressed demographics, ED symptoms and frequencies	Researcher developed questionnaire, EDI-2 and BDI.	Patients with consecutive admissions to a behavioural, inpatient, and partial hospitalization program for EDs	IP and POP
De Zwaan [37]	To present a novel case report on one patient	19-year-old female with a history of EDs (AN, 43kg / 15.6kg/m ²). Patient 1: 27 year old female	Case Study, 1 Patient	A case report	Psychotherapy treatment setting	OP
McCutcheon & Nolan [39]	To present a novel case report on two patients	Patient 2: 19 year old female college student	Case Report, 2 Patients	A case report of two subjects	Psychotherapy treatment setting	Not Specified
Makhzoumi, Guarda, Schreyer, Reinblatt, Redgrave, and Coughlin [36]	To characterize CHSP in a large sample of ED inpatients treated in a hospital-based behavioural speciality program. To investigate associations between regular CHSP and personality dimensions, ED and depression symptomatology, and short-term clinical outcome variables. To examine CHSP including the amount of food typically consumed and frequency of Loss of Control (LOC) associated with CHSP behaviour.	324 Patients (Mean age = 29, SD = 12.4) were diagnosed by trained interviewers using the structured clinical interview for DSM-IV	Cross-Sectional Study. Results of ED patients who CHSP were compared to those who do not CHSP. Questionnaires addressed demographics, ED symptoms and frequencies	Frequency and overall number of nine types of current and lifetime ED behaviours were assessed using a researcher developed questionnaire, BDI, EDI-2, NEO-FFI.	Patients with consecutive admissions to an integrated inpatient partial hospital treatment program for EDs who agreed to participate in an outcome study	IP and POP
Kovacs, Mahon, and Palmer [38]	To study the prevalence and association of CHSP in a series of patients with AN, BN, and EDNOS	710 adult patients (Mean age not specified) were diagnosed according to the criteria outlined in the DSM-III-R	Cross-Sectional Study. ED patients who CHSP were compared between ED subtypes (AN, BN, and EDNOS) and those who did not engage in CHSP	Clinical Eating Disorder Rating Instrument (CEDRI), defined bingeing (DSM-III-R definition), subjective overeating, and subjective distortion of body image.	Inpatient ED Service of the Leicester General Hospital between 1991 and 1998 Patients evaluated at the Outpatient ED Clinic at the University of Minnesota between 1985 and 1996	IP
Durkin, Swanson, Crow, Mitchell, Peterson, and Crosby [35]	To promote cohesion between existing CHSP literature (CHSP is trans-diagnostic) from an outpatient perspective	972 outpatients (Mean age = 24.6, IQR = 20.66-31.10)	Cross-Sectional Study. Patients were classified as having current CHSP behaviour or having had CHSP (at any frequency) during their lifetime.	EDQ. CHSP behaviour was assessed was determined by using 2 general EDQ items.	Files of patients were retrospectively evaluated and diagnosed based on the information present in the files that corresponds to the DSM-III BN criteria and who engaged in CHSP	OP
Mitchell, Pyle, Hatsukami, and Eckert [1]	A presentation of information about CHSP in BN patient engaging in the behaviour at high frequency, including information about their associated ED symptoms, treatment histories, and related psychopathology	Patients (Mean age = 23.9y, SD = 5.3) who presented at an ED clinic prior to the commencement of the study.	Retrospective analysis. 25 patient files were retrospectively examined for indications of CHSP	Files of patients were retrospectively evaluated and diagnosed based on the information present in the files that corresponds to the DSM-III BN criteria and who engaged in CHSP	Files of patients evaluated at the ED Clinic at the University of Minnesota over three years prior to this 1987 study.	Not Specified
Smith and Ross [33]	To present a novel case report on one patient	28-year-old Caucasian obese female with no previous history of ED behaviour, but with a history of treatment for bipolar disorder.	Case Study, 1 Patient	A case report	Psychotherapy treatment setting / physician directed PSMF	OP

Table 2: Summary of included studies on CHSP (findings and conclusions of studies in discussion section of this review)

2.4.1 Main Findings

The nine studies included indicate that CHSP has been investigated in predominantly ED samples [1, 13, 33-39]. The results below indicate a number of similarities between individuals with an ED who engage in CHSP.

As shown in Table 2, one cross-sectional study by Song et al. (N=359) [34], found that 24.5% of participants with EDs and with CHSP had more pathological eating behaviours, higher levels of food craving, more concerns regarding body shape, and higher levels of mood and anxiety related symptoms [34]. CHSP was found to be trans-diagnostic (occurring in AN, BN, and EDNOS diagnosed individuals), associated with more pathological compensatory behaviours, and correlated with greater ED severity [28].

Similarly, a cross-sectional study by Guarda et al. [13] (N = 310) reported that individuals with EDs engaging in CHSP (CHSP+) were to be younger (22.6 years (SD = 7.2) compared to 25.6 years (SD = 10.5)) than those who did not (CHSP-). However, length of illness was not associated with this finding. Moreover, compensatory behaviour was more prevalent in the CHSP+ group. Overall CHSP was indicated to be trans-diagnostic and was more strongly correlated with restrictive behaviours than with binge-purge behaviour. CHSP+ participants who binged (CHSP+/B+) did not significantly differ in relation to binge frequency in comparison to CHSP+ participants who did not binge (CHSP+/B-). However, the majority (76%) of CHSP+/B+ had a BN diagnosis and a vast majority of those who binged and engaged in CHSP (87%) engaged in purging. Although, CHSP+/B+ and CHSP+/B- showed no significant difference in psychometric measures (i.e. BDI, EDI-2, length of illness, and dieting history.) The results of this study indicated CHSP was positively associated with ED severity [13].

Makhzoumi et al. [36] reported that, in a cross-sectional study, 34% of respondents (N = 324) with CHSP had binge-like quantities of food (\geq or = 1000 calories) in their lifetime, and 18% reported this in the eight weeks before admission to an ED clinic. Nine out of the 10 individuals engaging in CHSP at the time of the study reported a subjective sense of loss of control (LOC) at some point in their lifetime, with a majority of CHSP+ (70%) reporting LOC even when they CHSP non-binge quantities. CHSP groups did not differ about demographics, clinical indices, or CHSP frequency across ED diagnostic groups. However individuals who CHSP, were

more likely to have a purging, as opposed to restricting, diagnosis. Nonetheless, after controlling for behavioural subtype, individuals with CHSP engaged more frequently in restrictive eating behaviours, diet pill, laxative abuse, and over-exercise [36]. Additionally, CHSP+ participants engaged more frequently in binge eating and appeared to engage in a wider array of ED behaviours than CHSP- participants. Finally, CHSP participants had also exhibited greater drive for thinness, body dissatisfaction, and higher depressive symptomology and neuroticism (even after controlling for behavioural subtype), and were more likely to endorse suicide ideation. Makhzoumi et al. concluded that CHSP should be assessed in all ED individuals, as neuroticism is a risk factor for ED behaviour and is positively correlated with ED symptoms [36]. Higher levels of neuroticism in a patient may be thus a contributing factor to engage in CHSP and increased ED behaviours.

In a cross-sectional study, Kovacs et al. [38] found that people with EDNOS (N = 344) and AN (N = 124) who reported CHSP showed more severe eating behaviour pathology compared to participants with BN that CHSP (N = 242). In contrast, participants with BN who CHSP reported a greater distortion of body image compared to their AN and EDNOS counterparts. CHSP was trans-diagnostic and positively correlated with laxative abuse in individuals with AN. The individuals with EDNOS who engaged in CHSP appeared to exhibit traits concordant with AN. Subjective overeating appeared to be a positive predictor of CHSP in the AN group.

Results of a cross-sectional study by Durkin et al. (N = 972) [35] indicated an overall positive association between being diagnosed with an ED and lifetime CHSP, with CHSP frequencies ranging from less than or equal to once a month to several times a day. The majority (67.9%) of those who engaged in CHSP at some point in their lifetimes generally were still currently engaging in the behaviour at the time of study. The results also indicated that participants who have had a lifetime history of CHSP were more likely to have been diagnosed with AN or BN as opposed to EDNOS. However, the authors did not indicate if CHSP was a risk factor for developing a clinical ED in the future [35]. Findings of the study indicated that CHSP was not trans-diagnostically present –unlike in the other cross-sectional studies - but was more commonly associated with those with an AN or BN diagnosis as opposed to EDNOS. Younger participants were more likely than older participants to engage in CHSP. Furthermore, it was demonstrated that CHSP was associated with both past

and present restrictive behaviour and CHSP is usually used as a short-term compensatory behaviour for some individuals with EDs [35].

In a cross-sectional study Mitchell et al. [1] (N = 25), found 68% of participants reported CHSP with 8% indicating having had CHSP at a minimum frequency of several times a week at some point during their illness. The authors posited that CHSP is used as a substitute for bingeing and purging or other bulimic behavioural patterns. In this study CHSP occurred at a low frequency in women with BN [1]. When comparing individuals with BN who had low frequency CHSP to those with high frequency CHSP, there was no significant difference between these types of participants and a control group [1].

Of the included studies, three were case reports (De Zwaan [37], McCutcheon and Nolan [39], and Smith and Ross [33]) outlining participants' histories, both in the context of CHSP and wider ED behaviour. In total, the case studies report on four females aged between 19 and 28. Similar themes between the reports highlight that CHSP is used as a weight-control method and is often associated with negative emotions such as self-disgust, remorse, and shame, but may be less distressing than bingeing and purging [33, 37, 39]. Additionally, because of CHSP, individuals appeared to have concerns over social, financial, and familial issues [33, 37, 39]. Only one study, by Smith and Ross [33] offered possible explanations for the CHSP behaviour, including avoiding feeling deprived, addiction transference, a stress response, or a deficiency in trace minerals or vitamins

2.5 DISCUSSION

This systematic review identified nine studies that met the eligibility criteria [1, 13, 33-39]. Grey literature, clinical but non-academic sources, and other sources that did not meet the eligibility criteria were surveyed to generate plausible hypotheses and mechanisms for describing pathways and outcomes of CHSP. However, the prevalence of CHSP remains unclear due to the paucity of peer-reviewed academic literature on CHSP and the available studies being case studies or cross-sectional studies with small sample sizes that are mostly comprised of adult female participants. The psychological, social, or physiological precursors or outcomes of the behaviour also remain unclear. Moreover, the Ferro and Speechley [30] index scores raised concerns about the quality of studies, with no single study scoring above ten on a fifteen-point scale. Further to this, studies that addressed LOC did not comment on

probable resulting referral bias or the differences in comorbidity dependant on inpatient or outpatient setting and clinical specialties (see Table 2 for included study settings). Such referral bias could have given rise to higher numbers of participants with specific eating disorders, rather than sampling CHSP across the ED spectrum. The quality of eligible studies was of concern as no RCTs were conducted to investigate responses to various treatment options for the disordered behaviour of CHSP. Overall, the included studies did not provide deep insight into the wider prevalence and consequences of CHSP.

Nonetheless, the included studies highlighted some aspects of CHSP prevalence between ED cohorts (ranging from 22-100%). With the exception of diuretic and laxative misuse, the disordered behaviours of binge eating and dietary restriction were very common (ranging over 70%) in people with lifetime or current CHSP [13, 34, 36, 38]. The included studies considered the incidence of CHSP in predominantly (90% or more) Caucasian adult female participants with very little focus on CHSP in males, children, or those of other racial or ethnic groups [1, 13, 33, 35-39]. Most included studies assessed CHSP in participants who were 18 years or older [1, 13, 33, 34, 37-39], with two also assessing the behaviour in some adolescent participants [29, 30], and none in children. Both Durkin et al. [35] and Guarda et al. [13] indicated that CHSP appears to be more common in younger individuals with eating disorders.

It is likely that the bias towards female participants was due to the study samples being based in ED clinics and it is known men with EDs are less likely to access treatment services than women [40]. However, it is also indicative of the relative neglect of men in ED research [40-42].

All included studies except for Smith and Ross [33] focused on the behaviour of CHSP exclusively in ED individuals. Smith and Ross [33] presented a case study on CHSP symptomology in a patient who was not diagnosed with an ED but who turned spontaneously to the behaviour during a period of extreme calorie and nutrient deprivation akin to that experienced during disordered eating patterns.

Further to this, CHSP may be an indicator of ED behavioural severity [13]. As ED illness severity increases, individuals may experiment with more ED behaviours such as CHSP. CHSP may serve as a way to taste ‘forbidden’ or feared food, and it is possible that CHSP ‘binging’ may develop as a substitute for regular bingeing and

purging even if the associated risks with the behaviour appear elevated [13, 34, 36, 39].

While the participants in the Mitchell et al., [1] study were not studied systematically relative to treatment they received, a review of their charts indicated that most were able to participate in an outpatient program for BN and had apparent success (however no follow-up study was conducted). It appeared that those that engaged in CHSP at high frequencies may eventually cease or decrease the behaviour with most not using CHSP as a complete substitute for purging (laxative or vomiting) but may alternate between both behaviours [1].

Prior to the DSM-5 [2, 5], CHSP was included under the EDNOS classification. However, in the DSM-5 CHSP behaviour has been removed from the definition of OSFED and UFED (formerly EDNOS) with no explanation or transfer to another ED diagnostic category. One possible reason for this is that CHSP crosses ED diagnostic boundaries. Studies included in this systematic review indicate that CHSP is likely to be a trans-diagnostic behaviour [34, 36, 38]. Therefore, it is the recommendation of the authors of the present systematic review that clinicians consider inquiring about CHSP in all people presenting with an ED (or disordered eating), as there is, to date, no empirical evidence that extensively assesses CHSP prevalence and behaviour in other groups.

This review identified a number of limitations in the current research centred on CHSP, all of which appeared to be of modest quality. Primarily, one-third of what little literature does exist on this topic comes from case studies. Only one case study involved a person without an ED and few studies undertook an in-depth analysis of the physical, social, or psychological implications of CHSP, with no studies deeply investigating physical or social impacts. None of the studies investigated CHSP in children or as a precursor to EDs later in life. We found no longitudinal studies and men and children with CHSP were severely under-represented in study samples. Longitudinal studies are needed to determine the prolonged effects of CHSP and the impacts on physiological, psychological, and social well-being. Such studies would provide greater insight treatment design for those that engage in CHSP but may not meet full diagnostic ED criteria.

A limitation to this review is that it sourced only English-language studies. One study in Japanese was present in the original literature search and there may have been

others if non-English language databases had been searched. This would potentially have increased the number of studies and study participants of non-Caucasian descent.

Another limitation of this systematic review was its inability to source empirical studies on CHSP practices in populations without EDs but with specific dietary requirements, such as individuals with diabetes, athletes, bodybuilders, and bariatric patients. As bariatric surgery is becoming more commonplace in the treatment of morbid obesity, it would be extremely valuable to ascertain how common CHSP is in this population [43]. The impact of CHSP on weight loss, as well as possible psychological and medically adverse complications in these groups, is at this time uncertain. The focus of published studies on CHSP and its association with EDs rather than in individuals who exhibit CHSP alone may result in some ‘at-risk’ people not being clinically identified as engaging in CHSP. Undiagnosed and untreated CHSP may lead to a future diagnosable ED.

Further and higher quality research into CHSP is needed to provide greater understanding across several areas including: gaining insight into CHSP treatment, along with other more common ED types; lowering relapse rates for individuals with AN and BN; bringing relief and insight for those engaging in CHSP; assisting clinicians who seek to treat individuals overcome CHSP behaviours; and providing clinicians with clear diagnostic criteria for EDs (that includes screening for CHSP) modified from the strict criteria AN or BN treatments currently offer and would help determine a course of treatment [44]. Studies should also investigate the precursors and outcomes of CHSP not only in individuals with identified eating disorders but also in undiagnosed individuals who engage in CHSP and those who may be at risk for beginning the behaviour.

2.6 CONCLUSION

This systematic review of CHSP literature revealed no consensus on the ED typology most closely associated with CHSP. The small number of poor quality studies published demonstrates that CHSP is an understudied topic.

Higher quality studies, including qualitative, quantitative, mixed-methods, and longitudinal studies, are required to add depth to clinical, physiological, psychological, and socioeconomic understandings of CHSP. Such studies would assist in determining if there is a common psychological link between individuals with CHSP behaviour, if

there is a trend in the socio-emotional functions for those who engage in the behaviour, the physiological impact of prolonged CHSP and how best to treat the symptoms.

CHAPTER REFERENCES

1. Mitchell, J. E., Pyle, R., Hatsukami, D., & Eckert, E. (1988). *Chewing and spitting out food as a clinical feature of bulimia*. *Psychosomatics*, 29(1), 81-84.
2. American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5 (5th ed.)*. American Psychiatric Association Publishing. Washington, DC.
3. World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.
4. Binder, R. (2015). *The new American psychiatric association: 2015 in review*. *Psychiatric News*, 50(23), 1-1. <http://dx.doi.org/10.1176/appi.pn.2015.12a24>
5. American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR (4th ed., text rev.)*. Washington, DC: American Psychiatric Association Publishing
6. Mitchell, J. E., & De Zwaan, M. (Eds.). (2012). *Psychosocial assessment and treatment of bariatric surgery patients*. New York, NY: Routledge
7. Mitchell, J. E., & Zwaan, M. D. (2005). *Bariatric surgery: A guide for mental health professionals*. New York, NY: Routledge
8. Still, C., Sarwer, D. B., & Blankenship, J. (2014). *The ASMBS Textbook of Bariatric Surgery (No. 2): Integrated Health*. New York, NY: Springer.
9. Johns Hopkins Medicine. (2015). *Bariatric surgery and eating disorders*. Hopkins Brainwise, 4. Retrieved from http://www.hopkinsmedicine.org/news/publications/psychiatry_newsletter/files/s_ebindoc/s/e/73ACAB93EF4162E4C1031886BF91B294.pdf.
10. Brethauer, S. A., Schauer, P. R., & Schirmer, B. D. (Eds.). (2007). *Minimally invasive bariatric surgery*. New York, NY: Springer.
11. Conceição, E., Orcutt, M., Mitchell, J., Engel, S., LaHaise, K., Jorgensen, M., & Wonderlich, S. (2013). *Characterization of eating disorders after bariatric surgery: A case series study*. *The International Journal of Eating Disorders*, 46(3), 274-279. Doi: 10.1002/eat.22074
12. Broberg, D. J., & Bernstein, I. L. (1989). *Cephalic insulin release in anorexic women*. *Physiology & Behaviour*, 45(5), 871-874.
13. Guarda, A. S., Coughlin, J. W., Cummings, M., Marinilli, A., Haug, N., Boucher, M., & Heinberg, L. J. (2004). *Chewing and spitting in eating disorders and its relationship to binge eating*. *Eating Behaviours*, 5(3), 231-239.
14. Méquinion, M., Langlet, F., Zgheib, S., Dickson, S., Dehouck, B., Chauveau, C., & Viltart, O. (2014). *Ghrelin: central and peripheral implications in anorexia nervosa*. *Neuropeptide GPCRs in Neuroendocrinology*, 17.

15. Monteleone, P., Serritella, C., Martiadis, V., & Maj, M. (2008). *Deranged secretion of ghrelin and obestatin in the cephalic phase of vagal stimulation in women with anorexia nervosa*. *Biological Psychiatry*, 64(11), 1005-1008.
16. Moyer, A., Rodin, J., & Cummings, N. (1993). *Cephalic phase insulin release in bulimia*. *International Journal of Eating Disorders*, 14(3), 331-339.
17. Teff, K. L. (2011). *How neural mediation of anticipatory and compensatory insulin release helps us tolerate food*. *Physiology & Behavior*, 103(1), 44-50.
18. Teff, K. L., & Engelman, K. (1996). *Palatability and dietary restraint: Effect on cephalic phase insulin release in women*. *Physiology & Behaviour*, 60(2), 567-573.
19. Ukleja, A. (2005). *Dumping syndrome: Pathophysiology and treatment*. *Nutrition in Clinical Practice*, 20(5), 517-525.
20. Young, R. C., Gibbs, J., Antin, J., Holt, J., & Smith, G. P. (1974). *Absence of satiety during sham feeding in the rat*. *Journal of Comparative and Physiological Psychology*, 87(5), 795
21. Robertson, M. D., Jackson, K. G., Williams, C. M., Fielding, B. A., & Frayn, K. N. (2001). *Prolonged effects of modified sham feeding on energy substrate mobilization*. *The American Journal of Clinical Nutrition*, 73(1), 111-117
22. Kirkham, T. C., & Cooper, S. J. (1988). *Naloxone attenuation of sham feeding is modified by manipulation of sucrose concentration*. *Physiology & Behavior*, 44(4), 491-494
23. Arosio, M., Ronchi, C. L., Beck-Peccoz, P., Gebbia, C., Giavoli, C., Cappiello, V., Conte, D., & Peracchi, M. (2004). *Effects of modified sham feeding on ghrelin levels in healthy human subjects*. *The Journal of Clinical Endocrinology & Metabolism*, 89(10), 5101-5104
24. Monteleone, P., Serritella, C., Scognamiglio, P., & Maj, M. (2010). *Enhanced ghrelin secretion in the cephalic phase of food ingestion in women with bulimia nervosa*. *Psychoneuroendocrinology*, 35(2), 284-288.
25. Klein, D. A., Schebendach, J. E., Gershkovich, M., Smith, G. P., & Walsh, B. T. (2010). *Modified sham feeding of sweet solutions in women with anorexia nervosa*. *Physiology & Behaviour*, 101(1), 132-140. Doi: <http://dx.doi.org/10.1016/j.physbeh.2010.04.030>
26. Hatsukami, D., Mitchell, J. E., Eckert, E. D., & Pyle, R. (1986). *Characteristics of patients with bulimia only, bulimia with affective disorder, and bulimia with substance abuse problems*. *Addictive Behaviors*, 11(4), 399-406.
27. Fairburn, C. G., Wilson, G. T., & Schleimer, K. (1993). *Binge eating: Nature, assessment, and treatment* (pp. 317-360). New York: Guilford Press.
28. Golden, C. (2015). *DSM-V: Eating disorders*. Eating Disorders Victoria. Retrieved 11 January 2016, from <http://www.eatingdisorders.org.au/eating-disorders/what-is-an-eating-disorder/classifying-eating-disorders/dsm-5>

29. Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). *Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement*. *Annals of Internal Medicine*, 151(4), 264-269.
30. Downs, S. H., & Black, N. (1998). *The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions*. *Journal of Epidemiology and Community Health*, 52(6), 377-384.
31. Ferro, M. A., & Speechley, K. N. (2009). *Depressive symptoms among mothers of children with epilepsy: a review of prevalence, associated factors, and impact on children*. *Epilepsia*, 50(11), 2344-2354.
32. Tierney, J. F., & Stewart, L. A. (2005). *Investigating patient exclusion bias in meta-analysis*. *International Journal of Epidemiology*, 34(1), 79-87.
33. Smith, G. R., & Ross, R. L. (1988). *Chewing and spitting associated with a protein sparing modified fast and psychosocial stressors*. *Psychosomatics*, 30(2), 224-226.
34. Song, Y. J., Lee, J. H., & Jung, Y. C. (2015). *Chewing and spitting out food as a compensatory behavior in patients with eating disorders*. *Comprehensive Psychiatry*, 62, 147-151.
35. Durkin, N. E., Swanson, S. A., Crow, S. J., Mitchell, J., Peterson, C. B., & Crosby, R. (2013). *Re-examination of chewing and spitting behavior: characteristics within and across eating disorder diagnoses*. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 19(3), 315-320.
36. Makhzoumi, S. H., Guarda, A. S., Schreyer, C. C., Reinblatt, S. P., Redgrave, G. W., & Coughlin, J. W. (2014). *Chewing and spitting: A marker of psychopathology and behavioral severity in inpatients with an eating disorder*. *Eating Behaviors*, 17, 59-61.
37. De Zwaan, M. (2009). *Chewing and spitting out food in eating disorder*. *International Journal of Psychiatry in Clinical Practice*, 1(1), 37-38. doi: 10.3109/13651509709069203
38. Kovacs, D., Mahon, J., & Palmer, R. L. (2002). *Chewing and spitting out food among eating-disordered patients*. *The International Journal of Eating Disorders*, 32(1), 112-115.
39. McCutcheon, R., & Nolan, A. (1994). *Chewing and spitting out food—a neglected symptom?*. *International Journal of Eating Disorders*, 17(2), 197-200.
40. Striegel, R. H., Bedrosian, R., Wang, C., & Schwartz, S. (2012). *Why men should be included in research on binge eating: results from a comparison of psychosocial impairment in men and women*. *International Journal of Eating Disorders*, 45(2), 233-240.
41. Thapliyal P, Hay PJ. *Treatment experiences of males with an eating disorder: A systematic review of qualitative studies*. *Translational Developmental Psychiatry*. 2014 Dec 11, 2.

42. Dolhanty, J. (1998). *Giving up an eating disorder: What else might you be giving up?*. National Eating Disorder Information Centre (NEDIC) Canada. Retrieved 27 January 2016, from <http://nedic.ca/giving-eating-disorder-what-else-might-you-be-giving>
43. Maggard, M. A., Shugarman, L. R., Suttorp, M., Maglione, M., Sugerman, H. J., Livingston, E. H., Ninh, T., Nguyen, M. T., Li, Z., Mojica, W. A., Hilton, L., & Rhodes, S. (2005). *Meta-analysis: surgical treatment of obesity*. *Annals of Internal Medicine*, 142(7), 547-559.
44. Simmers, M. (2013). *Tackling relapse among anorexia nervosa patients*. *Eating Disorders Review*. Retrieved 12 February 2016, from http://eatingdisordersreview.com/nl/nl_edr_24_1_4.html

Chapter 3: Adult Prevalence (Study 2)

This chapter is of works that has already been peer-reviewed and published, and appears in its entirety. Text formatting was amended to maintain uniformness throughout the dissertation, however referencing and citation styles are those adhered to by journal to which this work was submitted.

Cited As: Aouad, P., Hay, P., Soh, N., & Touyz, S. (2018). Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. *International Journal of Eating Disorders*, 51(8), 968-972. doi: 10.1002/eat.22873

**Prevalence of Chew and Spit (CHSP) and its relation to other features of
Disordered Eating in a Community Sample**

Phillip Aouad

School of Psychology, University of Sydney, Sydney, Australia
phillip.aouad@sydney.edu.au

Phillipa Hay

*Translational Health Research Institute, School of Medicine, Western Sydney
University, Penrith, Australia*
p.hay@westernsydney.edu.au

Nerissa Soh

School of Medicine, University of Sydney, Sydney, Australia
nerissa.soh@sydney.edu.au

Stephen Touyz

School of Psychology, University of Sydney, Sydney, Australia
stephen.touyz@sydney.edu.au

3.1 ABSTRACT

Until recently, research into Chew and Spit (CHSP) behaviour has predominantly focused on clinical samples, and little is known of its prevalence in the community. The current study aimed to bridge this gap by exploring CHSP features in a representative sample of the general population. We hypothesized that the point-prevalence of CHSP would be less than 1%; concurrent with other eating disorder symptomology, and associated with poorer health related quality of life (HRQoL).

Using the 2016, respondent-based, South Australian Health Omnibus Survey (HOS), data were collected on 3047 participants aged ≥ 15 years old. HRQoL was assessed with the Short-Form health-questionnaire-v1 (SF-12).

CHSP point-prevalence was 0.4% (95% CI .23 to .69%; $n=13$), and was more prevalent in people with compensatory disordered eating behaviours. The median age of those with CHSP was 39, and both mental and physical HRQoL were reduced compared to the general population (*Mdn*: MHQoL=49; HRQoL=50), with MHQoL being significantly lower in those with symptoms of a clinically diagnosable ED and concurrently engaged in CHSP ($z = -2.33, p = .020$).

Due to the low prevalence of CHSP, the reliability of inferential statistics may increase the chance of Type II errors, therefore, future studies should use larger samples. Although CHSP is not “common” in a wider community sample, its prevalence appears to be similar to other ED associated symptoms.

Keywords: Chew and Spit; CHSP; Oral Expulsion Syndrome; Eating Disorder, Anorexia, Bulimia, EDNOS, OSFED, Abnormal Eating, C/S, Chewing and Spitting

3.2 INTRODUCTION

Chew and Spit (CHSP) refers to the disordered eating practice of chewing a subjectively enjoyable, often calorie dense, food and spitting it out before swallowing [1]. Those who often engage in CHSP include individuals with eating disorders (ED), medical patients, bariatric patients, and athletes [1-2]. A recent systematic review [1] identified six themes related to CHSP including its more common presentation in younger sufferers, trans-diagnostic occurrence (although often seen in restrictive-type EDs), being a potential marker of ED severity, and its association with increased pathological eating, increased negative emotions, and some subjective Loss of Control (LoC). This review also identified a gap in the literature with regard to accurate prevalence estimates of CHSP in the ED population, and the lack of estimates in representative community samples.

Therefore, the aim of the current study was to provide estimates on CHSP point-prevalence in a community sample and describe the demographic features, ED features, mental health related quality of life (MHQoL), and physical health related quality of life (HRQoL) in individuals identified with CHSP.

3.3 METHOD

3.3.1 Materials

The South Australian Health Omnibus Survey (HOS) was developed in 1990 and is administered by The University of Adelaide, in conjunction with Harrison Research, and a number of other health organisations [4; 16; 17]. It is conducted annually, usually in October/November, and is a respondent-based interview utilising the Short Form health assessment tool (SF-12) to gauge participant mental and physical health related Quality of Life (MHQoL; HRQoL) [18].

3.3.2 Participants

Samples were randomly (through coding at each stage) selected from 4,400 households with an overall 70% response rate of those 4,400 households participating (~3080 households participated in the HOS) [4; 16]. The median age of the 2016 HOS sample population was 59 years old and the sample represented men and women equally across metropolitan and country South Australia [4; 16]. Median BMI for the general population (study participants who do not CHSP) was 27kg/m², with >50/100 medians for both MHQoL and HRQoL indices. The demographic features of the 2016

HOS sample were consistent with the data from the previous two-year collection periods [2; 16]

3.3.3 Procedure

Ten households were selected from each collection district (CD) using a four-staged approach: Stage 1 – stratification of Metropolitan Adelaide (n=400 metropolitan CDs selected, equivalent to 75% of the total sample) and rural centres with ≥ 1000 inhabitants, across South Australia (n=130 rural CDs selected, equivalent to 25% of the total sample); Stage 2 – using randomisation (by coding) for the statistical area to provide a starting point for CD selection, 410 CDs were systematically selected based on the Australian Bureau of Statistics stratification of the State of South Australia [17]; Stage 3 - selection of 10 Households (HHs) from each of the 410 CDs; and Stage 4 – selection of individuals to participate [16]. For each household, the individual selected to participate was randomly selected from any person in the household over the age of 15 years old [16]. Participants were unable to choose another household member to participate in their place. Six contact attempts were made face-to-face, before marking a participant as “non-contactable” [4; 9; 16]. Prior to main data collection, a pilot study with 50 participants was conducted in order to validate questions and testing procedures [4; 16].

Outcome

Specific eating behaviour questions were used to assess CHSP prevalence and its relation to other disordered eating behaviours. Questions listed in appendix B were developed by various organisations and academics that utilised the HOS in order to gather data, with reliability and validity being assessed as part of a pilot study. Particularly related to determining CHSP prevalence, question G9 “*Over the past three months have you made yourself spit out food after chewing it, in order to control your shape or weight, and if so how often have you done this i.e. chew/spit eating behaviour?*” was developed in order to understand 1) if participants engaged in CHSP, and 2) if so, how often. Additionally, question G9 was modelled after a similar line of questioning utilised by other studies investigating CHSP [1, 7, 10].

Covariates

In addition to the above assessment of CHSP, the SF-12 (assessment for HRQoL) and data related to demographic features were also used [18, 19]. Given that

the HOS was respondent-based, and a reliance on self-reporting for height and weight was obtained, accuracy of the information used to assess BMI was unable to be verified.

Data Analysis for CHSP Prevalence

Participants were categorised into one of three groups (the general population who had neither an ED nor CHSP (NoCHSP/NoED); CHSP and No ED (CHSP/NoED); and CHSP with an ED (CHSP/ED)) based on their responses to the HOS. The presence of an ED was diagnosed based on participant responses to ED behaviours overvaluation of body weight or shape, as defined in the DSM-5 and previously reported [20]. Non-parametric testing of unweighted data was used to compare the demographics of participants who CHSP to those of the general population. It should be noted that reference to unweighted participant data indicates that additional weighting, other than naturally occurring in the distribution (that is: level-of-education, sex, age, and location), was not employed during analysis and is subsequently referred to as unweighted. Unweighted data was used due to the small sample size, with minimal differences in overall demographic characteristics, when compared to weighted data. The Chi square, Mann-Whitney U, and Kruskal-Wallis tests were used to compare groups. All analyses were conducted with the SPSS package version 24.

3.4 RESULTS

The point-prevalence of CHSP behaviour in this community sample was 0.43% (95% CI .25-.73; n=13; N=3047). Table 3 presents the demographic features of the CHSP subgroup and the wider community sample. Those with CHSP were predominantly female, younger in age, and had poorer MHQoL than those who did not CHSP.

<i>Demographic Features</i>	<i>CHSP</i>				<i>General Population (Non-CHSP)</i>			
	<i>Mean</i>	<i>SD</i>	<i>Median</i>	<i>IQR</i>	<i>Mean</i>	<i>SD</i>	<i>Median</i>	<i>IQR</i>
Age (years)	47.25	21.12	39	33	54.67	19.49	57	32
BMI (m ² /kg)	29.11	8.10	27	9.5	26.91	5.59	26	6.5
Gender	1.83	0.39	2	0	1.67	0.49	2	1
Education	4.83	2.37	4.5	4	5.09	2.30	5	4
Marital Status	3.50	1.78	4.5	4	2.45	1.57	2	3
Employment	4.75	2.83	5	4	4.78	2.93	1	1
Location	1.25	0.45	1	1	1.28	0.448	1	1
MHQoL	46.70	9.08	47	16	52.05	9.34	55	8.93
HRQoL	44.25	13.63	50	24.5	46.80	11.35	52	11.36

Note. Differences are between individuals (male and female) that engage in CHSP (regardless of clinically diagnosable ED) and people from the HOS 2016 representative sample (general population) – using unweighted data for CHSP.

Table 3: Demographic and Notable Features between all participants with CHSP (n=13) and without CHSP (n=3034)

<i>Eating Disordered Behaviour</i> [Question Number]	<i>n (~%) of n (CHSP) engaging in behavior</i>	<i>n (~%) of n (general population) engaging in behavior</i>	<i>Med (IQR)</i>	<i>Mann-Whitney-U</i>		<i>Chi-Square</i>		
				<i>z</i>	<i>p</i>	<i>x²</i>	<i>df</i>	<i>p</i>
Purging (all forms) [G5]	3 (23)	24 (0.8)	4 (1)	-	-	73.13	2	<.001
Excessive Dieting [G6 & G8]	4 (31)	185 (6)	2.5 (2)	-	-	23.13	2	<.001
Distress LoC & OBE [G1 - G4]	7 (53)	1188 (38)	2 (-)	-3.12	.002	-	-	-
Overvaluation [G7]	10 (85)	1202 (39)	2 (1)	-3.73	<.001	-	-	-
Grazing [G10]	10 (85)	1483 (49)	2 (1)	-2.94	.003	-	-	-
Grazing w/ Subjective LoC [G11]	8 (62)	408 (13)	3 (2)	-5.12	<.001	-	-	-
MHQoL	13 (0.4)	-	47 (16)	-	-	-	-	-
HRQoL	13 (0.4)	-	50 (24.5)	-	-	-	-	-

Note. G5-G11 refer to the questions found in Appendix A. Comparisons are of individuals that engaged in CHSP regardless of a clinically diagnosable ED. N=3047

Table 4: Eating Disorder symptoms related to those that CHSP

Table 4 presents the results of associated ED and CHSP behaviours. Those with CHSP when compared to those that do not CHSP (general population), were significantly more likely to purge regularly (23% vs. 0.8%), use extreme dieting or fasting (31% vs. 6%), have distress associated recurrent objective binge eating episodes (53% vs. 38%), high levels of weight/shape overvaluation (85% vs. 39%), more frequent grazing (85% vs. 49%), and grazing associated with loss of control over eating (62% vs. 13%).

Of those that CHSP, five respondents met the criteria for a diagnosable ED, of which 4 met criteria for Bulimia Nervosa (BN) and 1 met criteria for Binge Eating Disorder (BED). Contrastingly, of those that did not CHSP, 18 participants met broad criteria for Anorexia Nervosa (AN), 31 for BN, 39 for BED, and 5 for Avoidant/Restrictive Food Intake Disorder (ARFID). A significant difference between MHQoL was observed across all three groups (No CHSP with no ED, CHSP with no ED, and CHSP with ED) ($p = .039$; $df = 2$; $n = 3$). CHSP/ED should the lowest levels of MHQoL. However those who CHSP but did not meet the criteria for a clinically diagnosable ED (CHSP/ No ED), still had lower MHQoL than the general population (No CHSP/ No ED). Post-hoc analysis indicated a significant difference between MHQoL of the general population and those with CHSP/ ED ($z = -2.331$; $p = .020$). It was found that the MHQoL of those who CHSP with an associated ED ($med = 45.16$) was lower than the general population ($med = 55.21$).

3.5 DISCUSSION

The present study found a point-prevalence of 0.4% of CHSP in a representative community sample, similar to the community prevalence of other ED symptoms [2-3]. Comparisons between three groups revealed that engaging in CHSP does negatively impact MHQoL especially in the presence of an ED. Additionally, CHSP was more prevalent in women and in individuals who were younger; and in those with lower MHQoL and HRQoL. Individuals who engaged in CHSP also reported other concurrent, ED symptoms such as dieting; purging; overexercise; laxative or diuretic misuse; body image overvaluation; binge eating and over eating (with subjective LoC); and grazing. It was found that CHSP may occur mainly in women with poor MHQoL and concurrent ED symptoms, such as *Objective* and *Subjective Binge Eating* (OBE / SBE), and weight/shape overvaluation. Moreover, those with CHSP reported poorer

mental and physical HRQoL than participants without CHSP; and while the median values of the two groups are close, the IQR is narrow, suggesting little variation.

In the present study, CHSP occurred in older individuals compared to that reported in our systematic review ($M = \sim 24$, $SD = \sim 8$) [1]. This may be due to the younger ED samples used for studies identified in the review [1, 7, 14]. The ages from the HOS 2016 (CHSP) ranged from 21 to 93 years old. However, in our systematic review those with CHSP were younger than the general population ($\text{Median}_{\text{CHSP}} = 39$ vs. $\text{Median}_{\text{pop}} = 59$) [1]. As noted in studies by Guarda and colleagues [7] and Makhzoumi et al. [10], it was expected that the age of those that CHSP would be lower than that of the general population. Nonetheless, as older women are less likely to admit to, and seek treatment for, ED behaviours than younger counterparts, it may be speculated that CHSP behaviours were under-reported in the general population [1,7,14]. Taking this into account, females who had been treated for ED behaviours at a younger age could potentially still express some disordered eating habits as ‘residual’ effects post-recovery, or may utilise CHSP as a coping strategy. The HOS was chosen for the current study due to its rigorous nature and strict adherence to formal statistical techniques. Moreover, the selected sample of participants was clustered according to geographic location; multi-staged; systematically sampled by randomly assigned numerical values; and self-weighted by age, education level, gender, and area - covering both metropolitan and country South Australia – as the sample had a normal distribution for each of these demographic elements. Such elements were important to gain an accurate representation of the population being sampled. Additionally, the HOS offered a sound representation of the general population with respects to socio-demographic features, such as gender, income, education, and age.

A limitation of our study is that given the low prevalence of CHSP in a community sample, reliability of inferential statistics may increase the chance of Type-II errors. Moreover, the lack of statistical power precluded regression modelling, which would have yielded inaccurate results, as given the number of missing data, predictors (demographic, or other ED-features) would not have been reliable in determining the occurrence of CHSP. To overcome the aforementioned limitations, future studies into the phenomenology of CHSP should focus on larger community samples and include ‘*at risk*’ subgroups such as people with EDs. Additionally, future studies should also take into consideration potential latent or confounding variables such as duration of an ED, the physiological responses to CHSP, the co-occurrence of

CHSP and related ED symptoms, and the reported addictive nature of the behaviour. Nonetheless the current study provides a starting-point for investigating CHSP in people in the general population.

CHAPTER REFERENCES

- [1] Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): a systematic review. *Journal of Eating Disorders*, 4(1), 23. doi: 10.1186/s40337-016-0115-1
- [2] American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders: DSM-IV-TR (4th ed., text rev.): Washington, DC.
- [3] American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders: DSM-5 (5th ed.): Washington, DC.
- [4] Dal Grande, E. (2017). *Health Omnibus Survey (HOS). Population Research and Outcome Studies (PROS)*. Retrieved 10 April 2017, from <https://health.adelaide.edu.au/pros/data/hos/>
- [5] De Zwaan, M. (2009). Chewing and spitting out food in eating disorder. *International Journal of Psychiatry in Clinical Practice*, 1(1), 37-38. doi: 10.3109/13651509709069203
- [6] Durkin, N. E., Swanson, S. A., Crow, S. J., Mitchell, J., Peterson, C. B., & Crosby, R. (2013). Re-examination of chewing and spitting behaviour: characteristics within and across eating disorder diagnoses. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 19(3), 315-320.
- [7] Guarda, A. S., Coughlin, J. W., Cummings, M., Marinilli, A., Haug, N., Boucher, M., & Heinberg, L. J. (2004). Chewing and spitting in eating disorders and its relationship to binge eating. *Eating Behaviours*, 5(3), 231-239.
- [8] Kovacs, D., Mahon, J., & Palmer, R. L. (2002). Chewing and spitting out food among eating-disordered patients. *The International Journal of Eating Disorders*, 32(1), 112-115.
- [9] Wilson, D., Wakefield, M., & Taylor, A. (1992). The South Australian health omnibus survey. *Health Promotion Journal of Australia*, 2(3), 47-49.
- [10] Makhzoumi, S. H., Guarda, A. S., Schreyer, C. C., Reinblatt, S. P., Redgrave, G. W., & Coughlin, J. W. (2014). Chewing and spitting: A marker of psychopathology and behavioural severity in inpatients with an eating disorder. *Eating Behaviors*, 17, 59-61.
- [11] McCutcheon, R., & Nolan, A. (1994). Chewing and spitting out food—a neglected symptom?. *International Journal of Eating Disorders*, 17(2), 197-200.
- [12] Mitchell, J. E., Pyle, R., Hatsukami, D., & Eckert, E. (1988). Chewing and spitting out food as a clinical feature of bulimia. *Psychosomatics*, 29(1), 81-84.
- [13] Smith, G. R., & Ross, R. L. (1988). Chewing and spitting associated with a protein sparing modified fast and psychosocial stressors. *Psychosomatics*, 30(2), 224-226.
- [14] Song, Y. J., Lee, J. H., & Jung, Y. C. (2015). Chewing and spitting out food as a compensatory behavior in patients with eating disorders. *Comprehensive psychiatry*, 62, 147-151.

- [15] World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.
- [16] Harrison Research. (2016). *The Health Omnibus Survey Spring 2016* (pp. 5-15). Adelaide, SA: Department of Population Research and Outcome Studies - The University of Adelaide. Retrieved from https://health.adelaide.edu.au/pros/docs/hos_prospectus2016.pdf
- [17] Commonwealth of Australia. (2016). *ABS - The Australian Statistical Geography Maps. Australian Bureau of Statistics*. Retrieved 28 September 2017, from <http://stat.abs.gov.au/itt/r.jsp?ABSMaps>
- [18] Harrison Research. (2016). *Health Omnibus Survey (HOS). Population Research and Outcome Studies*. Retrieved 12 November 2017, from <https://health.adelaide.edu.au/pros/data/hos/>
- [19] Harrison Health Research. (2016). *The Health Omnibus Survey Spring 2016*. Adelaide: Harrison Research. Retrieved from https://health.adelaide.edu.au/pros/docs/hos_prospectus2016.pdf
- [20] Hay, P., Mitchison, D., Collado, A. E. L., González-Chica, D. A., Stocks, N., & Touyz, S. (2017). Burden and health-related quality of life of eating disorders, including Avoidant/Restrictive Food Intake Disorder (ARFID), in the Australian population. *Journal of eating disorders*, 5(1), 21. doi: 10.1186/s40337-017-0149-z

Chapter 4: Adolescent Prevalence (Study 3)

This chapter is of works that is currently under peer-review for publication in an academic journal, and appears in its entirety. Text formatting was amended to maintain uniformness throughout the dissertation, however referencing and citation styles are those adhered to by journal to which this work was submitted.

Cited As: Aouad, P., Hay, P., Soh, N., Touyz, S. & Mitchison, D., (under peer review). Chew and Spit (CHSP) in a Large Adolescent Sample: Prevalence, Impact on Health-Related Quality of Life, and Relation to Other Disordered Eating Features. *Eating Disorders: Journal of Treatment and Prevention*

Chew and Spit (CHSP) in a Large Adolescent Sample: Prevalence, Impact on Health-Related Quality of Life, and relation to other Disordered Eating features

Phillip Aouad

*School of Psychology, University of Sydney, Sydney, Australia
phillip.aouad@sydney.edu.au*

Phillipa Hay

*Translational Health Research Institute, School of Medicine, Western Sydney University, Campbelltown, Australia
p.hay@westernsydney.edu.au*

Nerissa Soh

*Honorary Associate, University of Sydney Northern Clinical School, Sydney, Australia
nerissa.soh@sydney.edu.au*

Stephen Touyz

*School of Psychology, University of Sydney, Sydney, Australia
stephen.touyz@sydney.edu.au*

Haider Mannan

*Translational Health Research Institute, School of Medicine, Western Sydney University, Campbelltown, Australia
h.mannan@westernsydney.edu.au*

Deborah Mitchison

*Department of Psychology, Macquarie University, Sydney Australia
deborah.mitchison@mq.edu.au*

4.1 ABSTRACT

A recent general population study of Chew and Spit (CHSP) behavior in adults found a 0.4% prevalence (based on interview data), predominantly in females. The current study explores this further by examining the same phenomenon in secondary-school aged adolescents. This study also explores the relationship between CHSP and other demographic and eating disorder (ED) features in 5111 adolescents (11-to-19 years of age) from 13 schools in New South Wales, Australia. Participants completed measures of ED symptoms and behaviors and change to impairment with two components: psychological distress (K-10) and health related quality of life (HRQoL; PedsQL). CHSP was found to have a 12.2% (95% CI 0.114, 0.132] point-prevalence rate (based on self-report data). Participants who indicated engaging in CHSP reported significantly higher levels of psychological distress (K-10) and lower HRQoL scores (PedsQL) compared to those that did not report CHSP. There was a dose-response relationship between CHSP frequency and psychological distress and HRQoL physical scores but not for HRQoL emotional and HRQoL social scores. Participants who reported regular CHSP were more likely to be female, younger, and to engage in compensatory behaviors such as purging. The high frequency of CHSP behavior in adolescents with disordered eating could suggest that CHSP should be considered in routine ED screening practices. Future studies may examine how to treat CHSP or investigate more focused treatment approaches, in order to target the behavior of CHSP more directly.

Keywords: Chew and Spit; CHSP; Adolescents; Eating Disorder, Anorexia, Bulimia, OSFED

4.2 INTRODUCTION

Chew and Spit (CHSP) is the pathological chewing of food and spitting it out before swallowing, often as a weight management technique by individuals with disordered eating (Aouad, Hay, Soh, & Touyz, 2016). As of 2013, the CHSP symptom no longer appears in the American Psychiatric Association Diagnostic and Statistical Manual (DSM) of mental disorders (American Psychiatric Association, 2000, 2013; Aouad et al., 2016; Aouad, Hay, Soh, & Touyz, 2018). However, evidence from the 2016 South Australian Health Omnibus Survey (Dal Grande, 2017) demonstrates that there is a 0.4% point-prevalence in a large adult population -representative community sample and CHSP was associated with poor mental and physical health related quality of life (HRQoL) and severe weight control behaviors (Aouad et al., 2018). This supports consideration of reintroducing CHSP as a symptom in future revisions of the DSM, as its prevalence is similar to other disordered eating behaviors such as purging in the absence of bingeing (Fear, Bulik, & Sullivan, 1996; Reba-Harrelson et al., 2009; Solmi, Hatch, Hotopf, Treasure, & Micali, 2014).

Currently, those who often engage in CHSP are thought to include individuals with eating disorders (ED), some medical patients, bariatric patients, and athletes (Aouad et al., 2016, 2018). However, there remains a paucity in knowledge into the prevalence and impact of CHSP in adolescents, and whether the clinical presentation of CHSP may differ amongst young people, aged 14 to 20 years, i.e. the typical age of onset of an ED (Killen et al., 1994; Stice, Killen, Hayward, & Taylor, 1998; Stice, Marti, & Rohde, 2013; Woodside & Garfinkel, 1992). In clinical samples, adolescents in ED inpatient treatment who engaged in CHSP have been found to be younger than those who did not CHSP (1).

The main aim of the current study was this to estimate the CHSP point-prevalence in a large adolescent sample and describe the demographic features, ED features, and HRQoL in young people who engage in CHSP. Based on the research findings above (Aouad et al., 2018), it was predicted that: 1) The point prevalence of CHSP in adolescents will be higher than the prevalence in adults. 2) The likelihood of reporting other ED symptoms is expected to be higher among adolescents who report CHSP than those who do not report CHSP. 3) The prevalence of CHSP i.e. expected to be higher in girls than in boys. 4) Adolescents with CHSP will be younger than

those who do not engage in CHSP behavior. 5) The mental and physical health related quality of life will be lower in those with CHSP compared to those without CHSP.

4.3 METHOD

4.3.1 Materials and Procedure

The EveryBODY (Trompeter et al., 2018) study, which commenced in 2017, is an Australian longitudinal research inquiry into eating and body image disturbances among adolescents. Data for this paper were drawn from the first wave of the study, with a final dataset of 5111 adolescents between the ages of 11 and 19 years ($M=14$ years, 11 months). Prior to obtaining the final dataset of 5111, 620 responses were excluded due to incomplete responses to questions.

Researchers initially approached principals and welfare staff of 50 secondary schools outside of Sydney, Australia and across the Newcastle and Hunter region of New South Wales, Australia. Of the 50 schools contacted, 18 schools (36%) initially agreed to take part in the study. Of these 18 schools, six withdrew their participation due to conflicting time commitments ($n=5$) and concerns regarding controversial topics such as gender identity and dating ($n=1$) prior to commencing the study. Other reasons for non-participation of schools included conflicting obligations and commitment to pre-existing research studies, time constraints, and insufficient staff numbers to oversee the administering of the study. To increase ethnic diversity among the sample, an additional seven Sydney-based schools were invited to participate: Two schools agreed to participate, with one withdrawing prior to the commencement of the study due to other commitments. Thus, a total of 13 schools participated in the research project. Independent (private) schools were slightly over-represented compared to the Australian general population (33.3% vs. 14.46%) compared to government (public) schools. Enrolment across all 13 participating schools ranged between 514 to 1305 students, with an average of 70% of enrolled students participating in the study. Socio-Economic Status (SES) was measured in participating schools using the Index of Community Socio-Educational Advantage (ICSEA). The ICSEA is a standardized ($M=1000$, $SD=100$) measure of educational advantage provided to schools and is based on parental education and occupation, location, and promotion of Indigenous (Aboriginal and Torres Strait Islander) enrolment numbers (Australian Bureau of Statistics, 2016a). Scores for participating schools ranged from 909 – 1129, with a

mean score of 1035 (SD=60.91), which is within 1SD of the standardized mean; with lower scores indicating a lower socio-economic status.

Human research ethics approval was obtained from Macquarie University's Human Research and Ethics Committee (HREC) and the NSW Department of Education. Unless stipulated by the school, all students were invited to participate in the study. Information letters to students and parents, as well as school-newsletter bulletin inserts, were distributed by participating schools prior to the study date. A passive parental consent procedure was used, where consent was assumed unless parents actively chose to have their children not take part in the survey.

Under the supervision of their respective teachers, students completed an online questionnaire on the day of testing. Only students with consenting parents who also provided their own assent for participating in the study were provided the survey. The questionnaire consisted of questions covering demographic features, eating behaviors and pathology, body weight and shape concerns, general physical health, psychological distress, quality of life (QoL), social media usage, bullying, gender characteristics, sexuality, and relationships. Pilot testing was conducted prior to the study to ascertain comprehension of questions and time-required (50-min typical class times) and to ensure fatigue was kept to a minimum.

4.3.2 Participants

Of the participants who commenced the survey ($N = 5191$), 80 were excluded: 79 were identified as non-serious responders with potentially unreliable data, and 1 participant withdrew consent. This left a total of 5111 participants in the current study sample. Of these, 2458 (48.1%) identified as female, 2154 (42.1%) as male, and 40 (0.8%) identified as other genders, 459 (9%) participants chose not to provide an answer. Regarding country of birth, 89.5% were born in Australia, 5.6% in Asia, 2.1% in Europe, 1.2% in the Oceania and Pacific region (not including Australia), 0.9% in Africa, 0.5% in North Africa, 0.1% in South America, and 0.1% did not specify their country of birth.

4.3.3 Measures

Chew and Spit (CHSP) Frequency

Chew and Spit (CHSP) frequency was assessed as part of the eating behaviors component of the questionnaire, which started with the stem: "...*Over the past 4 weeks*

(28 days), how many times have you... (give your best guess)". Participants were then presented with a range of behaviors, including "...spat out food before swallowing it?". Respondents were required to enter a numeric value, which was then categorized based on frequency: no CHSP; CHSP less than once per week (1-3 times in the 28 days prior to participation), CHSP at least once per week (4-7 times in the 28 days prior to participation), CHSP at least twice per week (8+ times in the 28 days prior to participation). There are no well validated measure of CHSP for use in large epidemiological surveys. The questions in this study were adapted from those asked in the larger adult survey which had demonstrated convergent validity with measures of mental health impairment and eating disorder symptoms.

Psychological Distress (K-10) and Health Related Quality of Life (HRQoL; PedsQL)

Psychological Distress – K-10: Psychological Distress, was measured using the Kessler Psychological Distress Scale (K-10) (Andrews & Slade, 2001; Kessler et al., 2002). This scale was selected due to the brevity of administration time, simplicity of questions asked, and the ability of the K-10 to discriminate between clinical and non-clinical cases of psychological distress (Kessler et al., 2002). Items used a 5-point Likert scale (ranging from 1. None of the Time to 5. All of the Time), and items were summed to provide a total score out of 50 – where higher scores indicate greater psychological affliction. Validation studies of the K-10 indicate that it has adequate validity and reliability (Cronbach's alpha (α) for current sample = 0.94) and has been widely used in epidemiological studies in adolescents (Smout, 2019).

Health Related Quality of Life (HRQoL) – PedsQL: Items from the Pediatric Quality of Life Inventory (PedsQL) were used to measure health-related quality of life (Varni, Seid, & Kurtin, 2001) across the domains of emotional, social, and physical functioning. The items centre around the physical cues and wellbeing that impact each of the examined factors (Varni et al., 2001). The PedsQL was used given the excellent internal consistency (Cronbach's α of 0.99), for the child-report, as well as being a well validated measure of HRQoL for this cohort (Varni et al., 2001). For the current study, participants completed items for the emotional, social and physical subscales. Cronbach's α for this study was 0.92.

Eating Pathology and Control Variables

In addition, data related to demographic features, eating behaviors and weight and shape concerns were also collected.

Weight/shape concerns and Eating Pathology (EDE-Q): Participants' weight/shape concerns were assessed using the combined weight and shape concerns subscales of the EDEQ (CG Fairburn, Z Cooper, & O'connor, 2008; J. Mond et al., 2014). These scales require participants to rate the severity and frequency of weight and shape concerns using a 7-point Likert scale (0=No days/Not at all to 6=Everyday/Markedly). The weight and shape concerns subscale has shown good reliability among Australian adolescents (Australian Bureau of Statistics, 2016b; Centers for Disease Control and Prevention, 2017; CG Fairburn et al., 2008; Fairburn & Beglin, 1994; J. Mond et al., 2014; J. M. Mond, Hay, Rodgers, Owner, & Beumont, 2004). In the current study, the measure had excellent internal reliability ($\alpha=0.96$). Objective binge eating, subjective binge eating, purging (emesis), laxative use, fasting for 8 or more hours, strict dieting and compulsive exercise were also measured with the respective EDE-Q items for these behaviors. The EDE-Q is a very well validated measure having been used extensively to study pathological eating (Aardoom, Dingemans, Op't Landt, & Van Furth, 2012; J. M. Mond et al., 2004).

Demographic variables: Age, SES, and migrant status (measured by "born in Australia" compared to "born overseas") were used as control variables. Postal area index scores were used as the proxy indicator for SES - an index of relative socio-economic advantage and disadvantage assigned to each postcode (equivalent to ZIP codes) by the Australian Bureau of Statistics (Australian Bureau of Statistics, 2016a). These indices are standardized ($M=1000$; $SD=100$), and provide an indirect measure of participants' socio-economic status, with higher scores indicating residence in more socio-economically advantaged areas (Australian Bureau of Statistics, 2016a; Trompeter et al., 2018).

4.3.4 Data Analysis

Frequencies were used to identify the point-prevalence of CHSP. Chi square analyses were used to determine the association between CHSP and other ED behaviors. Cut-off, or reference, scores for the presence of ED symptoms included: 0 for CHSP frequency: ≥ 4 for EDE-Q combined weight and shape subscales, and overeating, emesis (vomiting), laxatives, and fasting for ≥ 8 hours (other than sleep)

episodes; and ≥ 12 times in the past 28 days for strict dieting and exercise (Fairburn & Beglin, 1994; Trompeter et al., 2018). A chi-square analysis was also used to compare gender differences in CHSP. A one-way analysis of variance (ANOVA) was used to determine age differences in CHSP prevalence. Lastly, mixed effects linear regression models were used to compare psychological distress and HRQoL outcomes between CHSP (one or more *vs* none) as well as CHSP frequency groups (0 episode, 1-3 episodes, 4-7 episodes, 8+ episodes) while controlling for the effects of potential confounding due to other ED psychopathology and demographics (age, gender, SES and migrant status). Measures of other ED psychopathology included in the models were the EDE-Q combined weight/shape concerns subscales, overeating, objective binge eating, subjective binge eating, purging (emesis), laxative use, fasting for 8 or more hours, strict dieting and compulsive exercise. Multiple imputation (MI) (25 imputations) was used, as it is a highly reliable and valid method to address missing data in statistical analysis (Rubin, 1996). Further, the regression results were pooled using Rubin's rules (1987). A two-level linear mixed effects model was required to be used for each outcome variable as stated earlier, as it was found that there is clustering of participants within schools as evidenced by the following findings.

Estimated intraclass correlation coefficients (ICCs) were used to test effects of clustering by schools for each outcome variable. These were significantly different from zero, i.e. the likelihood ratio test was significant, when the outcomes were psychological distress (LR statistic=47.1, df=14 with $p<0.0001$), emotional HRQoL (LR statistic= 33.2, df=14 with $p<0.01$), social HRQoL (LR statistic=45.7, df=14 with $p<0.0001$), and physical HRQoL (LR statistic=32.2, df=14 with $p<0.01$), respectively. Moreover, there was no clustering of the four outcome variables within the participants as the likelihood ratio test for assessing clustering of these variables within the participants is non-significant (LR statistic=1.1, df=20444, $p=1.0$). Hence, separate analysis for each of the outcome in the current study, was considered preferable.

Furthermore, parametric testing of weighted data, using weights based on the 2016 Census gender data for 10-19 year-old adolescents in Australia (Australian Bureau of Statistics, 2016b), was used to compare the demographics of participants who reported CHSP in our survey to those of the 2016 adolescent census population. This ensured that if there was any oversampling of males or females in our survey, its effect was removed from the demographics of study participants which were reported

in this article. All data analyses were conducted with SPSS version 24 and SAS version 9.4 (SAS Institute, 2014).

4.4 RESULTS

4.4.1 Point Prevalence of CHSP

The point prevalence of at least one CHSP episode in the 28-days prior to the study, among the entire sample, was 12.2% (95% CI 0.114, 0.132] ($n_{\text{CHSP}}=627$; $n_{\text{No CHSP}}=4473$). Of these, 62.8% ($n=394$) reported engaging in the behavior at least once in the prior month, 19.9% ($n=125$) 4 to 7 times/month, and 17.2% ($n=104$) 8 or more times/month). Point-prevalence by CHSP frequency was noted at: 1-3 episodes of CHSP was 7.7% ($n=392$), 4-7 episodes was 2.5% ($n=125$), and 8 or more episodes of CHSP in the 28 days prior to participating in the study was 2.1% ($n=108$).

4.4.2 Occurrence of CHSP with Other ED Behaviours and Weight/Shape Concerns

Significant relationships between CHSP frequency and disordered eating behaviors (subjective binge eating, laxative abuse, vomiting and fasting) and weight/shape concerns were observed (Table 5). The association was negative for overeating, LOC with objective overeating, LOC with subjective overeating, and fasting. Weight/shape concerns, laxative abuse and vomiting had a significant positive relationship with CHSP frequency. CHSP frequency was not significantly associated with either strict dieting or exercise.

Behavior	CHSP Frequency											
	1-3 episodes				4-7 episodes [*]				8+ episodes [*]			
	χ^2	df	N	Frequency [^] (%)	χ^2	df	N	Frequency [^] (%)	χ^2	df	N	Frequency [^] (%)
<i>Overeating</i>	1.740	1	5111	73(1.43%)	37.46 [*]	1	5111	45 (0.88%)	46.42 [*]	1	5111	43 (0.84%)
<i>sLOC⁺(Objective</i>				58 (1.13%)				51 (1.00%)				41 (0.80%)
<i>Overeating)</i>	7.48 [*]	1	5111		123.25 [*]	1	5111		87.92 [*]	1	5111	
<i>sLOC⁺(Subjective</i>				87 (1.70%)				70 (1.37%)				64 (1.25%)
<i>Overeating)</i>	11.66 [*]	1	5111		153.32 [*]	1	5111		155.82 [*]	1	5111	
<i>Purging (Emesis)</i>	12.38 [*]	1	5111	25 (0.49%)	369.36 [*]	1	5111	42 (0.82%)	700.89 [*]	1	5111	52 (1.02%)
<i>Laxatives</i>	6.37 [*]	1	5111	15 (0.29%)	262.06 [*]	1	5111	28 (0.55%)	568.91 [*]	1	5111	37 (0.72%)
<i>Strict Dieting</i>	0.636	1	5111	22 (0.43%)	35.82 [*]	1	5111	20 (0.39%)	351.47 [*]	1	5111	46 (0.90%)
<i>Compulsive</i>				35 (0.68%)				25 (0.49%)				46 (0.90%)
<i>Exercise</i>	0.010	1	5111		20.47 [*]	1	5111		160.39 [*]	1	5111	
<i>Fasting >8hr</i>	20.47 [*]	1	5111	64 (1.25%)	179.79 [*]	1	5111	56 (1.10%)	215.27 [*]	1	5111	55 (1.08%)
<i>EDE-Q</i>				286(5.60%)				106(2.07%)				95 (1.86%)
<i>Combined</i>	17.88 [*]	1	5111		27.96 [*]	1	5111		32.52 [*]	1	5111	

Note: All associations for CHSP episodes with the listed behavior are examined in reference to the 0-episode category. Cut-offs for the presence of disordered eating symptomology included: 4 for EDE-Q combined weight and shape subscales, overeating, emesis (vomiting), laxatives, and fasting for 8 or more hours (other than sleep); 12 for strict dieting and exercise [15, 16]. ^{*}Significant to the $p<0.05$ level. [^]Frequency of respondents who CHSP and engaged in the listed behavior. ⁺Subjective Loss of Control (*sLOC*).

Table 5: 2x2 Chi-square test results for association between any CHSP in the 28 days prior to the study and other eating disorders

4.4.3 Gender Differences in CHSP

As indicated in Table 6, a significant relationship was found between gender and frequency level of CHSP.

4.4.4 Age Differences in CHSP

A one-way between subjects ANOVA was conducted to compare the effect of CHSP Frequency on age. There was a significant effect of age on CHSP at the $p < .001$ level for different CHSP frequency levels [$F(3, 20.36) = 8.35, p < 0.001$]. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the No CHSP ($M=14.95, SD = .58$) was significantly older than the individuals who engaged in 1-3 episodes of CHSP ($M=14.56, SD = 1.48$). Table 6 highlights the differences between CHSP frequency groups and age.

Gender	<i>CHSP Episode Frequency, n(%)</i>				<i>Statistic</i>		Post-hoc
	<i>No CHSP^a</i>	<i>1-3 episodes^b</i>	<i>4-7 episodes^c</i>	<i>8+ episodes^d</i>	χ^2 (df)	<i>p</i>	
<i>Male</i>	1866 (41.5)	143 (3.2)	31 (0.7)	38 (0.8)	33.798 (6)	<.001	Female>Males for ^{a,b,c,d} ; Females>other gender for ^{b,c,d}
<i>Female</i>	2019 (45)	212 (4.7)	84 (1.9)	63 (1.4)			
<i>Other</i>	27 (0.6)	4 (0.1)	2 (0.0)	2 (0.0)			
Age (years)	Mean (SD) [95% CI]				ANOVA F (df)		Post-hoc
	14.95 (1.58) [14.91-14.99]	14.56 (1.48) [14.42-14.71]	14.73 (1.36) [14.49-14.96]	15.08 (1.43) [14.77-15.33]	8.35 (3, 20.36)	<.001	

Table 6: Associations between CHSP frequency in the 28 days prior to the study, age, and gender in the sample (n=5111)

4.4.5 Psychological Distress and HRQoL

Mixed effects linear regression analyses were performed to investigate the impact of CHSP on wellbeing and functioning by examining both psychological distress and HRQoL among adolescents that CHSP versus adolescents who did not CHSP, based on their frequency of the behavior in the 28 days prior to the study. The results of the mixed effects linear regression models showed statistically significant differences between any CHSP and CHSP frequency groups when results for the dependent variables were considered separately. Participants who engaged in CHSP reported significantly higher levels of psychological distress (K-10) and lower HRQoL scores (PedsQL) compared to those who did not report any CHSP. There was a dose-response relationship between CHSP frequency and psychological distress and physical HRQoL. On the other hand, the levels of emotional and social HRQoL decreased with an increase in CHSP frequency but not in a linear fashion indicating a lack of dose-response relationship (as shown in Table 7).

Exposure variable	Dependent Variable							
	Psychological distress		HRQoL emotional		HRQoL social		HRQoL physical	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
CHSP (vs no) yes	2.394*	0.415	-5.886*	1.146	-4.562**	1.087	-2.036****	0.864
<u>Dose-response</u> CHSP frequency (vs none)								
1-3 episodes	2.008**	0.477	-5.750**	1.300	-3.225****	1.294	-1.455	1.030
4-7 episodes	3.311**	0.863	-8.593***	2.322	-9.335**	2.281	-2.578	1.826
8 or more episodes	4.950*	0.988	-7.092****	2.638	-9.146**	2.646	-6.080**	2.109

Note: The reference category is within parentheses; * indicates significant at $p < 0.0001$, ** significant at $p < 0.001$, *** significant at $p < 0.01$, **** significant at $p < 0.05$; all models are controlled for other EDs, namely, EDE-Q combined, overeating, LOC with objective overeating, LOC with subjective overeating, purging (emesis), laxatives, fasting for 8 or more hours, strict dieting, exercise and demographics, namely, age, SES and migration status.

Table 7: Results of mixed effects linear regressions for the effects of CHSP (yes vs no) and CHSP frequency categories on psychological distress, HRQoL emotional, HRQoL social and HRQoL physical

4.5 DISCUSSION

The present study found a moderate point-prevalence of 12% (based on self-report data) of any CHSP in an adolescent sample. The assumption that CHSP would have a point-prevalence greater than adults (0.4%, based on interview data) was thus met (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011) but the high point prevalence rate was beyond expectation. As expected, the prevalence of more frequently (4 or more episodes in the past 28 days) occurring CHSP was lower. Engaging in CHSP was associated with adverse outcomes, including greater psychological distress, a higher frequency of objective and subjective binge, self-induced vomiting, laxative misuse, strict dieting, compulsive exercise, and fasting. This supported the hypothesis that CHSP would occur concurrently with other eating disorder features. Moreover, the current study identified that weight and shape concerns were common across all three CHSP frequency groups (1-3 episodes, 4-7 episodes, and 8+ episodes), and was positively associated with increasing CHSP occurrence.

The expectation that CHSP would be more prevalent in females was supported. However, CHSP occurred in older adolescents, which when compared to the findings reported in our adult prevalence study (Aouad et al., 2018) and earlier systematic review (using an adolescent clinical sample) (Aouad et al., 2016), was not expected. This may be due to the younger sample used for the current study which had a wider age ranges (11-19 years old), compared to the narrower age range for studies identified in the systematic review (14 years of age vs. 16 years of age) (Aouad et al., 2016; Guarda et al., 2004; Song, Lee, & Jung, 2015).

Based on a similar prevalence study conducted in adults (Aouad et al., 2018), it may be concluded that most individuals, despite age and slight demographic variation, who engaged in CHSP also reported other concurrent ED symptoms. However, in the present study these associations were with shape and weight concerns and purging behaviors (vomiting/ laxative misuse) and not with overeating, or loss of control with overeating behaviors (Aouad et al., 2018). This differs from the finding in adults where CHSP occur mainly in women with higher psychological distress and concurrent ED symptoms, that included *Objective* and *Subjective Binge Eating* (OBE / SBE), and weight/shape overvaluation (Aouad et al., 2018). Moreover, both the current study,

and the prevalence study conducted in adults (Aouad et al., 2018), highlighted that those who CHSP reported poorer overall HRQoL than participants who did not CHSP or did so at a lower frequency.

The main strength of the current study was the statistical power from the large sample, giving confidence levels and reduced margin of error from the results obtained. Moreover, the methodological rigor of the study, and the well validated measures used, lent itself to the development of a repeatable study design, and as a result provided easier accessibility to the cohort for future follow-up longitudinal investigations. The findings of the current study may be generalizable to a wider adolescent sample, at least in Australia, as the schools sampled were for the most part representative (within 1SD of the standardized mean) of the population from which they were drawn. Nonetheless, the limitations of convenience sampling were still present and did not allow for a truly randomized selection of schools across the state of New South Wales, Australia. This may have introduced some level of sampling bias, which was controlled for during analyses, however may still have led to some systematic bias. Moreover, the question used to measure CHSP did not specify if this was done for body weight or shape control and therefore provided limited understanding as to the link between CHSP as a weight-control method. Further development of an instrument for assessing CHSP in epidemiology surveys is also needed.

The clinical significance of identifying associations with other behaviors (such as purging) and CHSP may provide insight into the treatment for CHSP, an otherwise under researched eating disordered behavior, and until the current study, one that was thought to not have been prevalent and consequently removed from the DSM-5 (American Psychiatric Association, 2013). The unexpected large point-prevalence rate of CHSP in an adolescent sample is cause for concern and warrants further investigation, predominately into future trends across several cohorts. Such a high prevalence rate is indicative of a disordered eating behavior that cannot be ignored. Without bring CHSP into clinical awareness, clinicians are unlikely to screen for the behavior. The easiest, and perhaps most practical way to do this, would be the reintroduction of CHSP as an ED behavior into diagnostic manuals, primarily the DSM. Additionally, including CHSP in screening tools, such as the EDE-Q and EAT-26, would prompt clinicians to further ask and monitor the behaviour in individuals being treated for eating pathology. Moreover. As the ramifications of the behavior are

still not well understood, future studies should also be considered to ascertain if there are adverse impacts (whether physiological, psychological, or social) to individuals who engage in CHSP behavior.

CHAPTER REFERENCES

- Aardoom, J. J., Dingemans, A. E., Op't Landt, M. C. S., & Van Furth, E. F. (2012). Norms and discriminative validity of the Eating Disorder Examination Questionnaire (EDE-Q). *Eating behaviors, 13*(4), 305-309. doi:10.1016/j.eatbeh.2012.09.002
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR (4th ed., text rev.)*. Washington, DC.: APA.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5 (5th ed.)*. Washington, DC.: APA.
- Andrews, G., & Slade, T. (2001). Interpreting scores on the Kessler psychological distress scale (K10). *Australian and New Zealand journal of public health, 25*(6), 494-497. doi:10.1111/j.1467-842X.2001.tb00310.x
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): a systematic review. *Journal of eating disorders, 4*(1), 23. doi:10.1186/s40337-016-0115-1
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2018). Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. *International Journal of Eating Disorders, 51*(8), 968-972. doi:10.1002/eat.22873
- Australian Bureau of Statistics. (2016a). Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia. Retrieved from <https://www.abs.gov.au/ausstats/abs@.nsf/mf/2033.0.55.001>
- Australian Bureau of Statistics. (2016b). Gender Indicators, August 2016, Australia. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/4125.0Glossary3August%202016>
- Centers for Disease Control and Prevention. (2017). About Teen & Child BMI. Retrieved from https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html
- CG Fairburn, Z Cooper, & O'connor, M. (2008). Eating disorder examination (Edition 16.0 D). *Cognitive behavior therapy and eating disorders, 265-308*.
- Dal Grande, E. (2017). Health Omnibus Survey (HOS). Population Research and Outcome Studies (PROS). Retrieved from <https://health.adelaide.edu.au/pros/data/hos/>
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders, 16*(4), 363-370. doi:10.1002/1098-108X(199412)16:4<363::AID-EAT2260160405>3.0.CO;2-%23
- Fear, J. L., Bulik, C. M., & Sullivan, P. F. (1996). The prevalence of disordered eating behaviours and attitudes in adolescent girls. *New Zealand Journal of Psychology.*

- Guarda, A. S., Coughlin, J. W., Cummings, M., Marinilli, A., Haug, N., Boucher, M., & Heinberg, L. J. (2004). Chewing and spitting in eating disorders and its relationship to binge eating. *Eating behaviors*, 5(3), 231-239. doi:10.1016/j.eatbeh.2004.01.001
- Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S.-L., . . . Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological medicine*, 32(6), 959-976. doi:10.1017/S0033291702006074
- Killen, J. D., Taylor, C. B., Hayward, C., Wilson, D. M., Haydel, K. F., Hammer, L. D., . . . Varady, A. (1994). Pursuit of thinness and onset of eating disorder symptoms in a community sample of adolescent girls: A three-year prospective analysis. *International Journal of Eating Disorders*, 16(3), 227-238. doi:Pursuit of thinness and onset of eating disorder symptoms in a community sample of adolescent girls: A three-year prospective analysis
- Mond, J., Hall, A., Bentley, C., Harrison, C., Gratwick-Sarll, K., & Lewis, V. (2014). Eating-disordered behavior in adolescent boys: Eating disorder examination questionnaire norms. *International Journal of Eating Disorders*, 47(4), 335-341. doi:10.1002/eat.22237
- Mond, J. M., Hay, P. J., Rodgers, B., Owner, C., & Beumont, P. (2004). Validity of the Eating Disorder Examination Questionnaire (EDE-Q) in screening for eating disorders in community samples. *Behaviour research and therapy*, 42(5), 551-567. doi:10.1016/S0005-7967(03)00161-X
- Reba-Harrelson, L., Von Holle, A., Hamer, R. M., Swann, R., Reyes, M. L., & Bulik, C. M. (2009). Patterns and prevalence of disordered eating and weight control behaviors in women ages 25–45. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 14(4), e190-e198. doi:10.1007/BF03325116
- Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys* (Vol. 81): John Wiley & Sons.
- Rubin, D. B. (1996). Multiple imputation after 18+ years. *Journal of the American statistical Association*, 91(434), 473-489. doi:10.1080/01621459.1996.10476908
- SAS Institute. (2014). *SAS version 9.4*. Cary, NC, USA: SAS Institute.
- Smout, M. F. (2019). The factor structure and predictive validity of the Kessler Psychological Distress Scale (K10) in children and adolescents. *Australian Psychologist*, 54(2), 102-113. doi:10.1111/ap.12376
- Solmi, F., Hatch, S. L., Hotopf, M., Treasure, J., & Micali, N. (2014). Prevalence and correlates of disordered eating in a general population sample: the South East London Community Health (SELCoH) study. *Social psychiatry and psychiatric epidemiology*, 49(8), 1335-1346. doi:10.1007/s00127-014-0822-3
- Song, Y. J., Lee, J.-H., & Jung, Y.-C. (2015). Chewing and spitting out food as a compensatory behavior in patients with eating disorders. *Comprehensive psychiatry*, 62, 147-151. doi:10.1016/j.comppsy.2015.07.010

- Stice, E., Killen, J. D., Hayward, C., & Taylor, C. B. (1998). Age of onset for binge eating and purging during late adolescence: a 4-year survival analysis. *Journal of abnormal psychology, 107*(4), 671.
- Stice, E., Marti, C. N., & Rohde, P. (2013). Prevalence, incidence, impairment, and course of the proposed DSM-5 eating disorder diagnoses in an 8-year prospective community study of young women. *Journal of abnormal psychology, 122*(2), 445. doi:10.1037/a0030679
- Swanson, S. A., Crow, S. J., Le Grange, D., Swendsen, J., & Merikangas, K. R. (2011). Prevalence and correlates of eating disorders in adolescents: Results from the national comorbidity survey replication adolescent supplement. *Archives of general psychiatry, 68*(7), 714-723. doi:10.1001/archgenpsychiatry.2011.22
- Trompeter, N., Bussey, K., Hay, P., Mond, J., Murray, S. B., Lonergan, A., . . . Mitchison, D. (2018). Fear of negative evaluation and weight/shape concerns among adolescents: the moderating effects of gender and weight status. *Journal of youth and adolescence, 47*(7), 1398-1408. doi:10.1007/s10964-018-0872-z
- Varni, J. W., Seid, M., & Kurtin, P. S. (2001). PedsQL™ 4.0: Reliability and validity of the Pediatric Quality of Life Inventory™ Version 4.0 Generic Core Scales in healthy and patient populations. *Medical care, 39*(8), 800-812.
- Woodside, D. B., & Garfinkel, P. E. (1992). Age of onset in eating disorders. *International Journal of Eating Disorders, 12*(1), 31-36. doi:10.1002/1098-108X(199207)12:1<31::AID-EAT2260120105>3.0.CO;2-S

Chapter 5: Phenomenological Analysis (Study 4)

This chapter is of works that is currently under peer-review for publication in an academic journal, and appears in its entirety. Text formatting was amended to maintain uniformness throughout the dissertation, however referencing and citation styles are those adhered to by journal to which this work was submitted.

Cited As: Aouad, P., Morad, A., Hay, P., Soh, N., Touyz, S. & Rhodes, P., (under peer review). Chew and Spit (CHSP): An Interpretative Phenomenological Analysis (IPA). *Eating Behaviors*

Chew and Spit (CHSP): An Interpretative Phenomenological Analysis (IPA)

Phillip Aouad

*School of Psychology, University of Sydney, Sydney, Australia
phillip.aouad@sydney.edu.au*

Arshia Morad

*School of Psychology, University of Sydney, Sydney, Australia
amor3918@uni.sydney.edu.au*

Phillipa Hay

*Translational Health Research Institute, School of Medicine, Western Sydney
University, Penrith, Australia
p.hay@westernsydney.edu.au*

Nerissa Soh

*Honorary Associate, Northern Clinical School, Faculty of Medicine and Health,
University of Sydney, Sydney, Australia
nerissa.soh@sydney.edu.au*

Stephen Touyz

*School of Psychology, University of Sydney, Sydney, Australia
stephen.touyz@sydney.edu.au*

Paul Rhodes

*School of Psychology, University of Sydney, Sydney, Australia
paul.rhodes@sydney.edu.au*

5.1 ABSTRACT

Chew and Spit (CHSP) is a prevalent disordered eating symptom and has been thought to be associated with a number of adverse effects. In the current study, eighteen participants (>90% female, aged between 18-51) took part in answering questions about their experiences, struggles, concerns, methods of coping, and personal meaning of CHSP and how it has impacted their lives. Data collection and analysis was conducted in accordance with Interpretative Phenomenological Analysis (IPA) methodology. Findings revealed seven primary themes of CHSP, which highlighted that CHSP may be: (1) associated with negative emotions - primarily shame; (2) exacerbated by stress and maybe a form to regain control; (3) temporarily provides pleasure; (4) a distraction or form of escapism; (5) a self-soothing or coping mechanism; (6) addictive, ritualistic, and similar to other eating disorders in that it can become part of an individual's self-identity; and (7) adversely impacting psychological, physiological, and social health. Some of the identified superordinate themes were in line with previous studies hypotheses, however overall the findings indicated that individuals who CHSP are often embroiled in what they may perceive as a struggle, with no specific, efficacious, approach to helping them control the behaviour. Future studies should focus on the treatment of CHSP, including treatment as a stand-alone disorder. Moreover, the perceived implications of engaging in CHSP should be examined more closely, with clinicians screening for the behaviour and carefully considering their approach when attempting to treat patients for CHSP.

Keywords: Chew and Spit; CHSP; Adolescents; Health Related Quality of Life; Oral Expulsion Syndrome; Eating Disorder, Anorexia, Bulimia, EDNOS, OSFED, Abnormal Eating, C/S, Chewing and Spitting, CaS.

5.2 SPECIAL ACKNOWLEDGEMENT

Before beginning, the researchers would like to wholeheartedly and sincerely thank all the wonderful people who participated in this study. We understand, appreciate, and respect that CHSP is a very personal matter to you. Moreover, we appreciate, respect, and admire your courage and choice to participate in the study, and for taking us on your journey. This paper was shaped by all your input, experiences, and history and without that, we would not be able to move the field forward and explore CHSP more closely. Once again, thank you.

5.3 INTRODUCTION

Chew and Spit (CHSP) has been identified as a symptom of disordered eating in several studies using eating disordered patients as the primary focus (Song, Lee, & Jung, 2009; Guarda, Coughlin, Cummings, Marinilli, Haug, Boucher, & Heinberg, 2004; De Zwaan, 1997; Durkin, Swanson, Crow, Mitchell, Peterson, & Crosby, 2014; Kovacs, Mahon, & Palmer, 2002; Makhzoumi, Guarda, Schreyer, Reinblatt, Redgrave & Coughlin, 2014). However, a recent study into CHSP in adults found the prevalence rate to be at 0.4% (Aouad, Hay, Soh, & Touyz, 2019). More concerning is CHSP among adolescents, with preliminary data indicating the prevalence rate to be >10% (Aouad, Hay, Soh, Touyz, & Mitchison, 2019). Data analyses in the aforementioned study are in the process of being finalised, with full results being made available for publication once complete.

Prior to the publication of the above findings on prevalence rates, CHSP was removed from the DSM-5 (American Psychiatric Association, 2013), in part possibly due to the lack of information and prevalence data on the topic at the time. However, the latest findings indicate that the behaviour is more prevalent than expected. Thus, clinicians need to be informed that CHSP is a symptom of disordered eating, or sometimes a 'stand-alone' issue, that needs to be screened for.

While clinicians may screen for CHSP, there may be disagreement as to how to treat CHSP behaviour given that it is poorly understood. In order to effectively understand and ultimately develop effective treatments for CHSP, it is important to gain insight into individual perspectives of the behaviour. As such, the foundational underpinnings of behaviour need to be highlighted to researchers and clinicians in order to understand the impacts of the behaviour and devise an effective approach to treat the behaviour.

Given the lack of knowledge concerning the CHSP, the current study aims to explore the phenomenon of the behaviour as it relates to the lived experience of individuals. Thus, through the use of Interpretative Phenomenological Analysis (IPA; Smith, Jarman, & Osborn, 1994; Smith, & Osborn, 2004), the current study aimed to explore the phenomenology of CHSP. From this it is hoped that insight is gained into how CHSP directly impacts individuals, the challenges individuals may face as a consequence of the behaviour, the burden individuals may associate with the

behaviour, the function CHSP may serves individuals, and the individuals' overall experiences of the behaviour.

5.4 METHOD

Interpretative Phenomenological Analysis (IPA), as a methodology, aims to explore how individuals experience particular events in their lives. It endeavours to understand the lived experience of individuals, make meaning of that lived experience, and finally make meaning of the meaning that was made (double hermeneutic) (Pietkiewicz & Smith, 2014; Larkin, Watts, & Clifton 2006). IPA is built on the premise that individuals are perpetually 'self-interpreting' their experiences, and is fundamentally based on phenomenological, idiographic, and hermeneutic principles (Pietkiewicz & Smith, 2014). Moreover, IPA is a process of eidetic reduction, where an attempt is made to break the phenomena down into its requisite parts, in order to identify what makes it unique as a whole. Based on these elements, IPA, therefore, becomes a dynamic exercise in examining the individual (idiographic) and making meaning of the 'self-interpretation' (double hermeneutic) of a particular experience (phenomenology), in this case, CHSP.

5.4.1 Purposive Sampling

As aforementioned, IPA attempts to comprehend the lived experiences and shared ideographic themes of behaviour often experienced by multiple individuals, using a small homogenous sample in order to deeply explore the nature of the phenomena of interest (Smith, Jarman, & Osborn, 1994; Smith, & Osborn, 2004). In the current study, eighteen participants across multiple countries were recruited through online, and print media, to share their perspective and experiences living with the eating disordered behaviour, Chew and Spit (CHSP). Participants were not required to be clinically diagnosed with an eating disorder, but were included only if they had engaged in CHSP on a consistent (at least once weekly) basis for a period of at least three months. Moreover, participants were able to participate in the study using Face-to-Face, Phone, Online, or Email methods, and with the semi-structured interview involving the same core questions for all eighteen participants.

5.4.2 Participants

Seventeen out of the 18 (94%) were female, with a median age of 29 years old ($M=30.5$; $SD=9.6$). Three participants were from Australia, six from the United States of America and Canada, two from the United Kingdom, and seven participants were from other parts of the world (primarily Latin America and Europe). The mean duration of having consistently engaged in CHSP was approximately 5 years. Participant reasoning for taking part in the current study centred predominantly around contributing to the research of CHSP, and for their own self-benefit (primarily in a hopes to understand CHSP more, feel less alone/isolated, and because they felt having an opportunity to discuss the topic was helpful). Other participant characteristics are detailed in Table 8 below, including their reasoning behind participating in the study, and their country of residence at the time of the study.

PID	Pseudonym*	Age*	Gender	Reason for Participating	Country*	Length of CHSP (years) [^]
1	A	28	Female	Self-Benefit	UK	14
2	B	26	Female	Self-Benefit	USA	5
3	C	43	Female	Self-Benefit	Italy	7
4	D	25	Female	Research Contribution	Withheld*	2
5	E	39	Female	Research Contribution & Self-Benefit & Encouraged	UK	3
7	F	18	Female	Research Contribution & Self-Benefit	Peru	5
8	G	18	Female	Encouraged	USA	3
9	H	32	Female	Research Contribution	Finland	9
10	I	51	Female	Research Contribution & Self-Benefit	Canada	6
11	J	29	Male	Research Contribution	Australia	4
12	K	46	Female	Self-Benefit	USA	5
13	L	27	Female	Self-Benefit	USA	11
14	M	23	Female	Research Contribution & Self-Benefit	Belgium	3
15	N	18	Female	Research Contribution	Withheld*	2
16	O	32	Female	Encouraged & Research Contribution	Columbia	1
17	P	29	Female	Research Contribution	Australia	9
18	Q	33	Female	Encouraged	USA	3
19	R	27	Female	Research Contribution & Self-Benefit	Australia	5

Note. Patient names removed, ages rounded to the closest whole number, and countries (not cities) have been unidentified for the purpose of maintaining anonymity. Some participants did not wish to have age or location disclosed. ^Participant six (6) withdrew from analysis. ^Estimates to nearest whole-year, derived from reported age, less being asked: "when did CHSP start for you?"*

Table 8: Participant Key Characteristics

5.4.3 Procedure

The interview was developed to broadly capture participants' experiences about eating pathology, attitudes, and past experiences that may have triggered their behaviour/s. The interviews then focused specifically on CHSP experiences, participant's attitudes toward themselves, CHSP, and their perception of the attitudes of others towards them; what CHSP means to them; the perceived negative and positive aspects and impacts of CHSP; their perception of CHSP as being an illness; how they cope, or coped with, CHSP on a daily basis; and finally their attitudes towards the future (both in terms of disordered eating and CHSP). A total of 25 questions were developed as an interview schedule (framework) to guide the discussion (See Appendix C: Phenomenological Interview Schedule) and were administered by the primary investigator (PA).

The guiding questions focused on how the individual perceives themselves and their experiences with eating disorders and CHSP, as well as how they perceive others perceptions of them, and how they navigate CHSP on a daily basis; what they believe are the effects of CHSP and what their perspective is on those impacts on different domains of their own (and those they are in contact with) lives (social, psychological, physiological); why they believe they engage in the behaviour; and how much of an impact they believe the behaviour has on their lives and if they see CHSP as an illness but still have positive future outlooks. The questions allowed the participants to provide their interpretation of their experiences but also provided an opportunity for researchers to examine the underlying discourse or narrative respondents may have been alluding to, without explicitly stating as such.

As the study utilised a semi-structured interview format, prompts were used to promote discussion, and follow-up questions were asked of participants where necessary. Where applicable (i.e when conducting interviews face-to-face, or via video or telephone calls) the interviews were recorded and transcribed in accordance with the institution's ethics committee approval. Six participants had phone or conference-call interviews, two had face-to-face, and 11 opted to answer questions by writing (email or online). The average time taken to complete the study was approximately 60 to 90 minutes. If more time was required, participants were offered (or reminded) to take a break before continuing, or a follow-up interview time was scheduled.

5.4.4 Analysis

As outlined by Smith and Osborn (2004), IPA procedures were used for all stages of data collection and analysis. The process of IPA critiques the emergent themes and the construction of meaning in a systematic and rigorous manner (Jeong & Othman, 2016; Smith, Flowers, & Larkin, 2009). Smith and Osborn (2004) initially developed three broad guiding sign-posts to IPA, which included “looking for themes in the first case”, “connecting the themes”, and “continuing the analysis with other cases”. However, Jeong and Othman (2016) took these guidelines further and developed a six-step approach to IPA, which involved: 1. Reading (and re-reading) transcribed interviews; 2. coding and making initial notes on the transcripts about potential themes, and commenting on them as being descriptive, linguistic, or conceptual in nature; 3. developing emergent themes centred around participant concepts in relation to their description and language used during the interview; 4. looking for connections between emergent themes to develop superordinate and subordinate theme hierarchies; 5. repeating the first four steps for other participants; and finally 6. looking for shared patterns across participants - by those stage super- and subordinate themes should become apparent and applicable to the majority of cases.

The approach taken by researchers of the current study was in line with Jeong and Othman’s (2016) approach. Responses provided were examined line-by-line by two researchers (PA & AM), with major themes being grouped into primary categories, and sub-themes nested within each higher-order theme. This process was repeated for all participants, cross-referencing with-in and between participant responses to confirm the accuracy of connections and themes. Several inter-rater checks were conducted throughout the coding process to ensure quality control, accuracy, and agreement between coders.

In order to ensure accuracy, and the generated theme was generalizable to a sizable proportion of participants, primary themes were considered appropriate if at least half of the participants indicated similar responses to the questions listed in the interview schedule (Smith, Jarman, & Osborn, 1999). Furthermore, member checking was undertaken, by way of summary, with four random participants who took part in the study, all of which agreed that the findings were accurate of their reporting.

Looking at the participants' experiences (themes) as either 'positive', 'negative', or 'neutral' based on the question that was asked (often revolving around how they feel about CHSP, why they may engage in it, and what it achieves and means to them) allowed for a broad overview and understanding of the perception that participants had towards CHSP, before more in-depth analysis was conducted. This approach is distinct from Ginev's (1998) "experience-near" and "experience-far" approach to double hermeneutics. The researchers of the current study utilised this approach as it was determined in-part, during analysis, that some participants may have had difficulty separating the phenomenon (CHSP) from their own identities. Researchers also felt that viewing participant responses to questions as either 'positive', 'negative' or 'neutral' would also help to 1. minimise the influence of researchers own biases, 2. build on other (empirical) research on the impacts of CHSP (that is, if the behaviour is causing harm, specifically - psychological harm); and 3. begin to examine an otherwise scantily explored phenomena, which needed to be examined from 'grassroots' stages.

5.5 RESULTS

Seven emergent themes were derived from the responses to this study regarding the phenomenology of CHSP. Each one is explored more deeply below.

1. Associated with negative emotions (primarily shame). CHSP was largely associated with feelings of shame at the behaviour. However, there also appeared to be feelings of disgust, feeling wasteful, and being misunderstood. Like with other eating disorders, such as BN, negative emotions may serve an important regulatory function in individuals who CHSP (Alpers, & Tuschen-Caffier, 2001; Frank, 2001; Burney, & Irwin, 2000). Participant responses suggest that negative feelings are abated or subsided while engaging in CHSP.

“By using this behaviour, I avoid really staying with my most uncomfortable feelings. These are loss, sorrow, shame, guilt and not wanting to live.” -- Participant: J

“I feel calmer when I’m doing it. I feel soothed and satiated. I feel like the world is quiet. My brain is quiet. I feel like I’m in complete privacy and nothing can enter that cocoon of sweet safety” -- Participant:: Q

“It is soothing. It actually makes my intrusive thoughts stop in the moment but then later on it makes it worse” -- Participant: B

However, upon reflecting on the behaviour, 'rational reasoning' creates a paradoxical paradigm for individuals where social norms come into effect and the 'taboo' nature of the behaviour is realised. The above being said, CHSP, especially in those that 'binge' CHSP, may have heightened stress or anxiety related to weight or shape concerns following a binge-type episode of CHSP, as is sometimes experienced by some individuals with BN (Serpell and Treasure, 2002).

“it gives me the sense of eating something pleasurable without the consequences and it’s a distraction. I do get a sense of relief when I start CHSP but I always feel bad afterwards.” --

Participant: E

“... I feel out of control, depressed, disgusted with myself after I CHSP” -- Participant: P

A systematic review of CHSP literature (Aouad, Hay, Soh, Touyz, 2016) highlighted that previous studies (Smith & Ross, 1989; De Zwaan, 1997; McCutcheon and Nolan, 1995) found CHSP was often associated with negative emotions, but may have been less distressing than bingeing and purging. Based on participant response, CHSP was specifically noted as being less distressing than bingeing and purging, with some participants indicating that they engage in the behaviour as a means to avoid bingeing and purging or as a type of perceived harm minimisation.

2. Exacerbated by stress and a form of control. Studies have highlighted that a predisposition to psychological stress is often noted in individuals with eating disorders (Bell & Lee, 2002). Participants in the current study indicated that while stress was not directly a trigger to spontaneously engage in CHSP, they believed stress had an impact in the gravitation toward CHSP behaviour.

“As indicated, I think I saw an opportunity to do it more, use an excuse, and because I was so out of control and blinded by the ED that I couldn't see anything wrong with it. I don't think there was one trigger as much as a 'natural' gravitation or transition to CHSP. Not being able to purge, I panicked and had to find another way to be able to 'binge' but not take on what I ate. Thinking about it, I don't know how or why i ended up there... In short, no there was no one trigger.” -- Participant: F

Notably, a majority of participants indicated that stress and anxiety are exacerbating factors to engaging in CHSP, especially if several periods of intense stress were experienced during the individual’s life. Further, as exemplified in the

response excerpt above and echoed by multiple other respondents, CHSP may be a method for individuals to overcome the ‘paradoxical paradigm’ outlined in the aforementioned first theme. In an attempt to resolve the internal ‘conflict’ between the ‘rational’ and eating disordered thinking, CHSP may be seen as a way to placate both internal desires. The below excerpts highlight that a compounding effect of stressful life-occurrences such as moving internationally or interstate (especially if moving alone), beginning high-stress degrees (such as medicine or PhDs), or traumatic events (several participants experienced multiple traumatic events) compounded and contributed to engaging in CHSP behaviour.

“... At this moment, there seems to be no point in stopping. I am really perfectionistic, I have been disappointed by so many people in the past (my boyfriend is the only one who was always there for me), so I just started to trust only myself. I worked so hard for my Master's, because that was only for me and I did not have to rely on anyone else. I am not able to control everything in my life, but I feel like I am/should be able to control my own accomplishments. So, I am really glad with my Master's and with my PhD, that I am currently doing. I should also be able to control my food, my weight and body shape (because that's also only on my, there is no one else that can ruin the relationship), and it frustrates me so much that I don't have it under control.” -- Participant: M

“Yes moving to a different country” -- Participant: O

“... CHSPing allowed me to go through that food before it spoiled. I was dieting at the time. I think diets cause eating disorders. I was going to have a large role in a play at a community theater and was uncomfortable with my size. I started dieting for this role and for something to do -- I was lonely and in a new city. I had just started my PhD. It was a very stressful and isolated time. I think the idea of accepting and rejecting 'good things' is something that is deep in my personality. I can't take something good for myself without feeling serious consequences. By both accepting and rejecting the food, I feel okay about having had it. Plus purging at the end minimizes the caloric consequences. (There are lots of health consequences to this obsv.) I also have diagnosed anxiety disorders, depression, bipolar II (though never treated for this), and PTSD from sexual assault.” -- Participant: R

R

The role of CHSP as a cathartic mechanism, and as a form of escapism, will be discussed in subsequent themes. Ross and Smith (1989) briefly drew attention to the idea that CHSP may be a stress response, but offer little to no explanation as to why this may be the case. The current study has progressed our understanding of CHSP behaviour and

identified potential reasons (i.e. escapism and catharsis) why CHSP may increase in response to stress in an individual's life.

3. Temporarily providing pleasure. The theme of CHSP temporarily providing pleasure without the associated guilt or consequence (weight gain) was very prevalent among participant responses.

“I do it [CHSP] to taste food and experience the chewing of food, without the guilt of actually eating it. It allows me to experience all the pleasure of food without worrying about putting on too much weight” – Participant: A

“The benefits for me is that I get to eat more “forbidden” foods with little weight gain. It relaxes me sometimes” -- Participant: I

The pleasure derived from CHSP was collectively related to being able to taste and experience 'forbidden' foods while maintaining weight. Deriving pleasure without consequence may be related to 'safety' as a type of perceived 'assurance' that weight gain would not result as a consequence of CHSP. However, participants did not mention long-term weight loss while using CHSP, instead focused their responses on weight maintenance and concerns over actually gaining weight while using CHSP. Studies (Palascha, van Kleef, & van Trijp, 2015; Oshio, 2015; Butow, Beumont, Touyz, 1993) focusing on dichotomous thinking in individuals with eating disorders outline the often 'black and white' or 'safe and unsafe' thinking held by most individuals with marked eating pathology. The need to avoid "unsafe" foods, while still deriving pleasure from them, was a primary goal for utilising CHSP as a weight control method. However, the consequences of CHSP are still unknown, with weight gain still hypothesised as an outcome of CHSP behaviour (Aouad et. al., 2016).

4. A distraction or a form of escapism from intrusive thoughts. CHSP appeared to act as a form of distraction from other intrusive thoughts or negative feelings. It was portrayed by responses as a form of escapism from reality when emotions were heightened, either through external stimuli or psychological distress.

“It gives me the sense of eating something pleasurable without the consequences and [it's] a distraction. I do get a sense of relief when I start CHSP but I always feel bad afterwards” -- Participant: E

“It's a distraction. It's relaxing...” --Participant: C

“The aim is to make me feel better. If I am bored, it gives me something to do. It definitely acts as a distraction when I am dealing with negative things. Also, it can be an excuse to stop doing mundane things like chores.” -- Participant: J

Turning one's attention to food may serve as a neutral (that is: non-overwhelming or safe) distraction and may be associated with feelings of comfort, safety, and requires low levels of cognitive processing. A particularly notable feature of eating disorders is an attentional bias toward food or food-related stimuli (Smeets, Roefs, van Furth, & Jansen, 2008), particularly in those with BN (Brooks, Prince, Stahl, Campbell, & Treasure, 2011). Thus, the reported use of CHSP as a distraction does not deviate from what was expected. While further testing on individuals who CHSP is needed in order to ascertain if attentional bias toward food is present, and could aid in determining if CHSP is related more to AN or BN symptomatology.

This suggests that participants are aware of the impacts of bingeing and purging, do not have a desire to self-harm, but are still unable to fully-control the impulsive nature of their eating disorder. Participant responses allude to the notion that although their drive-for-thinness and overvaluation of body weight/shape are high, they possess higher levels of insight and judgement that allows them to shift their behaviour to something they perceive is less harmful while meeting the ‘desires’ of their eating disorder.

5. A self-soothing or coping mechanism. Participants explained the act of CHSP as often being soothing, comforting, or helping them cope with feelings of negativity due to the repetitive nature of the behaviour.

“[CHSP] initially helped me manage my anxiety. I think of it like a grounding or self-soothing strategy” --Participant: Q

A cathartic, recurrent behaviour is often seen in other disorders such as Autism Spectrum Disorder (ASD) where an individual may use self-stimulatory behaviour (stimming) to calm themselves down during an overwhelming encounter or experience (Patterson, Smith, & Jelen, 2010).

“It is soothing. It actually makes my intrusive thoughts stop in the moment but then later on it makes it worse” --Participant: B

“[CHSP] allows me to ‘eat’ for a very long time, so I don’t feel compelled to think about the rest of my life. It’s like being in a parallel universe where the most important thing in the world is simply eating the food” --Participant: Q

The incidence of those with eating disorders and comorbid ASD has been identified by academics to be relatively high (Huke, Turk, Saeidi, Kent, & Morgan, 2013). Self-soothing and coping strategies manifesting as disordered eating symptomatology are well documented and may be propagated by traumatic events, or avoidance of particular emotions, thoughts, or memories (Goodsitt, 1993; Esplen, Garfinkel, & Gallop, 2000; Wonderlich, Crosby, Mitchell, Thompson, Redlin, Demuth, Smyth, & Haseltine, 2001). Functionally, CHSP would, therefore, serve as a type of self-stimulating behaviour (as seen in individuals with ASD), used to quieten the mind of an overwhelmed and emotional individual. Coupled with the behaviour being distracting, exacerbated by multiple stressors (and subsequently attempting to regain control), and temporarily providing pleasure, the link between ASD and CHSP may warrant further investigation.

6. Addictive, ritualistic, and similar to other eating disorders in that it can meld with one’s identity. A number of participants portrayed CHSP as being an addictive and ritualistic type behaviour. Some participants indicated they have consistently engaged in CHSP for over 10 years and are unable to stop.

“Throughout this whole period of getting treatment [for AN binge-purge type], my CHSP behaviours increased. I noticed that the more I tried to avoid purging, the more I relied on CHSP” -- Participant: A

“But when I started working and living by myself, it [CHSP] became an addiction. When I’m bored, or worried or upset, it gets worse” -- Participant: C

“I truly believe that I am addicted to CS in a way that people are addicted to using drugs” ... “I feel hopelessly addicted to doing it and I wish I had never started. I can’t imagine that I will ever quit doing this” --Participant: Q

There were also mentions of the behaviour developing rapidly and appeared to become ingrained as part of some individual’s identity or self-concept. As with other eating disorders (Schupak-Neuberg, & Nemeroff, 1993; Stein & Corte, 2007; Fox, & Diab, 2015), identifying CHSP as a behaviour that is very addictive and can become ingrained as part of one’s identity may aid clinicians in the approach taken in order to help support clients struggling with CHSP. Studies have likened some EDs or ED behaviours to

addictions (Goodman, 1990; Wilson, 1991) with the focus being on breaking/ interrupting the addiction (or ED) cycle. Previous studies (Aouad et al., 2016) had not specifically mentioned the addictive nature of CHSP (perhaps as it was not assessed), nor had the ability for CHSP to disrupt self-concept of an individual, although this has been seen in other EDs. Understanding CHSP at this level may provide insight into how the behaviour should be targeted through treatment, however, this requires further investigation. As mentioned, previous studies have made reference to EDs being addictive, ritualistic, and identity-consuming. CHSP being in line with these findings should therefore not come as a surprise.

7. Adversely impacting psychological, physiological, and social health. The majority of participants expressed concerns over the adverse impacts to their health as a result of CHSP. The predominant concerns identified by the participants were physical (especially teeth and menses), psychological (reliance/addictiveness of CHSP), financial, and social issues.

“Economic and psychological (guilt about wasting food)” -- Participant: B

“Physically, I always feel my body heavy, I feel tired all day long and it’s very hard for me to concentrate. My nights are horrible because the crises get stronger at that time and I sleep very badly. I have completely isolated myself from my friends because of my problem with food. I spend a lot of money and time on this, I can spend hours and hours chewing and spitting. I am tired of myself, so many times I feel that I want to give up, I cannot stand my mind and my behavior out of control anymore. I have no control of myself and I’m very ashamed of it.” -- Participant: D

“I feel dirty and isolated- I don't feel that I can relate to anyone else, as I feel that this disorder is quite unusual and not many people have heard of it or would understand. Also, after 14 years of CHSP my teeth are incredibly sensitive and I find it hard not to always want something to eat. I feel 'weird', and that my normality is odd.” -- Participant: A

“Social - because most times I would rather return home after work and CHSP, or I am comfortable to stay at home, most probably because of CHSP where as if I didn't do this I would probably be out more. Physically, I normally weigh around 4kg less than my current weight, but having returned from travelling I am back at my parents and not working so I CHSP more often. I believe this can cause weight gain. Before travelling when I was working in London I would CHSP less as I had to work (although I still did this in work also). Even though I know this can cause weight gain, I can't help but do this. Economically - I have spent a lot of money CHSP” --Participant: I

Understanding the implications of CHSP on various domains of an individual's life are crucial if research aims to understand the harm caused by the behaviour. More importantly, if clinicians and academics want to target treatments related to adverse CHSP outcomes, it is necessary that we understand what these outcomes are. From the provided responses it is clear that participants are able to identify the areas of their lives that CHSP has an impact. These findings are consistent with the findings and hypotheses detailed in a previous systematic review of CHSP (Aouad et al., 2016), where concerns over psychological, physiological, and social well-being were speculated, but data were not available to examine the ideas presented. Additional studies are required to further understand the negative impacts of CHSP on individuals' mental, physical, and social well-being

5.6 DISCUSSION

Overall, seven themes were identified relating to CHSP including: (1) association with negative emotions - primarily shame; (2) exacerbated by stress and maybe a form to regain control; (3) temporarily provides pleasure; (4) a distraction or form of escapism; (5) a self-soothing or coping mechanism; (6) addictive, ritualistic, and similar to other eating disorders in that it can become part of an individual's self-identity; and (7) adversely impacting psychological, physiological, and social health.

Unfortunately, due to the volume of information provided by participants for the current study, some omissions were necessary across some explored domains. This was in order to provide a clearer picture of the phenomenology of CHSP, as well as to distil aspects of the behaviour that were most applicable to a majority of participants.

It is clear from all participant responses that CHSP is a phenomenon that is insidious in nature and may increase in severity over time. Overall the picture being painted of CHSP is one that serves a function but is ultimately harmful or destructive to the individual, yet individuals feel addicted or trapped in a cycle. It acts as a safety behaviour to many but is associated with shame, guilt and negative emotions. It follows that this may be due to an internal conflict by individuals who CHSP feeling that the behaviour is addressing eating disordered motives while providing some semblance of control to the individual over their weight/shape.

Examining the extant literature on phenomenological similarities and differences between CHSP and other eating disorders, it would appear that CHSP draws on a combination of Anorexia Nervosa and Bulimia Nervosa phenomenological underpinnings. For example, while participants indicated that CHSP was a weight control method, the

fear of gaining weight (Ngai, Lee, & Lee, 2000) did not appear to be a dominant theme as with other eating disorders. However, shame (Sanftner, Barlow, Marschall, Tangney, 1995) did appear to be a dominant feature of CHSP phenomenology.

Further to this, CHSP appears, for the most part, to be exacerbated by stress, anxiety, and in turn seems to have become a form of control for many of the participants who took part in the current study. Further to this, CHSP serves as a distraction or a form of escapism from negative emotions and intrusive thoughts and may propagate into a maladaptive self-soothing or coping strategy. On this front, treatment may focus on educating individuals about utilising more adaptive coping mechanisms, and equipping them with strategies that can increase their distress tolerance and engaging in less destructive behaviour (Corstorphine, Mountford, Tomlinson, Waller, & Meyer, 2007; Wisner, & Telch, 1999; Brown et al., 2019)

Most participants displayed a high level of insight and judgement about CHSP and the potential harms and level of psychological distress experienced after CHSP. There appears to be an active choice to using CHSP (a seemingly ‘less harmful’) behaviour compared to bingeing-purging, which has been shown to negatively impact health. Future research may explore if this awareness could be utilised during treatment programs to help with overall disordered eating recovery. Further to this participants appeared to be aware of the areas of impact that CHSP has on their lives including physiological, social, psychological, and economic burdens, yet they still feel unable to control the behaviour. Similar to other addictions, individuals who engage in CHSP may be aware of the harms of their behaviour, but do not acknowledge the severity of the issue. Future studies may wish to explore the addictive nature of CHSP further and may begin by examining self-awareness in a CHSP sample, as well as ventromedial prefrontal cortex functioning (Moeller, & Goldstein, 2014).

Overall the current study highlighted that the focus on CHSP should be on developing effective treatments. This was highlighted by the majority of participants, who felt that CHSP was an illness, just like other eating disorders/disordered eating. At the very least the consensus of participants indicates that CHSP should be considered as a symptom of an eating disorder and subsequently something many require help in managing effectively. Participant’s responses indicated that there was a lot of cognitive dissonance surrounding CHSP, while the behaviour is soothing and they are able to draw some comfort from it, it is followed with negative feelings, uncertainty about the impacts the behaviour is truly having on their health.

The current study is not without its limitations, especially considering the broad limitations of IPA have been discussed at length in academic literature (Brocki, & Wearden, 2006; Tuffour, 2017). The data gathered are invaluable for understanding CHSP, but the sample of participants was predominantly female-focused. Male attitudes towards CHSP would be worth exploring further. Furthermore, while the recommended number of participants for IPA 6-8 individuals was obtained (18 usable responses were collected for the current study), the findings might not be transferable to other samples, due to the narrow demographic features of the current sample. To overcome this, future studies should focus on saturation of findings across diverse samples; and focus on triangulation of the CHSP phenomenon in at-risk subgroups (e.g. bariatric patients, ED/DE patients, and athletes).

In conclusion, the insights into CHSP presented in this paper inform academics and clinicians and may help with approaching CHSP in a manner that is conducive to the individual's treatment regime. The current study helps us understand the overarching "function" that CHSP serves; creates awareness to reduce stigma, physiological, and psychosocial distress by bringing it to the attention of academic research into disordered eating; and highlights that further study is needed to add depth to clinical, physiological, psychological, and socioeconomic understandings of CHSP.

CHAPTER REFERENCES

- Alpers, G. W., & Tuschen-Caffier, B. (2001). Negative feelings and the desire to eat in bulimia nervosa. *Eating Behaviors*, 2(4), 339-352.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5 (5th ed.)*: Washington, DC.
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): a systematic review. *Journal of Eating Disorders*, 4(1), 23.
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2018). Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. *International Journal of Eating Disorders*, 51(8), 968-972. doi: 10.1002/eat.22873
- Aouad, P., Hay, P., Soh, N., Touyz, S., & Mitchison, D. (2019). Chew and Spit (CHSP) in a Large Adolescent Sample: Prevalence, Impact on Health-Related Quality of Life, and Relation to Other Disordered Eating Features. At the *International Conference of Eating Disorders*. New York City: Academy of Eating Disorders.
- Ball, K., & Lee, C. (2002). Psychological stress, coping, and symptoms of disordered eating in a community sample of young Australian women. *International Journal of Eating Disorders*, 31(1), 71-81.
- Brocki, J. M., & Wearden, A. J. (2006). A critical evaluation of the use of interpretative phenomenological analysis (IPA) in health psychology. *Psychology and health*, 21(1), 87-108. 10.1080/14768320500230185
- Brooks, S., Prince, A., Stahl, D., Campbell, I. C., & Treasure, J. (2011). A systematic review and meta-analysis of cognitive bias to food stimuli in people with disordered eating behaviour. *Clinical psychology review*, 31(1), 37-51.
- Brown, T. A., Cusack, A., Anderson, L., Reilly, E. E., Berner, L. A., Wierenga, C. E., Lavender, J. M., & Kaye, W. H. (2019). Early Versus Later Improvements in Dialectical Behavior Therapy Skills Use and Treatment Outcome in Eating Disorders. *Cognitive Therapy and Research*, 43(4), 759-768.
- Burney, J., & Irwin, H. J. (2000). Shame and guilt in women with eating-disorder symptomatology. *Journal of Clinical Psychology*, 56(1), 51-61.
- Butow, P., Beumont, P., & Touyz, S. (1993). Cognitive processes in dieting disorders. *International Journal of Eating Disorders*, 14(3), 319-329.
- Corstorphine, E., Mountford, V., Tomlinson, S., Waller, G., & Meyer, C. (2007). Distress tolerance in the eating disorders. *Eating behaviors*, 8(1), 91-97.
- De Zwaan, M. (1997). Chewing and spitting out food in eating disorder. *International Journal of Psychiatry in Clinical Practice*, 1(1), 37-38.
- Durkin, N. E., Swanson, S. A., Crow, S. J., Mitchell, J., Peterson, C. B., & Crosby, R. (2014). Re-examination of chewing and spitting behavior: characteristics within and across eating disorder diagnoses. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 19(3), 315-320.

- Esplen, M. J., Garfinkel, P., & Gallop, R. (2000). Relationship between self-soothing, aloneness, and evocative memory in bulimia nervosa. *International Journal of Eating Disorders*, 27(1), 96-100.
- Frank, E. S. (1991). Shame and guilt in eating disorders. *American Journal of Orthopsychiatry*, 61(2), 303-306.
- Fox, J. R., & Diab, P. (2015). An exploration of the perceptions and experiences of living with chronic anorexia nervosa while an inpatient on an Eating Disorders Unit: An Interpretative Phenomenological Analysis (IPA) study. *Journal of health psychology*, 20(1), 27-36.
- Ginev, D. (1998). Rhetoric and double hermeneutics in the human sciences. *Human Studies*, 21(3), 259-271. doi: 10.1023/A:1005327608803
- Goodman, A. (1990). Addiction: definition and implications. *British Journal of Addiction*, 85(11), 1403-1408. doi: 10.1111/j.1360-0443.1990.tb01620.x
- Goodsitt, A. (1983). Self-regulatory disturbances in eating disorders. *International Journal of Eating Disorders*, 2(3), 51-60.
- Guarda, A. S., Coughlin, J. W., Cummings, M., Marinilli, A., Haug, N., Boucher, M., & Heinberg, L. J. (2004). Chewing and spitting in eating disorders and its relationship to binge eating. *Eating behaviors*, 5(3), 231-239.
- Huke, V., Turk, J., Saeidi, S., Kent, A., & Morgan, J. F. (2013). Autism spectrum disorders in eating disorder populations: a systematic review. *European Eating Disorders Review*, 21(5), 345-351.
- Jeong, H., & Othman, J. (2016). Using interpretative phenomenological analysis from a realist perspective. *The Qualitative Report*, 21(3), 558-570.
- Kovacs, D., Mahon, J., & Palmer, R. L. (2002). Chewing and spitting out food among eating-disordered patients. *International Journal of Eating Disorders*, 32(1), 112-115.
- Larkin, M., Watts, S., & Clifton, E. (2006). Giving voice and making sense in interpretative phenomenological analysis. *Qualitative research in psychology*, 3(2), 102-120. Retrieved from <https://nsuworks.nova.edu/tqr/vol21/iss3/9>
- Makhzoumi, S. H., Guarda, A. S., Schreyer, C. C., Reinblatt, S. P., Redgrave, G. W., & Coughlin, J. W. (2015). Chewing and spitting: A marker of psychopathology and behavioral severity in inpatients with an eating disorder. *Eating behaviors*, 17, 59-61.
- Moeller, S. J., & Goldstein, R. Z. (2014). Impaired self-awareness in human addiction: deficient attribution of personal relevance. *Trends in cognitive sciences*, 18(12), 635-641.
- McCutcheon, R., & Nolan, A. (1995). Chewing and spitting out food—a neglected symptom?. *International Journal of Eating Disorders*, 17(2), 197-200.

- Oshio, A. (2009). Development and validation of the dichotomous thinking inventory. *Social Behavior and Personality: An International Journal*, 37(6), 729-741.
- Palascha, A., van Kleef, E., & van Trijp, H. C. (2015). How does thinking in Black and White terms relate to eating behavior and weight regain?. *Journal of Health Psychology*, 20(5), 638-648.
- Patterson, S. Y., Smith, V., & Jelen, M. (2010). Behavioural intervention practices for stereotypic and repetitive behaviour in individuals with autism spectrum disorder: a systematic review. *Developmental Medicine & Child Neurology*, 52(4), 318-327.
- Pietkiewicz, I., & Smith, J. A. (2014). A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychological journal*, 20(1), 7-14.
- Schupak-Neuberg, E., & Nemeroff, C. J. (1993). Disturbances in identity and self-regulation in bulimia nervosa: Implications for a metaphorical perspective of "body as self". *International Journal of Eating Disorders*, 13(4), 335-347.
- Serpell, L., & Treasure, J. (2002). Bulimia nervosa: friend or foe? The pros and cons of bulimia nervosa. *International Journal of Eating Disorders*, 32(2), 164-170.
- Smeets, E., Roefs, A., van Furth, E., & Jansen, A. (2008). Attentional bias for body and food in eating disorders: Increased distraction, speeded detection, or both?. *Behaviour Research and Therapy*, 46(2), 229-238.
- Smith, J. A., Flowers, P., & Larkin, M. (2009). Interpretative phenomenological analysis: Theory, method and research. Sage.
- Smith, J. A., Jarman, M., & Osborn, M. (1999). Doing interpretative phenomenological analysis. *Qualitative health psychology: Theories and methods*, 218-240.
- Smith, J. A., & Osborn, M. (2004). Interpretative phenomenological analysis. *Doing social psychology research*, 229-254.
- Smith, G. R., & Ross, R. L. (1989). Chewing and spitting associated with a protein sparing modified fast and psychosocial stressors. *Psychosomatics: Journal of Consultation and Liaison Psychiatry*.
- Song, Y. J., Lee, J. H., & Jung, Y. C. (2015). Chewing and spitting out food as a compensatory behavior in patients with eating disorders. *Comprehensive psychiatry*, 62, 147-151.
- Stein, K. F., & Corte, C. (2007). Identity impairment and the eating disorders: Content and organization of the self-concept in women with anorexia nervosa and bulimia nervosa. European Eating Disorders Review: *The Professional Journal of the Eating Disorders Association*, 15(1), 58-69.
- Tuffour, I. (2017). A critical overview of interpretative phenomenological analysis: a contemporary qualitative research approach. *Journal of Healthcare Communications*, 2(4), 52. doi: 10.4172/2472-1654.100093

- Wilson, G. T. (1991). The addiction model of eating disorders: A critical analysis. *Advances in Behaviour Research and Therapy*, 13(1), 27-72. doi: 10.1016/0146-6402(91)90013-Z
- Wiser, S., & Telch, C. F. (1999). Dialectical behavior therapy for binge-eating disorder. *Journal of clinical psychology*, 55(6), 755-768.
- Wonderlich, S. A., Crosby, R. D., Mitchell, J. E., Thompson, K. M., Redlin, J., Demuth, G., Smyth, J., & Haseltine, B. (2001). Eating disturbance and sexual trauma in childhood and adulthood. *International Journal of Eating Disorders*, 30(4), 401-412.

Chapter 6: Discussion and Conclusions

This chapter presents a synthesis of the results found in each of the aforementioned studies on CHSP. It aims to critically analyse the implications of these findings in academic and clinical contexts, and suggests directions for future research. The results presented suggest that there is a need to further investigate CHSP not only the context of eating disorders, but to identify prevalence rates among other populations, determine the impacts and implications of the behaviour across multiple life domains, and give serious consideration to reinstating the behaviour into clinical diagnostic manuals. By gaining additional insight into CHSP, careful deliberation may be given to developing treatment approaches to help individuals who feel they are struggling with CHSP and who are seeking help with a distressing behaviour.

6.1 SUMMARY OF RESULTS AND SYNTHESIS

The results obtained across each of the four studies in this dissertation, highlight a clearly prevalent, but starkly under studied eating pathology, where more academic and clinical attention should be given to a problematic behaviour.

6.1.1 Systematic Review (Chapter 2)

As outlined in the systematic review, the main findings were identified in the literature on CHSP, including CHSP being a marker of ED severity, CHSP appearing in younger individuals, CHSP being associated with negative emotions (albeit less distressing than bingeing and purging), CHSP being associated with some subjective Loss of Control (LoC), CHSP being transdiagnostic, and CHSP being a sign of increased pathological eating. All of these findings were seen across both prevalence studies and phenomenological analysis, except for CHSP being a direct marker of ED illness severity (Guarda, 2009). Moreover, the use of a single measure of eating disorder severity is not always telling of the progression the illness has taken (Edler, Haedt, & Keel, 2007; Elder, Paris, Añez, & Grilo, 2008). Instead tools such as the Clinician Administered Staging Instrument for Anorexia Nervosa (CASIAN; Treasure, Stein, & Maguire, 2015; Maguire, Touyz, Surgenor, Crosby, Engel, Lacey, Heywood, & Le Grange, 2012) may be more useful in assessing the severity of illness.

However, as it stands no such measures exist for BN, EDNOS/OSFED and other types of eating disorders.

Moreover, the systematic review highlighted that there is a great dearth of knowledge surrounding CHSP. There were no community samples investigated, nor had studies examined the underlying function of CHSP behaviour. The systematic review highlighted various directions for future research and offered a comprehensive overview of what is known and unknown about the behaviour, and offered possible insight into why CHSP was removed from the current DSM, which may be due to paucity in current knowledge.

6.1.2 Adult Prevalence (Chapter 3)

After determining the paucity in research, a large community sample was examined to determine point-prevalence of CHSP behaviour. Results indicated a 0.4% point-prevalence rate (N=3047), and also highlighted that individuals who CHSP had lower MHRQoL and HRQoL scores. Further it was determined that CHSP was more present in females than males (as highlighted by the findings of the systematic review), and was associated with multiple ED features including: Grazing, Grazing with Subjective LoC, Body Overvaluation, Distress LoC and Objective Binge Eating, Excessive dieting and exercise, and Purging (all forms).

The age of those engaged in CHSP for the adult prevalence study (Aouad, Hay, Soh, & Touyz, 2018) was older than that reported in the systematic review (Aouad, Hay, Soh, & Touyz, 2016), and may have been influenced by younger aged participants in previous studies (Guarda, Coughlin, Cummings, Marinilli, Haug, Boucher, & Heinberg, 2004; Makhzoumi, Guarda, Schreyer, Reinblatt, Redgrave, & Coughlin, 2014). Nonetheless, ages from the adult prevalence study showed those that CHSP were still younger than the general population (Aouad et al., 2018) and was not unexpected as other studies had suggested this may be the case (Guarda et al., 2004; Makhzoumi et al., 2014). It was speculated that reports of CHSP may have been underreported by the general population, as older females may be less likely to admit to disordered eating behaviours, and subsequently seek treatment for such related issues (Aouad, et al., 2016; Guarda, et al., 2004; Song, Lee, & Jung, 2015). With the prevalence rate being similar to findings of other community sample studies, the findings of CHSP having a point 0.4% prevalence rate appears to be in line with other studies that suggest AN, BN, and EDNOS lifetime prevalence rates may range

anywhere between 0.2% to 3% for both men and women across several Western and European countries (Smink, Van Hoeken, & Hoek, 2012). The lifetime prevalence of CHSP may in fact be higher than the stated point-prevalence in the paper (Aouad et al., 2018).

Accuracy of such information relies on clinicians screening and reporting such cases, and may require prompting from diagnostic manuals. As was seen in the phenomenological study (Chapter 5) patients are also less likely to directly indicate CHSP as a problem, therefore skewing figures even further, although the issue could be considered prevalent among the population. Therefore it was appropriate to assess prevalence further, given that several groups were identified in the systematic review as potentially be at risk of CHSP. One particular group that this notion was extended to was adolescents.

6.1.3 Adolescent Prevalence (Chapter 4)

The difference in point-prevalence between adults who CHSP (0.4%) and adolescents who CHSP (12%; N=5191) was over thirty times greater in adolescents than adults. Moreover, those that CHSP had lower HRQoL scores; and greater propensity towards feelings of Loss of Control (LoC), laxative abuse, vomiting, weight/ shape concerns, and fasting for periods of 8hrs or more (in an aim to influence body weight/shape). Similar to the findings in an adult community sample, CHSP appeared to present more in females than males, and those that CHSP were marginally older than non-CHSP counter-parts. Findings indicated that CHSP may occur mainly in females with higher psychological distress and concurrent ED symptoms, such as Objective and Subjective Binge Eating (OBE / SBE), and weight/shape overvaluation, similar to the adult community sample (Aouad et al., 2018).

Adolescent prevalence was greater than expected and highlights the stark reality that CHSP is a prevalent eating disordered symptom among young people. The need to bring CHSP into clinical awareness is further evidenced by the associated disordered eating behaviours seen in individuals who CHSP, and the lowered HRQoL that is experienced by those who CHSP. Drawing from both the systematic review and adult sample, it was noted that CHSP may potentially be a precursor for other eating disorders. While CHSP, as a precursory indicator, was not directly tested in the study, a point-prevalence rate of CHSP in adolescents was obtained, and may allow for

researchers to follow-up and continue to track the trajectory of young individuals who CHSP in order to assess the most appropriate time for intervention.

6.1.4 Interpretative Phenomenological Analysis (Chapter 5)

From the phenomenological study, it was found that CHSP is associated with negative emotions, which was noted in the systematic review (Guarda et al., 2004; Aouad et al., 2016). However, the findings of the phenomenological analysis expanded on this knowledge and found that the negative emotions experience by individuals who CHSP were primarily related to shame. Moreover, it was found that CHSP is exacerbated by stress; temporarily provides pleasure; acts as a distraction or a form of escapism; is a self-soothing or coping mechanism; is addictive, ritualistic, and similar to other eating disorders in that it can become part of an individual's self-identity; and is believed to adversely impact psychological, physiological, and social health and well-being.

The impacts of eating disorders such as Bulimia Nervosa, Binge Eating Disorder, and Anorexia Nervosa has been well documented and are known to impact a variety of domains in an individual's life. Impacted areas may include physiological (such as oral, endocrine, reproductive, neurological functioning), psychological (including cognition), and social impacts (Marjorie, Kaplan, & Vaughn, 2001; Katzman, & Zipursky, 1997; Agh, Kovács, Supina, Pawaskar, Herman, Vokó, & Sheehan, 2016; Fonville, Giampietro, Williams, Simmons, & Tchanturia, 2014; Drownowski, Kurth, & Krahn, 1994). The addictive and ritualistic nature of CHSP, along with participants reported experiences of the disorder becoming part of their identity is not unheard of for other eating disorders (Schupak-Neuberg, & Nemeroff, 1993; Stein & Corte, 2007; Fox, & Diab, 2015). Moreover, the psychological distress experienced and the soothing mechanisms of CHSP allow the behaviour to take root as a habit, which offers psychological comfort but also brings about distress.

Synthesis

Although associated with lower quality of life and other pathological eating behaviours in both adults and adolescents, the finding that prevalence rates of CHSP were higher in adolescents than expected was perhaps most notable. Furthermore, although the phenomenological analysis was conducted in adults, the findings therein may be applicable to adolescents who may use CHSP as a maladaptive coping strategy

in dealing with negative emotions and biopsychosocial changes associated with their development. These several key findings add evidence to the proposition that further investigation should be conducted in to CHSP and serious consideration given to its inclusion in future revisions of diagnostic manuals, particularly future revisions of the DSM.

Overall, the findings of the studies presented, indicate that current knowledge on CHSP as a behaviour is still in its infancy, and that clinical understanding of CHSP needs additional data to build on the existing and presented knowledge. Additionally, the findings highlight a need to investigate CHSP further and examine other implications, treatment options, and support services that may be beneficial for individuals who engage in CHSP behaviour. There is a need to create public, clinical, and academic awareness of CHSP. By bringing CHSP back to social and medical awareness, doctors, psychologists, psychiatrists, and other clinicians may be better equipped to support patients requiring help with CHSP.

6.2 STRENGTHS AND LIMITATIONS

The strength of the empirical studies reported in this thesis come from their large sample sizes. Moreover, the rigour of the methodologies of each of the studies enabled quality data collection and comprehensive analysis to occur. The robustness of the study designs lent themselves to demonstrate the need and importance to study CHSP behaviour.

However, the studies presented are not without their limitations. Overall the studies presented did not capture the treating clinician's perspectives of individuals who engage in CHSP. By capturing clinical attitudes toward CHSP, education resources may be made available to help practitioners see the importance of taking admissions of CHSP more seriously; as well as possible courses of actions that may be considered to support the patient. Nonetheless, clinicians and academics have yet to determine how to treat CHSP as limited findings from the presented systematic review provided a narrow entry point for further building knowledge and understanding CHSP more holistically. The results indicated an underrepresentation of males, especially in the phenomenological study. However this may be due the incidence of CHSP (similar to other EDs) being lower in males than in females. The incidence of CHSP in males may require further exploration in order to gain additional

perspectives on CHSP and its phenomenology. Moreover, the inability to use inferential statistics in the adult community sample (Aouad et. al., 2018) limited generalisability of the findings and did lead to potential sources of type-II errors which were circumvented through the use of more robust, but less conservative, non-parametric tests.

Other at risk groups for eating disorders should have the prevalence of CHSP examined, including bariatric patients (Aouad et al., 2016), LGBTQI+ communities (Siconolfi, Halkitis, Allomong, & Burton, 2009; Hospers, & Jansen, 2005), and individuals with various biopsychosocial factors that may leave them at risk of developing disordered eating (Fairburn, Doll, Welch, Hay, Davies, & O'Connor, 1998; Striegel-Moore, & Bulik, 2007).

6.3 CLINICAL IMPLICATIONS, AND RECOMMENDATIONS

The results can impact clinical practice by informing clinicians of the prevalence of CHSP. Given that there is prevalence of CHSP in both adults and adolescents, it is worthwhile for clinicians to keep in mind this eating disorder feature when treating patients with feeding or eating difficulties. Clinicians may find it beneficial to screen specifically for CHSP behaviour in those presenting with eating pathology. It can be seen that the pattern of individuals who CHSP will not readily come forward and present this as a problem and may require prompting. This aversion to admitting to CHSP may be a type of safety behaviour. Therefore, clinicians should actively ask patients about CHSP behaviour. Consideration to include CHSP in screening tools (e.g. EDE-Q or EAT-26) may help prompt clinicians to specifically ask about the presence of CHSP. Having the behaviours listed back into the DSM means that clinicians can make reference to a known symptom in order to work collaboratively and provide holistic care for the patient.

As CHSP appears to be an addictive behaviour, clinicians may adopt an approach that works on breaking the maladaptive habit. Examining CHSP in the context of other behaviours, specifically disordered eating behaviours, offers assistance to the patient and allows them the opportunity to discuss and express their thoughts, emotions, and concerns not only about the behaviour, but also about the underlying issues that lead to CHSP.

Teaching patients more adaptive coping strategies for dealing with intrusive thoughts and negative emotions may help alleviate CHSP behaviour. The findings presented in this dissertation indicate that CHSP may be a self-soothing coping strategy, a form of escapism, or a distraction from events occurring in the individual's life. Moreover, given that mental and health related quality of life may be lower in individuals that CHSP, clinicians may find it beneficial to focus on quality of life improvement and shifting attention to healthier alternatives that improve quality of life

6.4 FUTURE DIRECTIONS OF RESEARCH

Future research should explore CHSP more closely by tracking population trends, sampling other groups from other countries, investigate the phenomenon in 'at risk' groups, and further examine the nuances of the behaviour across more people. Specifically, at-risk groups identified in the aforementioned studies (bariatric patients, athletes, males, and LGBTQI+ identifying individuals) should be studied in order to establish prevalence rates in these samples, and to triangulate the function served by CHSP behaviour, in other groups.

For example, bariatric patients may use CHSP to 'taste' food while adhering to their medically-necessary meal plans or eating requirements (Mitchell & De Zwaan, 2012; Mitchell & Zwaan, 2005; Still, Sarwer, & Blankenship, 2014). This may be most used by Roux-en-Y Bypass (RNY) patients who are unable to tolerate high amounts of sugar or fat, leading to dumping syndrome, where the contents of the stomach gets 'dumped' into the small intestine without having time to properly digest in the stomach, causing discomfort and adverse effects (Brethauer, Schauer, & Schirmer, 2015; Johns Hopkins Medicine, 2015; Mitchell & de Zwaan, 2007). Many bariatric patients (post-op) and candidates (pre-op), are said to suffer from ED symptoms, with the belief that many instances of bulimia and binge eating disorder are especially significantly under reported and undiagnosed during the patient screening process. One of the primary ED symptoms noted post-op is CHSP (Conceição et al., 2013).

Further to this, attention should be given to effective clinical treatments for CHSP that support the patient to overcome a distressing behaviour. There still remains a lack of consensus in the academic community if CHSP is considered (and thus treated) as a restrictive or compensatory behaviour (Aouad et al., 2016). However, given that the behaviour has been identified by many as addictive, means that future

research into potential therapies may benefit from examining elements of addiction treatment (similar to Bulimia Nervosa) in order to break the CHSP cycle and restore normal functioning (Wilson, 1991; Davis, & Claridge, 1998).

The studies in this dissertation offer a starting point for understanding CHSP and its clinical implications. Future research should focus on where CHSP as a behaviour may fit along the eating disorder spectrum, as well as investigate treatment options and the addictive properties of CHSP and how to bring relief to those feeling ‘trapped’ by the behaviour.

6.5 CONCLUSIONS

Reinstating CHSP into the DSM may help bring it to the forefront of clinical and academic consideration, in order to help individuals who are suffering the inadvertent consequences of a behaviour they are unable to control. However, it should be clarified that reinstating CHSP into the DSM should not aim to sequester, or categorise, the behaviour into either AN or BN categories, nor does it warrant (in its infancy) a category of its own. Instead, it is worth empirically investigating CHSP further, and consideration given for CHSP to be reinstated into the DSM as a subcategory of OSFED or UFED. Once additional research is able to establish etiology, epidemiology, or course of treatment, then the aforementioned recommendation put forward can be reassessed. Nonetheless, the point that there is not enough data on CHSP, and that the prevalence is so high, gives rise to the deliberation that further research into the behaviour is needed. Until more is known about CHSP behaviour, it is recommended that when examining a patient, it is important to determine if CHSP is co-occurring with other eating disordered features, or if CHSP is presenting as the primary symptom. CHSP is not an issue which should be ignored in favour of more ‘traditional’ understandings of eating pathology. Instead, it should be explored in the context of other feeding and eating issues to determine the best clinical approach to a behaviour that is clearly affecting many young individuals.

CHAPTER REFERENCES

- Agh, T., Kovács, G., Supina, D., Pawaskar, M., Herman, B. K., Vokó, Z., & Sheehan, D. V. (2016). A systematic review of the health-related quality of life and economic burdens of anorexia nervosa, bulimia nervosa, and binge eating disorder. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 21(3), 353-364. doi: 10.1007/s40519-016-0264-x
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5 (5th ed.)*: Washington, DC.
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2016). Chew and Spit (CHSP): a systematic review. *Journal of Eating Disorders*, 4(1), 23. doi: 10.1186/s40337-016-0115-1
- Aouad, P., Hay, P., Soh, N., & Touyz, S. (2018). Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. *International Journal of Eating Disorders*, 51(8), 968-972. doi: 10.1002/eat.22873
- Brethauer, S. A., Schauer, P. R., & Schirmer, B. D. (Eds.). (2015). Minimally invasive bariatric surgery (pp. 232-244). Springer New York.
- Conceição, E., Orcutt, M., Mitchell, J., Engel, S., LaHaise, K., Jorgensen, M., Woodbury, K., Hass, N., Garcia, L., Wonderlich, S. (2013). Characterization of Eating Disorders After Bariatric Surgery: A Case Series Study. *The International journal of eating disorders*, 46(3), 274-279. doi: 10.1002/eat.22074
- Davis, C., & Claridge, G. (1998). The eating disorders as addiction: a psychobiological perspective. *Addictive behaviors*, 23(4), 463-475. doi: 10.1016/S0306-4603(98)00009-4
- Drewnowski, A., Kurth, C. L., & Krahn, D. D. (1994). Body weight and dieting in adolescence: impact of socioeconomic status. *International Journal of Eating Disorders*, 16(1), 61-65. doi: 10.1002/1098-108X(199407)16:1<61::AID-EAT2260160106>3.0.CO;2-R
- Edler, C., Haedt, A. A., & Keel, P. K. (2007). The use of multiple purging methods as an indicator of eating disorder severity. *International Journal of Eating Disorders*, 40(6), 515-520. doi: 10.1002/eat.20416
- Elder, K. A., Paris Jr, M., Añez, L. M., & Grilo, C. M. (2008). Loss of control over eating is associated with eating disorder psychopathology in a community sample of Latinas. *Eating behaviors*, 9(4), 501-503. doi: 10.1016/j.eatbeh.2008.04.003
- Fairburn, C. G., Doll, H. A., Welch, S. L., Hay, P. J., Davies, B. A., & O'Connor, M. E. (1998). Risk factors for binge eating disorder: a community-based, case-control study. *Archives of general psychiatry*, 55(5), 425-432. doi: 10.1001/archpsyc.55.5.425
- Fonville, L., Giampietro, V., Williams, S. C. R., Simmons, A., & Tchanturia, K. (2014). Alterations in brain structure in adults with anorexia nervosa and the impact of illness duration. *Psychological medicine*, 44(9), 1965-1975. doi: 10.1017/S0033291713002389

- Fox, J. R., & Diab, P. (2015). An exploration of the perceptions and experiences of living with chronic anorexia nervosa while an inpatient on an Eating Disorders Unit: An Interpretative Phenomenological Analysis (IPA) study. *Journal of health psychology, 20*(1), 27-36. doi: 10.1177/1359105313497526
- Guarda, A. S., Coughlin, J. W., Cummings, M., Marinilli, A., Haug, N., Boucher, M., & Heinberg, L. J. (2004). Chewing and spitting in eating disorders and its relationship to binge eating. *Eating Behaviours, 5*(3), 231-239. doi: 10.1016/j.eatbeh.2004.01.001.
- Hospers, H. J., & Jansen, A. (2005). Why homosexuality is a risk factor for eating disorders in males. *Journal of social and clinical psychology, 24*(8), 1188-1201. doi: 10.1521/jscp.2005.24.8.1188
- Katzman, D. K., & Zipursky, R. B. (1997). Adolescents with anorexia nervosa: the impact of the disorder on bones and brains. *Annals of the New York Academy of Sciences, 817*(1), 127-137. doi: 10.1111/j.1749-6632.1997.tb48202.x
- Johns Hopkins Medicine. (2014). Bariatric Surgery and Eating Disorders. BrainWise, Hopkins BrainWise - Winter 2015, 3.
- Ngai, E. S., Lee, S., & Lee, A. M. (2000). The variability of phenomenology in anorexia nervosa. *Acta Psychiatrica Scandinavica, 102*(4), 314-317. doi: 10.1034/j.1600-0447.2000.102004314.x
- Marjorie, E., Kaplan, S., & Vaughn, I. (2001). Impact of anorexia, bulimia and obesity on the gynecologic health of adolescents. *American Family Physician, 64*(3), 445-451. Retrieved from: <https://pdfs.semanticscholar.org/1588/1a05418398677da8d3ee42a0ac529462d9b9.pdf>
- Maguire, S., Touyz, S., Surgenor, L., Crosby, R. D., Engel, S. G., Lacey, H., Heywood, S., & Le Grange, D. (2012). The clinician administered staging instrument for anorexia nervosa: development and psychometric properties. *International Journal of Eating Disorders, 45*(3), 390-399. doi: 10.1002/eat.20951
- Makhzoumi, S. H., Guarda, A. S., Schreyer, C. C., Reinblatt, S. P., Redgrave, G. W., & Coughlin, J. W. (2014). Chewing and spitting: A marker of psychopathology and behavioural severity in inpatients with an eating disorder. *Eating Behaviors, 17*, 59-61. doi: 10.1016/j.eatbeh.2014.12.012
- Mitchell, J. E., & Zwaan, M. D. (2005). *Bariatric Surgery: A Guide for Mental Health Professionals*: Routledge.
- Mitchell, J. E., & de Zwaan, M. (2007). *Bariatric Surgery: A Guide for Mental Health Professionals*: Taylor & Francis.
- Mitchell, J. E., & De Zwaan, M. (2012). *Psychosocial assessment and treatment of bariatric surgery patients*: Taylor & Francis
- Sanftner, J. L., Barlow, D. H., Marschall, D. E., & Tangney, J. P. (1995). The relation of shame and guilt to eating disorder symptomatology. *Journal of Social and Clinical Psychology, 14*(4), 315-324. doi: 10.1521/jscp.1995.14.4.315

- Schupak-Neuberg, E., & Nemeroff, C. J. (1993). Disturbances in identity and self-regulation in bulimia nervosa: Implications for a metaphorical perspective of "body as self". *International Journal of Eating Disorders*, *13*(4), 335-347. Doi: 10.1002/1098-108X(199305)13:4<335::AID-EAT2260130402>3.0.CO;2-M
- Siconolfi, D., Halkitis, P. N., Allomong, T. W., & Burton, C. L. (2009). Body dissatisfaction and eating disorders in a sample of gay and bisexual men. *International Journal of Men's Health*, *8*(3), 254. doi: 10.3149/jmh.0803.254
- Smink, F. R., Van Hoeken, D., & Hoek, H. W. (2012). Epidemiology of eating disorders: incidence, prevalence and mortality rates. *Current psychiatry reports*, *14*(4), 406-414. doi: 10.1007/s11920-012-0282-y
- Song, Y. J., Lee, J. H., & Jung, Y. C. (2015). Chewing and spitting out food as a compensatory behavior in patients with eating disorders. *Comprehensive Psychiatry*, *62*, 147-151. doi: 10.1016/j.comppsy.2015.07.010
- Stein, K. F., & Corte, C. (2007). Identity impairment and the eating disorders: Content and organization of the self-concept in women with anorexia nervosa and bulimia nervosa. *European Eating Disorders Review: The Professional Journal of the Eating Disorders Association*, *15*(1), 58-69. doi: 10.1002/erv.726
- Still, C. D., Sarwer, D. B., & Blankenship, J. (2014). *The ASMBS Textbook of Bariatric Surgery: Volume 2: Integrated Health*: Springer New York.
- Striegel-Moore, R. H., & Bulik, C. M. (2007). Risk factors for eating disorders. *American psychologist*, *62*(3), 181. doi: 10.1037/0003-066X.62.3.181
- Treasure, J., Stein, D., & Maguire, S. (2015). Has the time come for a staging model to map the course of eating disorders from high risk to severe enduring illness? An examination of the evidence. *Early intervention in psychiatry*, *9*(3), 173-184. doi: 10.1111/eip.12170
- Wilson, G. T. (1991). The addiction model of eating disorders: A critical analysis. *Advances in Behaviour Research and Therapy*, *13*(1), 27-72. doi: 10.1016/0146-6402(91)90013-Z

Appendices

Appendix A

Error and Speechley (2009) Quality Index Scores for included studies in systematic review

	Reporting							External Validity			Internal Validity (Bias and Confounding)				Power	TOTALS
	Hypothesis or Objectives Described	Main Outcomes Described in Introduction or Methods sections	Patient Characteristics Described	Main Findings Described	Estimates of the Random Variability	Probability Values Reported	Response Rate Described	Patients Asked to Participate Representative of Population	Patients Prepared to Participate Representative of Population	Staff, Places, and Facilities Representative of Treatment Majority	‘‘Data Dredging’’ Made Clear	Statistical Tests Appropriate	Outcome Measures Valid and Reliable	Adjustment for Confounding	Sample Size or Power Calculation	
Song et al. [34]	1	1	1	1	0	1	0	0	1	0	1	1	1	0	0	9
Guarda et al. [13]	1	1	1	1	0	1	0	0	1	0	1	1	1	0	0	9
De Zwaan [37]	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
McCutcheon & Nolan [39]	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
Makhzoumi et al. [36]	1	1	1	1	1	1	0	1	0	0	1	1	1	0	0	10
Kovacs et al. [38]	1	1	1	0	0	1	0	1	1	0	1	1	1	0	0	9
Durkin et al. [35]	1	1	1	1	1	1	0	1	0	0	1	1	1	0	0	10
Mitchell et al. [1]	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	4
Smith and Ross [33]	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2

Table 9: Ferrer and Speechley (2009) Quality Index Scores for included studies in systematic review

Appendix B

Questions Included in the Health Omnibus Survey (HOS) 2016 to assess eating behaviour

Weight Control

G1: Over the past three months how often have you overeaten?

G2 (only asked if 1G response was >0): Is the binge or overeating you experience usually associated with distress?

G3: Over the past 3 months have you felt your eating was out of control when others might not agree the amount of food was usually large (e.g. 2-3 pieces of bread)?

G4: Is this smaller overeating you experience usually associated with distress?

Weight Control Methods

G5: Over the past three months have you regularly used, that is at least once a week, any of the following: laxatives, diuretics (water tablets), made yourself sick, in order to control your shape or weight?

G6: Over the past three months have you regularly done any of the following: gone on a very strict diet, or eaten hardly anything at all for a time, in order to control your shape or weight?

G7: On a scale of 0-6, where 0 is 'not at all important' and 6 is 'extremely or the most important issue'. How important an issue has your weight and/or your shape been to how you think about (judge or view) yourself as a person in the past three months?

G8: Are you currently avoiding or restricting eating any foods to the degree that you have lost a lot of weight and/or become lacking in nutrition (e.g. have low iron) and/or had problems with family, friends or at work?

G9: Over the past three months have you made yourself spit out food after chewing it, in order to control your shape or weight, and if so how often have you done this i.e. chew/spit eating behaviour?

Grazing behaviour

G10: Over the past three months, typically how many episodes of grazing have you had per week?

G11 (only asked if 10G response was >0): Over the past three months, typically how many episodes of grazing with loss of control have you had per week?

G12: During the past one-month on how many days (approximately), if any, were you unable to complete you work, study, or household responsibilities because of any problem with your physical or emotional health?

Appendix C

CHSP Phenomenological Interview Schedule

1. Tell me a little about yourself
2. Why did you choose to participate in this study?
3. How did your experience of an eating disorder first start?
4. How would you describe yourself as a person?
5. How has having an eating disorder, or disordered eating, made a difference to how you see yourself?
6. How do you feel having an eating disorder, or disordered eating, has made a difference to how other people see you?
7. Has anyone ever expressed concern about your eating disorder or disordered eating behavior?
8. How do you feel when talking (or writing freely) about CHSP?
9. When did the chewing and spitting start?
10. Why do you think your CHSP behavior started when it did and not at some other time? What do you think 'triggered' CHSP?
11. What would you say are the benefits or uses of CHSP behaviour?
12. How does it help you?
13. What are the effects of CHSP that you might sometimes find valuable?
14. What (if any) effects of CHSP concern you the most?
15. What kind of situations, emotions, or circumstances exacerbate or improve CHSP?
16. What are the aims of engaging in CHSP?
17. What is the meaning of CHSP for you?
18. Are you still engaging in ED/DE behaviour (specifically CHSP)? How often?

19. How does living with an ED/CHSP affect your everyday life?
20. If you had to describe what the eating disorder (again specific to CHSP) means to you, what would you say?
21. How would *you* define CHSP?
22. How much do you think about your own physical and mental health and the impacts of CHSP?
23. Do you see yourself as being ill because of CHSP?
24. On a day-to-day basis, how do you deal with having an ED and CHSP?
25. Do you think about the future much?