Understanding the Nature of Anorexia Nervosa: Typologies and Maladaptive Schemas

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

Stephanie Rose Damiano
B.App.Sci. (Psychology)(Honours)

Division of Psychology
School of Health Sciences
College of Science, Engineering, and Health
RMIT University

September, 2012
Declaration

I certify that, except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and ethics procedures and guidelines have been followed.

Signed:

__________________________
Stephanie Damiano

Date:
Acknowledgements

I would like to sincerely thank the following people for their support, guidance, and assistance while formulating this thesis. First and foremost, I would like to thank my understanding husband for his unwavering love, support, patience, and encouragement. Thank you to my parents and Nonna for their eternal belief in me and always encouraging and supporting me throughout my life and education.

Special thanks to my supervisors, Associate Professor John Reece and Dr Sophie Reid for their ongoing wisdom and assistance in the production of this thesis and for challenging me along the way. Immense gratitude goes to Dr Linsey Atkins for providing her clinical expertise and encouragement throughout my PhD.

Many thanks must also go to the following individuals with facilitating the recruitment process and success of this research: Professor George Patton, Stephanie Campbell, Dr Jacinta Coleman, Michelle Caughney, Dr Catherine Lynch, Belinda Dalton, and the paediatricians from the Centre for Adolescent Health at the Royal Children’s Hospital and from the adolescent clinic at the Monash Medical Centre. Thanks also to Liz Atkinson for editing this thesis. I would also like to thank the school Principals and liaising staff at the secondary schools who participated in this research for their willingness to contribute to this research. A special thank you must also go to the participants of this research, for without their involvement this research would not have been possible.

Finally, thank you to the Butterfly Foundation’s Research Institute for providing funding for this research through a top-up scholarship awarded for excellence in the field of research into eating disorders throughout Australia and New Zealand.
Dissemination Information

Sections of this thesis have been disseminated as conference presentations. The candidate has taken primary authorship on these presentations.

Note: The candidate was formerly known as Stephanie Romagnano.


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Abstract

Anorexia Nervosa (AN) is the most severe eating disorder (ED) as it has one of the highest mortality rates compared to other mental illnesses and has a significant psychological and physical impact on sufferers. AN affects significantly more females than males, and typically has an onset during adolescence. The development and maintenance of AN is influenced by the complex interrelationship between a number of predisposing, precipitating, and perpetuating factors. Some of these factors relate to eating, weight, and body shape, for example, body dissatisfaction; however, other factors are not specifically related to eating, weight, and body shape, but may underlie the presentation of these concepts, for example, perfectionism. The aim of this thesis was to build upon the current theories of the development and maintenance of AN by evaluating the characteristics of adolescent females with AN that are not specific to diagnostic criteria. In doing so, the aim was to provide an understanding of AN patients aside from their eating, weight, and shape related factors, to assist clinicians and researchers in understanding AN patients from a perspective other than eating pathology and how best to treat them. The specific focus was on examining typologies within the AN diagnosis and the differences in treatment outcomes of these typologies, and the evidence for the presence of maladaptive schemas in adolescent females with AN.

The classification of ED patient characteristics is important for recognising different sub-disorders and applying tailored interventions. Researchers have demonstrated the clinical utility in examining variables beyond ED diagnostic criteria in order to meaningfully profile ED patients. Limited research, however, has examined the AN typologies of adolescent females using a broad range of variables not specific to DSM-IV-TR ED diagnostic criteria. Study 1 investigated whether a group of adolescent females from an outpatient assessment clinic for AN could be grouped into clinically relevant typologies based upon a range of psychological, health, and family variables, which were not limited only to the
diagnostic criteria for AN. Furthermore, Study 1 examined the differences in the natural course and outcomes for the typologies that resulted. A clinical case review was conducted on 39 adolescent females aged between 13 and 18 years and diagnosed with AN or subthreshold AN. Medical, psychological, behavioural, and family information were collected from case notes, as well as follow-up medical data recorded six months after the initial diagnosis. A two-step cluster analysis derived two clinically distinct typologies, labelled Egosyntonic AN and Heterogeneous AN. Egosyntonic AN patients were characterised by severely underweight patients who reported no clinical elevations on any eating or mental health disturbances. Conversely, Heterogeneous AN patients were characterised by healthy weight patients who reported significantly higher levels of eating, psychological, and behavioural problems. Limited follow-up data highlighted that Egosyntonic AN patients tended to report better outcomes in terms of weight gain and other health outcomes compared to Heterogeneous AN patients.

Recent research has highlighted the presence of maladaptive core beliefs in individuals with an ED, using Young’s model of Early Maladaptive Schemas (EMSs). EMSs are not related to eating, weight, and shape, but increasing research is demonstrating that EMSs may underlie the presentation of ED pathology. Little research has examined the presence of EMSs in adolescent females clinically diagnosed with AN. Study 2 assessed the EMSs reported by adolescent females, aged between 13 and 18 years, who presented for AN outpatient treatment compared with a community group. A second aim of Study 2 was to replicate the two AN clusters derived in Study 1 in the AN clinic sample. Subsequently, the differences in EMSs among the clusters derived were examined. Thirty-six adolescent females with AN or subthreshold AN were recruited from outpatient hospital and private ED clinics in Melbourne, Australia. The community group comprised 111 female secondary school students. Participants completed measures assessing EMSs, adaptive and maladaptive
personality and behavioural features, and general psychopathology. In general, the AN clinic group reported greater maladaptive schemas, general psychopathology, and behaviour problems than the community group. A two-step cluster analysis based upon responses to a general measure of psychopathology and problem behaviours used in both studies derived two AN clusters, labelled Egosyntonic AN and Heterogeneous AN, which replicated the results of Study 1. Additionally, 32% of the community group had indicated a possible ED, according to results of a brief ED screen, thus, the community group was divided into an At-risk group and Non-ED group. Subsequently, more fine-grained analyses comparing the four groups showed that: Heterogeneous AN patients reported the highest level of EMSs, psychopathology, and behaviour problems; no differences were found between Egosyntonic AN patients and Non-ED participants, except for on only two EMSs and depression scores; and At-risk participants reported greater EMSs, general psychopathology, and behaviour problems than Non-ED participants. Six EMSs were found to be characteristic of AN in adolescent females, including Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition. The results highlighted that EMSs are greater in adolescent females with AN or subthreshold AN than community participants and that particular EMSs were characteristic of different AN typologies.

The studies in this thesis have enhanced the understanding of AN in adolescent females by examining factors that are not specific to ED diagnostic criteria. Examination of such factors revealed clinically relevant subgroups in adolescent females with AN. The two independent clusters derived in Study 1 were replicated in Study 2 and added to with the addition of a profile of maladaptive schemas. In enhancing the understanding of AN in adolescent females, the present findings may have clinical implications for the treatment of this patient group. First, the knowledge of differences between a rather homogeneous patient group may facilitate clinicians in understanding their clients from a perspective other than
simply their eating pathology and may assist with the application of individualised treatment approaches. Second, identifying the EMSs that may be present in adolescent females with AN may assist in the development of a schema profile and may have implications for intervention, such as the potential use of schema-focused therapy.
CHAPTER 1: Thesis Overview

An eating disorder (ED) is a psychosomatic illness, in that it is primarily a psychological maladjustment with physical manifestations, which can lead to serious psychiatric and medical complications (Garfinkel & Garner, 1982). EDs are defined by severe disturbances in eating habits or weight-control behaviours and an over-evaluation of body weight and shape (Fairburn & Harrison, 2003). EDs are in the top 10 major psychiatric disorders for Australian females, and have been shown to exist in children as young as seven years of age (Pratt & Woolfenden, 2002). In general, EDs are significantly more prevalent in females than males, with a ratio of approximately 10 females to 1 male (Lucas, Beard, O'Fallon, & Kurland, 1991). As such, the majority of research into EDs only includes female samples; the research reported in this thesis will also focus solely on females. The most current Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000) defines three types of EDs: Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Eating Disorder Not Otherwise Specified (EDNOS). The most severe ED is AN due to its significant psychological and physical effects on those it affects and its typically treatment resistant nature, which contribute to AN having one of the highest mortality rates for mental illness (Lawton, 2009; Treasure & Szmukler, 1995). AN is characterised by a refusal to maintain a healthy body weight, an intense fear of gaining weight, disturbance in perception of body weight and shape, and amenorrhea (American Psychiatric Association, 2000). Conversely, BN is characterised by recurrent episodes of binge eating and inappropriate compensatory behaviours, alongside negative self-evaluation of body shape and weight (American Psychiatric Association, 2000). EDNOS refers to the
individuals who do not fulfil all the diagnostic criteria for AN or BN, but present with some of their characteristics (American Psychiatric Association, 2000).

The mean age of onset differs across the range of EDs. Specifically, according to *DSM-IV-TR* (2000), AN typically presents in adolescent females aged between 14 and 18 years, whereas BN typically presents in the later adolescent years or early adult years. A central difference between AN and BN diagnostic criteria is the weight of a patient, with individuals with AN requiring a weight below 85% of their expected weight for their height and age, while there is no weight restriction on a diagnosis of BN or EDNOS (American Psychiatric Association, 2000). Females with AN are also more likely to receive treatment for their ED due to their physical emaciation being more obvious to family and friends or the occurrence of medical complications, such as bradycardia, whereas BN is typically more of a secretive disorder, which reduces the likelihood of receiving treatment early (Wade, Bergin, Tiggesmann, Bulik, & Fairburn, 2006). Clinical research with female outpatients with a diagnosis of AN or BN has demonstrated that these two groups can be differentiated on personality and behavioural features, as AN patients often present with over-control and emotional constraint, while BN patients often present with poor impulse control (Pryor & Wiederman, 1996). Due to the differences in the age of onset, treatment seeking behaviour, and presenting characteristics between AN and BN patients, and the major psychological and physical impact of AN on sufferers, the research described in this thesis will focus solely on treatment seeking adolescent female patients with a diagnosis of AN. As approximately twice as many individuals diagnosed with AN receive a diagnosis of EDNOS (e.g., Keski-Rahkonen et al., 2007), the research in this thesis will also investigate patients with subthreshold AN, diagnosed as such due to not meeting all the AN diagnostic criteria.

AN is a highly complex disorder that develops as a result of the interrelationships among a range of predisposing individual, familial, and societal factors, alongside
precipitating factors that trigger an individual’s vulnerability to one, or a combination of, the predisposing factors (Garner & Garfinkel, 1980). AN can also be difficult, time-consuming, and costly to treat (Pratt & Woolfenden, 2002). Given the complexity of AN, the typically treatment resistant nature of AN, and the psychological and physical impact on adolescent females, it is important to determine avenues for the early intervention of AN. To assist with the implementation of early interventions for AN, it is important to better understand the characteristics of individuals diagnosed with AN. Increased research into the disorder has improved the classification criteria, as well as clinicians’ and researchers’ understanding of the factors associated with the development and maintenance of AN; however, further research is necessary to understand this complex disorder.

As will be described in Chapter 2, there is a range of factors related to the development and maintenance of AN. There are factors specifically related to the AN diagnostic criteria, for example, body dissatisfaction, and there are factors that are not specific to AN diagnostic criteria but may underlie the presentation of EDs, for example, perfectionism (see Section 2.5.1a). Increasingly, more researchers are demonstrating the relevance in examining the factors beyond the diagnostic criteria, as it is known that there is more to the development and maintenance of AN than simply eating, weight, and body shape concerns (reviewed in Chapters 3 and 5). As such, the overall aim of this thesis is to examine the psychopathology, beyond AN diagnostic criteria, of a clinical group of adolescent females seeking treatment for AN or subthreshold AN, with a specific focus on two areas: typologies that may exist within this group and their treatment outcomes; and an evaluation of early maladaptive schemas (EMSs).

First, researchers and clinicians have considered the classification of ED patient characteristics as important for recognising different subgroups and for applying tailored interventions (Sloan, Mizes, & Epstein, 2005; Turner & Bryant-Waugh, 2004; Turner,
Bryant-Waugh, & Peveler, 2009). A number of studies have demonstrated the clinical utility in examining variables not specific to ED diagnostic criteria in order to create comprehensive typologies of ED patients (see Chapter 3). Of these studies, few have examined the AN typologies that may exist in a sample of adolescent females using a range of psychological, behavioural, health, family, and eating variables. Building on previous research, the aim of Study 1 was to investigate whether a group of adolescent females, aged between 13 and 18 years, and who presented to an outpatient assessment and treatment clinic for AN, could be grouped into clinically relevant typologies based upon a range of variables that are not limited to the diagnostic criteria for AN. A further aim of Study 1 was to determine the differences that may exist in the medical and general well-being outcomes for any typologies that result. Knowledge of the differences between patients with similar diagnoses may facilitate clinicians in understanding their clients from a perspective other than simply their eating pathology, and may assist in the application of individualised treatment approaches.

Second, a growing number of researchers have examined the underlying core beliefs of individuals with an ED, as it has been suggested that cognitions about eating, weight, and body shape are not sufficient in accounting for the presentation of an ED (Jones, Leung, & Harris, 2007). Young’s EMSs have been of particular interest in ED research, as schema theory suggests these EMSs are present in individuals with chronic psychological disorders (Young, Klosko, & Weisharr, 2003), such as EDs. Young has proposed the existence of 18 EMSs that capture self-defeating core patterns of mental health functioning, which are not related to eating, weight, or shape beliefs (Young et al., 2003). Generally, researchers have found that ED patients reported greater EMSs than those without an ED (Cooper, Rose, & Turner, 2006; Deas, Power, Collin, Yellowlees, & Grierson, 2011; Dingemans, Spinhoven, & van Furth, 2006; Jones, Harris, & Leung, 2005; Leung, Waller, & Thomas, 1999; Muris, 2006; Waller, 2003; Waller, Dickson, & Ohanian, 2002; Waller, Ohanian, Meyer, & Osman,
Nevertheless, as this is a developing area of research, little research has examined the differences in schema profile between adolescent females with and without AN. Thus, the aim of Study 2 was to assess the EMSs and general psychopathology and behaviours reported by adolescent females, aged between 13 and 18 years, who presented for AN outpatient treatment compared with a community comparison group. The AN typologies derived in Study 1 will also be attempted to be replicated in Study 2, and the differences in EMSs between the typologies will be examined. Knowledge of the EMSs of adolescent females with AN may assist in the development of a schema profile for AN patients and may have implications for the use of schema therapy with this patient group. Furthermore, understanding the schema profiles of subtypes of AN patients may facilitate the application of a targeted treatment approach.

The present studies examine AN in adolescent females from a perspective unrelated to eating, weight, and shape, to enhance the understanding of the factors that may be influencing the development and maintenance of AN and to highlight the possible treatment implications for doing so. As such, this thesis is presented as six chapters. Chapter 2 provides an introduction to AN by describing the diagnostic criteria, characteristics of, and constructs related to the development and maintenance of AN. Of particular focus are the predisposing, precipitating, and perpetuating factors of AN, which demonstrate the complexity of the disorder and the many interrelated factors associated with the development and maintenance of AN.

Chapter 3 provides a summary of the literature related to developing typologies of ED patients. Primarily, the use of cluster analysis to derive typologies will be described, followed by a review of the studies that have applied a cluster analysis to develop ED typologies, including research that has examined the wider clinical presentation of EDs, typologies derived from dietary restriction and negative affect, and ED typologies based on
personality features. The relationship between characteristics of ED patients and their subsequent outcomes will be briefly explored, alongside the treatment interventions commonly used for adolescent females with AN. Chapter 4 provides the rationale, aims, method, results, and discussion for Study 1.

Chapter 5 summarises the literature related to maladaptive schemas. An introduction to Beck’s theory of schemas will be followed by a summary of Young’s schema theory, encompassing EMSs and schema domains, schema processes, the Young Schema Questionnaire, and schema therapy. A review of the literature that has examined Young’s EMSs in ED samples will also be provided. Chapter 6 provides the rationale, aims, method, results, and discussion for Study 2. Chapter 7 is the general discussion, which will provide an overview of findings, describe the expanding profile of two AN typologies, possible treatment implications of the results, limitations of the current research, and directions for future research.
CHAPTER 2: Introduction to Anorexia Nervosa

AN is a highly complex disorder; however, increased research into the disorder has improved the classification criteria, as well as clinicians’ and researchers’ understanding of the factors associated with the development and maintenance of AN. This chapter will review the evolution of diagnostic criteria for AN, the current prevalence rate of AN and subthreshold forms of the disorder, the fundamental diagnostic characteristics of AN, and the key factors associated with the development and maintenance of AN.

2.1 History

AN was the first clinically described ED. William Gull and Charles Lasègue, in the early 1870s, independently acknowledged the presence of an eating pathology in females, characterised by a refusal to eat, severe emaciation, and amenorrhea (the cessation of menstruation) (Dally, 1969; Russell, 1995). These core features were considered to represent a disorder affecting adolescent females and could not be explained as a result of another physical illness (Brumberg, 1988; Russell, 1995). Both acknowledged the presence of a psychological disturbance in the illness, with Gull hypothesising a morbid mental state and Lasègue labelling the disorder hysterical anorexia (Russell, 1995). Lasègue asserted that AN was the result of high levels of emotional distress, predominantly among adolescent females, which he hypothesised to be related to the transition to adulthood (Brumberg, 1988), hence, predominantly affecting adolescent females.

2.2 Classification

In a review of AN literature, Russell (1970) summarised the diagnostic criteria for AN. Russell developed three fundamental criteria: (1) behaviour leading to marked weight
loss and malnutrition, typically encompassing the restriction of carbohydrate-containing foods, such as confectionary and bread, along with self-induced vomiting, purging, or excessive exercise; (2) amenorrhea; and (3) a morbid fear of becoming fat, which was characterised by patients (a) endeavouring to maintain an abnormally low weight, (b) claiming they eat satisfactorily, and (c) overestimating their body weight (Russell, 1970). Russell (1970) further reported the comorbid presence of depressive, obsessive, hysterical, or phobic symptoms. It was not until 1980 that specific diagnostic criteria for AN emerged in the *DSM-III* (1980).

A modification of AN criteria emerged as a result of further research into the condition. This enhanced the clinical knowledge of the disorder and led to the definitions of other EDs. Following on from his initial description of AN, Russell (1979) described a new ED, labelled Bulimia Nervosa (BN), which, at first, was considered a variant of AN. Subsequently, subtypes of AN (Beumont, George, & Smart, 1976; Dally, 1969) and BN (American Psychiatric Association, 1994) were proposed as clinical differences in the presentation of these conditions were recognised. The diagnosis of EDNOS, also referred to as subthreshold AN or BN, was established because too many individuals did not meet the full diagnostic criteria for AN or BN despite exhibiting many of the symptoms of these disorders (American Psychiatric Association, 1987; Fairburn & Harrison, 2003). As such, the *DSM-IV-TR* (2000) defines three types of EDs: AN, with restricting type (AN-R) and binge-eating/purging type (AN-BP); BN, with purging type (BN-P) and non-purging type (BN-NP); and EDNOS, which also includes Binge Eating Disorder (BED).

The DSM-V is to be released in 2013 and in light of recent research a number of suggestions for the modification to AN diagnostic criteria have been proposed. Specifically, Becker, Eddy, and Perloe (2009) have suggested that the current criterion referring to the ‘refusal’ to maintain body weight implies a level of intent, which is unfounded and is difficult
to measure if a patient does not acknowledge, or is in denial of, their ED. Furthermore, the
criterion of refusal does not allow for the inclusion of individuals who are engaging in weight
restorative treatment, and thus, are no longer refusing to maintain a healthy weight, but would
not yet be considered recovered (Becker et al., 2009). Becker et al. (2009) suggested
modifying the terminology to ‘resistance’ or ‘difficulty’ in maintaining weight, rather than
‘refusal’. Moreover, it has been suggested by Attia and Roberto (2009) that the amenorrhea
criterion be removed from the diagnosis of AN given that individuals with AN who do and do
not meet the amenorrhea criterion typically differ little on psychopathology, but rather differ
on physiological severity of the disorder. Therefore, the amenorrhea criterion may be added
as a descriptor of clinical severity for physical symptoms rather than a diagnostic criterion
(Attia & Roberto, 2009).

Given that these papers are merely proposals for changes to the diagnosis of AN in
the DSM-V, and that the *DSM-IV-TR* (2000) AN diagnostic criteria will be used to diagnose
clinical ED patients in the studies in this thesis, the *DSM-IV-TR* (2000) AN diagnosis will be
the focus in this literature review. The research into EDs is complex and at times includes a
mix of AN, BN, and EDNOS patients, so although the primary focus of this literature review
is to outline the literature specific to AN, the research to be analysed may not always be
solely about AN, or subthreshold AN. As such, some consideration of all EDs is useful;
hence, the *DSM-IV-TR* (2000) diagnostic criteria for AN, BN, and EDNOS are presented in
Table 2.1, Table 2.2, and Table 2.3, respectively.
Table 2.1

*Diagnostic Criteria for AN from the DSM-IV-TR (2000, p.589)*

**Diagnostic criteria for 307.1 Anorexia Nervosa**

A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected).

B. Intense fear of gaining weight or becoming fat, even though underweight.

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 denial of the seriousness of the current low body weight.

D. In postmenarcheal females, amenorrhea, i.e., the absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., oestrogen, administration).

*Specify type:*

**Restricting Type:** during the current episode of Anorexia Nervosa, the person has not regularly engaged in binge eating or purging behaviour (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

**Binge Eating/Purging Type:** during the current episode of Anorexia Nervosa, the person has regularly engaged in binge eating or purging behaviour (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas)
Table 2.2

Diagnostic Criteria for BN from the DSM-IV-TR (2000, p. 594)

Diagnostic criteria for 307.51 Bulimia Nervosa

A. Recurrent episodes of binge eating. An episode of binge eating is characterised 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 most people would eat during a similar period of time and 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 behaviour in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.

C. The binge eating and inappropriate compensatory behaviours both occur, on average, at least twice 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 type:

**Purging Type:** during the current episode of Bulimia Nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas

**Non-purging Type:** during the current episode of Bulimia Nervosa, the person has used other inappropriate compensatory behaviours, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.
Table 2.3

Diagnostic Criteria for EDNOS from the DSM-IV-TR (2000, pp.594-595)

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 behaviour 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 behaviours characteristic of Bulimia Nervosa
2.3 Prevalence of Anorexia Nervosa

One aim of a large Finnish longitudinal cohort study of female twins, born between 1975 and 1979, was to determine the lifetime prevalence of AN, according to *DSM-IV* diagnostic criteria (Keski-Rahkonen et al., 2007). The participants completed four waves of self-report questionnaires at age 16, 17, 18, and between 22 and 28 (Keski-Rahkonen et al., 2007). Only the wave 4 questionnaires included a screen for EDs, which was then followed by a diagnostic telephone interview. The researchers defined lifetime prevalence of AN to include all cases identified in the study as having AN at some stage in their life, which was not restricted by age of onset, age at interview, or the current recovery status (Keski-Rahkonen et al., 2007). Based on the analysis of 2881 women from the general community with a mean age of 24.4 years, the results indicated a lifetime prevalence of 2.2% for *DSM-IV* AN, and 4.2% for EDNOS, referring to subthreshold AN only (Keski-Rahkonen et al., 2007).

Other researchers found a lifetime prevalence rate for AN of 2% for a community sample of young adult females aged 18 to 25 years (Favaro, Ferrara, & Santonastaso, 2003). In a twin study of Australian adult women, Wade et al. (2006) revealed a lifetime prevalence of 4.3% for both AN and EDNOS; however, this high rate should be considered with caution because EDNOS typically has a higher prevalence rate than AN (Hoek & van Hoeken, 2003). Notably, as the reports with adult samples were for lifetime prevalence, these rates indicated that these women had received a diagnosis of AN at some point throughout their lifetime. Despite the onset of AN often being during adolescence, the research investigating the lifetime prevalence of AN has frequently reported on young adult women. For this reason, Lewinsohn, Striegel-Moore, and Seeley (2000) investigated the lifetime prevalence for AN in a secondary school sample of adolescent females and found a lifetime prevalence of 0.6% to 1.4%. Moreover, Swanson, Crow, Le Grange, Swendsen, and Merikangas (2011) conducted a cross-sectional survey on a nationally representative sample of 10,123 adolescents from the
United States, aged between 13 and 18 years. A lifetime prevalence rate of 0.3% was found for females with AN (Swanson et al., 2011).

A number of researchers have also determined the point prevalence of AN, which is the prevalence rate at a specific point in time (Hoek & van Hoeken, 2003; Treasure, Schmidt, & van Furth, 2005). Such studies have demonstrated a point prevalence rate ranging from no prevalence of AN to 3.9%, and between 0.7% and 14.6% for EDNOS for adolescent and young adult females (Favaro et al., 2003; Fernandez, Labrador, & Raich, 2007; Keel, Klump, Miller, McGue, & Iacono, 2005; Kjelsas, Bjornstrom, & Gotestam, 2004; Morande, Celada, & Casas, 1999; Sancho, Arija, Asorey, & Canals, 2007; Santonastaso et al., 1996). Importantly, different studies employed differing diagnostic criteria, with some utilising the DSM-III-R and others the DSM-IV; however, this did not appear to influence the prevalence rate findings.

A review of epidemiological research predominantly from the United States and Western Europe conducted by Hoek and van Hoeken (2003) revealed an average prevalence rate of 0.3% for AN among females aged 13 to 35 years. It was also found that there was a higher prevalence of individuals who did not meet the full diagnostic criteria for AN and who therefore received a diagnosis of EDNOS (Hoek & van Hoeken, 2003), which is line with the other above-mentioned published rates, indicating that subthreshold has a higher lifetime and point prevalence than AN.

Research has demonstrated that the prevalence of AN has increased over time; however, it is acknowledged that, as with a range of mental health issues, community knowledge and recognition of EDs has exponentially improved with the changes in diagnostic criteria, service provision, and patterns of care. Thus, it is difficult to conclude that the prevalence of AN is increasing when the increase in prevalence rates may be a result of enhanced knowledge of the condition (Fombonne, 1995).
2.4 Characteristics Associated with the Diagnosis of Anorexia Nervosa

There are a number of core features that are common to all EDs; however, only the characteristics associated with the diagnosis of AN will be reviewed in this section. Furthermore, it is implied that when reviewing AN in the following discussion, subthreshold AN is also included, unless otherwise indicated.

2.4.1 Drive for Thinness and Weight and Shape Distortion

The relentless determination for a thin body is a central characteristic of AN that can be expressed by a range of ED behaviours, including restricted eating, excessive exercise, and compensatory behaviours, including vomiting, laxative misuse, and diuretics misuse (Abraham, 1996; Faust, 1987; Garfinkel & Garner, 1982; Levitt, 2003; Russell, 1970). The impetus for the pursuit of thinness is most often the morbid fear of weight gain or becoming fat, which is a core criterion in the diagnosis of AN (Bruch, 1978; Levitt, 2003). Another possible factor motivating the drive for thinness is a gross misperception of actual body weight and shape. Often, individuals with AN may incorrectly view themselves as being much heavier than they are, which contributes to their strict rules around dietary restraint (Garfinkel & Garner, 1982; Shafran, Cooper, & Fairburn, 2002). Importantly, individuals with AN do not perceive their drive for thinness to be maladaptive, and this pursuit does not diminish as an individual’s weight decreases (Garfinkel & Garner, 1982). In fact, their concern regarding weight gain tends to increase with weight loss (Garfinkel & Garner, 1982). Individuals with AN may fail to recognise their emaciated state due to the distorted view they have of their body (Bruch, 1978). Hence, research with AN patients has highlighted that a higher drive for thinness is associated with more eating-related pathology, including frequency of purging and restricted eating (Vervaet, van Heeringen, & Audenaert, 2004), higher depression, body dissatisfaction, and less interoceptive awareness, which refers to the inability to differentiate the sensations of hunger and satiety (Faust, 1987; Garner, 2004).
Alongside this intense drive for thinness, individuals with AN may participate in excessive exercise, which, as the disorder progresses, becomes a more solitary activity, the aim being to burn calories or show those around them that they are still healthy (Bruch, 1978). Individuals with AN may also exhibit bursts of excessive energy, which is often related to self-discipline and the need to maintain their daily calorie expenditure (Garfinkel & Garner, 1982). It has long been suggested that the drive for thinness begins with dieting (Garfinkel & Garner, 1982), or perhaps the drive for thinness and the fear of fat are key motivators toward dieting, which is a fundamental precipitating factor of AN, to be discussed later in this chapter.

2.4.2  Physiology of Anorexia Nervosa

AN has a number of life-threatening physiological effects. The most apparent physiological characteristic of AN is severe emaciation (Dally, 1969; Fairburn & Harrison, 2003; Garfinkel & Garner, 1982), which, for the diagnosis of AN, is defined as body weight less than 85% of that expected for an individual’s height and age (American Psychiatric Association, 2000). Significantly low body weight alters the body’s physiological functioning and subsequently contributes to an array of externally evident and internal physiological disturbances. Externally, AN sufferers develop dry, rough, and thin skin, which may acquire a ‘grey’ complexion (Dally, 1969; Fairburn & Harrison, 2003). Hypercarotanaemia may also be experienced; an orange pigmentation of the skin of the palms and soles (Dally, 1969; Fairburn & Harrison, 2003). The development of lanugo hair, a fine downy hair, is also common on the back, forearms, legs, and side of the face (Dally, 1969; Fairburn & Harrison, 2003). For AN sufferers who frequently vomit, erosion of the inner surface of the teeth can occur (Fairburn & Harrison, 2003). Frequently disturbed sleep is also related to emaciation (Dally, 1969; Fairburn & Harrison, 2003). As the disorder progressively becomes more severe, individuals with AN tend to sleep for fewer hours and wake more frequently during the night (Dally, 1969; Fairburn & Harrison, 2003). Dreams
are infrequent for most; however, it has been reported that those who retain feelings of hunger and an appetite may dream about food (Dally, 1969).

Internally, starvation and severe emaciation slow down the body’s natural functions (Dally, 1969). Hormonal imbalances are common in individuals with AN and can influence a range of physiological functions. One such example is amenorrhea, the cessation of menstruation, in females of menstruating age who are not on oral contraceptives (Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). It is suggested that disturbance to hypothalamus and pituitary gland functioning results in amenorrhea (Treasure et al., 2005). Hormone abnormalities may also lead to the delay of menarche, or the first period, in pre-pubertal females, as well as stunted growth and failure of breast development (Fairburn & Harrison, 2003).

The gastrointestinal system also slows as a consequence of starvation and emaciation. Specifically, individuals with AN commonly experience constipation as their body works to retain the very little amount of food consumed (Dally, 1969; Fairburn & Harrison, 2003). Decreased colon motility may also be experienced as a consequence of laxative misuse (Fairburn & Harrison, 2003). Similarly, the cardiovascular system slows in emaciated individuals, who often experience bradycardia, a slowing of the pulse rate, and hypotension, a fall in blood pressure resulting in feelings of dizziness and fainting (Dally, 1969; Fairburn & Harrison, 2003). These physiological symptoms of AN, alongside the risk of suicide, place 20% of individuals with AN who do not seek treatment at risk of mortality, compared with a mortality risk of 2-3% for individuals with AN who seek treatment (Birmingham, Su, Hlynsky, Goldner, & Gao, 2005; Lawton, 2009). It is these debilitating physiological effects of AN, as well as the high risk of mortality, which motivates further research into the disorder, particularly into the need for early intervention.
2.4.3 Comorbidities

Negative affect is often present in individuals with AN (Chen & Le Grange, 2007; Grilo, 2004; Grilo, Masheb, & Berman, 2001; Stice, 2001; Stice & Agras, 1999). As such, a range of Axis I psychological disorders have shown to be comorbid with EDs, including mood disorders (Arkell & Robinson, 2008; Blinder, Cumella, & Sanathara, 2006; D. B. Herzog, Keller, Sacks, Yeh, & Lavori, 1992), anxiety disorders (Blinder et al., 2006; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004; Salbach-Andrae et al., 2008), and substance abuse disorders (Blinder et al., 2006; Salbach-Andrae, Lenz, et al., 2008; Wildman, Lilenfeld, & Marcus, 2004). In two studies examining the presence of substance abuse disorders, substance abuse was evaluated on substances in general, in combined samples of AN, BN, and EDNOS patients (Salbach-Andrae, Lenz, et al., 2008; Wildman et al., 2004). Blinder et al. (2006) found significant differences in alcohol abuse and polysubstance abuse across subtypes of EDs, and further found that these forms of substance abuse were more prevalent in individuals with binge eating and purging tendencies.

Prevalence rates for any comorbid Axis I disorder have been shown to range from 72.3% in adolescent females with AN from an inpatient and outpatient facility (Salbach-Andrae, Lenz, et al., 2008), to 92.9% in a treatment-seeking ED outpatient sample aged between 13 and 45 years at the time of intake into a longitudinal study (D. B. Herzog et al., 1992), to 97% in AN and EDNOS female inpatients aged between 11 and 68 years (Blinder et al., 2006). Recent studies have shown that mood disorders, including major depressive disorder, are highly prevalent in ED and AN-specific populations, affecting between 60.4% to 94% of female inpatients and outpatients (Blinder et al., 2006; D. B. Herzog et al., 1992; Salbach-Andrae, Lenz, et al., 2008; Wildman et al., 2004). Anxiety disorders, including obsessive compulsive disorder (OCD), phobias, and generalised anxiety disorder, have also shown to be highly comorbid with AN, being diagnosed in 25.7% to 74% of female
inpatients and outpatients (Blinder et al., 2006; Kaye et al., 2004; Salbach-Andrae, Lenz, et al., 2008; Wildman et al., 2004). OCD has been reported as the most common comorbid anxiety disorder in AN compared with other EDs (Blinder et al., 2006; O'Brien & Vincent, 2003). Conversely, substance use disorders are more highly prevalent in BN patients than AN patients (Blinder et al., 2006; O'Brien & Vincent, 2003), which has been affirmed by Salbach-Andrae, Lenz, et al. (2008) who found that significantly more patients with AN-BP, which mirror BN behaviours, reported substance use disorders in general, compared with AN-R patients.

Some research suggests that comorbidities exist prior to the onset of an ED. In fact, research has shown that psychological comorbidities increase the risk of young females developing an ED by sevenfold (Patton, Selzer, Coffey, Carlin, & Wolfe, 1999). Research by Wade, Bulik, Neale, and Kendler (2000) demonstrated a premorbid shared risk between AN and major depression in female twins, which is proposed to be influenced by genetic factors as well as shared environment. Kaye et al. (2004) found that 42% of young adult females with an ED reported experiencing one or more anxiety disorders during childhood, while 23% of this group reported childhood OCD prior to the onset of any ED. Similarly, a study by Wildman et al. (2004), with 51 young adult women with a current or previous ED diagnosis, revealed that 85% of these participants reported an onset of an anxiety disorder prior to the onset of their ED, while 33% of cases reported an onset of major depressive disorder prior to their ED. Despite 50% of this sample reporting a lifetime history of substance abuse disorder, only two cases had developed the substance abuse disorder prior to their ED (Wildman et al., 2004). Notably, Wildman et al. (2004) examined a group of current and previous ED patients with a diagnosis of either AN, BN, or EDNOS, which may account for the rates of lifetime history of substance abuse, given that other researchers have demonstrated that alcohol abuse is more prevalent among BN or binge eating patients.
Keel et al. (2005) suggest that the limited association between substance use and AN is a reflection of the typical age of AN patients. AN behaviours typically commence in early adolescence; thus, it would be anticipated that substance use, beyond experimentation with cigarettes and alcohol, would not commence until late adolescence or early adulthood. Hence, this may explain the onset of substance abuse following the onset of AN.

2.5 Factors Associated with the Development and Maintenance of Anorexia Nervosa

The process by which AN infiltrates a young female’s life is complex, and there are a number of factors that must be considered in order to understand the development and maintenance of the disorder. In consideration of this important process, a number of theories have been developed. Fairburn, Cooper, and Shafran (2003) have proposed the cognitive-behavioural ‘transdiagnostic’ model that purports that AN, BN, and subthreshold EDs share the same psychopathology. In this model, it is suggested that four principle factors are involved in the development of an ED, specifically, clinical perfectionism, low self-esteem, mood intolerance, and over-evaluation of eating, shape, and weight, and their control (Fairburn et al., 2003). These factors can then lead to eating psychopathology, including strict dieting, binge eating, and compensatory behaviours, which can then work to maintain the disorder by further reinforcing the perfectionism or control over eating, weight, and shape (Fairburn et al., 2003).

Despite the relevance and popularity of Fairburn et al.’s (2003) theory, the transdiagnostic model does not encompass the vast array of other relevant risk factors that have been identified to explain the complexity of the development and maintenance of AN. As such, the following sections will discuss the possible relationships between the predisposing, precipitating, and perpetuating factors related to the development and maintenance of AN, as proposed by the model devised by Garner and Garfinkel (1980, p.
Interestingly, despite this model being developed over 30 years ago, its framework is still relevant today, and its proposed process by which AN develops is still cited in current theories (Fairburn & Harrison, 2003; Treasure, Schmidt, & Macdonald, 2010). Garner and Garfinkel (1980) proposed that many people have, or are exposed to, a range of individual, familial, and socio-cultural predisposing factors that have been identified as possible risk factors for AN. These predisposing factors may increase an individual’s vulnerability to being unable to cope with distress (Garner & Garfinkel, 1980). Precipitating factors, such as a stressor, may then trigger these vulnerabilities. A stressor, such as a relationship breakdown, puberty, abuse, or being teased or bullied about weight or shape, may initiate a drive for thinness and dieting behaviour as a means of coping with the need for control and negative emotions (Garner & Garfinkel, 1980). Subsequently, the perpetuating factors, which include the effects of starvation and social feedback from the weight loss, reinforce further food restriction and perpetuate the maintenance of AN behaviours (Garner & Garfinkel, 1980).

2.5.1 Predisposing Factors

In line with this model of development, there are no distinct causes of AN, but rather the complex relationship among a range of interrelated individual, familial, and societal vulnerabilities and experiences, which may combine to initiate a dangerous cycle of food restriction (Bruch, 1978; Fairburn & Harrison, 2003; Garner & Garfinkel, 1980). It is important to highlight the process by which these vulnerabilities are triggered in order to understand how many individuals may have risk factors, but only a minority of the general population go on to develop an ED or AN. A risk factor is a characteristic of an individual or their environment, which is a measurable antecedent to the outcome of interest, in this case AN, which when present can increase one’s risk of developing AN compared with the unexposed general population (Striegel-Moore & Bulik, 2007; Treasure et al., 2005). By
identifying AN risk factors, researchers and clinicians can categorise individuals into high-risk and low-risk groups (Treasure et al., 2005). Importantly, the individual, familial, and socio-cultural risk factors highlight how some individuals are more susceptible to developing AN than others.

As mentioned earlier, AN is more prevalent in females, particularly young females. Despite changes to diagnostic criteria and associated research on risk factors, the most constant characteristic of AN is that adolescent females, aged between 14 and 18 years, have an increased vulnerability to the disorder over males and any other age group of females (Bruch, 1978; Fairburn & Harrison, 2003). A multitude of hypotheses have been developed over recent years to explain why females are more at risk; thus, a description of each predisposing factor is provided and the link with young females is highlighted if a clear relationship has been empirically established.

2.5.1a Individual risk factors.

The predisposing factors of AN relating to the individual can be delineated by psychological and biological vulnerabilities. These are the internal characteristics or predispositions of an individual, which may place them in the high-risk group for developing AN.

Psychological vulnerability.

Perfectionism.

Perfectionism can be viewed as both a characteristic of individuals with AN and as a predisposing factor of AN (Anderluh, Tchanturia, Rabe-Hesketh, & Treasure, 2003; Bulik et al., 2003; Shafran et al., 2002). Clinically, perfectionism is often described as impossibly high self-imposed standards in at least one prominent area of an individual’s life, upon which one’s self-evaluation is based, and which is maintained despite adverse consequences (Halmi et al., 2000; Shafran et al., 2002). Underlying this pursuit of excellence is the belief that
perfection exists and should be attained at all costs (Halmi et al., 2000; Shafran et al., 2002). For individuals with AN, perfectionism is defined by the unrelenting drive for control over eating, shape, and weight (Shafran et al., 2002); however, prior to the onset of AN it may be expressed in other areas, such as performance at school (Fairburn, et al., 2003).

Perfectionism is commonly described as a characteristic of individuals with AN, as research has highlighted the significant higher prevalence of perfectionism in females with AN compared with healthy peers (Halmi et al., 2000) and sufferers of BN (Anderluh et al., 2003; Bulik et al., 2003). Recent research has also highlighted that more severe ED symptomatology is related to higher levels of perfectionism (Halmi et al., 2000), particularly in young women with low self-esteem who perceive themselves to be overweight (Vohs, Bardone, Joiner, Abramson, & Heatherton, 1999) and have heightened body dissatisfaction (Ruggiero, Levi, Ciuna, & Sassaroli, 2003).

Perfectionism is often assessed by examining three key areas: an individual’s concern over mistakes; personal standards; and self-criticism (Garner, 2004; Halmi et al., 2000; Steele, O'Shea, Murdock, & Wade, 2011). Firstly, perfectionism is often motivated by a fear of failure, which an individual with AN defines as weight gain or not losing enough weight (Shafran et al., 2002). Secondly, individuals with AN constantly evaluate their progress in attaining their goal weight by mirror gazing for hours a day and measuring their body weight and size (Dally, 1969; Shafran et al., 2002). In particular, an individual with AN tends to focus on one area of their body that they dislike, for example, their thighs, and maintain a distorted perception of this body part (Garfinkel & Garner, 1982). Notably, their desired weight loss is often not achievable, hence the extreme weight loss measures. Thirdly, individuals with AN are also highly self-critical, perceiving that their efforts to lose weight are never good enough (Shafran et al., 2002). Should they reach a point of perceiving themselves as having successfully met their weight standards, they often reappraise their goal
because, in their view, their goal must have been insufficiently demanding, thus, leading to further food restriction, weight loss behaviours, and dangerously low weight levels (Shafran et al., 2002). Furthermore, individuals with AN often present with inflexible and dichotomous thinking, wherein the world is viewed in black and white; self-imposed rules are either simply met or not met (Garfinkel & Garner, 1982; Shafran et al., 2002). Individuals with AN fail to recognise ‘in-betweens’, for example, there is eating versus not eating, exercising versus not exercising, and that anything less than perfect equates to failure (Garfinkel & Garner, 1982; Shafran et al., 2002). This may help to explain why their eating behaviours and excessive exercise regimes are so stringent.

It is evident that perfectionism is common in the presentation of AN, but researchers have further shown that perfectionism may be a risk factor in the development of AN (Anderluh et al., 2003; Bulik et al., 2003; Shafran et al., 2002). Bulik et al. (2003) revealed that concern over mistakes and personal standards were significantly associated with the presence of AN in adult females. While Anderluh et al. (2003) found that approximately two-thirds of their young adult female participants with AN reported perfectionism and rigidity as children and were diagnosed with AN around the age of 16 years. These findings highlight that perfectionism may be a premorbid trait that places an individual in the high-risk group for developing AN. As suggested by Shafran et al. (2002), AN may be considered an expression of perfectionism. The theoretical argument is that perfectionism is present in an individual’s personality and is adaptively manifested in other areas of life through strict rules and ‘all-or-nothing’ thinking; however, when the focus becomes about eating, weight, and shape, this perfectionism becomes a maladaptive obsession. This notion has been argued by Garfinkel and Garner (1982) who asserted that a weight-conscious female may set herself an upper weight limit she does not wish to exceed; however, this upper limit is dangerously low. In contrast to a healthy dieter, an individual with AN views even a kilogram over that weight
limit as being totally out of control (Garfinkel & Garner, 1982). Evidently, those who view minimal weight gain as failure may be at an increased risk of developing AN.

**Body dissatisfaction and low self-esteem.**

As discussed, a clinical characteristic of the presentation of AN is the over-evaluation and misperception of body weight and shape (American Psychiatric Association, 2000). Related to this over-evaluation is the presence of body dissatisfaction and low self-esteem. Notably, body dissatisfaction and low self-esteem are seen in most AN patients, but may also be considered important factors predisposing an individual to develop AN, as these two factors are typically the reason for the commencement of the need for control over one’s body and subsequent dieting behaviours (Garfinkel & Garner, 1982; Neumark-Sztainer, Butler, & Palti, 1996). Specifically, research with adolescent females from middle and lower class sectors has demonstrated that girls reporting higher body dissatisfaction and drive for thinness, and lower self-esteem, were more likely to exhibit dieting behaviours and uncontrolled eating (Neumark-Sztainer et al., 1996).

Body dissatisfaction refers to an individual’s negative evaluation of their body shape or body parts (Presnell, Bearman, & Stice, 2004). Low self-esteem refers to an individual’s global negative view of themselves and their self-worth (Birbeck & Drummond, 2003; Fairburn et al., 2003). For individuals with an ED, low self-esteem can become part of their permanent identity (Fairburn et al., 2003). Body dissatisfaction and low self-esteem are primary characteristics of individuals with AN and are often a result of a distorted body image, which refers to an individual’s self-perception of their physical appearance (Garfinkel & Garner, 1982). For individuals with an ED, low self-esteem often develops because self-worth is equated to unachievable external standards of physical appearance (Garfinkel & Garner, 1982). A strong self-loathing is present, which is related to intense body dissatisfaction, and influenced by a range of the predisposing factors to be reviewed
For example, media and societal influence on perceptions of the ideal body distorts one’s own body image as one believes this thin body to be achievable when it is not, which may contribute to feelings of body dissatisfaction and low self-esteem (Garfinkel & Garner, 1982; Neumark-Sztainer et al., 1996). Body image is also a very pertinent issue during adolescence as the body matures. Research has highlighted that particularly young females are at risk of developing body dissatisfaction during this period (Paxton et al., 1991). Specifically, Paxton et al. (1991) revealed a substantial distortion in the body image of 341 Melbourne secondary school female students, in that 43.6% considered themselves to be overweight, when in fact a minor 12% were actually overweight. More alarmingly, of the 18 girls who were measured as underweight, 5.6% considered themselves to be overweight and 38.9% perceived themselves to be normal weight (Paxton et al., 1991). Moreover, 71.4% of girls wanted to be thinner than their current figure, with a minimum of 80% of the sample of girls claiming that being thinner would be advantageous to their happiness, success, health, appearance, their number of friends, number of dates, their intelligence, and the ease in which they could get what they want (Paxton et al., 1991).

Australian research has further revealed that prepubescent girls, as young as 6, experience body dissatisfaction (Birbeck & Drummond, 2003; Dohnt & Tiggemann, 2006a), which demonstrates that poor body image is not purely associated with the onset of puberty, but may be exacerbated by pubertal changes. Specifically, Birbeck and Drummond (2003) argued that body image dissatisfaction and a preference for thin friends occurred in girls as young as 6 years of age. Moreover, these researchers raised the possibility that children starting school earlier or progressing through the literacy process faster may develop body image concerns earlier, since children are exposed to content in children’s books that the authors liken to an adolescent’s exposure to media images (Birbeck & Drummond, 2003). For example, the authors highlight that Cinderella, with her slim physique, is portrayed as
lovely, gentle, and kind (Birbeck & Drummond, 2003). Birbeck and Drummond (2003) further suggested that when children start school they are exposed to a wider social learning environment, which can fortify their pre-existing body image concepts. In support of these arguments, Dohnt and Tiggemann (2006a) revealed that girls aged 6 to 8 years do experience body image concerns, with almost half of the 97 girls in school years 1 to 3 desiring a thinner body. It was further found that the more satisfied girls were with their appearance, the higher their self-esteem (Dohnt & Tiggemann, 2006a), highlighting the relationship between body dissatisfaction and self-esteem.

In summary, body image concerns in female children and adolescents has clearly been linked to the presence of body dissatisfaction and low self-esteem, which has subsequently been associated with an increased risk of dieting behaviours and AN. Importantly, as with perfectionism, body dissatisfaction and self-esteem are often part of the presenting characteristics of individuals with AN, but their premorbid presence can be a risk factor for the later development of AN. Due to the complex nature of these factors, it cannot be concluded if the premorbid presence of body dissatisfaction and low self-esteem contribute to the development of AN, or if these factors remain dormant and are expressed once the cycle of restricted eating and self-loathing commences.

**Personality.**

Research has further highlighted that individuals with an ED, at their worst stage of the disorder, present with perfectionism in the form of preoccupations and rituals (Halmi et al., 2000) that are characteristic of OCD and obsessive-compulsive personality disorder (OCPD). OCD is characterised by obsessive thoughts that are nullified by compulsive, and often maladaptive, behaviours (American Psychiatric Association, 2000). On the other hand, OCPD is a personality disorder defined by a chronic and disabling preoccupation with rules, rituals, and control against a perceived danger or threat (American Psychiatric Association,
It is not surprising that the *DSM-IV-TR* (2000) acknowledges the presence of obsessive-compulsive features in individuals with AN. A retrospective study by Anderluh et al. (2003) found that obsessive-compulsive traits, including checking, washing, and doubting, were significantly more prevalent in childhood for females who later developed an ED in adolescence. It was further found that ED participants who reported perfectionism and rigidity in childhood, also reported significantly higher scores on dimensions of OCPD as adults (Anderluh et al., 2003). The authors concluded that obsessive-compulsive personality traits in childhood are risk factors for the later development of AN (Anderluh et al., 2003); however, the recount of childhood traits was a retrospective assessment, so possible inaccuracies with memory must be considered.

Further research by Halmi et al. (2005) on females with a history of AN or BN, revealed that perfectionism was significantly higher in groups characterised by obsessive-compulsive behaviours compared with those without obsessive-compulsive behaviours. Overall, it was reported that OCPD was significantly more related to perfectionism than was OCD (Halmi et al., 2005). Evidently, OCPD involves a number of behavioural features that may increase an individual’s vulnerability to AN, as the chronicity of rules, rituals, and control are evident in both OCPD and AN. Though limited, family research has also found a shared familial risk between OCPD and AN, as relatives of AN probands reported higher levels of OCPD compared with relatives of healthy controls (Lilenfeld et al., 1998).

**Biological vulnerability.**

Research into the role of biology as a risk factor for AN is a relatively novel area of investigation, which may be due to the difficulty in conducting a large number of population studies on a disorder with a low prevalence. Nonetheless, in a collation of results from a range of population, treated patients, twin, and family aggregation studies, Gorwood, Kipman, and Foulon (2003) concluded a heritability rate of 70% for AN, while other
researchers highlight a significantly greater concordance rate of AN among monozygotic compared with dizygotic twins (Fairburn & Harrison, 2003; Katzman, Golden, Neumark-Sztainer, Yager, & Strober, 2000). A large family transmission study found that, compared with female relatives of control participants, the female relatives of participants with AN were 11 and 5 times more likely to be diagnosed with full and partial syndromes of AN, respectively (Katzman et al., 2000). Growing research is indicating that the 5-HT$_{2A}$ gene may be a vulnerability marker for AN (Gorwood et al., 2003); however, consistent findings are scant, indicating the need for further research. Further theories have speculated the role of dysfunction in the hypothalamus and relevant neurotransmitter function in regulating eating behaviour by affecting the ‘satiety’ centre of the hypothalamus (Brumberg, 1988; Fairburn & Harrison, 2003). Thus, biology may play a role in the development of AN in its early stages, as well as maintaining the disorder, since a range of biological vulnerabilities for AN may be triggered once dieting starts and weight begins to drop. No clear conclusions can be made on biology as a risk factor for AN; however, there is promising research. At this stage, it may be best to hypothesise that biological vulnerabilities combined with psychological and environmental factors may facilitate the expression of an anorexic phenotype in those at risk (Katzman et al., 2000).

2.5.1b Familial risk factors.

The family is the most important unit to growing children, and is typically the first environment wherein a young person establishes their behaviours, attitudes, and values. Hence, research has highlighted that there a number of predisposing factors of AN that may be related to the family (Baker, Whisman, & Brownell, 2000; Francis & Birch, 2005; Ogle & Damhorst, 2000; Paxton et al., 1991; Pike & Rodin, 1991; Wertheim, Martin, Prior, Sanson, & Smart, 2002). Specifically, research has highlighted the influence of familial behaviours and attitudes around eating and weight on the development of AN in adolescent females, and
a profile of the typical ‘anorexic’ family has been established largely based on clinical case presentations (Baker et al., 2000; Fairburn & Brownell, 2002; Francis & Birch, 2005; Ogle & Damhorst, 2000). Importantly, these familial aspects may not directly cause the development of AN, but may influence an individual’s vulnerability to the seductiveness of AN.

**Influence of parental behaviours, attitudes, and criticism.**

It has been demonstrated that the families, particularly the mothers, of young females with eating problems, present with maladaptive attitudes and behaviours around body image and eating. Research has highlighted that mothers of young females with disordered eating have a higher incidence of disordered eating themselves, compared with mothers without a daughter who has disordered eating (Pike & Rodin, 1991). Despite the possible hereditary component of AN, which was outlined earlier, researchers have further suggested that negative attitudes and behaviours around eating and weight can be transmitted to vulnerable youths via modelling or direct criticism from their parents (Baker et al., 2000; Francis & Birch, 2005; Ogle & Damhorst, 2000; Paxton et al., 1991; Pike & Rodin, 1991; Wertheim et al., 2002). The modelling hypothesis underlying the transmission of maladaptive eating and weight concerns and behaviours suggests that children and adolescents are susceptible to adopting their parents’ attitudes on eating and weight, as well as their dieting behaviours (Loth, Neumark-Sztainer, & Croll, 2009; Ogle & Damhorst, 2000). Loth et al. (2009) discussed the importance of children and adolescents having a good parental role model of healthy eating habits and physical activity patterns in order to develop healthy habits themselves. On the other hand, it has been found that direct criticism, including encouragement to lose weight, negative weight and body talk from parents about themselves or their children, and weight-related teasing, are potential risk factors for creating a family environment that encourages children to be critical of their own body (Loth et al., 2009).
Parental praise for nonphysical traits has also been identified as a protective factor against negative eating behaviours and weight concerns (Loth et al., 2009).

A longitudinal study by Francis and Birch (2005) assessed mother-daughter dyads when the daughters were 5, 7, 9, and 11 years of age. It was found that mothers who were more concerned with their own eating and weight, were also more concerned about their young daughter’s weight, reported higher restriction of energy-dense snacks, and were more likely to encourage their daughter to lose weight. Furthermore, young females who reported restrained eating behaviours and perceived pressure from their mother to lose weight also reported increased weight concerns (Francis & Birch, 2005). Alarmingly, these concerns and behaviours were present in females as young as 9 years of age (Francis & Birch, 2005). The authors highlighted their concern with mothers’ attempts to encourage their daughters to lose weight from a young age, since restrained eating at this early stage in life may increase the risk of developing AN in adolescence (Francis & Birch, 2005). Importantly, this study highlighted that mothers’ behaviours and concerns on eating and weight may increase the risk of their young daughters modelling these negative behaviours and concerns about eating and weight, but did not specifically predict the development of AN.

Furthermore, a study of early adolescent girls and their parents highlighted that for both premenstrual and menstrual girls a higher drive for thinness, body dissatisfaction, and eating pathology were related to parental encouragement to lose weight (Wertheim et al., 2002). This study further showed that a dieting mother was associated with a higher drive for thinness, and was, in fact, a significant predictor of drive for thinness and eating pathology in menstrual daughters (Wertheim et al., 2002). Since mothers’ dieting was not predictive of these factors for premenstrual daughters, and, in fact, no premenstrual daughters received a clinical diagnosis of AN, it may be suggested that pubertal timing may be an important precipitating factor to AN, which makes these young females more susceptible to modelling
their mother’s eating and weight concerns. Notably, this contrasts the trend found by Francis and Birch (2005) who found that eating concerns were present in girls as young as 9 years of age.

Ogle and Damhorst (2000) conducted a descriptive study on mother-daughter dyads, which further supports the modelling hypothesis of the transmission of eating behaviours. It was revealed that each dieting daughter had a mother who had dieted at some point throughout her life, and mothers who had never dieted had daughters who had also never dieted (Ogle & Damhorst, 2000). The authors suggested that there was evidence of these daughters adopting their mothers’ body attitudes and eating behaviours, however, no predictive conclusions could be made (Ogle & Damhorst, 2000). Conversely, Pike and Rodin (1991) revealed that 90% of mothers of daughters with disordered eating, and 79% of mothers with a daughter without disordered eating, had dieted previously. As not all daughters with a dieting mother diet, Ogle and Damhorst (2000) suggested that the likelihood of modelling a mother’s dieting behaviours may be influenced by the degree to which a daughter identifies with her mother, and whether a mother verbally reinforces the dieting behaviours of her daughter. Nevertheless, the presence of a dieting mother can be an important contributor to a daughter’s eating and weight concerns, and subsequent eating behaviours.

These studies highlight the potential damaging effects of parental encouragement to lose weight and mothers’ dieting behaviour on daughters’ susceptibility to maladaptive eating behaviours and weight concerns. Although supporting the modelling hypothesis of dieting behaviour, Ogle and Damhorst (2000) further reported that direct encouragement from a mother for a daughter to lose weight was a better predictor of serious dieting behaviours by a daughter than a mother’s own dieting behaviours. Baker et al. (2000) also found that young adult daughters’ perception of their parents criticising their body increased the likelihood of
disordered eating pathology, compared with the perception of their parents’ general attitudes and behaviours about eating and weight. It was further highlighted that perceived criticism directly related to eating and appearance was more harmful to a daughter’s body dissatisfaction and eating behaviours than perceived general criticism (Baker et al., 2000). Importantly, the above-mentioned characteristics and behaviours are also present in families without a child with AN, so familial characteristics and behaviours must be acknowledged solely as predisposing factors that may increase an individual’s susceptibility to negative body image and eating behaviours, which may then lead to AN.

Nevertheless, in interviews with 27 individuals, aged between 17 and 64 years, receiving outpatient treatment for an ED, Loth et al. (2009) revealed a number of important protective factors against the development of AN. Specifically, it was acknowledged that the open discussion of feelings within the family and being taught appropriate coping mechanisms were considered important for the prevention of EDs, as many sufferers reported the ED developing as a way of coping with negative or overwhelming emotions (Loth et al., 2009). The importance of parents helping their children to develop a healthy relationship with food was also discussed, and it was suggested that parents should minimise food rules and should strive to provide healthy food options and make mealtimes a positive family experience (Loth et al., 2009).

The ‘anorexic family’.

Early research attempted to characterise families with a member with AN. Such families were often characterised as well-functioning, financially stable, success-oriented, hard-driving, and perfectionistic (Bruch, 1978; Brumberg, 1988). Academic achievement was also emphasised, as these children were often sent to success-oriented schools and were exposed to an active social life and broad cultural environment (Bruch, 1978; Fairburn & Brownell, 2002). The typical ‘anorexic family’ was also identified as being controlling, with
rigid organisation and rules, and non-confrontational (Brumberg, 1988; Fairburn & Brownell, 2002). In fact, it has been reported that families with a child with AN are so eager to maintain harmony that conflicts and negative feelings are often ignored (Bruch, 1973), so it is likely that the family may ignore a problem with eating as it develops. In parallel with the pursuit of the familial ideal, is the family’s emphasis on external appearance (Bruch, 1978), which presumably influences a pubertal girl’s self-perception and body satisfaction. Moreover, girls with AN in this competitive and success-oriented family environment have reported frequently feeling the need to live up to these family expectations of perfectionism (Bruch, 1978). Recently, however, this early research has been criticised for blaming parents and families for the development of AN (Le Grange, Lock, Loeb, & Nicholls, 2009). Thus, it is important to acknowledge that much of the previous research that suggests the family has a role in the development and maintenance of AN is not causal research, but rather has highlighted the presence of patterns of specific behaviours and attitudes in families with a member with AN.

2.5.1c Socio-cultural factors.

A multitude of socio-cultural factors have been highlighted as possible risk factors for AN. It is difficult to reach any definitive conclusions that these factors cause AN; however, it seems that particular aspects in an individual’s social and cultural environment may be a predisposing factor to the development of AN.

Activities and occupation.

Research suggests that females in certain professions or with special interests and hobbies, including those in the fashion industry, models, ballet dancers, and athletes may be at a greater risk for developing AN than those who do not partake in such activities (Abraham, 1996; Davis et al., 1997; Garner & Garfinkel, 1980). One such study by Garner and Garfinkel (1980) examined the prevalence of AN and AN symptoms in young adult
female professional dance and fashion model students, a music student control group, who also undergo competitive training but without an emphasis on body shape, and a general control group. AN was identified in 6.5% of the dance group and 7% of the model group (Garner & Garfinkel, 1980). Despite, half of the model group with AN having an onset prior to the modelling course, this is still proportionately more than what is experienced by the general population. Furthermore, no cases of AN were identified in either of the control groups (Garner & Garfinkel, 1980). In general, the dance and modelling students reported a higher incidence of eating pathology than control participants (Garner & Garfinkel, 1980). When comparing females belonging to the highly competitive dance schools to the music students, who were also highly competitive but not body image focussed, dance students reported significantly higher eating pathology (Garner & Garfinkel, 1980). Interestingly, the students from the more competitive dance schools reported more eating pathology and significantly lower weight than those from the less competitive dance school (Garner & Garfinkel, 1980). It was concluded that body-focused competitive environments may be a risk factor for eating pathology, since music students did not report maladaptive eating behaviours despite being in a competitive environment (Garner & Garfinkel, 1980). It seems that competitive environments that emphasise a lean body shape place individuals at an increased risk of developing AN. A possible simultaneous relationship exists in that increased competitiveness in these environments also increases the risk of eating pathology, and, hence, the possible development of AN.

Correspondingly, in a study comparing adolescent female ballet dancers and school students, Abraham (1996) revealed that 12% of ballet dancers, compared to only 1% of control students, reported an underweight BMI below 16. Ballet dancers also reported a significantly higher frequency of eating disturbances compared with the school students. Abraham (1996) concluded that young ballet dancers are at an increased risk of developing
AN due to their requirement to sustain a below average body weight while performing above average exercise, and, thus, require support and advice with their eating and weight control behaviours.

Overall, it has been concluded that certain activities and occupations, such as competitive dancing and modelling, emphasise the importance of a lean figure, and such activities are also more common for female children than male children. Interestingly, Treasure et al. (2005) considered whether the requirements of a lean physique in these activities and professions encourages the development of AN, or whether individuals already vulnerable to AN are attracted to these worlds where skinny is idealised, which then only proliferates the disorder.

**Influence of peers.**

Peers become highly important to children once they leave the family home and commence school. As such, peer attitudes and behaviours, alongside the pressures to conform, can begin to frame an individual’s likes, dislikes, and behaviours, and can be more influential than reason and fact. There is recent research that suggests that peers can be a risk factor for the development of EDs (Dohnt & Tiggemann, 2006b; Ogle & Damhorst, 2000; Paxton, Schutz, Wertheim, & Muir, 1999).

In a study of adolescent female friendship cliques, Paxton et al. (1999) revealed that the more an adolescent female regarded her friends as a source of influence, had friends concerned with thinness and dieting, experienced peer teasing, and made body comparisons with peers, the higher their body image concern, dietary restraint, and extreme weight loss behaviours. In fact, it was found that viewing friends as a source of influence and body comparison was significantly associated with body image concern, dietary restraint, extreme weight loss behaviours, and binge eating (Paxton et al., 1999). Furthermore, more pressure...
from peers to be thin was significantly associated with higher body image concerns and dietary restraint (Paxton et al., 1999).

Similarly, Ogle and Damhorst (2000) found that adolescent females, who were dieting for one to two weeks, reported being motivated by dieting peers. Moreover, in a large longitudinal study by Field et al. (2008) it was found that pre-adolescent and adolescent females who thought that being thin was important to their peers were at an increased risk of starting weekly binge eating and purging. Research by Dohnt and Tiggemann (2006b) highlighted the influence of peers in Australian primary school girls aged 6 to 10 years. More frequent discussions with friends that were appearance-related and imitating of peers was associated with lower appearance satisfaction (Dohnt & Tiggemann, 2006b). Moreover, the perception that their best friend had a desire for a thinner body, at the initial assessment, significantly predicted a higher desire for thinness and lower appearance satisfaction and self-esteem one year later (Dohnt & Tiggemann, 2006b). Importantly, this is only the participants’ perception of their best friend’s desire for a thinner body, not the best friend’s actual report. Nonetheless, if the frequent appearance-related discussions are about the desire for thinness, then the participants may be more aware of their friend’s body concerns and desires. In another research paper, Donht and Tiggemann (2006a) found that the body dissatisfaction of Australian primary school girls aged 6 to 8 years was associated with their perceived peer body dissatisfaction, which highlights the influence of peer norms.

Evidently, peer relationships can have an impact on the body image and eating behaviours of female children and adolescents. Importantly, certain peer influences may only increase the susceptibility to developing an ED, which may be related to the increase in body dissatisfaction and exposure to negative eating behaviours. Paxton et al. (1999) proposed a number of explanations for the similarities in body image concerns and eating behaviours for friendship groups from their study, which can also be applied to the other research in this
domain. Girls may model the eating and body image attitudes and behaviours of their friends (Paxton et al., 1999). Alternatively, girls may join particular friendship groups based on pre-existing personal characteristics, in that girls who have more body image concerns may be more likely to befriend girls with similar weight and shape concerns (Paxton et al., 1999). In this case, it was proposed that the friendship group environment may be an effective marker of maladaptive eating and weight behaviours (Paxton et al., 1999). Finally, it was suggested that since this study was based on the perceptions of girls in these groups, it may be that those who have body image and dieting concerns may only perceive their friends to have similar issues as a means of normalising their own concerns (Paxton et al., 1999).

**Societal thin ideal.**

AN has often been described as a ‘Western culture’ disorder, as it is most commonly reported in societies of middle to upper-class competitive environments where ‘looking good’ is important and a thin physique is idealised (Brumberg, 1988; Treasure et al., 2005). This culture promotes the perception that power, self-worth, happiness, success, health, and positive relationships are rewards for attaining a perfect body (Brownell, 1991; Levitt, 2003) and that self-improvement and self-development are dependent on physical appearance (Thomsen, Weber, & Brown, 2002). It is further stereotyped that thin females are hardworking, independent, and have self-control (Brownell, 1991; Hesse-Biber, Leavy, Quinn, & Zoino, 2006). On the contrary, overweight individuals are viewed as lazy, lacking in self-control, self-indulgent, and moral failures (Brownell, 1991; Hesse-Biber et al., 2006).

It is most commonly females in Western cultures who are seduced by these societal pressures of the cult of thinness (Fairburn & Harrison, 2003; Hesse-Biber et al., 2006). Societal ideals of thinness are most commonly portrayed through the media, including beauty and fashion magazines, television programs, and advertisements, which also include messages from the food, diet, and fitness industries (Brownell, 1991; Hesse-Biber et al.,
The diet and nutrition industries emphasise nutrition books and magic pills and potions, while the exercise industry promotes home exercise equipment and health clubs and memberships through a range of media (Brownell, 1991). There has also been a significant increase in the number of dieting and exercise articles in women’s magazines (Wiseman, Gray, Mosimann, & Ahrens, 1992). Notably this refers solely to articles emphasising weight loss techniques, not diet and exercise advertisements (Wiseman et al., 1992). Unfortunately, the media emphasise the importance of external beautification, reinforcing society’s preference for thinness, which can exacerbate a female’s preoccupation with her body (Brumberg, 1988; Thomsen et al., 2002). These messages may also be portrayed by the Australian Government, which highlights an ‘obesity epidemic’ and has established a National Obesity Task Force, which may unintentionally generate a fear of fatness in vulnerable individuals (The National Obesity Task Force, 2003). Furthermore, Klein et al. (2006) highlighted the importance of physicians discussing healthy body image issues and nutrition with all adolescent patients, since their study with adolescents aged 14 to 18 years found that when adolescents met with their physician there was more emphasis placed on the prevention of being overweight and obese, rather than the risks of developing an ED. Notably, 29% were considered ‘at risk’ of being overweight, while 1.1% were ‘at risk’ of developing an ED (Klein et al., 2006), which corresponds with the prevalence rate in the general population. Importantly, adolescents may only be receiving a message from their physicians to avoid obesity, which may contribute to a fear of fatness, rather than promoting the important message of maintaining a healthy eating and exercise lifestyle.

In line with these societal ideals lie three fundamental assumptions. First, that these idealised and unrealistic female figures are actually achievable (Hesse-Biber et al., 2006). Second, that the body can be manipulated and changed with the ‘right’ program, exercise, and eating habits (Brownell, 1991). Finally, as mentioned earlier, there is an assumption that
those who attain a thin physique are more attractive and will be rewarded, such that their life and relationships will improve (Brownell, 1991).

Obviously everyone in society is exposed to these socio-cultural values, however, some individuals are influenced by these values more than others because not everyone goes on to develop AN. The means by which socio-cultural values increase one’s risk of developing AN is most likely to be through the internalisation of the thin ideal (Stice, 2001; Stice, Schupak-Neuberg, Shaw, & Stein, 1994). Particular individuals, when exposed to the thin ideal then develop a discrepancy between the self they perceive and the self they desire to be, which contributes to feelings of body dissatisfaction and low self-esteem (Striegel-Moore & Bulik, 2007). Recent research has highlighted that, for adolescent females, internalisation of society’s thin ideal and the perceived pressure to be thin are predictive of body dissatisfaction (Knauss, Paxton, & Alsaker, 2007; Stice, 2001). It has also been reported that individuals who are sensitive to the criticism and rejection of others are also sensitive about their appearance, and it has been postulated that these individuals are at an increased risk of accepting the cultural thin ideals as they perceive thinness as a way of avoiding criticism and rejection (Atlas, 2004).

The process of internalisation has been described by a number of different theories, including cultivation theory, uses and gratifications theory, and social comparison theory. Cultivation theory proposes a cumulative model of social influence, in that increasing one’s exposure to society’s thin ideals may increase their susceptibility to poor body image and ED symptoms (Atlas, 2004; Hesse-Biber et al., 2006). This theory may help to explain why EDs are more prevalent among females, who have a greater exposure to beauty and fashion magazines, dieting programs, and activities, such as dancing and modelling. Alternatively, the uses and gratifications theory suggests that females play a more active role in how they internalise media images and act upon them, as it proposes that females with a more positive
body image may not allow themselves to be seduced by unachievable media images (Hesse-Biber et al., 2006). Social comparison theory proposes that young females develop a negative body image because they evaluate and compare their own appearance based on what they see in magazines and on television (Hargreaves & Tiggemann, 2004). Social comparison has also been demonstrated with sister pairs discordant for AN, with the sister with a history of AN reporting significantly more sister comparisons than the sister without a history of AN (Karwautz et al., 2001).

Substantial research has demonstrated the internalisation of society’s thin ideal and the negative effects it may have on the body satisfaction, self-esteem, and subsequent eating habits of young females. In a prospective study of university undergraduate female students, Stice et al. (1994) revealed a small simultaneous increase in ED symptomatology when media exposure and gender-role endorsement increased. The more a student internalised society’s ideal body stereotype, as assessed by a measure created for the study, the higher the body dissatisfaction, which related to increased ED symptomatology (Stice et al., 1994). Similarly, Australian research has highlighted that primary school females who watch more television programs with an appearance-focus are at risk of higher body dissatisfaction (Dohnt & Tiggemann, 2006b). Correspondingly, a negative correlation has been found between reading women’s magazines and appearance satisfaction, as girls aged 5 to 8 years who looked at women’s magazines reported lower satisfaction with their own bodies (Dohnt & Tiggemann, 2006a). Watching music television and looking at more teenage, women’s, and appearance-focussed magazines was also predictive of dieting awareness (Dohnt & Tiggemann, 2006a), which suggests that exposure to thin idealised images through the media introduces youth to a range of more mature concepts.

Hargreaves and Tiggemann (2004) conducted a prospective analysis of the influence of idealised beauty in the media on the body image of both adolescent females and males.
Participants were 310 girls and 285 boys from South Australian secondary schools, and were between school years 8 and 12, with an average age of 14.3 years (Hargreaves & Tiggemann, 2004). The female students were divided into two approximately equal groups, where one group was exposed to commercials emphasising the thin ideal, and the other group was exposed to commercials that were not appearance focussed (Hargreaves & Tiggemann, 2004). Similarly, the male students were divided into two approximately equal groups, where one group was exposed to commercials emphasising the muscular ideal, and the other group was exposed to commercials that were not appearance focussed (Hargreaves & Tiggemann, 2004). Results showed that the adolescent females who were exposed to advertisements emphasising the thin ideal reported significantly higher body dissatisfaction than the females who were exposed to non-appearance focussed advertisements (Hargreaves & Tiggemann, 2004). Those exposed to the thin ideal advertisements also made significantly more appearance comparisons with the actors who appeared in the advertisements, which highlighted the influence of internalising the thin ideal through social comparison mechanisms (Hargreaves & Tiggemann, 2004). Hargreaves and Tiggemann (2004) further concluded that females tend to internalise self-related appearance information more automatically and more deeply than males do, which may also explain why EDs are significantly more prevalent in females. As such, women’s beauty and fashion magazines have been considered a principal culprit in transmitting the thin ideal to women. Specifically, Thomsen et al. (2002) found that in female secondary school students the frequency of reading beauty and fashion magazines was positively associated with the use of appetite suppressants, skipping two meals a day, intentional vomiting, and restricting calories.

As stated, the means by which these societal values increase an individual’s vulnerability to developing an ED is through internalisation of society’s standards of attractiveness (Vartanian, 2009). An analysis of adolescent females, aged between 13 and 17
years, revealed that thin ideal internalisation was associated with an increase in body dissatisfaction, which was subsequently related to an increase in dieting and negative affect (Stice, 2001). It has further been shown in a female sample, ranging from 14 to 59 years of age, that greater internalisation of societal standards of attractiveness is associated with increased body dissatisfaction, drive for thinness, dietary restraint, and diminished self-esteem (Vartanian, 2009). In fact, internalisation was shown to be the strongest independent predictor of body image and dieting concerns (Vartanian, 2009). Importantly, Vartanian (2009) highlighted that a poor sense of self-identity may increase a female’s vulnerability to internalising societal standards of thinness and attractiveness. Thus, it is important to examine how this sense of self-identity is affected, and how this increases the risk of developing body weight concerns and subsequent unhealthy weight control habits, which are two precipitating factors of AN, to be discussed below. Brownell and Rodin (1994) highlighted the importance of society-wide education regarding accepting different body shapes and sizes in much the same way that society accepts differences in eye and hair colours. This may help in minimising the societal ideal of a thin body. It was further suggested that society must acknowledge that the unrealistic belief that the body can be easily shaped and moulded increases an individual’s risk of developing an intense preoccupation with food and weight and a possible subsequent ED (e.g., Brownell & Rodin, 1994).

2.5.2 Precipitating Factors

The next major element in Garner and Garfinkel’s (1980) model of the development and maintenance of AN is precipitating factors. Precipitating factors are the necessary factors that precede the development of AN by triggering an individual’s vulnerability to one or a combination of the previously reviewed predisposing factors. The most simplistic way of describing the development of this complex illness is to acknowledge that the reviewed predisposing factors may place an individual at increased risk of developing eating, weight,
and shape concerns, and may further increase an individual’s inability to cope with stressors, such as the transition through puberty. Subsequently, the way of controlling these feelings of inadequacy to cope with distress, together with possible body dissatisfaction and low self-esteem, is to diet.

2.5.2a Stressors.

Life transitions are considered very important precipitating factors to the onset of AN, and ED patients have reported the importance of parental support in protecting a child during periods of transition (Loth et al., 2009). It has been documented that parental love and attention during transition periods, as well as teaching young people ways to love themselves and supporting them in finding their own identity, is a critical protective factor precipitating the development of an ED (Loth et al., 2009). Moreover, the ED patients in the study by Loth et al. (2009) reported that their ED started to develop during a challenging time, such as a difficult transition, personal struggle, or negative influence.

Adolescence is a well-documented stressful transition period; it is a time when an individual must cope with physical changes to their appearance and body shape, as well as develop a sense of self-concept (Bruch, 1978). Adolescence is also most often the time during which the onset of AN is typically reported (American Psychiatric Association, 2000; Fairburn & Harrison, 2003). In some cases, the normal changes and development of puberty is viewed as ‘fatness’, which may be influenced by the societal view of the ‘ideal’ body, as well as the fact that the weight gain experienced by adolescent females is often in less than ideal places, such as stomach and thighs (Bruch, 1978; Garfinkel & Garner, 1982). Parallel to these body changes, menstruating girls have reported higher drive for thinness and higher body dissatisfaction than premenstrual girls (Wertheim et al., 2002). There is further research supporting the notion that maturation and sexuality are minor risk factors for AN, since 24% of young adult female AN patients reported events evoking sexual shame or disgust prior to
the onset of AN (U Schmidt, Tiller, Blanchard, Andrews, & Treasure, 1997). Research by Swarr and Richards (1996) highlighted some possible mediating factors between the experience of adolescence and the development of AN in adolescent females. Perception of the timing of puberty, in comparison with peers, was important, with results indicating that girls who perceived puberty to be early reported higher ED symptomatology than girls who perceived their puberty to be later, indicating the importance of being on time with the development of their peers (Swarr & Richards, 1996).

The relationship and support from a girl’s father was also considered paramount. Adolescent females who report developing earlier than their peers are considered at-risk of unhealthy eating; however, spending time with their father during this transition period appeared to be somewhat of a protective factor (Swarr & Richards, 1996). Swarr and Richards (1996) explained that fathers can play an important role in the development of AN. Young females may grow to detest their body and feel that their changing body is unacceptable because some fathers may distance themselves due to not knowing how to deal with the discomfort of their daughter’s puberty and sexual maturity (Swarr & Richards, 1996). Hence, fathers who maintain a closeness with their daughters during this transition period may help their daughters to accept their changing bodies (Swarr & Richards, 1996).

Evidently, it is during this life transition that adolescents are vulnerable to the negative impact of the range of predisposing factors that have been discussed. This transition is related to changes in an adolescent’s perceptions of their world and their self, which increases the risk of developing low self-esteem and body dissatisfaction, and subsequent disordered eating.

Disruptive life events are other important transitions that have been related to the onset of EDs (Fairburn, Cooper, Doll, & Welch, 1999). Research has illustrated that a change of parent figure, frequent house moves, and severe personal health problems were
reported by significantly more females, aged 16 to 35 years, with a history of AN compared with healthy control females (Fairburn et al., 1999). Those with a history of AN also reported significantly more frequent house moves than control participants with a psychiatric disorder (Fairburn et al., 1999). Notably these disruptive events may have an additive effect when combined with the transition to adolescence.

Substantial research has further highlighted that the experience of abuse can be a major stressor and precipitating factor to the onset of AN (Fairburn et al., 1999; Fairburn & Harrison, 2003; Johnson, Cohen, Kasen, & Brook, 2002; Karwautz et al., 2001). In a retrospective study, Fairburn et al. (1999) revealed that, compared with healthy controls, significantly more young females with a history of AN reported some form of abuse, which included sexual abuse, repeated severe sexual abuse, physical abuse, or repeated severe physical abuse. Additionally, a longitudinal investigation illustrated that, compared with those who have not experienced abuse, children who have experienced physical neglect or sexual abuse are significantly more likely to be at risk of developing an ED, recurrent fluctuations in weight, strict dieting, and self-induced vomiting in adolescence or early adulthood (Johnson et al., 2002). It was further identified that sexual abuse was a risk factor for self-induced vomiting, while physical abuse was a risk factor for low body weight in young females (Johnson et al., 2002). Halse, Honey, and Boughtwood (2008) summarised two pathways in which physical and/or sexual abuse may contribute to the development and maintenance of AN. First, it was suggested that, as a means of coping with the abuse and gaining control of their life, the abused individual may turn to controlling their eating and weight (Halse et al., 2008). Second, a self-hatred develops for the abused individual’s body, which is expressed by striving for excessive thinness in order to make their body less appealing and desirable to their abuser (Halse et al., 2008). Importantly, this abuse often occurs at a time when an individual is vulnerable during their transition into adolescence.
(Lawton, 2009). The adolescent is already adapting to the challenges of a changing physique, thus, increasing their inability to cope with their current life events and augmenting their desire for control over their life and body (Lawton, 2009).

2.5.2b Control.

It has been proposed that by refusing to eat an adolescent asserts control over her body, which is indicative of controlling the life she feels she cannot control and feelings of ineffectiveness; thus, she can cope with issues of autonomy, individuation, and sexual development (Bruch, 1978; Brumberg, 1988; Levitt, 2003). Research highlights that control over eating is used as a coping mechanism for managing life stressors (Bruch, 1978; Pike & Rodin, 1991). Ruggiero et al. (2003) revealed that, for adolescent females, a stressor leads to feeling out of control due to perfectionistic tendencies and a fear of failure, which can increase the drive for thinness as a means of gaining control. Self-control in AN may be regarded as a feature of perfectionism, since individuals with AN restrict their intake of food and limit pleasurable activities as a way of asserting control (Shafran et al., 2002). Nevertheless, an important element of control is the previously discussed perfectionistic tendencies of individuals with AN (Anderluh et al., 2003; Halmi et al., 2000). It has been acknowledged that perfectionism often provides a structure to an individual’s life and gives them a sense of control (Shafran et al., 2002). Moreover, the thinness of an individual with AN is a display of their self-control and is viewed as an achievement (Levitt, 2003).

2.5.2c Dieting.

A consistent finding in the research of EDs is that, most typically, AN commences with dieting (Bruch, 1978; Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). It has been suggested that dieting is a key precipitating behavioural factor, which works in conjunction with a range of predisposing and other precipitating factors, to increase one’s risk of developing AN (Favaro et al., 2003; French & Jeffery, 1994). In fact, research with
young adult women has demonstrated that the number of diets is a significant predictor of developing an ED, with the risk increasing as the number of diets increases (Favaro et al., 2003). Researchers have asserted that once severe dieting has commenced, so has the path to an ED (Patton et al., 1999). Specifically, it was revealed that female adolescents who were severe and moderate dieters were at an 18-fold and 5-fold risk of developing an ED, respectively, compared with female adolescents who did not diet (Patton et al., 1999).

French and Jeffery (1994) further highlighted that it is females in middle and upper class societies who tend to diet the most, and AN is most common among this cohort of women. A study by McCreary and Sasse (2002) emphasised the difference in dieting behaviours of adolescent and young adult men and women and highlighted the societal norm that females diet. Alarmingly, it has been found that moderate dieting is widespread among adolescent females (French, Story, Downes, Resnick, & Blum, 1995; Patton et al., 1999). A study of 101 female secondary school students found that 48% were dieting to lose weight and reported high body dissatisfaction (McCreary & Sasse, 2002). There appears to be a societal expectation, in the Western world, that dieting to control one’s body shape and weight is part of the rite of passage from girlhood to adulthood, as it may be viewed as part of the female gender role (Ogle & Damhorst, 2000). This is disconcerting as dieting has been identified as a major precipitating factor of AN and many young females are engaging with the notion and practice of dieting. Furthermore, it has been demonstrated that dieting is related to significantly higher rates of depression (McCreary & Sasse, 2002), increased substance use, and a general pattern of negative psychosocial and health behaviour variables (French et al., 1995).

There is debate surrounding the benefits and harmfulness of dieting, with proponents from the obesity field emphasising the importance of dieting for those who are overweight and at medical and psychosocial risk, while opponents from the ED field argue that dieting is
the central precipitating feature of AN (Brownell & Rodin, 1994). Importantly, the rates of
dieting often exceed the prevalence of obesity, particularly in women; thus, many women
who are not obese are dieting (Brownell & Rodin, 1994). This ratio imbalance has been
identified in a number of studies. Specifically, Klein et al. (2006) revealed that 32.8% of
adolescent females with an ideal or underweight BMI reported weight loss attempts.
Correspondingly, Santonastaso et al. (1996) highlighted the distortion in body perception in a
sample of 359 adolescent females, wherein 8.6% of the 57 underweight females perceived
themselves to be fat, and only 39% correctly recognised that they were too thin.
Furthermore, 29% of the 244 girls in the ideal weight range for their age and height perceived
themselves to be fat (Santonastaso et al., 1996). Evidently, there is significant body
distortion in adolescent females, subsequently relating to unnecessary dietary restraint, which
is placing these females at an increased risk of developing AN.

2.5.3 Perpetuating Factors

As dieting behaviours continue and become more rigid, a range of psychological and
biological effects occupy the individual to maintain the disordered eating patterns. It has
been acknowledged that dietary restraint can not only lead to an obsession and preoccupation
with food, but an eventual enjoyment of being hungry for individuals with AN, particularly
once the biological effects of hunger take over and alter bodily sensations (Bruch, 1978).

2.5.3a Effects of starvation.

There are a range of psychological characteristics of individuals with AN that
manifest in behaviours and thought processes following the onset of AN. Interestingly, these
characteristics of individuals with AN have remained consistent from the early classifications
of the disorder (Bruch, 1978; Garfinkel & Garner, 1982). Distorted perceptions are highly
evident among individuals with AN, who often experience both a distorted perception of their
body shape and weight and distorted satiety perception. Initially, some individuals with AN
view themselves as heavier than they are and consider it necessary to lose weight, while others may view particular body parts as being fat, which are commonly the abdomen, thighs, and buttocks (Garfinkel & Garner, 1982). Once AN develops, individuals with AN then continue to fail to see their body as it is, as many do not see their emergent emaciation and believe they are fine despite family and friends being concerned over their diminishing size (Bruch, 1978). This is related to their extreme drive for thinness, which facilitates the distortion of true body perception. Also related to this distorted body perception is the denial of symptoms, which is present in almost all individuals with AN who rarely recognise that they have a problem with their eating (Bruch, 1973). What is puzzling is the notion that, although individuals with AN claim to not see their emaciation, they are exceedingly proud of their progressively skeleton-like appearance, which is often viewed as an achievement of self-discipline and supreme control (Bruch, 1978).

Individuals with AN further exhibit distorted satiety perception, also referred to as limited interoceptive awareness, where they report feeling full and severely bloated after the consumption of a very small amount of food, for example a biscuit (Garfinkel & Garner, 1982). Bruch (1978) suggested that it is not that individuals with AN do not have an appetite, but rather that they convince themselves they are not hungry so as to avoid their ‘dreaded fate’ of becoming fat; thus, their perceptions and feelings become altered. Bruch (1978) further summarised reports of female patients, some who argued not feeling hunger and others enjoying the feeling of hunger as it made them feel thinner. Evidently, these thoughts and subsequent behaviours facilitate the maintenance of the AN.

AN is further characterised by an intense preoccupation with food, which develops as starvation progresses (Bruch, 1978; Garfinkel & Garner, 1982). Individuals with AN often report intrusive thoughts about food and food-related activities, including cooking family meals, reading a great deal of nutrition and recipe books, constantly talking about it, and
enjoying feeding those around them, despite restricting themselves of food (Bruch, 1978; Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). Unfortunately, this preoccupation with food has been proposed to amplify the dieting behaviour of individuals with AN because the fear of not being able to control appetite is intensified (Garfinkel & Garner, 1982). As these starvation-induced behaviours are exacerbated, individuals with AN may develop more quirks related to their eating pathology, including taking a long time to eat a small amount of food and refusing to eat in the presence of others (Garfinkel & Garner, 1982). Subsequently, individuals with AN often become isolated from their family and friends, in part due to their own isolating behaviours and because they feel misunderstood by those around them (Bruch, 1978; Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). This social isolation often results in withdrawal, feelings of loneliness and social inadequacy (Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). Moreover, social isolation is paralleled by the narrowing of interest in the outside world and activities. Many girls lose interest in friends and social activities as their preoccupation with food and weight loss invades their constant thoughts (Garfinkel & Garner, 1982). Many also lose interest in sex and avoid sexual encounters and the opposite sex altogether (Garfinkel & Garner, 1982). This isolation and narrowing of interests towards food and weight only amplifies the pathological eating behaviours that maintain the AN.

Guilt is another characteristic of AN, which is often induced by the individual with AN perceiving they have over eaten for that day, according to their self-imposed strict rules of daily allocated calorie intake (Bruch, 1978; Garfinkel & Garner, 1982). This guilt puts individuals with AN at danger of further food restriction the next day (Bruch, 1978; Garfinkel & Garner, 1982). Problematically, this daily limit of consumption is minimised as the disorder progresses, which makes it harder to maintain and makes ‘failure’ more likely; hence, the AN becomes more ingrained and cyclical.
Many of these effects of starvation were demonstrated in the well-known Minnesota Experiment (Keys, Brožek, Henschel, Mickelsen, & Taylor, 1950). Keys et al. (1950) conducted an experiment, with 32 men enlisted in the Selective Service System, to understand the effects of famine and how best to plan relief measures of the starving in Europe at the time. The participants were aged between 20 and 33 years, with an average age of 25.5 years, and were in good physical and mental health at the commencement of the experiment (Keys et al., 1950). The semi-starvation part of the experiment was conducted over six months and began with a rigid physical activity regime and strict control of food intake, with participants only receiving two small meals a day (Keys et al., 1950). In general, participants reported tiredness, irritability, hunger pains, and depression, as a result of the semi-starvation (Keys et al., 1950). As the experiment progressed some participants reported feeling hungry all the time, others became defensive over food, and there was a general preoccupation with food, as participants often discussed, read about, or dreamed about food (Keys et al., 1950). Psychologically, the participants experienced emotional instability as a result of the distress from starvation (Keys et al., 1950). Periods of depression and feelings of ineffectiveness in daily living were also reported by the participants, and social isolation became more apparent as the experiment continued (Keys et al., 1950). Evidently, these findings highlight the effects of starvation on physical and psychological well-being in an experimental setting; however, the psychological and behavioural features reported by the participants in the Minnesota Experiment have also been demonstrated in individuals with AN, as previously discussed.

2.6 Summary

AN is a multi-determined psychosomatic disorder, which can be psychologically, biologically, and environmentally driven. It is a disorder that most commonly affects a small proportion of females, with an onset primarily during adolescence. The difference in each
individual’s journey to an AN diagnosis is a product of the unique combination of predisposing individual and environmental factors, along with precipitating factors that lead to the commencement of dieting behaviours and weight loss strategies. Researchers have highlighted that one’s psychological and biological predispositions, familial attitudes and behaviours, social environment, peer behaviours, and societal thin ideal may increase an individual’s vulnerability to being unable to cope with a stressor, or combination of stressors, including life transitions, events, or cruel remarks on one’s physical appearance (Anderluh et al., 2003; Brumberg, 1988; Dohnt & Tiggemann, 2006a; Garfinkel & Garner, 1982; Garner & Garfinkel, 1980; Halse et al., 2008; Loth et al., 2009; Pike & Rodin, 1991; Shafran et al., 2002). The combination of these factors then reinforces often pre-existing over-evaluation of shape and weight, feelings of body dissatisfaction, and low self-esteem, typically contributing to the need for controlling these events and feelings, leading to a displacement of control on one’s appearance and eating (Brumberg, 1988; Halse et al., 2008; Neumark-Sztainer et al., 1996; Paxton et al., 1991). Initially, the intention is to lose a little weight; thus, the process of food restriction begins (Bruch, 1978; Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). These behaviours and any observable weight loss are then reinforced by family, peers, or society, and the psychological effects of starvation; thus, these weight loss behaviours continue and can become ingrained in the person as they become more and more dissatisfied with their perceived weight and set more weight loss goals (Bruch, 1978; Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). Each of the reviewed predisposing and precipitating factors of AN can be related, in some way, to the commencement of dieting behaviours; thus, dieting is the fundamental precipitator for the development of AN. Advances in the knowledge and understanding of AN have evolved over the past 140 years; however, AN still remains one of the most potentially fatal mental health disorders,
highlighting the importance of further research to gain a deeper understanding into the disorder.

2.7 Thesis Aim

As discussed above, AN is typically a chronic mental health disorder with significant psychological and physical ramifications; it can be difficult to treat, and has a high mortality rate when not treated. Extensive previous research has shown that there is a complex array of factors, both related and unrelated to eating, weight, and body shape, that can combine to facilitate the onset of AN. Increasingly, research is placing more emphasis on the role of the factors not related specifically to eating, weight, and shape, such as perfectionism, and how such factors may influence the development and maintenance of AN. Thus, it is important to better understand the characteristics unrelated to eating, weight, and shape, with which AN patients present. Given that AN usually develops during adolescence, and affects significantly more females than males, it is important to understand AN as it occurs in adolescent females. Thus, the aim of this thesis is to enhance the understanding of AN by further exploring the characteristics of adolescent females with AN or subthreshold AN by focussing on constructs not limited to AN diagnostic criteria. Specifically, this thesis will examine a homogeneous AN sample of adolescent females and evaluate the typologies that may arise, followed by an analysis of the maladaptive core beliefs that may underlie the presentation of AN in adolescent females.
CHAPTER 3: Research on Eating Disorder Typologies

3.1 Introduction

As explored in Chapter 2, it is important to understand the characteristics of AN patients given that the development and maintenance of the disorder can be influenced by the unique combination of a range of factors (Garner & Garfinkel, 1980). In an attempt to better understand ED patients and the characteristics they present with, researchers and clinicians have considered the classification of different ED profiles as important, not only in the recognition of different sub-disorders but also the implications of different profiles of characteristics on subsequent treatment interventions (Sloan et al., 2005; Turner & Bryant-Waugh, 2004; Turner et al., 2009). Specifically, the examination of the characteristics distinguishing ED patients, and the impact of these characteristics on treatment outcomes, facilitates a better understanding of an ED patient presenting to a clinic as well as the application of tailored interventions aimed at targeting these characteristics. Cluster analysis has been commonly used in clinical research to identify and define discrete ED profiles (Clinton, Button, Norring, & Palmer, 2004; Espelage, Mazzeo, Sherman, & Thompson, 2002; Grilo, 2004; Strober, 1983; Turner, Bryant-Waugh, & Peveler, 2010). This chapter will explore the clinical studies that have used a range of clustering methodologies with different clinical samples in an attempt to identify statistically derived ED profiles and the characteristics forming these profiles. Specifically, Table 3.1 outlines a number of published studies selected because of their use of a cluster analytic approach to profile ED patients.
Table 3.1

Summary of Studies Applying Cluster Analysis to EDs

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Constructs</th>
<th>Measures</th>
<th>Analysis</th>
<th>Results</th>
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<tbody>
<tr>
<td>Chen &amp; Le Grange, 2007</td>
<td>98% female, ED outpatient clinic, aged 12-19 years (M = 16.1), diagnosis of BN (N = 80)</td>
<td>ED pathology &amp; negative affect; comorbidities; &amp; outcome</td>
<td>BDI; RSE; EDE-Interview; K-SADS</td>
<td>K-means</td>
<td>2 clusters: Dieting; Dieting-depressive</td>
</tr>
<tr>
<td>Claes et al., 2006</td>
<td>Female, ED inpatient &amp; outpatient, M = 22.64 years, diagnosis of AN, BN, &amp; EDNOS (N = 335)</td>
<td>Personality, ED pathology, &amp; psychiatric symptoms</td>
<td>NEO-FFI; ADP-IV; EDES; SCL-90; MALT</td>
<td>Two-steps – Ward’s hierarchical &amp; then K-means</td>
<td>3 clusters: Undercontrollers; Resilients; Overcontrollers</td>
</tr>
<tr>
<td>Clinton, Button, Norring, &amp; Palmer, 2004</td>
<td>Female, ED clinic samples, Swedish aged 14-19 years (M = 24.5) (N = 631), English aged 15-61 years M = 25.1 (N = 472), diagnosis of AN, BN, BED, &amp; EDNOS</td>
<td>Clinical utility - ED features</td>
<td>Semi-structured interviews to generate operational DSM-IV diagnoses</td>
<td>Hierarchical cluster analysis</td>
<td>3 clusters: Generalised ED; Overeater; Anorexics</td>
</tr>
</tbody>
</table>

Note.  BDI = Beck Depression Inventory; RSE = Rosenberg Self-esteem Scale; EDE = Eating Disorder Examination; K-SADS = The Schedule for Affective Disorder and Schizophrenia for School-Age Children; NEO-FFI = Neuroticism, Extraversion, Openness to New Experience-Five Factor Inventory; ADP-IV = Assessment of DSM-IV Personality Disorders; EDES = Eating Disorder Evaluation Scale; SCL = Symptom Checklist; MALT = Munich Alcohol test
### Table 3.1 continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Constructs</th>
<th>Measures</th>
<th>Analysis</th>
<th>Results</th>
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<tbody>
<tr>
<td>Clinton &amp; Norring, 2005</td>
<td>Female, ED clinic sample (range of treatment forms), aged 14-49 years (M = 24.5), diagnosis of AN, BN, BED, &amp; EDNOS (N = 601)</td>
<td>Clinical utility – ED features; psychiatric comorbidity</td>
<td>Semi-structured interview; EDI-2; SCL-90</td>
<td>Hierarchical cluster analysis</td>
<td>As per Clinton et al., 2004. Clusters showed greater clinical utility than diagnosis</td>
</tr>
<tr>
<td>Espelage, Mazzoeo, Sherman, &amp; Thompson, 2002</td>
<td>Female, ED outpatient treatment program, M = 21.81 years, diagnosis of AN, BN, &amp; EDNOS (N = 183)</td>
<td>ED &amp; personality</td>
<td>MCMI-II &amp; EDI</td>
<td>Ward’s algorithm</td>
<td>3 clusters: High-functioning; Undercontrolled/ Dysregulated; Overcontrolled/ Avoidant</td>
</tr>
<tr>
<td>Goldner, Srikameswaran, Schroeder, Livesley, &amp; Birmingham, 1999</td>
<td>Female, ED treatment clinic &amp; general university population, aged 17 – 46 years (M = 26.5), diagnosis of AN, BN, &amp; EDNOS, Clinic N = 163, Control N = 68</td>
<td>ED &amp; personality</td>
<td>DAPP-BQ</td>
<td>Ward’s algorithm</td>
<td>3 clusters: Rigid; Severe; Mild. ED pathology &amp; neuroticism are comorbid features.</td>
</tr>
</tbody>
</table>

*Note. EDI = Eating Disorder Inventory; SCL = Symptom Checklist; MCMI = Millon Clinical Multiaxial Inventory; DAPP-BQ = Dimensional Assessment of Personality Pathology – Basic Questionnaire*
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<tr>
<th>Study</th>
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<th>Analysis</th>
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<tbody>
<tr>
<td>Grilo, 2004</td>
<td>Female, psychiatric hospital – presenting with ED features, aged 13 – 18 years ($M = 15.6$), Score of 40 or greater on MACI ($N = 137$)</td>
<td>ED &amp; negative affect</td>
<td>MACI; BDI; RSE</td>
<td>K-means, with 2 clusters specified</td>
<td>2 clusters: Dieting; Dieting-depressive</td>
</tr>
<tr>
<td>Grilo, Masheb, &amp; Berman, 2001</td>
<td>Female, ED outpatient, $M = 31.8$ years, diagnosis of BN-P ($N = 48$)</td>
<td>ED &amp; negative affect</td>
<td>EDE-Questionnaire; QEWP-R; TFEQ; BDI; RSE; BSQ; ICS</td>
<td>K-means, with 2 clusters specified</td>
<td>2 clusters: Dieting; Dieting-depressive</td>
</tr>
<tr>
<td>Hay, Fairburn, &amp; Doll, 1996</td>
<td>Female, community sample, aged 16 to 35 years ($M = 24.7$), with recurrent binge eating based on responses to EDE-Q ($N = 250$)</td>
<td>ED features</td>
<td>EDE-Questionnaire; BSI; SAS; Parental &amp; personal obesity; SCID</td>
<td>Principal Components Analysis &amp; Ward’s cluster analysis</td>
<td>4 clusters: Severe ED with frequent purging; Severe ED with frequent objective bulimic episodes; High frequency of subjective bulimic episodes; Least disturbed</td>
</tr>
</tbody>
</table>

**Note.** MACI = Millon Adolescent Clinical Inventory; BDI = Beck Depression Inventory; RSE = Rosenberg Self-esteem Scale; EDE = Eating Disorder Examination; QEWP-R = Questionnaire on Eating and Weight Patterns-Revised; TFEQ = Three-Factor Eating Questionnaire; BSQ = Body Shape Questionnaire; ICS = Impulsivity Control Scale; BSI = Brief Symptom Inventory; SAS = Social Adjustment Scale; Structured Clinical Interview for DSM-III-R
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<tbody>
<tr>
<td>Holliday, Landau, Collier, &amp; Treasure, 2006</td>
<td>Female, ED register – lifetime prevalence of AN, $M = 33.6$ years, diagnosis of AN-R, AN-BP, or remitted ($N = 153$)</td>
<td>ED &amp; personality</td>
<td>DAPP-BQ</td>
<td>K-means</td>
<td>3 clusters: Broad personality disorder; Avoidant; Inhibited/ Compulsive</td>
</tr>
<tr>
<td>Mizes &amp; Sloan, 1998</td>
<td>94% female, inpatient &amp; outpatient ED treatment seeking, $M = 25.4$ years, diagnosis of EDNOS ($N = 53$)</td>
<td>ED features</td>
<td>Weight variables; EDI; MAC</td>
<td>Ward’s minimum variance method</td>
<td>2 clusters: Overweight binge-eating; Heterogenous EDNOS</td>
</tr>
<tr>
<td>Sloan, Mizes, &amp; Epstein, 2005</td>
<td>98% female, inpatient &amp; outpatient ED treatment seeking, $M = 25.4$ years, diagnosis of AN, BN, or EDNOS ($N = 159$)</td>
<td>ED features</td>
<td>EDI &amp; Weight variables</td>
<td>Ward’s minimum variance method</td>
<td>4 clusters resembling AN-R, BN, BED, &amp; subthreshold symptomatology</td>
</tr>
<tr>
<td>Stice &amp; Agras, 1999</td>
<td>Female, community ED sample, aged 15 – 50 years ($M = 28.3$), diagnosis of BN ($N = 265$)</td>
<td>ED, negative affect, comorbidities, &amp; personality</td>
<td>EDE-Interview; TFEQ; YBC-EDS; BDI; RSE; MPQ; SAS; SCID-I; SCID-II</td>
<td>K-means, with 2 clusters specified</td>
<td>2 clusters: Dieting; Dieting-depressive</td>
</tr>
</tbody>
</table>

*Note.* DAPP-BQ = Dimensional Assessment of Personality Pathology – Basic Questionnaire; EDI = Eating Disorder Inventory; MAC = Mizes Anorectic Cognitions; EDE = Eating Disorder Examination; TFEQ = Three-Factor Eating Questionnaire; YBC-EDS = Yale-Brown-Cornell Eating Disorder Scale; BDI = Beck Depression Inventory; RSE = Rosenberg Self-esteem Scale; MPQ = Multidimensional Personality Questionnaire; SAS = Social Adjustment Scale; SCID = Structured Clinical Interview for DSM Disorders.
<table>
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<tr>
<th>Study</th>
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<tbody>
<tr>
<td>Strober, 1983</td>
<td>Female, clinical sample, aged 15 – 19 years ( (M = 17.9) ), diagnosis of AN ( (N = 130) )</td>
<td>ED &amp; personality</td>
<td>MMPI; Structured clinical interview</td>
<td>Euclidean distance measure</td>
<td>3 clusters, which differed on their personality profiles – no labels published</td>
</tr>
<tr>
<td>Turner &amp; Bryant-Waugh, 2004</td>
<td>93.5% female, ED assessment clinic, ( M = 27.0 ) years, diagnosis of AN, BN, or EDNOS ( (N = 190) )</td>
<td>ED features</td>
<td>EDE –Interview</td>
<td>Ward’s cluster analysis</td>
<td>4 clusters represented by binge eating/purging, restriction, excessive exercise, &amp; underweight with denial of symptoms</td>
</tr>
<tr>
<td>Turner, Bryant-Waugh, &amp; Peveler, 2009</td>
<td>96% female, ED assessment clinic, Median = 23.7 years, diagnosis of AN, BN, or EDNOS ( (N = 182) )</td>
<td>ED features, attachment, coping</td>
<td>EDE-Interview; ASQ; UCL</td>
<td>Ward’s algorithm</td>
<td>4 clusters: Insecure generalised ED; Passive/avoidant restrictors; Bulimic; Mild ED</td>
</tr>
<tr>
<td>Turner, Bryant-Waugh, &amp; Peveler, 2010</td>
<td>97% female, ED assessment clinic, aged 17 – 26 years ( (M = 26.5) ), diagnosis of AN, BN, or EDNOS ( (N = 165) )</td>
<td>Clinical utility – ED features, attachment, coping, mood, health status, general functioning</td>
<td>EDE-Interview; ASQ; UCL; SF-36; WSAS; BDI</td>
<td>Cluster analysis as per Turner et al. (2009)</td>
<td>Clusters as per Turner et al. (2009) - Clusters showed more clinical utility than diagnostic categories</td>
</tr>
</tbody>
</table>

Note. MMPI = Minnesota Multiphasic Personality Inventory; EDE = Eating Disorder Examination; ASQ = Attachment Style Questionnaire; UCL = Utrecht Coping List; SF = Medical Outcome Survey Short-form; WSAS = Work and Social Adjustment Scale; BDI = Beck Depression Inventory
<table>
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<tr>
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<tbody>
<tr>
<td>van der Ham, Meulman, van Strien, &amp; van</td>
<td>ED outpatient clinic, aged 11 – 20 years ($M = 15.4$), diagnosis of</td>
<td>ED features</td>
<td>Semi-structured interview based on Morgan-Russell Outcome Schedule</td>
<td>Principal Components Analysis</td>
<td>Patients were divided by bulimic versus restrictive behaviours</td>
</tr>
<tr>
<td>Engeland, 1997</td>
<td>AN, BN, or EDNOS ($N = 55$)</td>
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<tr>
<td>Welch, Hall, &amp; Renner, 1990</td>
<td>Specialist ED service, diagnosis of AN, BN, or EDNOS ($N = 78$)</td>
<td>ED features</td>
<td>EDI; BDI; The Bulimia Test; clinical data</td>
<td>3 methods to test replicability</td>
<td>2 clusters – expected dichotomy of restrictors vs bulimic was not found</td>
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<td>Williamson, Gleaves, &amp; Savin, 1992</td>
<td>Adult female, inpatient &amp; outpatient ED programs, diagnosis of AN, BN,</td>
<td>ED features</td>
<td>IDED; EDI; EAT; BULIT; BIA</td>
<td>Ward’s minimum variance method</td>
<td>3 EDNOS clusters: Subthreshold AN; BN non-purging; BED</td>
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<td>or EDNOS ($N = 75$; EDNOS $n = 46$, for clustering)</td>
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*Note.* EDI = Eating Disorder Inventory; BDI = Beck Depression Inventory; IDED = Interview for Diagnosis of Eating Disorders; EAT = Eating Attitudes Test; BULIT = Bulimia Test; BIA = Body Image Assessment
A number of researchers have questioned the clinical utility of the DSM ED classification system (Clinton et al., 2004; Clinton & Norring, 2005; Turner et al., 2010). Other researchers have examined variables that are related to the wider presentation of EDs, which are not necessarily specific to an ED diagnosis but are important for identifying differences among individuals with an ED (Mizes & Sloan, 1998; Sloan et al., 2005; Turner & Bryant-Waugh, 2004; Turner et al., 2009; van der Ham, Meulman, van Strien, & van Engeland, 1997; Welch, Hall, & Renner, 1990; Williamson, Gleaves, & Savin, 1992). There is a growing body of research examining the role of dietary restraint and negative affect in establishing clinically distinct ED profiles (Chen & Le Grange, 2007; Grilo, 2004; Grilo et al., 2001; Stice & Agras, 1999), and researchers have further considered the role of personality profiles in establishing ED profiles (Claes et al., 2006; Espelage et al., 2002; Goldner, Srikameswaran, Schroeder, Livesley, & Birmingham, 1999; Holliday, Landau, Collier, & Treasure, 2006; Strober, 1983). The studies included in Table 3.1 all used a form of cluster analysis, thus, the use of cluster analysis in ED research will be discussed. Furthermore, the studies outlined in Table 3.1 will be reviewed in three major sections: ED typologies derived from characteristics associated with the wider clinical presentation of EDs; pure dieting versus dieting-depressive clusters; and personality profiles in EDs. This is followed by a review of the characteristics of ED patients, which have been shown to influence treatment outcome, as well as a review of the current treatment interventions for adolescents with AN.

### 3.2 Use of Cluster Analysis in Eating Disorder Research

Chapter 2 highlighted that there is a complex range of variables associated with the presentation of EDs. As such, the characteristics of individuals with an ED are often complex and difficult to investigate. Developing clinically relevant profiles of individuals with an ED is important in identifying the patterns of psychopathology and behaviours, and
Cluster analysis allows researchers to develop such profiles. Cluster analysis is a classification statistical method used to explore both theoretical and clinical problems in psychology (Distefano, 2012). The objective of cluster analysis is to categorise individuals from a larger heterogeneous group into meaningful smaller homogeneous groups by grouping together like characteristics of the individuals (Distefano, 2012). Cluster analysis has been used by many researchers in the area of classifying EDs in order to recognise clinical subgroups and to investigate the possible treatment implications of identifying characteristic profiles of ED patients (see Table 3.1). In addition to cluster analysis, other statistical methods, including latent class analysis and latent profile analysis, have been used to establish typologies of EDs (e.g., Crow et al., 2012; Wade, Crosby, & Martin, 2006). Although these analyses are useful, they are not reviewed in this thesis as latent class and profile analyses are large sample methods, therefore, the diverse methodologies of these studies are not comparable with the method in the current study.

3.3 Eating Disorder Typologies: A Wider Clinical Presentation

The DSM-IV-TR (2000) ED classification of three EDs is the most recognised, applied, and referenced ED classification system in current clinical work and research in this area. A number of researchers, however, have been sceptical of the clinical utility of the current DSM-IV-TR classifications for EDs, with particular concern over the high prevalence of patients receiving subthreshold diagnoses instead of an AN or BN diagnosis (Sloan et al., 2005). Of major concern is that patients with subthreshold AN or BN are considered to have less severe ED symptoms, when research has clearly demonstrated that the same behaviours, cognitions, and comorbidities are seen in individuals with either AN or subthreshold AN (Andersen, Bowers, & Watson, 2001; Sloan et al., 2005; Wilfley, Bishop, Wilson, & Agras, 2007). The DSM-IV-TR has been further criticised for applying what has been considered an arbitrary weight threshold for AN diagnoses (Andersen et al., 2001). An individual may
begin at an above average body weight, lose a significant amount of weight, present with a morbid fear of fatness, distorted body image, and significant physical manifestations, yet, will not receive a diagnosis of AN because their weight may not be low enough to meet the 85% threshold (Andersen et al., 2001). Another major criticism of the AN diagnosis is the amenorrhea criterion, which does not apply to males and pre-pubescent girls (Andersen et al., 2001; Attia & Roberto, 2009; Wilfley et al., 2007), two groups in which AN diagnoses are becoming more common. Furthermore, a large community epidemiological study of females aged between 15 and 64 years demonstrated that females who fulfilled all the AN criteria, but were menstruating, reported the same psychological and behavioural symptoms of full syndrome AN females experiencing amenorrhea (Garfinkel et al., 1996); thus, providing evidence of the amenorrhea criterion for AN perhaps being redundant. These concerns have been the impetus for a number of studies that have investigated whether statistically derived profiles support the existing DSM classification (Clinton & Norring, 2005; Turner et al., 2010; Williamson et al., 1992).

One such study, by Clinton et al. (2004), investigated the natural groupings of treatment seeking females from Sweden, aged 14 to 49 years ($M = 24.5$), and England, aged 15 to 61 years ($M = 25.1$), with a diagnosis of either AN, BN, BED, or EDNOS. Hierarchical and subsequent non-hierarchical cluster analyses were conducted on 10 key diagnostic variables from a semi-structured diagnostic interview, including BMI, fear of weight gain, food restriction, avoidance of fatty food, binge eating, vomiting, laxative abuse, compulsive exercise, amenorrhea, and body image disturbance (Clinton et al., 2004). A three-cluster solution was found to be the most clinically meaningful, and the clusters were labelled Anorexies, Generalised ED, and Overeaters. This study is one of the few recent studies to find statistically derived clusters similar to the DSM-IV classifications; AN patients were typically in the Anorexic cluster, BN patients in the Generalised ED cluster, and BED
patients in the Overeaters cluster (Clinton et al., 2004). As more typically seen in clinical research, EDNOS patients were divided between the three clusters (Clinton et al., 2004). A limitation of this study was that the clusters were only labelled according to their diagnosis, rather than a statistical analysis on the differences in the characteristics between the clusters being conducted. Additionally, it is important to note that the semi-structured interview, which comprised 10 diagnostic variables, generated operationalised DSM-IV diagnoses. The cluster analysis was then conducted solely on the 10 diagnostic variables; thus, it is not surprising that the statistically derived clusters in this study support the DSM-IV classification for EDs.

Clinton and Norring (2005) furthered their examination of the three established clusters from the same Swedish sample of female patients. Further analysis showed that, when compared with the three DSM-IV diagnostic classifications, the three statistically derived clusters reported a stronger association with ED symptoms, such as binge eating and food restriction (Clinton & Norring, 2005). The statistically derived clusters also accounted for more variability in key ED symptoms, such as BMI, weight phobia, and binge eating, compared with the DSM-IV diagnostic classifications (Clinton & Norring, 2005). The researchers claimed that the clinical utility of the statistically derived clusters was due to the clusters encompassing a wider range of psychological and behavioural characteristics, which are relevant to the presentation of EDs (Clinton & Norring, 2005). As a result, the patients who had been diagnosed with subthreshold disorders were reclassified into more clinically meaningful categories, which the researchers recognised as being unachievable within the highly restrictive DSM-IV classification system. The cluster analysis classified the EDNOS patients based on other variables related to the presentation of EDs and did not simply classify them as being a less severe ED (Clinton & Norring, 2005). In general, it was
concluded that the statistically derived clusters demonstrated more clinical utility than the 
*DSM-IV* diagnoses for EDs (Clinton & Norring, 2005).

Similar findings by Turner et al. (2010) among a mainly female sample of ED patients, aged between 17 and 26 years, corroborate the ability to statistically derive distinct clusters of patients with an ED to establish more clinically meaningful ED profiles, when compared with conventional *DSM-IV* diagnoses. A cluster analysis using Ward’s method established four distinct clusters labelled, Passive/Avoidant Restrictors, Bulimic, Mild ED, and Insecure Generalised ED (Turner et al., 2010). The results illustrated that the *DSM-IV* diagnostic groups were predominately differentiated on ED features, which would be expected due to the differences in diagnostic criteria among the disorders (Turner et al., 2010). Conversely, the statistically derived clusters were differentiated not only on ED features, but also on a number of cognitive and behavioural features, including self-reported depression, attachment and coping styles, and general health functioning (Turner et al., 2010). On the whole, the clusters showed higher between group effect sizes on the ED variables than the *DSM-IV* groups, which the researchers suggested was due to the clusters encompassing variables related to the wider presentation of EDs (Turner et al., 2010). These results not only highlight that statistically derived clusters can more meaningfully account for variation across ED presentations, but also the importance of examining variables relevant to the wider clinical presentation of EDs and not merely the eating and weight criteria (Turner et al., 2010). Turner et al. (2010) argue that it is important to reallocate EDNOS patients into clinically meaningful typologies rather than leave them as one heterogeneous group, as it may allow for these patients to receive interventions that are more suited to their specific needs. Thus, the clinical utility of the *DSM-IV* may be improved by widening some of the strict criteria employed to diagnose AN and BN and including more variables relevant to the wider clinical presentation of EDs.
Given this, a number of studies have examined eating and weight related features, not specific to diagnostic criteria, as a means of developing ED typologies beyond diagnostic classifications. Some important findings from these studies include the varied number of clusters extrapolated, similar cluster profiles across a number of studies (Mizes & Sloan, 1998; Sloan et al., 2005; Turner & Bryant-Waugh, 2004; Turner et al., 2009; van der Ham et al., 1997; Welch et al., 1990), and the role of binge eating in differentiating typologies (Sloan et al., 2005; Turner & Bryant-Waugh, 2004; van der Ham et al., 1997).

In contrast to the three existing DSM-IV-TR ED classifications, research employing cluster analyses on a wider range of eating and weight features has often revealed two-cluster (Mizes & Sloan, 1998; van der Ham et al., 1997; Welch et al., 1990) or four-cluster solutions (Sloan et al., 2005; Turner & Bryant-Waugh, 2004; Turner et al., 2009). The studies highlighting two key clusters tend to present one group as typically more underweight and in denial of ED symptomatology, and the second group with higher levels of eating psychopathology and bulimic behaviours (Mizes & Sloan, 1998; Welch et al., 1990). Specifically, Mizes and Sloan (1998) examined the statistically derived clusters of 53 adult inpatients and outpatients with a diagnosis of EDNOS. The two-clusters were defined as a heterogeneous EDNOS group, encompassing 42 patients, and an overweight binge eating group, comprising 11 patients (Mizes & Sloan, 1998). The two groups were similar in relation to general psychopathology, purging and restricting behaviours, and attitudes towards eating and weight, but differed significantly on weight, binge eating, and body dissatisfaction (Mizes & Sloan, 1998). In particular, the overweight binge eating group reported significantly more bingeing behaviours, and a significantly higher BMI, with the group average in the obese range, compared with the heterogeneous group reporting an average BMI in the ideal range (Mizes & Sloan, 1998). Despite the heterogeneous group reporting a significantly more unrealistic ideal weight, the overweight binge eating group reported
significantly higher body dissatisfaction (Mizes & Sloan, 1998). This study highlights two typologies that are symptomatically distinct. All of these patients had received a diagnosis of EDNOS but could be differentiated on the basis of the two clusters; thus, this study again highlights the importance of examining other variables related to the presentation of an ED in order to effectively classify EDNOS patients.

Conversely, in a study of 149 adults with either AN, BN, or EDNOS, Turner and Bryant-Waugh (2004) found a four-cluster solution representing four different clinical presentations of an ED. Three out of the four clusters reported similar eating pathology in terms of eating, weight, and shape concerns; however, they differed in their behavioural presentation (Turner & Bryant-Waugh, 2004). Cluster 1 was characterised by more binge eating and purging behaviours, Cluster 2 was characterised by eating restraint, while Cluster 3 was characterised by excessive exercise (Turner & Bryant-Waugh, 2004). On the other hand, Cluster 4 represented a different group, characterised by severely underweight patients with muted affect (Turner & Bryant-Waugh, 2004). The significantly low weight alongside lower levels of behavioural and cognitive disturbance resemble Strober, Freeman, and Morrell’s (1999) concept of ‘atypical’ AN, in which patients are in denial of eating and weight concerns. Overall, Turner and Bryant-Waugh (2004) highlighted that patients can present with a low weight and in denial of symptoms, or can present with a higher BMI and more significant psychopathology, which somewhat resembles the findings of Mizes and Sloan (1998). Turner and Bryant-Waugh (2004), however, further categorised the patients with higher BMI and psychopathology based upon different behavioural features related to the presentation of the ED.

The cluster analysis studies reviewed above have highlighted that ED patients can be classified into cluster profiles based on factors that are related to the wider presentation of an ED, but are not necessarily DSM-IV diagnostic criteria. As a result, EDNOS patients can be
more usefully classified into more clinically meaningful groups, rather than set aside as a sub-clinical disorder. Thus, EDNOS should not be viewed as a less severe or less clinically significant ED, because cluster analyses have illustrated that EDNOS patients can experience severe levels of eating psychopathology in much the same way as AN and BN patients (Mizes & Sloan, 1998; Sloan et al., 2005; Turner & Bryant-Waugh, 2004). A number of these studies further highlight that a consistent discriminating factor between cluster profiles is the presence of binge eating (Sloan et al., 2005; Turner & Bryant-Waugh, 2004; van der Ham et al., 1997). The examination of ED characteristics that are diagnostic specific, as well as those that are part of the wider clinical presentation of a patient, is useful for grouping ED patients into more clinically meaningful profiles. This will potentially facilitate a better understanding of the patients who present to a clinic, which, in turn, may assist with determining more appropriate and individualised treatment interventions (Sloan et al., 2005; Turner & Bryant-Waugh, 2004; van der Ham et al., 1997).

3.4 Pure Dieting versus Dieting-Depressive Clusters

Further research attempting to cluster ED patients into profiles has examined the ability of negative affect to discriminate among ED patients, given that negative affect is related to the wider presentation of all EDs (Chen & Le Grange, 2007; Grilo, 2004; Grilo et al., 2001; Stice, 2001; Stice & Agras, 1999). These studies used a cluster analysis methodology to test the hypothesis that patients with an ED can be differentiated by dietary restraint and negative affect by imposing a two-cluster solution on the data (Chen & Le Grange, 2007; Grilo, 2004; Grilo et al., 2001; Stice, 2001; Stice & Agras, 1999). The dietary restraint theory suggests that dieting may increase an individual’s risk of bulimic behaviours because the binge eating counteracts the food deprivation (Stice, 2001; Stice & Agras, 1999). On the other hand, negative affect theory suggests that emotional disturbance may promote bulimic behaviours as a means of comfort and distraction from the existing emotional
disturbance (Stice, 2001; Stice & Agras, 1999). However, dieting may also promote negative affect due to the associated feelings of failure from strict weight control efforts (Stice, 2001; Stice & Agras, 1999). Thus, it is suggested that the combination of dietary restraint and negative affect heighten the risk of an individual with an ED to binge eat and purge, and may increase their general psychopathology (Stice, 2001; Stice & Agras, 1999). This notion is supported by Fairburn et al.’s (2003) cognitive behavioural theory that asserts that a cycle exists between strict dietary restraint and episodes of binge eating. Dietary restraint is the means by which a patient with an ED commonly controls the core psychopathology of their ED, namely, eating, shape, and weight over-evaluation (Fairburn et al., 2003). However, the dietary rules are often unrealistic and inevitably easy to break, wherein any minor slip is perceived as failure and a lack of self-control, thus, triggering binge eating, followed by subsequent further dietary restraint and negative affect (Fairburn et al., 2003). This is the cycle of behaviour often seen in patients with AN-BP and BN (Fairburn et al., 2003). The relationship between dietary restraint and negative affect was first investigated in a sample of BN patients because of the presence of binge eating and purging behaviours in this group and the proposed influence of these bulimic behaviours on dieting behaviours and negative affect (Stice & Agras, 1999). This relationship was then replicated in studies with psychiatric patients with significant features of eating disturbance (Grilo, 2004), and in AN and EDNOS patients (Chen & Le Grange, 2007).

Stice and Agras (1999) conducted one of the first studies investigating whether individuals with BN could be categorised based on the presence of dietary restraint and negative affect, features that are commonly prevalent in BN patients. Participants were a community sample of 265 females who fulfilled DSM-III-R criteria for BN, aged between 15 and 50 years ($M = 28.3$) (Stice & Agras, 1999). The researchers randomly divided the sample into two subsamples as a means of validating the two-cluster profiles (Stice & Agras,
A Quick Cluster algorithm, imposing a two-cluster solution, was used on data from a range of measures evaluating eating and weight concerns, depression, self-esteem, control and impulsivity, social adjustment, and personality disorders (Stice & Agras, 1999). Results showed that the two clusters from both sub-samples matched the anticipated profiles of a pure dieting group and a dieting-depressive group; thus, a subsequent cluster analysis was conducted on the whole sample (Stice & Agras, 1999). Approximately 62% of the total sample was classified into the pure dieting group, and the remaining 38% were classified into the dieting-depressive group (Stice & Agras, 1999). The two clusters did not differ on age, educational attainment, BMI, ethnicity, and dietary restraint scores (Stice & Agras, 1999). Despite no significant differences in bulimic behaviours, which included frequency of objective and subjective binge eating, vomiting, and diuretic abuse, the dieting-depressive group reported significantly more bulimic attitudes as measured by eating, weight, and shape concerns (Stice & Agras, 1999). The dieting-depressive group also reported significantly more frequent laxative abuse, but the effect size was only small (Stice & Agras, 1999). The two clusters did not differ on disinhibition, hunger, and impulsivity; however, the dieting-depressive group reported significantly higher eating and weight preoccupations and rituals, and from the social adjustment scale, significantly more social maladjustment on the work, leisure, extended family, marital, family unit, and economic scales (Stice & Agras, 1999). Furthermore, the dieting-depressive group reported a significantly higher prevalence of comorbid major depression as well as social phobia and OCD than the pure dieting group, supporting the presence of depressive affect (Stice & Agras, 1999). The results supported the dietary restraint and negative affect models within this sample of females with BN; however, the results illustrated that although all the BN patients reported dieting, binge eating, and purging behaviours, only a subset reported significant depressive symptoms (Stice & Agras, 1999). The researchers concluded that the combination of dieting and depressive affect may
lead to a more clinically severe variant of an ED than dieting alone (Stice & Agras, 1999). The researchers also found that the dieting-depressive group reported more concerns with eating, weight, and shape than the pure dieting group, despite no significant differences in BMI between the clusters (Stice & Agras, 1999). It was suggested that the dieting-depressive group was either more inclined to allow their distress to transpire to their weight and shape concerns, or that this dissonance is a reflection of their perception bias (Stice & Agras, 1999). Notably, the similarity in binge eating and purging behaviours between the two clusters in this sample indicates that these behaviours alone do not influence the presence of negative affect, as otherwise suggested by the earlier theories, since the dieting-depressive group did not report significantly more bulimic behaviours than the pure dieting group.

Two studies have attempted to replicate the pure dieting and dieting-depressive clusters in clinical adolescent samples of mostly females (Chen & Le Grange, 2007; Grilo, 2004). These researchers acknowledged the importance of examining adolescent samples because disturbances in eating and weight concerns often develop during adolescence (Fairburn & Harrison, 2003; Grilo, 2004). Grilo (2004) examined 137 adolescent females admitted to an inpatient psychiatric facility for a range of different psychiatric reasons; however, from completion of the Eating Dysfunction Scale of the Millon Adolescent Clinical Inventory (MACI), all participants were revealed to have significant ED features. Patients were aged between 13 and 18 years ($M = 15.6$). The researchers measured dietary restraint by summing three items on the MACI Eating Dysfunction Scale that were specific to dietary restriction (Grilo, 2004). Negative affect was evaluated by the Beck Depression Inventory and the Rosenberg Self-esteem Scale. A Quick Cluster algorithm was conducted and a two-cluster solution was specified (Grilo, 2004). The two clusters represented the hypothesised typologies with 57% of the sample forming the pure dieting group and 43% forming the dieting-depressive group (Grilo, 2004). The two clusters reported similar levels of dietary...
restraint; however, the dieting-depressive group reported significantly lower self-esteem and higher levels of depression, which were in the clinically severe range, compared with the pure dieting group who reported higher self-esteem and lower levels of depression, within the minimal depression range (Grilo, 2004). Furthermore, the dieting-depressive group reported significantly more frequent binge eating, and overall eating dysfunction and body dissatisfaction (Grilo, 2004). The two clusters did not differ in age, purging behaviours, substance abuse, and impulsivity (Grilo, 2004). This study supports the reliability and validity of Stice and Agras’ (1999) sub-typing model by replicating the pure dieting and dieting-depressive typologies in a group of adolescent female psychiatric inpatients presenting with ED features (Grilo, 2004). In line with the conclusions made by Stice and Agras (1999), Grilo (2004) suggested that the combined effect of dieting behaviours and negative affect results in a more severe variant of an ED in regards to a patient’s psychopathology. An important limitation of this study was that BMI, a key indicator of the severity of an ED, was not calculated or reported; thus, it is difficult to know whether there were any differences in the body weight of the patients in either group. This weight information would have been particularly useful because patients were not from an ED specific treatment facility; thus, ED diagnoses were not determined either.

Similarly, Chen and Le Grange (2007) conducted a cluster analysis on the self-report data of 80 adolescents seeking outpatient treatment for BN, of which 46% fulfilled all diagnostic criteria and 54% had been diagnosed with subthreshold BN. Participants were aged between 12 and 19 years ($M = 16.1$), reported an average BMI of 22, and 98% were female. In line with the results of Stice and Agras (1999) and Grilo (2004), Chen and Le Grange (2007) found that the two clusters, pure dieting and dieting-depressive, did not differ in their dietary restraint; however, the dieting-depressive group reported significantly more depressed mood, lower self-esteem, and more eating and weight concerns. No differences
were found in the age, ethnicity, gender, BMI, and purging behaviours (Chen & Le Grange, 2007). In contrast to Grilo (2004), Chen and Le Grange (2007) found no difference in binge eating; however, this may be because Chen and Le Grange (2007) examined a BN sample, wherein binge eating would need to be present for a diagnosis, while Grilo (2004) examined a sample who presented with general ED features.

Chen and Le Grange (2007) further validated the existence of the pure dieting and dieting-depressive subtypes using an independent sample of 149 adolescents with a mean age of 15 years, diagnosed with AN, BN, or EDNOS, and seeking treatment for their ED from an outpatient clinic. The average BMI reported was 19.9 for the sample, and 89% of the sample were females (Chen & Le Grange, 2007). In line with Chen and Le Grange’s (2007) other analysis, the dieting-depressive group in this sample reported significantly higher depression and overall eating, weight, and shape concerns. In contrast, the dieting-depressive group also reported a significantly higher frequency of binge eating and higher perceived dietary restraint compared with the pure dieting group (Chen & Le Grange, 2007). A limitation of this analysis is that it is unknown how the ED groups were allocated into the two clusters. For instance, it is possible that the AN patients were predominantly in the dieting only group, whereas the BN patients were predominantly in the dieting-depressive group. Nonetheless, both analyses conducted by Chen and Le Grange (2007) support the validity of the pure dieting and dieting-depressive typologies among treatment seeking adolescents with a clinically diagnosed ED.

These studies have demonstrated that the presence of negative affect and the often associated bulimic behaviours highlight a more clinically severe ED typology when compared with patients who have significantly less negative affect. The evaluation of these two distinct typologies also highlights the usefulness of examining the wider clinical presentation of an ED, including negative affect, rather than basing an analysis solely on
existing diagnostic criteria. Notably, the first study differentiating typologies based on dietary restraint and negative affect focussed on BN patients (Stice & Agras, 1999). However, the studies by Grilo (2004) and Chen and Le Grange (2007) highlighted the reliability of the pure dieting and dieting-depressive typologies within more general ED samples. Thus, further research with other clinical ED samples should be conducted, particularly because dieting, binge eating, purging, and negative affect are also prevalent in AN-BP. Specifically, if a homogeneous clinic group of ED patients could be differentiated based on whether they present with negative affect or not, it is evident that different treatments would be necessary to target the negative affect compared with the dietary restraint alone. Furthermore, as demonstrated previously, EDNOS patients can present with the same level of psychopathology as patients fulfilling diagnostic criteria for AN or BN (Andersen et al., 2001; Sloan et al., 2005; Wilfley et al., 2007) and should not be treated as a less severe ED.

### 3.5 Eating Disorders and Personality Typologies

Clinical research on treatment-seeking females with an ED has demonstrated that, when examining the wider clinical presentation of EDs, AN and BN patients can present with different profiles of personality characteristics (Pryor & Wiederman, 1996; Wonderlich, Lilenfeld, Riso, Engel, & Mitchell, 2005). For instance, Pryor and Wiederman (1996) have shown that AN patients are characterised by control, and are more emotionally constrained, while BN patients are more impulsive. Wonderlich et al. (2005) summarised literature that presented individuals with restricting AN as being “constrained, conforming, obsessional, rigid, and perfectionistic” (p. S69). On the other hand, patients with binge eating and purging behaviours typically have more mood instability and impulsive behaviours, such as stealing, suicide attempts, and self-harm (Beumont et al., 1976; DaCosta & Halmi, 1992; Vitousek & Manke, 1994). Differences in personality between AN subtypes have also been demonstrated
by Pryor, Wiederman, & McGilley (1996) who found that female outpatients with AN-BP reported significantly more impulsive behaviours, including suicide attempts and stealing food, or weight-related items.

Evidently, there are personality characteristics that are related to the presentation of particular ED diagnoses. Because it has been found that personality disturbances in individuals with an ED can complicate treatment outcomes and lead to poorer prognoses (Espelage et al., 2002), it has been suggested that effective ED treatments should encompass aspects of personality, and not only focus on eating and weight behaviours and cognitions (Bollen & Wojciechowski, 2004). Therefore, it is important to examine the role of personality in EDs more specifically by examining the personality profiles that exist in ED groups. By identifying the common ED personality profiles, early interventions may be employed to more effectively target these profile groups to treat the ED from the wider clinical perspective, rather than solely the ED symptomatology. Correspondingly, a number of researchers have established clinically meaningful profiles of ED patients based on their personality characteristics in an attempt to encompass the wider clinical presentation of patients with EDs, rather than focus solely on ED diagnostic classifications (Claes et al., 2006; Espelage et al., 2002; Goldner et al., 1999; Holliday et al., 2006; Pryor & Wiederman, 1996; Strober 1983).

Strober (1983) was the first to conduct a cluster analysis to establish AN personality profiles. The study involved analysing results from the Minnesota Multiphasic Personality Inventory and a structured interview of clinical ED features of 130 adolescent females, aged between 15 and 19 years ($M = 17.9$), who were receiving a hospital delivered outpatient treatment program for AN (Strober, 1983). A cluster analysis revealed three personality subtypes, which encompassed 106 of the initial 130 patients (Strober, 1983). Cluster 1 encompassed 49 patients who were characterised as being highly energetic and productive,
superficially comfortable in social relationships, and highly perfectionistic, with a high degree of control over their impulses (Strober, 1983). These patients were the most affectively stable and came from highly stable family environments, which were close-knit and rarely experienced conflict (Strober, 1983). Cluster 1 patients appeared to most closely resemble the stereotype of belonging to the ‘anorexic’ family (see Section 2.5.1b), and were shown to have the best prognosis and weight gain at a three-month follow-up (Strober, 1983).

Cluster 2 encompassed 37 patients who were characterised as having even higher impulse control, compared with Cluster 1, and were highly anxious, obsessional, self-doubting, perfectionistic, shy, and socially isolated (Strober, 1983). Compared with Cluster 1 patients, Cluster 2 patients were more symptomatic at the three-month follow-up (Strober, 1983).

Cluster 3, on the other hand, encompassed 20 patients who presented with the most severe impairments compared with the other two subtypes (Strober, 1983). Cluster 3 patients were characterised as being affectively unstable, intolerant, self-indulgent, highly dependent, impulsive, and prone to substance abuse (Strober, 1983). These patients reported significantly more denial of ED symptoms, fear of fatness, binge eating and purging behaviours, and reported the highest level of family disharmony and instability, compared with Cluster 1 and 2 (Strober, 1983). Cluster 3 patients were also the most resistant to altering their behaviours, which was evident in their poorer treatment outcome at the three-month follow-up (Strober, 1983). Due to the significant differences between personality profiles and treatment outcome, Strober (1983) considered whether particular personality profiles may respond better to treatment approaches targeting the specific personality dispositions differentiating the AN subtypes.

Similarly, Espelage et al. (2002) analysed archival personality and ED related data for 183 female outpatients, with a mean age of 21.81 years, who had sought treatment for AN, BN, or EDNOS between 1988 and 1995. Using the Ward’s algorithm for clustering, a three-
cluster solution was derived (Espelage et al., 2002). Cluster 1 included 16.9% of the sample, and was labelled the High-Functioning group due to no self-reported clinical elevations in personality and eating and weight related dimensions (Espelage et al., 2002). Cluster 2 was represented by 49.1% of the sample, and was labelled the Undercontrolled/Dysregulated group due to the presence of passive-aggressive and self-defeating personality styles (Espelage et al., 2002). This group reported low self-esteem, frequently unstable moods, the tendency to act out emotionally, and to hold unstable interpersonal relationships (Espelage et al., 2002). Cluster 3, represented 34% of the sample, was labelled as the Overcontrolled/Avoidant group because of their social anxiety and avoidance of relationships (Espelage et al., 2002). This group reported significantly high scores of ineffectiveness, indicating feelings of insecurity, worthlessness, and solitude (Espelage et al., 2002). Both of the Undercontrolled/Dysregulated and Overcontrolled/Avoidant groups reported similar scores on eating specific dimensions such as drive for thinness, bulimic behaviours, and body dissatisfaction, all of which were significantly lower in the High-functioning group (Espelage et al., 2002). These results somewhat resemble those of Strober (1983), as the High-functioning group found by Espelage et al. (2002) matched Cluster 1 of Strober (1983), the Undercontrolled/Dysregulated group matched Cluster 3, and the Overcontrolled/Avoidant group matched Cluster 2.

Correspondingly, Claes et al. (2006) investigated the Big Five model of personality among 335 female ED inpatients and outpatients diagnosed with AN, BN, or EDNOS, with an overall mean age of 22.64 years. Hierarchical cluster analysis extrapolated a three-cluster solution consistent with the findings of Strober (1983) and Espelage et al. (2002). Specifically, Cluster 1 reported elevated scores on Neuroticism, and lower scores on Agreeableness and Conscientiousness, and were labelled the Undercontrollers (Claes et al., 2006). Cluster 2 reported low clinical scores on all the Big Five personality subtypes, and
were labelled the Resilients (Claes et al., 2006). Cluster 3 reported higher scores on Neuroticism than the Resilients, and higher scores on Conscientiousness than the Undercontrollers (Claes et al., 2006). Moreover, there was a significant difference in the ED diagnoses among the personality profiles, with 65% of the Overcontrollers represented by AN patients, 52.8% of the Undercontrollers represented by BN patients, and the Resilients were mixed diagnoses (Claes et al., 2006). Interestingly, no differences were found between the three clusters on drive for thinness and perfectionism; however, the Undercontrollers reported significantly higher bulimic behaviours, body dissatisfaction, and interoceptive awareness, which is consistent with a bulimic ED profile (Claes et al., 2006). Undercontrollers also reported significantly more hostility and impulsivity (Claes et al., 2006). The researchers concluded that the existence of three distinct, and highly robust, personality clusters are evident among ED samples from a number of studies, which highlights their importance for use in future ED studies (Claes et al., 2006).

A three-cluster solution, presenting a typically high-functioning and resilient group, an impulsive and emotionally dysregulated group, and a perfectionistic and overcontrolled group, has been clearly defined in a number of studies investigating personality features in EDs (Claes et al., 2006; Espelage et al., 2002; Strober, 1983), and has been further replicated in additional studies examining personality and EDs, which are listed in Table 3.1. Specifically, Goldner et al. (1999) revealed a three cluster solution of treatment seeking females with an ED, labelled as Rigid, Severe, and Mild ED pathology. Furthermore, Holliday et al.’s (2006) analysis of adult females with a lifetime prevalence of AN revealed three clusters defined as Broad Personality Disorder, Avoidant, and Inhibited/Compulsive. Given the results of a number of clinical studies, it is clear that ED samples of females can be effectively profiled into three distinct personality profiles. Despite the study by Strober (1983) examining the personality profiles within an adolescent sample with AN, subsequent
studies often examined the personality profiles among samples of adult females or samples with a mix of ED diagnoses. Future research may benefit from examining more homogeneous ED samples, since differences in personality characteristics have been acknowledged between AN and BN, which may have contributed to greater disparity in the personality profiles found (Pryor & Wiederman, 1996; Wonderlich et al., 2005). Nonetheless, these results highlight the usefulness of examining variables beyond the diagnostic criteria for an ED and the possible application of treatment approaches to target these personality features.

### 3.6 Symptomatology and Outcome

Researchers have consistently demonstrated that behavioural and personality differences in individuals with an ED significantly influence outcomes (Espelage et al., 2002; W. Herzog, Schellberg, & Deter, 1997; Strober, 1983). In a thorough review of ED outcome studies from 1950 to 1999, Steinhausen (2002) highlighted a number of key factors found to influence the outcome of AN. Specifically, a favourable outcome was most often associated with a shorter duration of symptoms prior to receiving treatment, a positive parent-child relationship, and a histrionic personality (Steinhausen, 2002). Conversely, a poor outcome was typically associated with vomiting, purgative abuse, chronicity of AN, features of an obsessive-compulsive personality, and premorbid developmental or clinical abnormalities, such as EDs in childhood (Steinhausen, 2002). The review illustrated that no definitive conclusion regarding outcome could be made on the influence of an early age of onset, a short duration of inpatient treatment, heavy weight loss at presentation, and socioeconomic status (Steinhausen, 2002).

The finding that patients presenting with bulimic behaviours tend to have a poorer outcome has also been illustrated by W. Herzog et al. (1997) in a 12-year follow-up study. Follow-up data from 69 AN patients were examined and it was found that AN-R patients
have an increased probability of recovery, compared with AN-BP patients. Furthermore, it was found that the combined effect of purging behaviour and a low level of social functioning significantly reduced a patient’s chance of recovering (W. Herzog et al., 1997). The researchers highlighted the importance of a combined therapy targeting the specific personal and behavioural problems, rather than treating the ED symptomatology only (W. Herzog et al., 1997).

From an Australian twin study of 1022 adult females, aged between 28 and 40 years of age ($M = 34.97, SD = 2.11$), 43 were diagnosed with lifetime AN, 29 with lifetime BN, 29 with lifetime BED, and 53 with EDNOS (Wade et al., 2006). The results illustrated that participants with a history of binge eating had the poorest outcome; as such, participants who were diagnosed with BN or BED were least frequently reported as having a positive outcome at a five-year follow-up (Wade et al., 2006). The researchers suggested that these outcomes may be due to the increased likelihood of women with AN seeking or receiving treatment, because their physical emaciation is more obvious to family and friends, whereas, BN and BED are more secretive disorders and these women may be less likely to receive treatment (Wade et al., 2006). Importantly, these participants were not asked about their treatment history, so conclusive statements cannot be made with this sample.

In contrast, Herpertz-Dahlmann, Wewetzer, Hennighausen, & Remschmidt (1996) investigated the outcomes of 39 adolescent inpatients with AN, and found that a lower BMI at admission was a significant predictor of still having an ED seven years later. Yet binge eating and purging behaviours at admission were not statistically predictive of outcome (Herpertz-Dahlmann et al., 1996). The researchers suggested that this unexpected result may be due to investigating a homogenous sample in terms of age and ED subtype (Herpertz-Dahlmann et al., 1996).
Given that different characteristics of ED patients have been shown to influence their outcome, early recognition of these factors may be useful to clinicians in tailoring interventions in order to target specific obstacles and optimise treatment outcomes. Stice and Agras (1999), who found the pure dieting and dieting-depressive ED clusters, highlighted the importance of identifying ED subtypes as having implications on treatment planning and outcome. For example, it was suggested that the dieting-depressive group may benefit from interpersonal therapy to treat their mood problems, whereas a behavioural intervention may be most suitable for an individual in the pure dieting group (Stice & Agras, 1999). This notion was supported by follow-up results that found that, after 20 sessions of cognitive behavioural therapy (CBT), the pure dieting group reported an abstinence rate from binge eating and compensatory behaviours two times higher than the dieting-depressive group, despite both groups reporting a zero level of abstinence at pre-treatment (Stice & Agras, 1999). The researchers concluded that CBT was perhaps less effective for treating the patients in the dieting-depressive group because the emotional disturbances stimulating the impetus to binge was not targeted in CBT, implying that a more interpersonal approach was required (Stice & Agras, 1999). As the characteristics with which ED patients present may be more effectively treated by certain therapeutic approaches, it is primarily necessary to develop profiles of these characteristics.

### 3.7 Treatment for Anorexia Nervosa

In order to understand which treatments may be more effective for different groups of patients, it is important to highlight the principal forms of psychotherapy that have shown to be effective. As the present study will examine adolescent females with AN, the treatment approach for AN only will be reviewed. Treatment guidelines suggest that treatment for AN should be a multidisciplinary approach, wherein the patient receives assistance from a paediatrician, mental health professional, and a dietician (Academy for Eating Disorders,
The paediatrician is the medical practitioner who typically evaluates the physical stability of a patient with AN, particularly for patients who present with low weight or purging behaviours (Grilo & Mitchell, 2010). Nutritional counselling from a dietician has shown to be an effective support tool for weight gain and normalising eating behaviours (Grilo & Mitchell, 2010). Medical and nutritional treatment is most frequently accompanied by a form of mental health treatment. Currently, evidence supporting the most effective therapies for AN is inconclusive, largely due to few studies comparing the use of different therapy with AN. Nonetheless, there are a number of outpatient psychotherapies that have independently shown to be useful in the treatment of AN, including family based treatment (FBT), CBT, individual psychotherapy, and dialectical behaviour therapy (DBT).

FBT, originally developed at the Maudsley Hospital in London, has demonstrated significant effectiveness in the treatment of adolescent patients with AN who are under the age of 19 years (Lock et al., 2010; Lock, Le Grange, Agras, & Dare, 2001; Wallis, Rhodes, Kohn, & Madden, 2007). The first aim of FBT is re-feeding, that is, promoting weight gain and normalised eating in the adolescent under their parents’ supervision (Lock & Le Grange, 2005; Lock et al., 2001; Wallis et al., 2007). Externalising the AN from the patient is also fundamental to the treatment, in order to minimise blame and feelings of guilt (Lock & Le Grange, 2005; Lock et al., 2001; Wallis et al., 2007). Once a healthy weight level is restored and maintained and the patient’s eating has improved, the aim is to allow the adolescent control over their eating by encouraging independence with food (Lock & Le Grange, 2005; Lock et al., 2001; Wallis et al., 2007). Once this has been attained, the other psychological challenges faced by the adolescent are dealt with (Lock & Le Grange, 2005; Lock et al., 2001; Wallis et al., 2007).
Given the obvious interaction among cognitions, behaviours, and emotions in AN patients, CBT has been identified as another effective psychotherapy for adolescents with AN (Grilo & Mitchell, 2010; Treasure et al., 2005). Specifically, AN outpatients, aged between 13 and 25, who received CBT showed significant improvement in eating attitudes and behaviours, and other psychological manifestations relevant to EDs (Ball & Mitchell, 2004). The aims of CBT for patients with AN include: cognitive restructuring of the attitudes and concerns associated with eating, weight, and shape; education about healthy eating, body weight regulation, and the detrimental effects of starvation and compensatory behaviours; and behavioural methods aimed at minimising binge eating and purging behaviours (Garner, Vitousek, & Pike, 1997).

Due to the role of individual factors in the development and maintenance of EDs (see Section 2.5.1a), individualised psychotherapy has also been shown to be effective in the treatment of adolescents with AN aged 12 to 18 years (Lock et al., 2010). Individual psychotherapy aims to combat the interpersonal difficulties, which may be related to the development and maintenance of AN (Treasure et al., 2005). The aim is to assist patients to identify their emotional states and how they differ from biological needs, as well as encouraging healthy eating and weight gain (Lock et al., 2010).

DBT is another form of psychotherapy that has been implemented with patients with AN, due to patients often being resentful of and resistant to treatment (McCabe & Marcus, 2002; Treasure et al., 2005). In fact, DBT was first developed to treat patients with Borderline Personality Disorder, which, like AN, is typically difficult to treat (Linehan, 1993). The therapy aims to modify the specific ED behaviours, such as dietary restraint, binge eating, purging behaviours, and excessive exercise; however, the first priority is minimising any parasuicidal behaviours that may be present (McCabe & Marcus, 2002; Treasure et al., 2005). As such, DBT involves skills training, through weekly sessions, to
modify the ED behaviours by identifying the negative behaviours, what the antecedents and consequences are, and to develop alternative behaviours, while regulating emotions (McCabe & Marcus, 2002; Salbach-Andrae, Bohnkamp, Pfeiffer, Lehmkuhl, & Miller, 2008). Skills training is also accompanied by individual psychotherapy (McCabe & Marcus, 2002; Treasure et al., 2005). A case series has shown DBT to be useful in the treatment of AN among adolescent female outpatients, who showed a decrease in ED pathology and general psychopathology after receiving 25 weeks of DBT treatment (Salbach-Andrae, Bohnkamp, et al., 2008). However, it was suggested that randomised controlled trials are necessary to confirm the efficacy of DBT in AN (Salbach-Andrae, Bohnkamp, et al., 2008).

There are a number of useful forms of psychotherapy for adolescent patients with AN, but it is evident that the effectiveness of these therapies may depend on the characteristics of the patient. This further highlights the need to establish more comprehensive profiles of AN patients, and evaluate the most effective treatments for the different profiles based on the differentiating characteristics.

### 3.8 Summary

Since 1970, extensive research has led to modifications to the way EDs have been defined and classified, which has led to the three EDs currently described in the *DSM-IV-TR* (2000). Some researchers, however, have questioned the clinical utility of the *DSM-IV-TR* classification of EDs due to the strict criteria imposed for AN and BN diagnoses, the higher prevalence of EDNOS diagnoses, and the misperception that EDNOS is a less severe ED (Andersen et al., 2001; Clinton & Norring, 2005; Sloan et al., 2005; Turner et al., 2010; Williamson et al., 1992). These researchers have shown that statistically derived typologies, based on ED symptomatology, may have greater clinical utility than the *DSM* diagnostic classifications, due to accounting for more statistical variability in the data (Clinton & Norring, 2005; Turner et al., 2010).
Furthermore, a number of researchers have demonstrated that there is value in examining variables related to the wider clinical presentation of EDs, which are not necessarily part of the diagnostic criteria (Chen & Le Grange, 2007; Claes et al., 2006; Espelage et al., 2002; Grilo, 2004; Mizes & Sloan, 1998; Stice & Agras, 1999; Strober, 1983; Turner & Bryant-Waugh, 2004). The studies that have established statistically derived clusters have led to the reallocation of EDNOS patients into more clinically meaningful groups, and the suggestion to widen the current strict *DSM-IV-TR* criteria for AN and BN (Mizes & Sloan, 1998; Sloan et al., 2005; Turner & Bryant-Waugh, 2004). There are also a small number of studies that have demonstrated that negative affect can differentiate ED patients who report the same level of dieting behaviours (Chen & Le Grange, 2007; Grilo, 2004; Stice & Agras, 1999). When investigating the role that personality features play in creating profiles of ED patients, three consistent personality profiles appear to be present in ED patients; specifically, a high-functioning and resilient group, an impulsive and emotionally dysregulated group, and a perfectionistic and overcontrolled group have been revealed (Claes et al., 2006; Espelage et al., 2002; Strober, 1983).

Each of the reviewed studies has demonstrated that by examining psychological and behavioural characteristics related to the wider clinical presentation of EDs, and not merely diagnostic criteria, a more comprehensive profile of the patients presenting to ED clinics is gained, which may assist clinicians in better understanding their patients and how best to treat them. Despite a thorough investigation into the ways in which ED patients can be categorised and which characteristics can effectively differentiate patients, there are a number of limitations in the current literature. In particular, much of the research has examined adult female samples, samples with a wide age range, or heterogeneous samples, which at times examined AN, BN, BED, and EDNOS patients together. Furthermore, there are number of factors, outlined in Chapter 2, which relate to the presentation of EDs but have not been
examined in these studies, for example the role of the family. The study described in Chapter 4 aims to target these limitations.
CHAPTER 4: Study 1

4.1 Rationale

As discussed in Chapter 3, researchers and clinicians have considered the classification of ED patient characteristics as important for recognising different subtypes and applying tailored treatment interventions. An effective means of identifying ED subtypes has been the use of cluster analysis techniques. A number of studies were reviewed in Chapter 3, which used cluster analysis to identify patterns of ED pathology, general psychopathology, and behaviours in ED samples. Some studies examined the clinical utility of the existing DSM-IV-TR classification of EDs and found that statistically derived ED typologies may have greater clinical utility (e.g., Clinton & Norring, 2005; Turner et al., 2010). Hence, further studies investigated variables related to the wider presentation of EDs, which are not specific to the ED diagnostic criteria. It was found that statistically derived clusters contributed to the reallocation of EDNOS patients into more clinically relevant groups leading to more appropriate treatment interventions (Mizes & Sloan, 1998; Sloan et al., 2005; Turner & Bryant-Waugh, 2004), negative affect classified ED patients into independent groups who reported similar levels of dietary restriction (Chen & Le Grange, 2007; Grilo, 2004; Stice & Agras, 1999), and personality characteristics were also found to play a role in creating profiles of ED patients (Claes et al., 2006; Espelage et al., 2002; Strober, 1983). Overall, the research reviewed in Chapter 3 showed that there is clinical utility in examining variables beyond ED diagnostic criteria in order to meaningfully profile ED patients. Such profiles may lead to clinicians being able to better understand their patients from a perspective other than their ED pathology and assist in providing a tailored intervention. Nevertheless, much of the previous research has examined adult female samples, heterogeneous samples, or
samples across a broad age range. Few studies, however, have examined an adolescent sample, particularly those aged between 13 and 18 years. This age range is the population of interest in the current study for a number of reasons. First, the onset of AN is most commonly reported during this pubertal age range. Second, this age range encompasses secondary school students in Australia. Third, adolescent ED clinical services in Australia are available for individuals up to the age of 18, then beyond this age individuals are transferred to adult services. Furthermore, limited research has investigated the typologies that exist within AN samples specifically. Although there are research studies that have applied cluster analysis to a range of variables related to the wider clinical presentation of EDs, including negative affect and personality characteristics, there are few studies that have provided a global analysis to include general functioning and family variables, which are known to impact the development and maintenance of AN (see Chapter 2). Thus, a more comprehensive picture is required to highlight other possible factors that may play a role in clustering individuals with AN into groups that are not defined by diagnostic categories. Specifically, the development of a profile of psychological, health, and family variables for AN adolescent patients, and the mapping of the natural course of these individuals, is likely to assist clinicians in their treatment and management of the disorder. This approach may also assist clinicians to better understand their patients from a perspective other than just their eating pathology.

4.2 Aims

The aim of this study was to investigate whether a group of adolescent females, aged between 13 and 18 years, who presented to an outpatient assessment and treatment clinic for AN, could be grouped into clinically relevant typologies based on a range of psychological, behavioural, eating, health, and family variables, which were not limited only to the
diagnostic criteria for AN. The second aim of this study was to determine the differences that may exist in the natural course and outcomes for any typologies that result.

### 4.3 Research Questions

Due to the exploratory nature of this study, and the variability in the findings of prior research on empirically derived typologies in ED patients, no *a priori* hypotheses were made. Hence, a number of more general research questions were considered: (1) Can clinically and theoretically interpretable typologies of adolescent females presenting with AN and subthreshold AN to an AN assessment clinic be extrapolated based upon a range of self-reported and parent-reported psychological, behavioural, eating, health, and family variables? (2) What are the key factors that differentiate the typologies? (3) Are there differences in weight restoration between the typologies six months after their initial assessment? (4) Do the typologies differ on other health outcomes?

### 4.4 Method

#### 4.4.1 Participants

Data were collected for the adolescent females, aged between 13 and 18 years, who presented at the outpatient ED clinic at the Centre for Adolescent Health (CAH) at the Royal Children’s Hospital (RCH), between February 2008 and February 2010. A clinical audit of the patient medical and psychological files was conducted based on the data collected at the initial diagnostic assessment. Inclusion into the study required each patient to be a female, aged between 13 and 18 years, with an initial diagnosis of AN or subthreshold AN, and having completed all of the assessment measures. A subthreshold AN diagnosis was given to individuals who did not fulfil the full criteria for an AN diagnosis, most frequently due to their weight. Importantly, all patients were diagnosed by the same psychiatrist, who is a specialist in the area of EDs.
4.4.2 Measures

A series of self-report and parent-report measures were required to be completed prior to a patient visiting the clinic for their clinical assessment. A range of demographic information was also collected, including: age; family type, encompassing traditional and non-traditional (defined by split, blended, and widowed families); family history of problem eating; mental health comorbidity; family history of other mental illness; the presence of purging behaviours; amenorrhea; self-harm ideation; suicidal ideation; and BMI, which was coded according to the classification system appropriate for children and adolescents (State Government of Victoria, 2010).

The *Eating Disorder Inventory-3 (EDI-3)* is a 91-item self-report evaluation of psychological constructs that have shown clinical relevance in eating disorder symptomatology (Garner, 2004). Use of the EDI-3 as a clinical and research tool is designed for adolescents aged 13 years and older, as well as adult females (Garner, 2004). Items ask the individual to rate how true a statement is of them on a six-point scale ranging from ‘always’ to ‘never’ (Garner, 2004). The items are summed to give six composite scores, which are derived from 12 independent subscales. One composite score is eating specific, that is, the Eating Disorder Risk Composite (EDRC), a global measure of eating and weight concerns, encompassing the Drive for Thinness, Bulimia, and Body Dissatisfaction subscales, which are specific to the diagnosis of an ED (Garner, 2004). The remaining five composites are psychological, including the Ineffectiveness Composite (IC), which comprises the Low Self-Esteem and Personal Alienation subscales, and measures an individual’s self-evaluation of personal identity (Garner, 2004). The Interpersonal Problems Composite (IPC) identifies problems with an individual’s social relationships, and contains the Interpersonal Insecurity and Interpersonal Alienation subscales (Garner, 2004). The Affective Problems Composite (APC) assesses an individual’s ability to correctly recognise and respond to emotional states,
and includes the Interoceptive Deficits and Emotional Dysregulation subscales (Garner, 2004). The Overcontrol Composite (OC) comprises the Perfectionism and Asceticism subscales, and highlights an individual’s impetus towards high personal achievement, as well as rigidity and presenting oneself in a socially desirable manner (Garner, 2004). The General Psychological Maladjustment Composite (GPMC) is an overall indicator of psychological maladjustment, which comprises all of the eight psychological subscales, mentioned prior, in addition to the Maturity Fears subscale (Garner, 2004). Higher scores on each of the composite scores indicate higher levels of ED and general psychopathology. The EDRC has shown good internal consistency, with reliability coefficients ranging from .91 to .97 across AN-R, AN-BP, and EDNOS clinical adolescent samples (Garner, 2004). The five psychological composites have also demonstrated adequate internal consistency in an adolescent clinical sample; IC α = .93; IPC α = .90; APC α = .89; OC α = .88; and GPMC α = .97 (Garner, 2004). In the current sample, all composites demonstrated adequate reliability; EDRC α = .96; IC α = .90; IPC α = .85; APC α = .86; OC α = .89; and GPMC α = .94.

According to the EDI-3 manual scoring procedures, a subscale score should not be computed, and is considered invalid when more than one response in that scale has not been answered (Garner, 2004). However, when one value in a subscale is missing this value can be imputed by taking the mean of the completed items on that scale (Garner, 2004). Additionally, composite scores with invalid subscale scores should not be calculated as it compromises the composite score (Garner, 2004). Notably, 11 patients had a missing value in at least one subscale, and one patient had more than one item missing in two subscales. Subscale averages were computed for these subscales and entered in the data file. Subscale scores and subsequent composite scores were then computed according to the EDI-3 scoring protocol (Garner, 2004). Elevated, typical, and low clinical ratings were assigned according
to the clinical qualitative ranges tables for the combined clinical adolescent sample (Garner, 2004).

The *Behavior Assessment System for Children, Second Edition Self-Report of Personality (BASC-2 SRP)* for adolescents aged 12 to 21 years, is a 176-item self-report measure of numerous aspects of behaviour and personality, including both positive (adaptive) and negative (clinical) dimensions (Reynolds & Kamphaus, 2004). The first 69 items require a true or false response, while the remainder require the individual to rate the frequency of an item on a four-point scale ranging from ‘never’ to ‘almost always’ (Reynolds & Kamphaus, 2004). The items are summed to give five composite scores, derived from 16 subscales (Reynolds & Kamphaus, 2004). The School Problems Composite is a general measure of adaptation to school, and includes the Attitude to School, Attitude to Teachers, and Sensation Seeking subscales (Reynolds & Kamphaus, 2004). The Internalising Problems Composite is a reflection of inwardly directed distress that a child may be experiencing, and is composed of the Atypicality, Locus of Control, Social Stress, Anxiety, Depression, Sense of Inadequacy, and Somatization subscales (Reynolds & Kamphaus, 2004). The Inattention/Hyperactivity Composite comprises the Attention Problems and Hyperactivity subscales, and is simply a measure of such behaviours (Reynolds & Kamphaus, 2004). The Personal Adjustment Composite is the only adaptive composite scale in the BASC-2 SRP and measures overall adjustment, including the Relations with Parents, Interpersonal Relations, Self-esteem, and Self-Reliance subscales (Reynolds & Kamphaus, 2004). Finally, the Emotional Symptoms Index (ESI) is a global indicator of serious emotional disturbance, and comprises the Social Stress, Anxiety, Depression, Sense of Inadequacy, Self-esteem, and Self-Reliance subscales (Reynolds & Kamphaus, 2004). Higher scores on the School Problems, Internalising Problems, and Inattention/Hyperactivity Composites and the ESI indicate higher levels of maladjustment, while higher scores on the Personal Adjustment
Composite indicated higher levels of adaptive functioning. Each of the five composites has demonstrated adequate internal consistency for adolescent females aged from 12 to 14 years and 15 to 18 years, respectively, including: School Problems $\alpha = .86$ and $\alpha = .83$; Internalising Problems $\alpha = .96$ and $\alpha = .95$; Inattention/Hyperactivity $\alpha = .85$ and $\alpha = .83$; Personal Adjustment $\alpha = .91$ and $\alpha = .89$; and ESI $\alpha = .95$ and $\alpha = .94$ (Reynolds & Kamphaus, 2004). Test-retest reliabilities for these composites are also adequate, ranging from a reliability of $.76$ to $.84$ (Reynolds & Kamphaus, 2004). In the current sample, all composites demonstrated adequate reliability: School Problems $\alpha = .90$; Internalising Problems $\alpha = .97$; Inattention/Hyperactivity $\alpha = .89$; and Personal Adjustment $\alpha = .94$.

Subscale and composite $T$-scores were calculated according to the BASC-2 protocol for both the BASC-2-SRP and subsequent clinical classifications were assigned according to the score classification system (Reynolds & Kamphaus, 2004).

The **BASC-2 Parent Rating Scales (PRS)** for adolescents aged 12 to 21 years, is a 150-item parent questionnaire of their child’s adaptive and clinical behaviours in the home and community (Reynolds & Kamphaus, 2004). Responses are on a four-point frequency scale ranging from ‘never’ to ‘almost always’ (Reynolds & Kamphaus, 2004). Four composite scales are composed from 14 subscales (Reynolds & Kamphaus, 2004), including an Externalising Problems Composite, which is a measure of disruptive behaviour problems, and is derived from the Hyperactivity, Aggression, and Conduct Problems subscales (Reynolds & Kamphaus, 2004). The Internalising Problems Composite identifies the presence of often over-controlled behaviour, and comprises the Anxiety, Depression, and Somatization subscales (Reynolds & Kamphaus, 2004). The Adaptive Skills Composite measures positive dimensions, including the Adaptability, Social Skills, Leadership, Activities of Daily Living, and Functional Communication subscales; together, these provide an indication of appropriate emotional expression and daily functioning (Reynolds &
Finally, the Behavioral Symptoms Index (BSI) is a global measure of problem behaviour, encompassing the Hyperactivity, Aggression, Depression, Atypicality, Withdrawal, and Attention Problems subscales (Reynolds & Kamphaus, 2004). Higher scores on the Externalising and Internalising Problems Composites and the BSI indicate higher levels of maladjustment, while higher scores on the Adaptive Skills Composite indicate higher levels of adaptive functioning. Each of the four composites has demonstrated adequate reliability for adolescent females aged from 12 to 14 years and 15 to 18 years respectively, including: Externalising Problems $\alpha = .92$ for both age groups; Internalising Problems $\alpha = .91$ and $\alpha = .90$; Adaptive Skills $\alpha = .95$ for both age groups; and BSI $\alpha = .94$ for both age groups (Reynolds & Kamphaus, 2004). Test-retest reliability was high for these composites, ranging from an alpha of .81 to .92 (Reynolds & Kamphaus, 2004). Moreover, inter-rater reliability was adequate for all four composites, ranging from an alpha of .73 to .88 (Reynolds & Kamphaus, 2004). In the current study, all composites demonstrated adequate reliability: Externalising Problems $\alpha = .90$; Internalising Problems $\alpha = .92$; Adaptive Skills $\alpha = .94$; and BSI $\alpha = .86$. Research has demonstrated the usefulness of the BASC-2 PRS in establishing typologies of primary age children, and it has been suggested that the BASC-2 is advantageous for use in providing information on a range and degree of psychopathology (Gladman & Lancaster, 2003).

The McMaster Family Assessment Device was designed as a simple screening tool to identify problem areas in the family and distinguish properties of healthy and unhealthy families (Epstein, Baldwin, & Bishop, 1983). The General Functioning Scale (GFS) from the McMaster Family Assessment Device is a measure of overall family well-being and pathology, and was of particular interest in this study (Epstein et al., 1983). It is a 12-item scale, assessing areas of problem solving, communication, roles, affective responses, affective involvement, and behaviour control (Epstein et al., 1983). The GFS has shown
adequate reliability, $\alpha = .92$, as well as the overall measure demonstrating adequate discriminant and construct validity (Epstein et al., 1983) and individual items in the subscales having face validity (Ryan, Epstein, Keitner, Miller, & Bishop, 2005). In the current study, the GFS demonstrated adequate reliability, $\alpha = .95$. Where possible, for this study, the adolescent patient, their mother, and their father independently completed this scale by rating their level of agreement or disagreement with each item describing their family. Responses are on a four-point rating scale ranging from ‘strongly agree’ to ‘strongly disagree’ (Ryan et al., 2005). Higher scores indicate poorer functioning (Ryan et al., 2005), with scores greater than 2 indicating clinical levels of poor family functioning (Miller, Epstein, Bishop, & Keitner, 1985).

For the GFS of the McMaster Family Assessment Device, positively worded items are coded 1 to 4 (strongly agree to strongly disagree), while negatively worded items are reverse scored (Ryan et al., 2005). Items are summed and divided by the number of items answered in that scale (Ryan et al., 2005). Importantly, if more than 40% of the items on this subscale are missing, then the scale cannot be calculated (Ryan et al., 2005). Three scores were calculated for each patient, including a report from each of the patient, their mother, and their father. Eleven patients did not complete the family functioning measure, of which five also had no data for their mother and father, and two of which had data missing for only one parent. Of the adolescents who completed the family functioning measure, 10 had missing data for at least one of their parents. As described below, multiple imputation was employed to manage the incomplete measures for each family member, and then the family average was calculated for each patient. Scores were then dichotomised into well and poor functioning.

For the six month follow-up, information was collected from the patient medical files, including height and weight for the calculation of BMI, status of amenorrhea (menses present or amenorrhea), the number of inpatient stays during that six month period (including if a
patient first presented to the clinic through the hospital emergency department), and if a patient had been discharged during the six month period. Additional follow-up information was collected via a brief questionnaire completed by both the patient and a parent, six months after the most recent patient’s initial presentation. It included questions about the type of medical and mental health treatment sought for the ED, as well as the adolescent and parent versions of the *Pediatric Quality of Life Inventory Version 4.0 (PedsQL)*. The PedsQL is a 23-item inventory of general health for adolescents aged 13 to 18 years (Varni, Seid, & Kurtin, 2001). Responses are on a five-point rating scale, ranging from ‘never’ to ‘almost always’ (Varni et al., 2001). The parent proxy version is identical to the adolescent self-report, however, it is reworded to be about their child. Both versions of the PedsQL measure four generic core scales, encompassing questions on physical health, emotional functioning, social functioning, and school functioning (Varni et al., 2001). A psychosocial health summary is also calculated based on responses to the items for emotional, social, and school functioning (Varni et al., 2001). The PedsQL has demonstrated adequate reliability for the adolescent self-report, including: Total Score $\alpha = .88$; Physical Health $\alpha = .80$; Emotional Functioning $\alpha = .73$; Social Functioning $\alpha = .71$; School Functioning $\alpha = .68$; and Psychosocial Health $\alpha = .83$ (Varni et al., 2001). Adequate reliability has also been demonstrated for the parent proxy-report, including: Total Score $\alpha = .90$; Physical Health $\alpha = .88$; Emotional Functioning $\alpha = .77$; Social Functioning $\alpha = .75$; School Functioning $\alpha = .76$; and Psychosocial Health $\alpha = .86$ (Varni et al., 2001). Construct validity has been demonstrated with the PedsQL effectively differentiating between the health status of healthy children compared with those who were acutely or chronically ill (Varni et al., 2001). In the current sample, the PedsQL scales demonstrated adequate reliability for both the adolescent and parent versions, respectively: Total Score $\alpha = .88$, $\alpha = .93$; Physical Health $\alpha = .84$, $\alpha = .84$;
Emotional Functioning $\alpha = .71, \alpha = .92$; Social Functioning $\alpha = .71, \alpha = .84$; School Functioning $\alpha = .71, \alpha = .66$; and Psychosocial Health $\alpha = .80, \alpha = .91$.

The items for both the adolescent and parent PedsQL were reverse scored according to the following linear transformation: $0 = 100$; $1 = 75$; $2 = 50$; $3 = 25$; $4 = 0$ (Varni et al., 2001). As a result, higher scores are indicative of better health. Subscale scores for the four generic core scores were calculated by summing the items and dividing by the number of items completed in the scale (Varni et al., 2001). It was necessary for at least 50% of the items in a scale to be completed, otherwise the scale is deemed invalid (Varni et al., 2001). The psychosocial health summary score was calculated by summing the items from the emotional, social, and school functioning subscales, and dividing by the number of completed responses (Varni et al., 2001). These five scores, as well as a total score, were calculated for both the adolescent and parent PedsQL.

4.4.3 Procedure

Upon receiving approval from the Royal Children’s Hospital Human Research Ethics Committee (HREC) and endorsement from the RMIT University HREC (see Appendix for HREC approval letters) to access the patient files, the demographic data from the clinical nurse co-ordinator’s database and the information from the patient mental health files were accessed, coded, and entered. All patient data were de-identified once extracted from the patient files; each patient was identified by a participant number.

4.4.4 Multiple Imputation

Complete data were available for 32 out of the 39 patients. Two patients were missing data for the BASC-2 SRP only, one patient was missing data for the BASC-2 SRP and the GFS, one patient was missing data for the BASC-2 PRS and the GFS, and three patients were missing data for the GFS only. For the patients who were missing data for a measure at their initial assessment, multiple imputation was necessary. Multiple imputation
is used to produce several complete datasets by estimating possible values for the missing values, based on the available data (Hawthorne & Elliott, 2005). Multivariate methods apply when multiple variables have missing values, and when variables are used as both dependent and predictor variables during imputation (Tabachnick & Fidell, 2007). The missing data from assessment measures were found to be Missing Completely At Random (MCAR) according to Little’s MCAR test. Furthermore, the assessment measures were all normally distributed. For this imputation, five imputations were performed, generating five complete datasets. Subsequently, the mean value of these five imputations was calculated for each of the missing BASC-2-SRP and BASC-2-PRS composite scores, and GFS, and was entered into the original dataset. Given the lack of patient responses, none of the missing data for the follow-up variables were estimated.

4.4.5 Data Analysis

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS v.17). To answer the first research question, a two-step cluster analysis was used to group the patients into interpretable clusters defined by similarities on the range of demographic, psychological, behavioural, eating, health, and family data. Cluster analysis is a multivariate technique that aims to maximise between cluster variability while minimising within cluster variability, and the two-step approach allows for the straightforward inclusion of categorical variables. The patients were clustered based on a number of categorical and continuous variables. The categorical variables included family type (traditional, non-traditional), family history of problem eating (yes, no), family history of a mental illness (yes, no), purging at the point of assessment (yes, no), amenorrhea (yes, no), self-harm ideation (yes, no), suicide ideation (yes, no), BMI classification (underweight, healthy weight, overweight, obese), and GFS rating (well functioning, poor functioning). The continuous variables included age, the six composite scales of the EDI-3, the five composite scales of the BASC-2 SRP, and the four
composite scales of the BASC-2 PRS.

Once the clusters were established, a series of analyses were conducted to determine which variables differentiated the typologies, as considered in the second research question. A single-factor between-subjects analysis of variance (ANOVA) was conducted between the cluster groups on age at assessment. Chi square analyses were conducted to examine the relationship between the clusters and the categorical variables, with Cramer’s $V$ as a measure of effect size. A series of multivariate analysis of variance (MANOVA) were conducted to determine cluster differences on each of the EDI-3, BASC-2 SRP and PRS scales. Cohen’s $d$ was the measure of effect size for the follow-up univariate analyses to the MANOVA. An alpha level of .05 was applied for all statistical tests.

To answer the third research question, a single-factor between-subjects MANOVA was conducted to compare mean differences between the two clustered groups on weight and height six months following diagnosis and the weight gained during that six month period. To answer the fourth research question, analysis of the six-month follow-up data involved conducting a series of chi-square analyses to examine the relationship between clusters and a number of dependent variables, including status of amenorrhea (yes, no), BMI classification, and whether a patient was discharged during the six months following diagnosis at the ED clinic (yes, no). A Mann-Whitney U test was conducted to assess cluster differences on the number of inpatient stays in the six months following assessment. Three single-factor between-subjects MANOVA were also conducted to analyse cluster differences on the health survey responses. The first MANOVA compared the clusters on their length of illness and BMI, the second MANOVA examined cluster differences in the PedsQL adolescent self-report, and the third MANOVA examined cluster differences in the PedsQL parent proxy report. Mann-Whitney U tests were conducted to examine the cluster differences in reporting of the ED still being a problem for the adolescent and the parent.
4.5 Results

4.5.1 Sample Characteristics

Ninety-three adolescent females presented to the ED clinic at the Centre for Adolescent Health (CAH) between February 2008 and February 2010 for assessment of an ED. Thirty-nine (41.94%) patients met criteria for entry into the clinical audit study. The remaining patients were excluded for not meeting the inclusion criteria, specifically, patients did not receive a diagnosis of AN or subthreshold AN, were outside the necessary age group, or had refused to complete the necessary measures at the time of their diagnostic assessment, thus, had no data available. At their assessment, patients were aged between 13 and 18 years ($M = 15.57, SD = 1.48$), with a BMI ranging from 12.77 to 24.61 ($M = 17.71, SD = 2.56$).

Ten (26%) received a diagnosis of AN, of which all were restricting subtype, and 29 (74%) received a diagnosis of subthreshold AN because they did not meet full criteria for AN. Of the 39 patients, 11 (28%) reported current purging behaviours. Twenty-eight (72%) of the 39 patients had experienced menarche, which was reported to have occurred between the ages of 10 and 15 years ($M = 12.25, SD = 1.38$). Of these 28 females, 18 (64%) were experiencing amenorrhea at the point of assessment. Additionally, 17 (44%) of the total sample reported a mental health comorbidity, while 12 (30%) reported self-harm ideation, and 9 (23%) reported suicidal ideation. In terms of family characteristics, 27 (69%) patients came from a traditional family, 12 (31%) reported a family history of problem eating, including AN or obesity, and 28 (72%) revealed a family history of another form of mental illness. According to scores on the GFS, 5 (13%) families averaged a poor family functioning rating. Further group descriptive statistics for the EDI-3, BASC-2 SRP, and BASC-2 PRS scales are displayed in Table 4.1 and Table 4.2.
### Table 4.1

*Summary of Sample Descriptive Statistics for the Eating and Psychological Measures Composite Scores (N = 39)*

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<th>95% CI for Mean</th>
<th>Minimum</th>
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Table 4.1  

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Table 4.2

*Correlation matrix between the scales from the EDI-3, BASC-2 SRP, and BASC-2 PRS (N = 39)*

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*Note. Variables 1 – 6 are the EDI-3 scales; Variables 7 – 11 are the BASC-2 SRP scales; Variables 12 – 15 are the BASC-2 PRS scales  
*p < .05  **p < .01*
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Note: Variables 1 – 6 are the EDI-3 scales; Variables 7 – 11 are the BASC-2 SRP scales; Variables 12 – 15 are the BASC-2 PRS scales

*p < 0.05 **p < 0.01
Examination of the EDI-3 composite scores in Table 4.1 showed that the total sample mean scores on all the scales, excluding Eating Disorder Risk, was within the Typical Clinical range according to EDI-3 classifications, while the mean score for Eating Disorder Risk represented the Low Clinical range. When examining the range of EDI-3 scores it was apparent that patients had reported scores at the minimum level in the Low Clinical range, while others had reported scores at the maximum level in the Elevated Clinical range, highlighting the variability in the sample as a whole.

Similarly, according to BASC-2 SRP clinical classifications, the total sample means were in the Average range for School Problems, Internalising Problems, Inattention/Hyperactivity, and Personal Adjustment. The group mean for the Emotional Symptoms Index was within the At-risk Clinical category. Parent means were in the Average range for Externalising Problems, Behavioural Symptoms, and Adaptive Skills; however, parent means were in the At-risk Clinical range for Internalising Problems. Variability was also high among the BASC-2 scale adolescent and parent scores, with high standard deviations and score ranges. Notably, adolescent scores revealed more variability than parent scores.

Table 4.2 showed that almost all of the scales of the EDI-3 and the BASC-2 SRP were correlated. The strongest correlation between the two measures was for the relationship between the General Psychological Maladjustment scale of the EDI-3 and the Internalising Problems scale of the BASC-2 SRP ($r = .89$). Few significant correlations were found when examining the BASC-2 PRS and EDI-3 scales. Nevertheless, all BASC-2 PRS scales correlated with the Interpersonal Problems scale on the EDI-3; the coefficients were all moderate in strength. The strongest correlation between the EDI-3 and BASC-2 PRS was between the EDI-3 Interpersonal Problems scale and the BASC-2 SRP Behavioural symptoms scale ($r = .55$). There were a number of significant correlations between the
BASC-2 SRP and PRS scales, with the strongest correlation being between the Personal Adjustment scale of the BASC-2 SRP and the Adaptive Skills scale of the BASC-2 PRS.

4.5.2 Data Assumption Testing

All the scales of the EDI-3 and BASC-2 were assessed for normality using a range of tests. Some variables showed some skew, however, the level of skew was not considered serious enough to warrant transformation given the robustness of the analyses to be conducted. An additional assumption of cluster analysis is independence, which was assessed between the EDI-3 and BASC-2 scales. A number of significant correlations were found as displayed in Table 4.2; however, theoretically it was anticipated that the scales from these measures would be related so it was deemed appropriate to proceed with the analysis. Further, the distance measures used in the two-step cluster analysis procedure tend to compensate for multicollinearity among the clustered variables. For the MANOVA, the assumption of homogeneity of variance was not violated by the data.

4.5.3 Results of Cluster Analysis

From the two-step cluster analysis, in which all variables were entered to determine the clusters, a two cluster solution emerged. All of the 39 patients were successfully incorporated into a cluster, which was a desirable outcome given that it is not a requirement for a case to be included in a two-step cluster solution. Cluster 1 comprised 21 (54%) patients, of which 10 (48%) had been diagnosed with AN-R and 11 (52%) with subthreshold AN, while Cluster 2 comprised 18 (46%) patients, wherein all were diagnosed with subthreshold AN. Chi square analyses showed a significant relationship between ED diagnosis and the cluster groupings, $\chi^2 (1, N = 39) = 11.53, p = .001, V = .54$. Examination of standardised residuals indicated that the high proportion of AN patients in Cluster 1 (2.0) and the low proportion of AN patients in Cluster 2 (-2.1) contributed to the significant result. A further significant relationship was found between BMI classification and the cluster
groupings, $\chi^2(1, N = 39) = 11.53, p = .001, V = .54$. Examination of standardised residuals indicated that the high proportion of underweight patients in Cluster 1 (2.0) and the low proportion of underweight patients in Cluster 2 (-2.1) contributed to the significant result. Cluster 1 encompassed all of the 10 underweight patients and 11 healthy weight patients, compared with Cluster 2 patients wherein all 18 patients were classified as being in the healthy weight range. A single-factor between-subjects ANOVA showed no significant difference in age between Cluster 1 ($M = 15.26; SD = 1.60$) and Cluster 2 ($M = 15.93; SD = 1.28$), $F(1, 37) = 2.04, p = .161$. Chi-square analyses were performed on the family and mental health categorical variables between the clusters and are presented in Table 4.3.
Table 4.3

*Cluster Differences on the Demographic Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cluster 1 (n = 21)</th>
<th>Cluster 2 (n = 18)</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>$V$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>66.7%</td>
<td>72.2%</td>
<td>0.14</td>
<td>.71</td>
<td>.06</td>
</tr>
<tr>
<td>Non-traditional</td>
<td>33.3%</td>
<td>27.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family History of Problem Eating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28.6%</td>
<td>33.3%</td>
<td>0.10</td>
<td>.75</td>
<td>.05</td>
</tr>
<tr>
<td>No</td>
<td>71.4%</td>
<td>66.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family History of Other Mental Illness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>66.7%</td>
<td>77.8%</td>
<td>0.59</td>
<td>.44</td>
<td>.12</td>
</tr>
<tr>
<td>No</td>
<td>33.3%</td>
<td>22.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Comorbidity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>38.1%</td>
<td>50.0%</td>
<td>0.56</td>
<td>.46</td>
<td>.12</td>
</tr>
<tr>
<td>No</td>
<td>61.9%</td>
<td>50.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purging Present</td>
<td></td>
<td></td>
<td>12.35</td>
<td>&lt;.001</td>
<td>.56</td>
</tr>
<tr>
<td>Yes</td>
<td>4.8%</td>
<td>55.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>95.2%</td>
<td>44.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amenorrhea</td>
<td></td>
<td></td>
<td>0.71</td>
<td>.40</td>
<td>.14</td>
</tr>
<tr>
<td>Yes</td>
<td>52.4%</td>
<td>38.9%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>47.6%</td>
<td>61.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-harm Ideation</td>
<td></td>
<td></td>
<td>13.65</td>
<td>&lt;.001</td>
<td>.59</td>
</tr>
<tr>
<td>Yes</td>
<td>9.5%</td>
<td>55.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>90.5%</td>
<td>44.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicidal Ideation</td>
<td></td>
<td></td>
<td>9.64</td>
<td>.002</td>
<td>.50</td>
</tr>
<tr>
<td>Yes</td>
<td>0.0%</td>
<td>50.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100%</td>
<td>50.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.3 highlights a significant relationship between cluster grouping and the presence of purging behaviours. The examination of standardised residuals indicated that the high presence of purging in Cluster 2 (2.2) and the low presence of purging in Cluster 1 (-2.0) contributed to the significant result. Cluster groupings and self-harm ideation were also significantly related; standardised residuals indicated that the relatively high frequency of self-harm ideation in Cluster 2 (1.9) and the relatively low frequency of self-harm ideation in Cluster 1 (-1.8) contributed to the significant result. Furthermore, a significant relationship was found between cluster groupings and suicide ideation, with standardised residuals indicating that the high proportion of Cluster 2 patients reporting suicidal ideation (2.4) and the low proportion of Cluster 1 patients reporting suicidal ideation (-2.2) contributed to the significant result. Furthermore, a contingency table analysis of cluster groupings and the GFS rating showed a significant relationship between these two variables, $\chi^2(1, N = 39) = 6.69, p = .01, V = .41$. Examination of standardised residuals indicated that the relatively high proportion of families reporting poor functioning in Cluster 2 (1.8) and the relatively low proportion of families reporting poor functioning in Cluster 1 (-1.6) contributed to the significant relationship. Specifically, all Cluster 1 families reported family functioning averages in the well functioning category, while five families in Cluster 2 were classified as poor functioning. The clusters were almost identical in relation to their family type, presence of family history of an ED, family history of a mental illness, mental health comorbidity, and amenorrhea.

A series of single-factor between-subjects MANOVA compared the two clusters on the range of eating specific and general behavioural scales. A significant multivariate effect was found among the two clusters on the EDI-3, Wilks’ $\Lambda = .49, F(6, 32) = 5.48, p = .001, \eta^2 = .51 [.15, .61]$, BASC-2 SRP, Wilks’ $\Lambda = .37, F(5, 33) = 11.28, p < .001, \eta^2 = .63 [.34, .72]$, and BASC-2 PRS, Wilks’ $\Lambda = .64, F(4, 34) = 4.90, p = .003, \eta^2 = .37 [.06, .51]$. Follow-up
univariate analyses of each of the EDI-3, BASC-2 SRP, and BASC-2 PRS scale scores are presented in Table 4.4.
Table 4.4

*Descriptive Statistics and Univariate Results on the Self-report and Parent-report Measures for the Two Clusters*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>F</th>
<th>p</th>
<th>d [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDI-3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating Disorder Risk</td>
<td>39.71 (11.94)*</td>
<td>54.44 (10.96)**</td>
<td>16.61</td>
<td>&lt;.001</td>
<td>1.31 [0.61, 2.00]</td>
</tr>
<tr>
<td>Ineffectiveness</td>
<td>42.33 (8.96)*</td>
<td>54.22 (5.51)**</td>
<td>23.89</td>
<td>&lt;.001</td>
<td>1.57 [0.84, 2.29]</td>
</tr>
<tr>
<td>Interpersonal Problems</td>
<td>44.62 (7.51)**</td>
<td>53.17 (6.17)**</td>
<td>14.76</td>
<td>&lt;.001</td>
<td>1.24 [0.54, 1.92]</td>
</tr>
<tr>
<td>Affective Problems</td>
<td>43.05 (8.10)**</td>
<td>54.72 (4.90)***</td>
<td>28.41</td>
<td>&lt;.001</td>
<td>1.71 [0.96, 2.44]</td>
</tr>
<tr>
<td>Overcontrol</td>
<td>38.86 (7.57)*</td>
<td>50.56 (9.79)**</td>
<td>17.67</td>
<td>&lt;.001</td>
<td>1.35 [0.64, 2.04]</td>
</tr>
<tr>
<td>General Psychological Maladjustment</td>
<td>41.48 (7.78)*</td>
<td>53.94 (4.67)***</td>
<td>35.24</td>
<td>&lt;.001</td>
<td>1.91 [1.13, 2.66]</td>
</tr>
<tr>
<td><strong>BASC-2 SRP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Problems</td>
<td>43.65 (9.17)*</td>
<td>56.70 (16.83)*</td>
<td>9.40</td>
<td>.004</td>
<td>0.98 [0.31, 1.65]</td>
</tr>
<tr>
<td>Internalising Problems</td>
<td>47.28 (10.54)*</td>
<td>68.69 (8.59)**</td>
<td>47.32</td>
<td>&lt;.001</td>
<td>2.21 [1.40, 3.01]</td>
</tr>
<tr>
<td>Inattention/Hyperactivity</td>
<td>43.47 (9.36)*</td>
<td>57.36 (8.47)*</td>
<td>23.28</td>
<td>&lt;.001</td>
<td>1.55 [0.82, 2.26]</td>
</tr>
</tbody>
</table>

EDI severity ratings: *Low clinical; **Typical clinical; ***Elevated clinical
BASC severity ratings: *Normal; **At-risk; ***Clinically significant
Table 4.4  continued

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>F</th>
<th>p</th>
<th>d [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 21)</td>
<td>(n = 18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Adjustment</td>
<td>49.40 (10.44)*</td>
<td>32.00 (7.71)**</td>
<td>34.06</td>
<td>&lt;.001</td>
<td>1.87 [1.11, 2.63]</td>
</tr>
<tr>
<td>Emotional Symptoms Index</td>
<td>51.18 (11.90)*</td>
<td>73.27 (8.00)***</td>
<td>44.60</td>
<td>&lt;.001</td>
<td>2.15 [1.34, 2.93]</td>
</tr>
<tr>
<td>BASC-2 PRS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externalising Problems</td>
<td>48.24 (7.15)*</td>
<td>54.74 (9.09)*</td>
<td>6.26</td>
<td>.017</td>
<td>0.80 [0.14, 1.45]</td>
</tr>
<tr>
<td>Internalising Problems</td>
<td>60.52 (13.53)**</td>
<td>70.93 (9.76)***</td>
<td>7.36</td>
<td>.010</td>
<td>0.87 [0.21, 1.53]</td>
</tr>
<tr>
<td>Behavioural Symptoms Index</td>
<td>54.76 (9.19)*</td>
<td>61.63 (8.25)**</td>
<td>5.95</td>
<td>.020</td>
<td>0.78 [0.12, 1.43]</td>
</tr>
<tr>
<td>Adaptive Skills</td>
<td>47.14 (8.73)*</td>
<td>38.23 (7.48)**</td>
<td>11.50</td>
<td>.002</td>
<td>1.09 [0.41, 1.76]</td>
</tr>
</tbody>
</table>

EDI severity ratings: *Low clinical; **Typical clinical; ***Elevated clinical
BASC severity ratings: *Normal; **At-risk; ***Clinically significant
Table 4.4 shows that Cluster 2 patients reported significantly more eating related problems and psychological maladjustment compared with Cluster 1 patients. In fact, Cluster 2 patients scored elevated clinical scores on Affective Problems and General Psychological Maladjustment and typical clinical scores on the remaining EDI-3 scales. While Cluster 1 patients reported low clinical scores on all EDI-3 scales, aside from Interpersonal Problems and Affective Problems in which they scored typical clinical scores.

Cluster 2 patients also reported significantly higher scores on all of the BASC-2 maladaptive scales on both the SRP and PRS measures, while consistently reporting significantly lower scores on the adaptive scales, compared with Cluster 1 patients. Examination of the BASC-2 SRP scales highlighted that Cluster 2 patients scored in the normal range of School Problems and Inattention/Hyperactivity; however, they were at-risk of significant Internalising Problems and Personal Adjustment, and reported clinically significant emotional symptoms. According to their parents, Cluster 2 patients were reported as having a normal range of Externalising Problems, as being at-risk of significant behavioural symptoms and as having poor adaptive skills. Consistent with the adolescent report, parents of Cluster 2 patients reported their daughters as exhibiting clinically significant Internalising Problems. Conversely, Cluster 1 patients and their parents generally reported scores in the normal range for all scales on the BASC-2-SRP and PRS, aside from the parents scoring their daughters as at-risk of Internalising Problems. Cluster 2 patients reported significantly more eating, psychological, and behavioural problems compared with Cluster 1 patients. Large effect sizes were evident for these cluster differences for the EDI-3, BASC-2-SRP, and BASC-2-PRS scale scores, except for the Behavioural Symptoms Index of the BASC-2-PRS which demonstrated a medium to large effect size, according to Cohen’s criteria (1988).
4.5.4 EDI-3 Cluster Comparisons

Further exploration of the 12 EDI-3 subscales compared across the clusters revealed a significant multivariate effect, Wilks’ Λ = .27, $F(12, 26) = 5.79$, $p < .001$, $\eta^2 = .73$ [.32, .75]. Follow-up univariate analyses of each of the subscales found that Cluster 2 patients reported significantly higher mean scores on all the subscales ($p < .01$), excluding Maturity Fears. A subsequent single-factor between-subjects MANOVA of the individual EDI-3 items between the clusters did not show a significant multivariate effect, Wilks’ Λ = .02, $F(37, 1) = 1.14$, $p = .65$, $\eta^2 = .98$ [.00, .56]. Nonetheless, examination of univariate analyses of each EDI-3 item highlighted that Cluster 2 patients reported significantly higher mean scores on 63 of the 91 items compared with Cluster 1 patients ($p < .05$). When considering the number of items in each subscale, proportionately more than 50% of items from the Drive for Thinness, Bulimia, Body Dissatisfaction, Low Self-Esteem, Interpersonal Alienation, Interoceptive Deficits, and Asceticism subscales were significantly different across the clusters. Thus, these are the individual areas in which Cluster 2 patients reported significantly more maladaptive scores than Cluster 1 patients. Notably, further examination of these items revealed that Cluster 2 patients self-report binge eating, and think about binge eating, significantly more than Cluster 1 patients. Cluster 2 patients also reported feeling significantly less in control of their lives, compared with Cluster 1 patients. Moreover, Cluster 1 patients did not report significantly higher scores on any items compared with Cluster 2 patients. Both clusters reported very low scores on items associated with the abuse of drugs or alcohol.

4.5.5 Effect of the Removal of Severely Thin Patients on Cluster Differences

Due to almost 50% of Cluster 1 patients being underweight according to their BMI classification, in addition to low scores on measures of eating psychopathology and general psychopathology scores, it was considered whether these patients may be cognitively unable
to effectively complete the assigned measures due to their emaciated state. Thus, in order to
determine that this possibility was not confounding the significant differences between the
clusters, these 10 patients were removed and the relevant chi square and single-factor
between-subjects MANOVA were again conducted with the cluster groupings as the factor and
the same dependent variables employed previously.

In support of the established findings, there still existed a significant relationship
between cluster groupings and the presence of purging, \( \chi^2 (1, N = 29) = 6.26, p = .012, V = .47 \). Standardised residuals indicated that the relatively high proportion of purging Cluster 2
patients (1.2) and the relatively low proportion of purging Cluster 1 patients (-1.6)
contributed to the significant result. Furthermore, the clusters continued to significantly
relate to self-harm ideation, \( \chi^2 (1, N = 29) = 9.33, p = .002, V = .57 \). Examination of
standardised residuals showed that the relatively high proportion of Cluster 2 patients
reporting self-harm ideation (1.5) and the relatively low proportion of Cluster 1 patients
reporting self-harm ideation (-1.9) contributed to the significant result. Suicide ideation also
remained significantly related to the cluster groupings, \( \chi^2 (1, N = 29) = 7.96, p = .005, V = .52 \), and standardised residuals indicated that the relatively high proportion of Cluster 2
patients reporting suicidal ideation (1.4) and the relatively low proportion of Cluster 1
patients reporting suicidal ideation (-1.8) contributed to the significant result. Notably, GFS
rating between the clusters only approached significance, \( \chi^2 (1, N = 29) = 3.69, p = .055, V = .36 \), despite the families reporting poor functioning still remaining in Cluster 2, and all
families in Cluster 1 reporting typical functioning. A series of single-factor between-subjects
MANOVA again compared the two clusters on the EDI-3, BASC-2 SRP and PRS scales. A
significant multivariate effect was found between the clusters on the EDI-3, Wilks’ \( \Lambda = .38, F(6, 22) = 6.04, p = .001, \eta^2 = .62 \quad [.19, .70] \), the BASC-2 SRP, Wilks’ \( \Lambda = .36, F(5, 23) = 8.19, p < .001, \eta^2 = .64 \quad [.26, .73] \), and the BASC-2 PRS, Wilks’ \( \Lambda = .39, F(4, 24) = 3.84, p =
.015, $\eta^2 = .39 \ [.02, .54]$. Follow-up univariate analyses of each of the EDI-3, BASC-2 SRP, and BASC-2 PRS scale scores are presented in Table 4.5.
<table>
<thead>
<tr>
<th>Scale</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>F</th>
<th>p</th>
<th>d [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDI-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating Disorder Risk</td>
<td>38.82 (9.84)*</td>
<td>54.44 (10.96)**</td>
<td>14.95</td>
<td>.001</td>
<td>1.48 [0.62, 2.32]</td>
</tr>
<tr>
<td>Ineffectiveness</td>
<td>43.45 (7.59)*</td>
<td>54.22 (5.51)**</td>
<td>19.58</td>
<td>&lt;.001</td>
<td>1.69 [0.81, 2.56]</td>
</tr>
<tr>
<td>Interpersonal Problems</td>
<td>45.27 (5.87)**</td>
<td>53.17 (6.17)**</td>
<td>11.60</td>
<td>.002</td>
<td>1.31 [0.47, 2.12]</td>
</tr>
<tr>
<td>Affective Problems</td>
<td>43.00 (6.99)**</td>
<td>54.72 (4.90)**</td>
<td>28.23</td>
<td>&lt;.001</td>
<td>2.03 [1.10, 2.95]</td>
</tr>
<tr>
<td>Overcontrol</td>
<td>38.55 (8.83)*</td>
<td>50.56 (9.79)**</td>
<td>11.04</td>
<td>.003</td>
<td>1.27 [0.44, 2.08]</td>
</tr>
<tr>
<td>General Psychological Maladjustment</td>
<td>41.73 (6.78)*</td>
<td>53.94 (4.67)**</td>
<td>33.11</td>
<td>&lt;.001</td>
<td>2.20 [1.24, 3.14]</td>
</tr>
<tr>
<td>BASC-2 SRP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Problems</td>
<td>47.18 (7.77)*</td>
<td>56.70 (16.83)*</td>
<td>3.08</td>
<td>.091</td>
<td>0.67 [-0.10, 1.44]</td>
</tr>
<tr>
<td>Internalising Problems</td>
<td>46.91 (8.17)*</td>
<td>68.69 (8.59)**</td>
<td>45.51</td>
<td>&lt;.001</td>
<td>2.58 [1.55, 3.58]</td>
</tr>
</tbody>
</table>

EDI severity ratings: *Low clinical; **Typical clinical; ***Elevated clinical
BASC severity ratings: *Normal; **At-risk; ***Clinically significant
Table 4.5 continued

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>F</th>
<th>p</th>
<th>d [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 11)</td>
<td>(n = 18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inattention/Hyperactivity</td>
<td>46.64 (10.46)*</td>
<td>57.36 (8.47)*</td>
<td>9.15</td>
<td>.005</td>
<td>1.16 [0.34, 1.96]</td>
</tr>
<tr>
<td>Personal Adjustment</td>
<td>45.82 (8.18)*</td>
<td>32.00 (7.71)**</td>
<td>20.96</td>
<td>&lt;.001</td>
<td>1.75 [0.86, 2.62]</td>
</tr>
<tr>
<td>Emotional Symptoms Index</td>
<td>52.91 (8.97)*</td>
<td>73.27 (8.00)**</td>
<td>40.36</td>
<td>&lt;.001</td>
<td>2.43 [1.43, 3.41]</td>
</tr>
<tr>
<td>BASC-2 PRS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externalising Problems</td>
<td>46.45 (6.09)*</td>
<td>54.74 (9.09)*</td>
<td>7.14</td>
<td>.013</td>
<td>1.02 [0.22, 1.81]</td>
</tr>
<tr>
<td>Internalising Problems</td>
<td>60.18 (11.78)**</td>
<td>70.93 (9.76)**</td>
<td>7.09</td>
<td>.013</td>
<td>1.02 [0.21, 1.81]</td>
</tr>
<tr>
<td>Behavioural Symptoms Index</td>
<td>54.73 (7.94)*</td>
<td>61.63 (8.25)**</td>
<td>4.92</td>
<td>.035</td>
<td>0.85 [0.06, 1.62]</td>
</tr>
<tr>
<td>Adaptive Skills</td>
<td>45.00 (7.23)*</td>
<td>38.23 (7.48)**</td>
<td>5.73</td>
<td>.024</td>
<td>0.92 [0.12, 1.70]</td>
</tr>
</tbody>
</table>

EDI severity ratings: *Low clinical; **Typical clinical; ***Elevated clinical
BASC severity ratings: *Normal; **At-risk; ***Clinically significant
Evidently, Cluster 2 patients remained significantly more maladaptive than Cluster 1 patients when comparing scores on the EDI-3, BASC-2 SRP, and BASC-2 PRS scales. The only exception was the BASC-2 SRP School Problems Composite, which was no longer significant after removing the severely thin patients from Cluster 1, despite Cluster 2 still reporting a higher mean score than Cluster 1. The severity ratings for Cluster 1 scores did not vary from the ratings that included the underweight patients. The same large effect sizes were evident for the significant cluster differences for the EDI-3, BASC-2-SRP, and BASC-2-PRS scale scores, according to Cohen’s (1988) classification.

4.5.6 Results of Six-month Follow-up

Medical data at the six-month follow-up was available for 34 (87%) of the 39 patients. One patient had been discharged after three months as medically stable and not requiring further assistance with their ED, one patient transferred to another service, and three patients did not have any record of follow-up appointments after their initial diagnosis. The 34 patients were aged 13 to 18 years ($M = 15.38, SD = 1.48$). Weight at six months was available for all 34 patients, ranging between 35.15kg and 77.75kg ($M = 50.35, SD = 7.08$). Height information was only available for 18 patients. From their initial assessment, the height of these 18 patients increased between zero and 5cm, with an average of 1.28cm; thus, in order to calculate BMI at this time period 1.28cm was added to the patient’s height from their initial assessment in an attempt to estimate the height of patients with no height information six months later. Height for the group of patients ranged from 143cm to 175cm ($M = 163.16, SD = 7.01$). Thus, BMI for the 34 patients ranged from 15.56 to 27.22 ($M = 18.89, SD = 2.11$), with four (12%) patients being classified as underweight, 29 (85%) were a healthy weight, and one (3%) was overweight. Amenorrhea was reported by two (6%) patients, while 12 (35%) were reported as having a regular period or being premenarche, and 20 (59%) were not specified in the medical file. Fifteen (44%) patients were admitted to
hospital on at least one occasion for an inpatient stay during the six month period, this
included those who first attended the ED clinic through the emergency department of the
hospital. In total, four (12%) of the 34 patients were deemed medically stable and discharged
from medical treatment for their ED during the six month period.

Nineteen patients from Cluster 1 and 15 patients from Cluster 2 had follow-up
information. Chi square analyses showed no relationship between clusters and status of
amenorrhea, BMI classification, and proportion of patients discharged within the six month
period. The Mann-Whitney test also show no significant difference between the clusters on
the number of inpatient stays, $z = -1.08, p = .28$. A single-factor between-subjects MANOVA
compared the two clusters on three dependent variables, including weight at six months,
height at six months, and average weight gain from initial assessment to six-month follow-up.
A significant multivariate effect was found, Wilks’ $\Lambda = .66, F(3, 30) = 4.80, p = .008, \eta^2 = .32 \text{ [.03, .49]}$. Follow-up univariate analyses of each dependent variable found a significant
difference among the two clusters for only one of the dependent variables, weight gain, as
Cluster 1 ($M = 5.83, SD = 4.66$) gained significantly more kilograms in six months compared
with Cluster 2 ($M = 2.39, SD = 3.71$), $F(1, 32) = 5.47, p = .026, d = 0.81 \text{ [0.10, 1.51]}$.

4.5.7 Results of Health Survey Follow-up

Thirteen (33%) of the 39 patients and their parents returned the health survey, of
which seven were from Cluster 1 and six from Cluster 2. These patients were aged between
13 and 18 years at the time of completing the survey, and the approximate length of time
since their diagnostic assessment at the Centre for Adolescent Health ranged between 6 and
27 months ($M = 14.54, SD = 5.44$). Only 8 of these patients provided self-report current
weight and height information. The BMIs ranged from 17.70 to 22.30 ($M = 19.50, SD = \text{1.68}$), and were each classified to be in the healthy weight range for their age. Of these
patients, approximately 46% reported their ED as no longer a problem, 8% reported a slight
problem, 15% reported a moderate problem, 15% reported quite a problem, and 15% reported an extreme problem. In contrast, approximately 17% of parents reported their daughter’s ED to be no problem, 33% reported a slight problem, 17% reported a moderate problem, 25% reported quite a problem, and 8% reported an extreme problem. Pearson’s correlation highlighted a significant positive correlation between the patient and parent reports, \( r (N = 12) = .78, p = .003, r^2 = .61. \)

A single-factor between-subjects MANOVA was conducted to determine cluster differences among two dependent variables, including length of illness and BMI at the time of the survey. No multivariate effect was found, Wilks’ \( \Lambda = .96, F(2, 5) = 0.12, p = .89, \eta^2 = .05 [.00, .34]. \) Mann-Whitney tests showed significant differences between the clusters on adolescent reports of their ED still being a problem, \( z = -2.42, p = .016, \) and for parents reporting their daughter’s ED to still be a problem, \( z = -2.97, p = .003, \) with Cluster 2 patients and parents reporting the ED to be more of a problem than Cluster 1 patients and parents. No significant differences were found between the clusters for the mental health and medical treatment facilities attended by the patients and the type of mental health treatment sought. However, the Royal Children’s Hospital ED program was the most frequently reported mental health service attended by patients, as 77% of the sample attended this service. The two most commonly received mental health treatments were FBT (69%) and individual therapy (54%). Furthermore, 85% of these patients reported receiving medical treatment for their ED from the Centre for Adolescent Health service.

Results from the PedsQL adolescent version and parent version were analysed using two single-factor between-subjects MANOVA. The first analysis showed no multivariate effect between clusters on the adolescent PedsQL, Wilks’ \( \Lambda = .40, F(6, 6) = 1.48, p = .32, \eta^2 = .60 [.00, .65]. \) Nonetheless, subsequent univariate analyses showed that Cluster 2 patients (\( M = 69.79, SD = 18.61 \)) reported significantly worse physical health, according to the Physical
Health Scale, compared with Cluster 1 patients \((M = 88.39, SD = 3.92), F(1, 11) = 6.74, p = .025, d = 1.44 [0.18, 2.66]\). The second analysis showed no multivariate effect between clusters on the parent PedsQL, Wilks’ \(\Lambda = .30, F(5, 7) = 3.33, p = .074, \eta^2 = .70 [.00, .77]\). Follow-up univariate analyses found that three of the six parent proxy report scales differed significantly between the clusters. Compared with the parents of Cluster 1 patients, parents of Cluster 2 patients reported their daughters as having significantly worse physical health, \(F(1, 11) = 11.96, p = .005, d = 1.92 [0.55, 3.24]\), emotional functioning, \(F(1, 11) = 4.98, p = .047, d = 1.24 [0.01, 2.42]\), and overall general health, \(F(1, 11) = 5.15, p = .044, d = 1.26 [0.03, 2.45]\) at follow-up.

### 4.6 Discussion

#### 4.6.1 Overview

This study evaluated whether a sample of adolescent females presenting to an outpatient clinic for AN treatment could be grouped into clinically relevant typologies based on a range of psychological, behavioural, eating, health, and family variables, which are not limited to the criteria for an ED diagnosis. The variability in the sample’s EDI-3 and BASC-2 scores supported the investigation of possible subgroups within this sample of patients. The two-step cluster analysis yielded two independent typologies of adolescent females aged between 13 and 18 years with AN or subthreshold AN, which differed significantly on a broad range of variables, including eating pathology, BMI, self-harm ideation, suicide ideation, family functioning, and self-reported and parent reported psychological and behavioural factors. Examining this range of variables provided a holistic profile of the current clinical presentation of this adolescent sample, which only limited previous research has undertaken. Parent reports also contributed an important and unique element to this study by validating the patient self-reports. The results highlighted that Cluster 2 patients reported significantly higher levels of eating, psychological, and behavioural psychopathology; hence,
reporting a typically more maladaptive clinical profile compared with Cluster 1 patients. Based on the characteristics of the clusters, Cluster 1 has been labelled as Egosyntonic AN and Cluster 2 has been labelled as Heterogeneous AN. The profiles of the two statistically derived clusters are independently described.

4.6.2 Summary of Egosyntonic AN

The Egosyntonic AN cluster encompassed 21 patients who represented 54% of the total sample. Approximately half of Egosyntonic AN patients were classified as underweight, according to the BMI classification system appropriate for children and adolescents (State Government of Victoria, 2010). Egosyntonic AN patients presented with a significantly lower average BMI than Heterogeneous AN patients, despite manifesting no clinical elevations on ED pathology on the self-report measures. Purging behaviours, self-harm ideations, and suicide ideations were rarely reported by Egosyntonic AN patients. An independent psychiatric diagnosis indicated that 38.1% of Egosyntonic AN patients were diagnosed with a comorbid mental health disorder; however, no clinical elevations were reported on a range of psychological and behavioural areas measured by the EDI-3 and BASC-2 SRP, including overcontrol, personal adjustment, ineffectiveness, school problems, inattention/hyperactivity, and the global psychopathology indices. Egosyntonic AN patients only reported clinical scores on the EDI-3 on interpersonal problems, emotional dysregulation, and interoceptive deficits, which refers to the inability to differentiate the sensations of hunger and satiety (Faust, 1987; Garner, 2004). Notably, these scores were still significantly lower than those reported by Heterogeneous AN patients. In line with their daughters’ self-reports, parents reported an absence of externalising and behavioural problems, alongside adaptive functioning. In contrast to their daughters’ self-reports, parents did not perceive any interpersonal problems. General family functioning was reported as adaptive by all families in Egosyntonic AN patients. Evidently, the Egosyntonic AN cluster
comprised patients diagnosed with AN-R or subthreshold AN, who were significantly lower in weight, compared with Heterogeneous AN patients, and reported few elevations on eating, psychological, and behavioural self-report measures, which was validated by their parent reports.

From the scoring manuals of the EDI-3 and BASC-2, Egosyntonic AN patient scores would suggest some denial or a reluctance to report problems in these areas (Garner, 2004; Reynolds & Kamphaus, 2004). Low reporting on the EDI-3 of any eating symptoms in individuals diagnosed with AN or subthreshold AN is more likely to reflect a denial of their current clinical state rather than indicate no problem with eating and weight (Garner, 2004). This seems plausible given that Egosyntonic AN patients have a significantly lower average weight than Heterogeneous AN patients, and approximately half of Egosyntonic AN patients were diagnosed with an underweight BMI. These low scores may also indicate a temporary state of the ego-syntonic nature of symptoms typically seen in individuals with AN-R, wherein the ED feels right to the patient, thus, the patient may be currently satisfied with their weight loss and emaciated state, and not engage in ED behaviours at that time (Garner, 2004).

It was unusual that Egosyntonic AN patients reported low scores on perfectionism and overcontrol; however, this may further relate to this temporary sense of attained perfection. Garner (2004) further suggests that low scores on the EDI-3 psychological scales are likely to indicate that Egosyntonic AN patients have minimised the reporting of their overall level of distress, rather than the absence of psychological maladjustment. The tendency for individuals with an ED to minimise their psychological disturbance is often motivated by a desire to present themselves in a socially desirable or idealistic manner (Reynolds & Kamphaus, 2004).

The scales on which Egosyntonic AN patients reported clinical elevations were typical of the scores expected in this clinical sample, according to the EDI-3 norms for
adolescent ED samples (Garner, 2004). Despite reporting significantly lower scores than Heterogeneous AN patients in these areas, scores suggest that Egosyntonic AN patients experience some level of distress in social relationships, feelings of insecurity, and generally poor interpersonal relationships, alongside some mood instability and inadequacy in identifying and responding appropriately to their emotional states (Garner, 2004). Parent scores on the BASC-2 suggest that parents generally view their daughter as high-functioning in daily life, with overall adaptive skills, positive interpersonal relationships, and appropriate emotional expression (Reynolds & Kamphaus, 2004). According to Reynolds and Kamphaus (2004), BASC-2 scores indicate a tendency for Egosyntonic AN patients to be submissive and excessively monitor their actions, which may allow any problems to go unnoticed by their family.

The profile of family, psychological, and behavioural presentation of the Egosyntonic AN patients from the present study support the conclusions of Bruch (1966, 1973), which stated that AN patients attempt to normalise their emaciated state, deny symptoms of eating and weight problems, and feel a paralysing sense of ineffectiveness, as though their behaviours are driven by outside forces. Alternatively, Vitousek and Manke (1994) have suggested that starvation may reduce a patient’s cognitive capacity. This reasoning was the impetus for removing the 10 underweight patients from the Egosyntonic AN cluster and again conducting the MANOVA comparing the EDI-3 and BASC-2 scales between the two clusters. Given that Heterogeneous AN patients continued to show significantly more maladaptive characteristics than Egosyntonic AN patients, and that the parent reports validated the patient self-reports, it is evident that the underweight patients from the Egosyntonic AN cluster were not cognitively impaired to the point of being unable to complete the assessment measures, but rather tended to report low levels of ED psychopathology, general psychopathology, and behavioural problems. For the family, the
obvious decline in weight in their daughter is often unconsciously accommodated because she tends to be high-achieving, dependable, obedient, sociable, and eager to please (Bruch, 1973). Thus, the parents may overlook the emaciation because their daughter is excelling in other domains in life. This finding supports the study conducted by Cantwell, Lewinsohn, Rohde, and Seeley (1997) that found a strong level of agreement between parent and adolescent reports of the adolescent’s psychopathology, in particular, core symptoms of AN.

The Egosyntonic AN profile resembles the findings of Turner and Bryant-Waugh (2004) who found a cluster among adult ED patients characterised as severely underweight with muted affect and little behavioural and cognitive disturbance. The Egosyntonic AN cluster in the present study is also similar to the pure dieting group derived in research by Stice and Agras (1999), Grilo (2004), and Chen and Le Grange (2007), which highlighted a typology, in mostly BN samples, characterised by dietary restraint and lower levels of eating, weight, and shape concerns, and general psychopathology. The profile of Egosyntonic AN patients in the present study is also similar to research examining the role of personality characteristics in clustering ED groups, which found a personality group characterised by no clinical elevations in personality, eating, and weight related dimensions, a high degree of control over their impulses, superficially comfortable in their social relationships despite their internal distress, and belonging to a highly stable and relatively harmonious family (Claes et al., 2006; Espelage et al., 2002; Strober, 1983). Despite characteristics of Egosyntonic AN patients resembling some of the findings in previous research, this study provided a more holistic presentation of the characteristics of this sample of patients.

The low scores on the self-report measures would suggest an absence of eating, psychological, and behavioural problems in Egosyntonic AN patients. Given the weight status of this cluster, the psychiatric diagnosis of patients as either AN-R or subthreshold AN, as well as the presence of a mental health comorbidity in 38.1% of the cluster, it is most
likely that Egosyntonic AN patients have tended to deny their clinical symptoms. The unique inclusion of parent reports has validated the patient reports by also reporting low clinical levels on a range of psychological and behavioural scales. Positive parent reports may indicate that parents were unaware of any problem with eating or general functioning because of their daughter’s ability to mask any disturbance. Or it may be that as a family there is a denial of any problems with eating or general functioning. As all families in the Egosyntonic AN cluster reported adaptive family functioning scores, it may be suggested that Egosyntonic AN patients come from the stereotypical family with a member with AN, which is often characterised as well-functioning and non-confrontational (see Section 2.5.1b).

4.6.3 Summary of Heterogeneous AN

The Heterogeneous AN cluster encompassed 18 patients, who represented 46% of the total sample, and, in complete contrast to the Egosyntonic AN cluster, all Heterogeneous AN patients were classified as a healthy weight according to their BMI. Heterogeneous AN patients reported high scores on eating pathology and related behaviours. Results from the ED scales are indicative of most patients with a clinical ED, including significant eating and weight concerns, interoceptive deficits, body dissatisfaction, and bulimic behaviours, such as, binge eating and purging behaviours. In fact, purging was reported by more than half of the cluster. Investigation of individual EDI-13 items also highlighted that Heterogeneous AN patients reported binge eating and thinking about binge eating significantly more than Egosyntonic AN patients. This may explain the increased purging behaviours to counteract the binge eating. Self-harm ideation and suicide ideation were also reported by approximately half of the cluster, which was significantly more than Egosyntonic AN patients. Heterogeneous AN patients reported high scores on a range of general psychological and behavioural functioning areas, including ineffectiveness, interpersonal problems, overcontrol, affective and internalising problems, and general psychological
maladjustment, and reported low scores on personal adjustment. The reported difficulties in interpersonal relationships and the presence of negative affect may have contributed to over a quarter of Heterogeneous AN families reporting high scores on family dysfunction, which may include difficulties with problem solving, communication, roles, affective problems, and behaviour control. Hence, it is not surprising that Heterogeneous AN parents reported their daughters as presenting with high levels of problem behaviours, poor adaptive skills, and clinically significant internalising problems.

According to the scoring manuals of the EDI-3 and BASC-2, Heterogeneous AN patient scores tend to indicate an on-average extremely high level of distress across a range of psychological areas, as well as a range of behavioural problems (Garner, 2004; Reynolds & Kamphaus, 2004). Garner (2004) suggests that the heightened levels of depression and anxiety, poor self-esteem, a poor sense of self-awareness and significant difficulties in identifying, understanding, or accurately responding to emotions, as shown by the scores of Heterogeneous AN patients, may contribute to distress in social relationships and poor interpersonal relationships in general. The internalising and personal adjustment problems, highlighted by the BASC-2 SRP scores, tend to indicate elevated emotional and interpersonal problems, and suggest that a patient manifesting these characteristics may have few coping resources and positive outlets for alleviating stress (Reynolds & Kamphaus, 2004). These problems reported by the patients were further validated by the parent reports. According to Reynolds and Kamphaus (2004), the high scores on the BASC identify Heterogeneous AN patients as at risk of a less favourable outcome, particularly when compared with Egosyntonic AN patients.

Previous research has highlighted that binge eating and purging behaviours are related to increased psychopathology and self-harm and suicide ideations (Beumont et al., 1976; DaCosta & Halmi, 1992; Vitousek & Manke, 1994), as was found in the present study. The
Heterogeneous AN profile resembles that of the dieting-depressive group from Grilo (2004) and Chen and Le Grange’s (2007) work, who presented with higher psychopathology, significantly more frequent binge eating, and overall eating dysfunction and body dissatisfaction compared with the pure dieting group. In contrast to Grilo’s (2004) two clusters, which did not differ on purging behaviours, Heterogeneous AN patients in the present study reported significantly more frequent purging behaviours than Egosyntonic AN patients. The Heterogeneous AN patients showed both dietary restraint and negative affect in the present study. According to the dietary restraint and negative affect theories, the combination of dietary restraint and negative affect increases an individual’s risk of bulimic behaviours and general psychopathology, resulting in a more maladaptive presentation (Stice, 2001; Stice & Agras, 1999), which was found in the present study with Heterogeneous AN patients reporting higher clinical scores across a range of areas compared with Egosyntonic AN patients.

Evidently, Heterogeneous AN patients all presented with a healthy weight and were diagnosed with subthreshold AN; however, the high scores from the self-report measures would suggest the presence of eating, psychological, and behavioural problems. The maladaptive presentation of this cluster in general may be related to the reported negative affect and the cycle between dietary restraint and bulimic behaviours. Overall, eating, psychological, and behavioural reports from Heterogeneous AN patients and their parents suggest a significantly more maladaptive profile compared with Egosyntonic AN patients.

4.6.4 Cluster Similarities and Differences

The present findings demonstrated that this clinic sample of adolescent females with AN or subthreshold AN can be clustered into two independent statistically derived typologies. Egosyntonic AN patients were typically underweight, tended to report a denial of eating, psychological, and behavioural maladjustments, reported adaptive family functioning,
and were reported by their parents as presenting with no obvious psychological and
behavioural problems. Conversely, Heterogeneous AN patients were of a healthy weight
range and presented with high levels of eating pathology, psychological and behavioural
maladjustments. The parents of Heterogeneous AN patients reported their daughter to have
significantly more psychological and behavioural problems than Egosyntonic AN parents,
which may be due to the more obvious behavioural problems exhibited in a range of daily
living domains.

The two-cluster solution derived in this study most closely resembles the clusters
derived in the dieting restraint and negative affect research, which has consistently found the
pure dieting and dieting-depressive subtypes (Chen & Le Grange, 2007; Grilo, 2004; Stice &
Agras, 1999). Egosyntonic AN appears to be most closely aligned with the pure dieting
group and Heterogeneous AN the dieting-depressive group, as discussed earlier. Importantly,
the present study has demonstrated the existence of these subtypes within an outpatient group
of adolescent females specifically with AN, or subthreshold AN, whereas previous studies
examined wider age groups, mixed genders, or multiple ED groups, with much of the
research being conducted with BN samples (Chen & Le Grange, 2007; Grilo, 2004; Stice &
Agras, 1999). Also, the two-cluster solution in the present study was derived from different
measures from Stice and Agras (1999) and Chen and Le Grange (2007), who used the Eating
Disorder Examination to measure eating psychopathology and the Beck Depression Inventory
and Rosenberg Self-esteem scale to measure negative affect. Grilo (2004) used the same
measures as Stice and Agras (1999) and Chen and Le Grange (2007) for negative affect, but
used the ED scale of the MACI to measure eating psychopathology. Conversely, the present
study used the EDI-3 to measure eating psychopathology and the BASC-2 SRP and PRS to
measure a range of psychological and behavioural problems, in which negative affect was
encompassed.
The present study not only measured more global functioning in the adolescent females in the study, and used a different clinic group with different measures, but the parent data also provided a unique facet to validate the patient responses. Importantly, the studies conducted by Stice and Agras (1999), Grilo (2004) and Chen and Le Grange (2007) restricted a two cluster solution on the analysis, while the present study placed no restriction on the data and still found two clusters. The present results further validate the role of reported negative affect in clustering ED typologies and highlight that typologies can be derived by grouping clinical characteristics that ED patients present with, which are not necessarily part of the diagnostic criteria for an ED.

The two clusters derived in the present study may appear to represent the existing *DSM-IV-TR* AN subtypes, which are differentiated by the presence or absence of binge eating and purging behaviours. Despite the present study deriving two clusters that differ significantly on bulimic behaviours, the present study did not derive the two clusters solely from these ED behaviours, but rather conducted a holistic analysis of a range of eating, psychological, familial, and behavioural characteristics with which the patients were presenting to the assessment clinic. Furthermore, the clinical diagnosis of approximately half of the patients in the Egosyntonic AN cluster and all patients in Heterogeneous AN was subthreshold AN, due to not fulfilling all the criteria for an AN diagnosis. Thus, the two clusters in this study cannot be defined by *DSM-IV-TR* AN subtype classifications because 74% of the patients in this study did not fulfil the diagnostic criteria for either of the AN subtypes.

There were a number of interesting areas in which the two clusters did not differ, including mental health comorbidity and amenorrhea. As discussed in Section 2.4.3, Axis I disorders are common among patients with AN (Blinder et al., 2006; Salbach-Andrae, Lenz, et al., 2008). Approximately 44% of the present sample was diagnosed with mental health
comorbidity at the time of their initial assessment. Interestingly, despite Heterogeneous AN patients reporting significantly higher levels of psychopathology on the EDI-3 and BASC-2 measures, there was no significant difference between the clusters in the presence of mental health comorbidities. In fact, the patients reporting a mental health comorbidity almost evenly dispersed between the two clusters, with eight of the Egosyntonic AN patients and nine of Heterogeneous AN patients having a mental health comorbidity.

Additionally, there was no significant difference between the clusters on the presence or absence of menstruation, as approximately half of the patients in the Egosyntonic AN cluster and just under half of the patients in Heterogeneous AN reported amenorrhea at the time of their initial assessment. Notably, each cluster comprised patients with amenorrhea and menstruating patients, thus, the presence or absence of menstruation did not contribute to allocating patients to clusters. This finding corroborates the study by Garfinkel et al. (1996), which found that the same psychological and behavioural symptoms were reported by females who fulfilled all the AN criteria and those who fulfilled all AN criteria excluding amenorrhea. This finding further supports the premise of Attia and Roberto (2009) that AN patients with and without amenorrhea have few psychological differences. As such, it is questionable as to how important the amenorrhea criterion should be in diagnosing patients with AN, given that eating psychopathology and psychological and behavioural profiles are not influenced by menstruation status. Treatment interventions are also not based on menstruation status, but rather focus on the eating, psychological, and behavioural aspects of the disorder.

4.6.5 Summary of Follow-up

A shortcoming of both the six-month and health survey follow-ups is that complete data for all patients were not available or attained. Nonetheless, some interesting trends emerged from the analysis showing differences between the clusters. From the six-month
follow-up, which was only medically based, Egosyntonic AN patients showed the most improvement overall. Specifically, Egosyntonic AN patients reported a significantly higher average weight gain than Heterogeneous AN patients. At first glance this finding appears to support previous literature that demonstrated that patients who present with dietary restraint, a positive family environment, and less psychopathology tend to have a better outcome, while patients who present with more bulimic behaviours tend to have a poorer outcome (W. Herzog et al., 1997; Steinhausen, 2002; Wade et al., 2006). Half of the patients in the Egosyntonic AN cluster, however, were considered underweight at their initial assessment, and Egosyntonic AN patients reported a significantly lower BMI than Heterogeneous AN patients, thus, Egosyntonic AN patients actually had more weight to gain to be deemed medically stable. Interestingly, despite Egosyntonic AN patients being underweight and considered less medically stable, there was no significant difference between the clusters in the number of inpatient stays during the six month period following their initial assessment. Thus, it may be that Egosyntonic AN patients were admitted for an inpatient stay due to their emaciation and malnutrition, whereas, Heterogeneous AN patients may have been admitted for their maladaptive behaviours, such as, binge eating and purging.

The health survey follow-up showed that Heterogeneous AN patients and their parents reported the ED still being a problem significantly more frequently than Egosyntonic AN patients and their parents. The derived cluster profiles were paralleled by the results of the PedsQL in that Heterogeneous AN patients reported significantly worse physical health than Egosyntonic AN patients, which may be related to the effects of binge eating and purging in the Heterogeneous AN patients. Additionally, Heterogeneous AN parents reported their daughters as having significantly poorer physical and emotional health, and general health, compared with Egosyntonic AN parents. In general, there was a trend that Heterogeneous AN patients had a poorer outcome than Egosyntonic AN patients. This may
be a result of two possibilities. Firstly, these reports mirror the present cluster profiles in that Egosyntonic AN patient and parent reports indicated a general denial of symptoms, while Heterogeneous AN patients presented with more ED pathology, general psychopathology, and maladaptive behaviours. Secondly, the follow-up analyses may support previous research that suggests that Heterogeneous AN type patients are prone to a poorer outcome given their eating pathology, psychological and behavioural problems (W. Herzog et al., 1997; Steinhausen, 2002; Wade et al., 2006).

4.6.6 Limitations

The present findings must be considered in light of some limitations. A limitation of the present study is the small sample size due to the use of existing clinic data. Only 39 patients fulfilled the age and diagnostic criteria for this study and had completed all of the necessary measures at their initial assessment. Furthermore, data were only available for a two year period, because this was the timeframe in which the described measures were used. After February 2010, the measures used at assessment changed. Nevertheless, a cluster analysis was effectively conducted with all patients being allocated to one of the two clusters derived, which supports the strength of the clusters found in this study. Furthermore, large effect sizes were found between the two clusters on the EDI-13, BASC-2 SRP and PRS scale scores, thus, indicating adequate power and cluster stability.

The results from this study have limited generalisability as the sample of adolescent females with AN or subthreshold AN were from the same clinic, whose services have been regionalised. Thus, it is unknown if socioeconomic factors may impact the results. Future research should attempt to replicate the results using the same measures with other adolescent AN samples. Another possible limitation of this study was the reliance on psychiatrist assessment for diagnosing patients as opposed to using the standardised Eating Disorder Examination. Initially it was thought that another limitation may be reporting bias, due to the
patient data being mostly self-reported. However, a parent’s viewpoint of their daughter was also collected, which validated the patient psychological and behavioural reports. Despite Egosyntonic AN patients’ reports indicating a general denial of any eating psychopathology, and psychological and behavioural maladjustments, the correct interpretation of the reports highlighted this denial as part of the clinical presentation of this subtype.

A major limitation of the follow-up analyses was the limited sample data; however, this was governed by the existing follow-up information in the patient medical files. Unfortunately, for the six-month follow-up, some patients did not return for medical treatment, while others went to private clinics for care, hence, the limited data. Furthermore, a specific six-month follow-up was not conducted by the clinic; thus, some of the information was missing for particular patients, for example, information on amenorrhea status. The health survey had been sent out to all the patients who had ever attended the outpatient clinic and was voluntary. The patients were not followed up by the medical team to return the survey; hence, the poor response rate.

4.6.7 Summary and Implications

Despite these limitations, the present study established two clinically distinct subtypes of adolescent females with AN and subthreshold AN, which were determined by psychological, behavioural, and general functioning factors, alongside eating pathology and family functioning. These results highlight that natural groupings of the characteristics with which AN patients present can be derived from examining individual differences and aspects related to the wider presentation of EDs, rather than defining patients solely by their ED diagnosis. A major strength of this study is the presence of the parent reports, which have not been assessed in the previous research described in Chapter 3. Importantly, the parent reports from the BASC-2 PRS validated the patient reports given that similar profiles of elevated and
low scores were mirrored by parents and patients in both clusters. A summary of the key characteristics of each cluster is presented in Table 4.6.
Table 4.6

**Summary of Profiles of the Two Clusters**

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Key characteristics</th>
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</table>
| 1 \((n = 21)\) | • Underweight BMI but low levels of eating and weight concerns  
• Infrequent purging behaviours, self-harm ideations, and suicide ideations  
• Well-functioning family scores  
• Low levels of overcontrol, general psychological maladjustment and disturbance, school problems, and inattention  
• Typical clinical levels of ineffectiveness and affective problems  
• Positive personal adjustment  
• Parents reported daughter with low levels of externalising and internalising problems, and positive adaptive skills |
| 2 \((n = 18)\) | • Healthy BMI but high level of eating and weight concerns  
• Binge eating, purging, self-harm ideations and suicide ideations present  
• Poor family functioning scores  
• High levels of ineffectiveness, interpersonal and affective problems, overcontrol, and general psychological maladjustment and disturbance  
• Poor levels of personal adjustment  
• Parents reported daughter at-risk of behavioural and adaptive problems, and clinically significant internalising problems |
In summary, the present study examined a relatively homogeneous ED clinic group in terms of age, demographic region, and diagnosis, and found clinically relevant differences within this group by examining a range of patient characteristics and not merely diagnostic criteria. Medically and physically, it is more obvious that Egosyntonic AN patients have a problem with eating due to their emaciated state; however, they may have generally gone unnoticed because of their ability to mask their eating, psychological, and behavioural problems, in addition to their adaptive functioning in daily life. Therefore, the eating problems faced by Egosyntonic AN patients should not be ignored simply because these patients do not manifest any obvious and severe behavioural problems. In speculating on treatment implications, it may be that Egosyntonic AN patients should receive immediate treatment due to the negative ramifications of their low weight on their health. Conversely, Heterogeneous AN patients were in a healthy weight range, but reported maladaptive bulimic behaviours, including binge eating and purging. These patients also tended to present with higher levels of psychopathology and behavioural maladjustments.

Despite limited sample data, the trends from the follow-up analyses demonstrated that Egosyntonic AN patients who reported low weights and low levels of eating, psychological, and behavioural maladjustments, generally reported a better outcome in terms of weight gain and other health outcomes compared with Heterogeneous AN patients who reported frequent binge eating and purging behaviours and higher levels of psychopathology. Evidently, these differences in the two clusters suggest that tailored interventions, targeting the different cluster characteristics, may be important. For instance, Egosyntonic AN patients may benefit most from family based treatment because the first step is promoting weight gain and adaptive eating (Lock et al., 2010; Lock et al., 2001; Wallis et al., 2007), which is obviously a priority for Egosyntonic AN patients. Furthermore, as this re-feeding process occurs under the supervision of the parents, it may be more suitable and effective in a family with less
conflict, such as those in the Egosyntonic AN cluster. Alternatively, Heterogeneous AN patients may respond well to a cognitive-behavioural approach, as the emphasis is placed on cognitively restructuring eating attitudes and minimizing bulimic behaviours (Garner et al., 1997), which are the fundamental problems with Heterogeneous AN patients. It may otherwise be suggested that dialectical behaviour therapy (DBT) be applied to Heterogeneous AN patients as it aims to modify specific ED behaviours using skills training, accompanied by psychotherapy (McCabe & Marcus, 2002; Treasure et al., 2005). Future research should compare the effectiveness of CBT and DBT in AN patients who fit the Heterogeneous AN profile to determine the most beneficial treatment for this group. Importantly, the long term implication of the present findings is that if patients can be identified as belonging to a typology upon assessment, and specific treatments are implemented for these typologies, then a treatment known to target these problematic characteristics could be implemented immediately.
CHAPTER 5: Research on Maladaptive Schemas

5.1 Introduction

The findings from Study 1, presented in Chapter 4, alongside previous research examining variables related to the wider presentation of EDs, presented in Chapter 3, demonstrated that ED patients can be grouped into clinically relevant typologies by examining general psychological and behavioural variables that are not part of the ED diagnostic criteria. This chapter continues to explore the notion of examining EDs from a perspective not related specifically to DSM-IV-TR diagnostic criteria, by examining underlying core beliefs.

Individuals with EDs have a tendency to base their self-worth largely on their eating, weight, or body shape, as well as their ability to control these aspects (Fairburn et al., 2003). As such, cognitive theories of the development and maintenance of EDs suggest that ED symptoms are developed and maintained by negative automatic thoughts and dysfunctional assumptions about eating, weight, and body shape (Beck, 1976; Jones et al., 2007). Beck (1976) proposed that automatic thoughts tend to occur involuntarily, like a reflex, to specific situations; for individuals who are more ‘disturbed’ these thoughts are difficult to disable. Importantly, these automatic thoughts are considered to be valid to the individual despite reality or logic (Beck, 1976). Thus, individuals with an ED tend to maintain the validity of their automatic thoughts about eating, weight, and shape (Fairburn et al., 2003), which may explain why EDs are typically resistant to treatment. This theory, however, has more recently been challenged as it has been proposed that eating, weight, and shape related cognitions alone are not sufficient to explain ED psychopathology (Jones et al., 2007). Thus,
researchers have aimed to examine the possible maladaptive core beliefs and schemas not related to eating, weight, and shape beliefs, which may be present in individuals with an ED (Cooper et al., 2006; Deas et al., 2011; Dingemans et al., 2006; Jones et al., 2005; Leung et al., 1999; Muris, 2006; Waller, 2003; Waller et al., 2002; Waller et al., 2000).

Although it has been demonstrated that cognitions related to eating, weight, and shape are related to the development and maintenance of EDs, recent research has also highlighted that cognitions not specifically associated with eating, weight, and shape may be involved. Thus, in line with the aim of this thesis to examine AN from a perspective beyond eating, weight, and shape related factors, it would seem further relevant to examine the maladaptive cognitions that may underlie ED psychopathology, but are not eating, weight, and shape specific. This chapter will describe the notion of cognitive schemas as introduced by Aaron Beck, later expanded by Jeffrey Young, who described the presence of maladaptive schemas in treatment resistant mental health disorders. Young’s theory of maladaptive schemas will be described, followed by a review of the relevant literature that has examined maladaptive schemas in ED samples and the limitations of the existing research.

5.2 Beck’s Theory of Schemas

Beck’s theory of the role of cognitions in mental illness was first hypothesised as being related to the development and maintenance of depression (Beck, 1967). Beck (1967) proposed that individuals respond in a consistent manner to similar events due to their cognitive organisation, which consists of relatively enduring cognitive structures. The term schema was used by Beck (1967) to describe a cognitive structure. Defined by Beck (1967), “a schema is a structure for screening, coding, and evaluating the stimuli that impinge on the organism” (p. 283). Schemas are the means by which an individual interprets their experiences and environment by breaking them down and organising them into meaningful components (Beck, 1967). It was proposed that when a cognition is formed, the schema
provides the conceptual framework in terms of how an individual perceives and labels the dominant features of their experiences and environment (Beck, 1967). As such, individuals have schemas for all facets of life. Specifically, Beck (1967) proposed that schemas may be small patterns of thought, such as assisting the identification of a shoe, or may be large global patterns, such as ethnic prejudice, in which an individual may view a person’s behaviour from another ethnic group in a hostile manner. Beck’s general theory of schemas relates to the broader, more complex, schemas and the present review of literature will focus on these.

The schemas seen in psychopathology are largely a result of distortions of reality in one’s conceptions, attitudes, premises, goals, and expectations (Beck, 1967, 1976). Beck (1967) proposed that negative schemas develop in response to aversive experiences in childhood, which lead to dysfunctional beliefs about the world. Beck (1967) hypothesised that, in patients with depression, these negative schemas are typically dormant during non-depressed periods, become particularly strong as the depression develops, and then reside again with therapy. As an individual becomes more depressed, their depressive thoughts progressively dominate their thought content and typically lead to more depressive feelings of sadness and pessimism (Beck, 1967). Beck (1976) theorised that as psychopathology increases, the individual attempts to validate their negative schemas by selectively extracting the details from their environment or situation to fit into the framework of their schema. As a result, these dominant negative schemas disrupt an individual’s ability to be objective as more appropriate schemas are displaced and substituted with negative schemas (Beck, 1967). This process is how schemas are proposed to be maintained despite reason and logic (Beck, 1967).
5.3 Young’s Theory of Maladaptive Schemas

5.3.1 Early Maladaptive Schemas and Schema Domains

As an extension of Beck’s (1967, 1976) work, and based on his own clinical observations, Young devised a theory of early maladaptive schemas (EMSs) and core emotional needs proposed to underlie personality disorders and many chronic Axis I disorders (Young, 1999; Young et al., 2003). An EMS has been defined as “a broad, pervasive theme or pattern, comprised of memories, emotions, cognitions, and bodily sensations, regarding oneself and one’s relationships with others, developed during childhood or adolescence, elaborated throughout one’s lifetime and dysfunctional to a significant degree” (Young et al., 2003, p. 7). EMSs are the dysfunctional and unconditional frameworks by which an individual perceives and processes their experiences and environment (Young, 1999; Young et al., 2003). It is hypothesised that EMSs are developed early in life as a result of unmet childhood needs (Young, 1999; Young et al., 2003). Thus, EMSs form part of an individual’s self-concept and perception of their environment, and therefore are familiar for an individual, and allow the greatest ease of processing their environment (Young, 1999; Young et al., 2003). EMSs are typically resistant to change as an individual attempts to maintain cognitive consistency by distorting their perceptions of themselves and their environment to validate their schemas (Rafaeli, Bernstein, & Young, 2011; Young, 1999; Young et al., 2003). Importantly, perceptions are maintained regardless of whether they are accurate or inaccurate, adaptive or maladaptive (Rafaeli et al., 2011; Young, 1999; Young et al., 2003). This is in line with Beck’s (1967) theory in which schemas are maintained despite reason or logic, and has been further supported by research that has demonstrated the long-term stability of EMSs (e.g., Riso et al., 2006).

Young has thus far identified 18 EMSs, which have been grouped into five broad schema domains (Young, 1999; Young et al., 2003). The schema domains are proposed to
correspond to five universal emotional childhood needs, including: (1) secure attachments to others; (2) autonomy, competence, and sense of identity; (3) freedom to express valid needs and emotions; (4) spontaneity and play; and (5) realistic limits and self-control (Young, 1999; Young et al., 2003). If these needs are unmet during childhood, then an individual is at risk of developing the EMSs that correspond to that schema domain (Young, 1999; Young et al., 2003). The complete list and explanation of the five schema domains and the 18 EMSs is displayed in Table 5.1.
Table 5.1

*Early Maladaptive Schemas with associated Schema Domains* (Young et al., 2003, pp. 14-17)

<table>
<thead>
<tr>
<th>Domain/Schema</th>
<th>Description</th>
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<tbody>
<tr>
<td>Disconnection and Rejection</td>
<td><em>The expectation that one’s needs for security, safety, stability, nurturance, empathy, sharing of feelings, acceptance, and respect will not be met in a predictable manner. Typical family origin is detached, cold, rejecting, withholding, lonely, explosive, unpredictable, or abusive.</em></td>
</tr>
<tr>
<td>1. Abandonment</td>
<td>The perceived <em>instability</em> or <em>unreliability</em> of those available for support and connection. Involves the sense that significant others will not be able to continue providing emotional support, connection, strength, or practical protection because they are emotionally unstable and unpredictable (e.g., have angry outbursts), unreliable, or present only erratically; because they will die imminently; or because they will abandon the individual in favour of someone better.</td>
</tr>
<tr>
<td>2. Mistrust</td>
<td>The expectation that others will hurt, abuse, humiliate, cheat, lie, manipulate, or take advantage. Usually involves the perception that the harm is intentional or the result of unjustified and extreme negligence. May include the sense that one always ends up being cheated relative to others or ‘getting the short end of the stick’.</td>
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Table 5.1  continued

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<tr>
<th>Domain/Schema</th>
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<tr>
<td>3. Emotional</td>
<td>The expectation that one’s desire for a normal degree of emotional support will not be adequately met by others. The three major forms of deprivation are: Deprivation of Nurturance: Absence of attention, affection, warmth, or companionship; Deprivation of Empathy: Absence of understanding, listening, self-disclosure, or mutual sharing of feelings from others; Deprivation of Protection: Absence of strength, direction, or guidance from others.</td>
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<tr>
<td>Deprivation</td>
<td></td>
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<tr>
<td>4. Defectiveness</td>
<td>The feeling that one is defective, bad, unwanted, inferior, or invalid in important respects or that one would be unlovable to significant others if exposed. May involve hypersensitivity to criticism, rejection, and blame; self-consciousness, comparisons, and insecurity around others; or a sense of shame regarding one’s perceived flaws. These flaws may be private (e.g., selfishness, angry impulses, unacceptable sexual desires) or public (e.g., undesirable physical appearance, social awkwardness).</td>
</tr>
<tr>
<td>5. Social Isolation</td>
<td>The feeling that one is isolated from the rest of the world, different from other people, and/or not part of any group or community.</td>
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<td>Domain/Schema</td>
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<tr>
<td>Impaired Autonomy and Performance</td>
<td><em>Expected</em>ations about oneself and the environment that interfere with one’s perceived ability to separate, survive, function independently, or perform successfully. Typical family origin is enmeshed, undermining of child’s confidence, overprotective, or failing to reinforce child for performing competently outside the family.</td>
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<tr>
<td>6. Dependence</td>
<td>Belief that one is unable to handle one’s <em>everyday responsibilities</em> in a competent manner, without considerable help from others (e.g., take care of oneself, solve daily problems, exercise good judgment, tackle new tasks, make good decisions). Often presents as helplessness.</td>
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<tr>
<td>7. Vulnerability to Harm</td>
<td>Exaggerated fear that <em>imminent</em> catastrophe will strike at any time and that one will be unable to prevent it. Fears focus on one or more of the following: (a) Medical catastrophes (e.g., heart attacks, AIDS); (b) Emotional catastrophes (e.g., going crazy); (c) External catastrophes (e.g., elevators collapsing, victimisation by criminals, airplane crashes, earthquakes).</td>
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<td>Domain/Schema</td>
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<tr>
<td>8. Enmeshment</td>
<td>Excessive emotional involvement and closeness with one or more significant others (often parents) at the expense of full individuation or normal social development. Often involves the belief that at least one of the enmeshed individuals cannot survive or be happy without the constant support of the other. May also include feelings of being smothered by or fused with others or insufficient individual identity. Often experienced as a feeling of emptiness and foundering, having no direction, or in extreme cases questioning one’s existence.</td>
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<tr>
<td>9. Failure</td>
<td>The belief that one has failed, will inevitably fail, or is fundamentally inadequate relative to one’s peers in areas of achievement (school, career, sports, etc.). Often involves beliefs that one is stupid, inept, untalented, lower in status, less successful than others, and so forth.</td>
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Table 5.1  continued

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<tr>
<th>Domain/Schema</th>
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<tbody>
<tr>
<td>Impaired Limits</td>
<td>Deficiency in internal limits, responsibility to others, or long-term goal orientation. Leads to difficulty respecting the rights of others, cooperating with others, making commitments, or setting and meeting realistic personal goals. Typical family origin is characterised by permissiveness, overindulgence, lack of direction, or a sense of superiority rather than appropriate confrontation, discipline, and limits in relation to taking responsibility, cooperating in a reciprocal manner, and setting goals. In some cases, the child may not have been pushed to tolerate normal levels of discomfort or may not have been given adequate supervision, direction, or guidance.</td>
</tr>
<tr>
<td>10. Entitlement</td>
<td>The belief that one is superior to other people; entitled to special rights and privileges; or not bound by the rules of reciprocity that guide normal social interaction. Often involves insistence that one should be able to do or have whatever one wants, regardless of what is realistic, what others consider reasonable, or the cost to others; or an exaggerated focus on superiority (e.g., being among the most successful, famous, wealthy) in order to achieve power or control (not primarily for attention or approval). Sometimes includes excessive competitiveness toward or domination of others: asserting one’s power, forcing one’s point of view, or controlling the behaviour of others in line with one’s own desires without empathy or concern for others’ needs or feelings.</td>
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<td>Domain/Schema</td>
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<td>11. Insufficient Self-control</td>
<td>Pervasive difficulty or refusal to exercise sufficient self-control and frustration tolerance to achieve one’s personal goals or to restrain the excessive expression from one’s emotions and impulses. In its milder form, the patient presents with an exaggerated emphasis on <em>discomfort avoidance</em>: avoiding pain, conflict, confrontation, responsibility, or overexertion at the expense of personal fulfilment, commitment, or integrity.</td>
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<tr>
<td>Other-Directedness</td>
<td><em>An excessive focus on the desires, feelings, and responses of others, at the expense of one’s own needs in order to gain love and approval, maintain one’s sense of connection, or avoid retaliation. Usually involves suppression and lack of awareness regarding one’s own anger and natural inclinations. Typical family origin is based on conditional acceptance: Children must suppress important aspects of themselves in order to gain love, attention, and approval. In many such families, the parents’ emotional needs and desires – or social acceptance and status – are valued more than the unique needs and feelings of each child.</em></td>
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<th>Domain/Schema</th>
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<tr>
<td>12. Subjugation</td>
<td>Excessive surrendering of control to others because one feels <em>coerced</em> – submitting in order to avoid anger, retaliation or abandonment. The two major forms of subjugation are: (a) <strong>Subjugation of needs</strong>: Suppression of one’s preferences, decisions, and desires, and (b) <strong>Subjugation of emotions</strong>: Suppression of emotions, especially anger. Usually involves the perception that one’s own desires, opinions, and feelings are not valid or important to others. Frequently presents as excessive compliance, combined with hypersensitivity to feeling trapped. Generally leads to a build up of anger, manifested in maladaptive symptoms (e.g., passive-aggressive behaviour, uncontrolled outbursts of temper, psychosomatic symptoms, withdrawal of affection, “acting out”, substance abuse).</td>
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<tr>
<td>13. Self-sacrifice</td>
<td>Excessive focus on <em>voluntarily</em> meeting the needs of others in daily situations at the expense of one’s own gratification. The most common reasons are: to prevent causing pain to others; to avoid guilt from feeling selfish; or to maintain the connection with others perceived as needy. Often results from an acute sensitivity to the pain of others. Sometimes leads to a sense that one’s own needs are not being adequately met and to resentment of those who are taken care of. Overlaps with concept of co-dependency.</td>
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<td>Domain/Schema</td>
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<tr>
<td>14. Approval-seeking</td>
<td>Excessive emphasis on gaining approval, recognition, or attention from other people or on fitting in at the expense of developing a secure and true sense of self. One’s sense of esteem is dependent primarily on the reactions of others rather than on one’s own natural inclinations. Sometimes includes an overemphasis on status, appearance, social acceptance, money, or achievement as means of gaining approval, admiration, or attention (not primarily for power or control). Frequently results in major life decisions that are inauthentic or unsatisfying or in hypersensitivity to rejection.</td>
</tr>
<tr>
<td>Overvigilance and Inhibition</td>
<td><em>Excessive emphasis on suppressing one’s spontaneous feelings, impulses, and choices or on meeting rigid, internalised rules and expectations about performance and ethical behaviour, often at the expense of happiness, self-expression, relaxation, and close relationships, or health.</em> Typical family origin is grim, demanding, and sometimes punitive: performance, duty, perfectionism, following rules, hiding emotions, and avoiding mistakes predominate over pleasure, joy, and relaxation. There is usually an undercurrent of pessimism and worry that things could fall apart if one fails to be vigilant and careful at all times.</td>
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<td>Domain/Schema</td>
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<tr>
<td>15. Negativity</td>
<td>A pervasive, lifelong focus on the negative aspects of life (pain, death, loss, disappointment, conflict, guilt, resentment, unsolved problems, potential mistakes, betrayal, things that could go wrong, etc.) while minimising or neglecting the positive or optimistic aspects. Usually includes an exaggerated expectation – in a wide range of work, financial, or interpersonal situations – that things will eventually go seriously wrong or that aspects of one’s life that seem to be going well will ultimately fall apart. Usually involves an inordinate fear of making mistakes that might lead to financial collapse, loss, humiliation, or being trapped in a bad situation. Because they exaggerate potential negative outcomes, these individuals are frequently characterised by chronic worry, vigilance, complaining, or indecision.</td>
</tr>
<tr>
<td>16. Emotional Inhibition</td>
<td>The excessive inhibition of spontaneous action, feeling, or communication, usually to avoid disapproval by others, feelings of shame, or losing control of one’s impulses. The most common areas of inhibition involve: (a) inhibition of anger and aggression; (b) inhibition of positive impulses (e.g., joy, affection, sexual excitement, play); (c) difficulty expressing vulnerability or communication freely about one’s feelings, needs, and so forth; or (d) excessive emphasis on rationality while disregarding emotions.</td>
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<td>Domain/Schema</td>
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<td>17. Unrelenting Standards</td>
<td>The underlying belief that one must strive to meet very high internalised standards of behaviour and performance, usually to avoid criticism. Typically results in feelings of pressure or difficulty slowing down and in hypercriticalness toward oneself and others. Must involve significant impairment in pleasure, relaxation, health, self-esteem, sense of accomplishment, or satisfying relationships. Unrelenting standards typically present as (a) perfectionism, inordinate attention to detail, or an underestimate of how good one’s own performance is relative to the norm; (b) rigid rules and “shoulds” in many areas of life, including unrealistically high moral, ethical, cultural, or religious precepts; or (c) preoccupation with time and efficiency, the need to accomplish more.</td>
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<tr>
<td>18. Punitiveness</td>
<td>The belief that people should be harshly punished for making mistakes. Involves the tendency to be angry, intolerant, punitive, and impatient with those people (including oneself) who do not meet one’s expectations or standards. Usually includes difficulty forgiving mistakes in oneself or others because of a reluctance to consider extenuating circumstances, allow for human imperfection, or empathise with feelings.</td>
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It has been hypothesised that to develop in a psychologically healthy manner a child’s emotional needs, which correspond to the five schema domains, must be adequately met (Young, 1999; Young et al., 2003). If these developmental needs are not met, it is proposed that problems will occur in the corresponding schema domain (Young, 1999; Young et al., 2003). Importantly, it is often not one isolated traumatic event that initiates the development of the EMSs in a schema domain, but rather an ongoing pattern of toxic experiences in a child’s environment with family and peers, alongside the interaction with a child’s temperament (Young, 1999; Young et al., 2003). The more experiences, the stronger the EMS (Young, 1999). Examples of the experiences required for a core emotional need to be unmet are described as follows.

First, for a child to be prone to developing the EMSs in the Disconnection and Rejection domain, the child must experience consistent rejection; for instance, they may not receive enough love, affection, acceptance, and attention from their parents (Young, 1999). Second, a child who has parents who provide little help and guidance, or at the other extreme has parents who are overprotective, is at risk of developing the EMSs in the Impaired Autonomy and Performance domain (Young, 1999). Third, a child who is overindulged by their parents, praised excessively, or allowed to do as they please all the time may be unaware of realistic limits on their behaviour; thus, they are at risk of developing the EMSs in the Impaired Limits domain (Young, 1999). Fourth, a child who is bound by conditional acceptance, in that they are unable to express their needs and emotions without the consequence of reprisal or guilt, may be at risk of developing the EMSs in the Other-directedness domain (Young, 1999). Finally, a child who is consistently asked to complete tasks beyond their scope or learns that their accomplishments are never enough is at risk of developing the EMSs in the Overvigilance and Inhibition domain (Young, 1999). In a less than favourable environment, a child is at increased vulnerability to developing EMSs in one
or more schema domain (Young, 1999). Importantly, these EMSs persist into adult life and influence an individual’s functioning and interactions (Young, 1999).

5.3.2 Schema Processes

Young (1999) proposed three schema processes to explain how EMSs influence an individual and their behaviour, including schema maintenance, schema avoidance, and schema compensation. Schema maintenance, which was briefly introduced in Section 5.3.1, refers to the self-defeating behaviours and cognitive distortions employed to maintain the validity of a schema (Young, 1999). Typically, an individual will focus on the information that confirms their EMS and dismiss information that contradicts it (Young, 1999). For example, an individual presenting with the Failure EMS may intentionally not put all their effort into a project in order to receive a less favourable critique, thus, confirming that they are a failure (Young, 1999).

Schema avoidance refers to the automatic processes that allow an individual to avoid the situations, thoughts, or feelings associated with the EMS or that may trigger the EMS (Young, 1999). As in the Failure EMS example above, the individual may refuse a demanding project at work in an attempt to avoid the failure they believe is inevitable (Young, 1999). The individual assumes they will fail, and thus, becomes an underachiever to avoid situations in which they may fail (Young, 1999).

Schema compensation involves processes to overcompensate for the EMSs that have arisen from the specific needs that were not met as a child (Young, 1999). For example, an individual with the Failure schema may refuse to admit a mistake they have made, even when the evidence of the mistake is brought to their attention (Young, 1999). From this example, it is suggested that schema compensation can result in an individual believing in the opposite extreme of the schema (Young, 1999). These three schema processes highlight how schemas
continue to be validated and strengthened throughout an individual’s life, and how they may influence subsequent self-beliefs, behaviours, and decisions, despite opposing evidence.

5.3.3 Young Schema Questionnaire

As a means of measuring the presence of EMSs, Young devised the Young Schema Questionnaire (YSQ). The first version of the YSQ measured the 16 EMSs initially proposed by Young, which included Emotional Deprivation, Abandonment, Mistrust, Social Isolation, Defectiveness, Social Undesirability, Failure to Achieve, Dependence, Vulnerability to Harm, Enmeshment, Subjugation, Self-sacrifice, Emotional Inhibition, Unrelenting Standards, Entitlement, and Insufficient Self-control (Young & Brown, 1990). The Social Undesirability EMS was found to lack psychometric validity (Schmidt, Joiner, Young, & Telch, 1995). As such, many researchers removed the items for Social Undesirability when using the YSQ (e.g., Waller, 2003; Waller et al., 2002). Subsequently, the YSQ-2 was developed to measure the 15 psychometrically sound EMSs (Young & Brown, 2001). Young then defined an additional three EMSs, namely, Approval-seeking, Negativity, and Punitiveness, and developed the YSQ-3 to measure all 18 EMSs (Young & Brown, 2003). The YSQ-3 exists in both long and short forms. The detailed explanation and psychometric properties of the YSQ are outlined in Section 6.4.2.

5.3.4 Schema Therapy

Schema therapy was developed to treat typically treatment resistant disorders, such as individuals with a personality disorder who presented with chronic psychological problems and were not adequately improving with traditional CBT (Young, 1999). The aim of schema therapy is to target the EMSs by eliminating maladaptive schema processes and rebuilding early schemas (Young et al., 2003). Importantly, schema therapy is designed to address what is proposed as the core psychological disturbances, namely the EMSs, rather than psychiatric symptomatology (Young et al., 2003). Young’s schema therapy provides a new system of
psychotherapy by expanding on traditional CBT techniques and integrating other schools of therapy (Young et al., 2003). Specifically, in schema therapy, childhood and adolescent psychological problems are explored in greater depths, there is a greater use of emotive techniques, and an analysis of maladaptive coping styles, compared with traditional CBT (Young et al., 2003).

Schema therapy has shown to be particularly effective in samples of patients with borderline personality disorder, which is a chronic disorder considered to be relatively resistant to traditional cognitive therapies (Farrell, Shaw, & Webber, 2009; Giesen-Bloo et al., 2006; Nordahl & Nysæter, 2005). Young (1999) has also hypothesised that it can be used for patients with major depression, anxiety disorders, substance abuse, and eating disorders. There is, however, a lack of research that has examined the effectiveness of schema therapy in ED samples. Nevertheless, it may be suggested that schema therapy is a suitable addition to treatment for EDs for two possible reasons. First, similar to personality disorders, EDs are also typically resistant to treatment, often due to the complex and ingrained features of the disorder, such as poor self-esteem and body disturbance (Waller, Kennerley, & Ohanian, 2007). Second, the family can play a large role in the development and maintenance of EDs (see Section 2.5.1b), and schema theory hypothesises that EMSs develop as a result of unmet childhood needs, most often from the family. Thus, given the treatment resistant nature of EDs and the role of the family in ED and schema development, schema therapy may be a useful treatment intervention for ED patients.

### 5.4 Early Maladaptive Schemas in Eating Disorders

As discussed in Chapter 2, there are a complex range of factors associated with the development and maintenance of EDs. Many of the psychological factors have been considered typically resistant to existing treatments for EDs, for example, poor self-esteem (Waller, Kennerley, et al., 2007). It has been suggested that maladaptive schemas, which are
not specifically related to eating, weight, and body shape, may underpin these resistant psychological factors; thus, it may be particularly helpful to establish a schema-level model of EDs and subsequent appropriate interventions (Waller, Kennerley, et al., 2007). There is a growing body of recent research that has examined the presence of Young’s EMSs in ED groups (Cooper et al., 2006; Deas et al., 2011; Dingemans et al., 2006; Jones et al., 2005; Leung et al., 1999; Muris, 2006; Waller, 2003; Waller et al., 2002; Waller et al., 2000). Jones et al. (2007) reviewed a number of studies examining the relationship between core beliefs and ED behaviours published between 1999 and 2005; overall, it was found that maladaptive schemas can be present in individuals with EDs, are associated with different eating psychopathology, including dietary restraint, binge eating, and purging, and may be involved in the development and maintenance of EDs.

The earliest study to have examined Young’s EMSs in an ED sample was conducted by Leung et al. (1999). The original 16 EMSs were investigated in 57 adult females who were diagnosed with AN-R, AN-BP, or BN, and 23 females recruited through contact with the researchers, who reported no current ED or binge eating and purging in the previous 3 months (Leung et al., 1999). The sample mean age was 25.18 years (Leung et al., 1999). Collectively, the ED participants reported significantly higher EMS scores than the control participants on each of the 16 EMSs (Leung et al., 1999). BN patients reported significantly higher scores on Entitlement compared with AN-R, but no other significant differences were found between ED groups (Leung et al., 1999). Within the BN subgroup only, unhealthy eating attitudes were positively correlated with 8 of the 16 EMSs (Leung et al., 1999). The researchers subsequently examined the relationship between the EMSs and binge eating and vomiting behaviours in the AN-BP and BN groups (Leung et al., 1999). For the AN-BP group, no significant associations were found between EMSs and binge eating; however, there was a strong positive correlation between vomiting and Failure (Leung et al., 1999).
For the BN group, there was a moderate negative correlation between binge eating and Social Undesirability, but no significant associations were found with vomiting (Leung et al., 1999). In general, adult females diagnosed with an ED tended to report a higher level of EMSs than non-ED females; however, the differences among ED diagnostic groups were limited. The researchers concluded that the role of core beliefs, which are not directly related to eating, weight, and body shape, in EDs is evident; however, further research is necessary, in particular by examining ED diagnostic groups independently (Leung et al., 1999).

One of the researchers from this initial study, Waller, went on to lead a number of investigations into the presence of EMSs in ED samples and the relationships between EMSs and eating psychopathology factors. Typically these investigations involved groups of ED patients presenting with bulimic behaviours (Waller, 2003; Waller et al., 2002; Waller et al., 2000). Specifically, Waller et al. (2000) investigated the patterns of EMSs in 50 adult females seeking psychotherapy treatment for either BN, AN-BP, or BED, compared with a control group of adult females recruited through personal contact with the researchers who had no current ED or history of binge eating and purging over the previous three months. The long form of the original YSQ was used to measure the 16 EMSs Young had defined by that time. EMS scores of each of the ED groups were compared with the control group, in which it was found that the control group reported significantly lower EMS scores than at least one of the ED groups on all EMSs, excluding Entitlement (Waller et al., 2000). Furthermore, no significant differences were found between the ED groups on all of the EMSs (Waller et al., 2000). Interestingly, the ED sample reported binge eating more frequently when they presented with higher scores on Emotional Inhibition, and reported a higher tendency to purge when they reported higher scores of Defectiveness/Shame (Waller et al., 2000).
In a similar study, Waller (2003) investigated the EMSs in BED and BN-P adult female patients from specialist ED clinics, compared with a matched general population control group. The YSQ short form was used to measure 15 EMSs, as the Social Undesirability EMS had been shown to have poor psychometric validity (Schmidt et al., 1995) and because Waller, Meyer, and Ohanian (2001) had previously suggested that the cognitions related to the Social Undesirability EMS relate to body image. Overall, patients with BN and BED reported significantly more higher scores on the EMSs than a matched group of females without an ED, as significant differences were found on 10 of the 15 EMSs (Waller, 2003). In contrast to Waller’s prior studies, differences were evident between the ED diagnostic groups in this study, as BED patients reported significantly higher scores on the EMSs Failure, Dependence/Incompetence, and Entitlement, compared with BN-P patients (Waller, 2003).

Another study, by Waller et al. (2002), aimed to determine the relationship between EMSs and eating psychopathology in 75 adult females diagnosed with either BN, AN-BP, or BED. The EDI-2 was the measure of eating psychopathology and for EMSs the long form of the YSQ was used, again excluding the Social Undesirability schema. Correlational analyses showed that a higher desire to be thin was associated with an increase in scores on Functional Dependence and Emotional Inhibition, while higher scores on bulimic attitudes and behaviours were related to higher reporting of Emotional Deprivation, Insufficient Self-control, and Social Isolation (Waller et al., 2002). The researchers suggested that bulimic characteristics may be driven by emotional deprivation and social isolation beliefs, but the relationship is mediated by a range of ego-dysfunction attitudes (Waller et al., 2002). Body dissatisfaction was not related to any EMS (Waller et al., 2002). The strongest correlation was found between the Unrelenting Standards EMS and the Perfectionism subscale of the EDI-2 (Waller et al., 2002); however, this would be expected as both scales measure the same
construct. Nonetheless, this finding provides support for the validity of the Unrelenting Standards EMS in Young’s model.

The research, led by Waller (Leung et al., 1999; Waller, 2003; Waller et al., 2002; Waller et al., 2000), has demonstrated that EMSs are present in adult female ED patients presenting with bulimic behaviours. In general, individuals with an ED who present with bulimic behaviours tend to report higher scores on EMSs than healthy controls (Leung et al., 1999; Waller, 2003; Waller et al., 2000). Notably, the studies differed on the EMSs that were more representative of an ED sample; thus, it is difficult to conclude which EMSs are specific to ED patients presenting with bulimic behaviours and attitudes. Differences between the diagnostic groups were also inconsistent, making it difficult to draw conclusions. There was consistent evidence that EMSs relate to eating psychopathology, such as dietary restraint and bulimic behaviours; however, these results also varied between studies. These studies are an integral foundation in the area of EMSs in EDs, but further research is necessary to determine if an EMS profile for ED patients can be established.

A number of other researchers have examined the role of Young’s EMSs in ED samples over the last decade (Deas et al., 2011; Dingemans et al., 2006; Jones et al., 2005). One such study by Jones et al. (2005) examined EMSs in a sample of adult females with an average age of 32.56 years who were divided into three groups: those reporting currently suffering an ED; those reporting being recovered; and a healthy control group. The short form of the YSQ-2 was used to measure the 15 EMSs. Results indicated that the current ED participants reported significantly higher scores than the recovered and control groups on the Mistrust, Social Isolation, Defectiveness, Failure, Dependence, Vulnerability to Harm, Enmeshment, Subjugation, Emotional Inhibition, and Unrelenting Standards EMSs (Jones et al., 2005). Interestingly, three of the five EMSs that did not differ between the ED and control groups in the study by Waller (2003), were significantly higher for the ED group in
this study. High levels of Emotional Deprivation, Abandonment, and Self-sacrifice were found in both the current ED and the recovered participants; thus, the researchers suggested that these three EMSs may be part of the cognitive organisation of females with an ED, despite whether the ED is active or not (Jones et al., 2005). As the recovered group reported significantly more maladaptive scores than the healthy controls on 8 of the 15 EMSs, it was suggested that females who have recovered from an ED retain more EMSs than healthy controls do, and perhaps these EMSs are implicated in the propensity to relapse (Jones et al., 2005). The Entitlement and Insufficient Self-control EMSs did not differ across any of the groups (Jones et al., 2005). The researchers further examined the ED group and found that females who participated in binge eating reported significantly higher scores of Abandonment and Vulnerability to Harm than those who did not binge eat (Jones et al., 2005). Notably, a limitation of this study was that participants were not formally diagnosed with an ED, but, rather, self-reported currently having or previously recovering from an ED; however, according to the researchers, the participants with a current clinical diagnosis had reliably reported having an ED (Jones et al., 2005). Moreover, the researchers highlighted that the treatment undertaken by the recovered participants was unknown, along with the EMSs prior to commencing treatment; thus, it is unclear if the recovered participants already had lower EMSs to begin with by comparison with the current ED group (Jones et al., 2005).

Dingemans et al. (2006) compared the EMSs of AN-R, AN-BP, BN-P, and BED patients with healthy controls using the original long form of the YSQ measuring 16 EMSs. The average age of the total sample was 30.92 years. The groups were compared on the schema domains rather than individual EMSs. Collectively, the ED groups reported significantly greater maladaptive core beliefs than healthy controls (Dingemans et al., 2006). AN-BP patients consistently reported significantly higher scores on all schema domains compared with the BED patients; however, no differences were found between the AN and
BN groups (Dingemans et al., 2006). The researchers also reported that a higher frequency of engaging in inappropriate compensatory behaviours was related to more severe scores on schema domains (Dingemans et al., 2006), but it must be acknowledged that these correlations were low, ranging from .24 to .36. Nonetheless, it was concluded that core beliefs, which are not related to eating, weight, and body shape, are particularly maladaptive in patients with an ED, and can be reported as more maladaptive by patients who engage in inappropriate compensatory behaviours (Dingemans et al., 2006).

A recent study by Deas et al. (2011) examined the perfectionistic schemas and how they relate to AN. The Defectiveness, Failure, and Unrelenting Standards EMSs were compared between 40 female AN inpatients and outpatients, aged between 18 and 65 years, 44 individuals undergoing treatment for depression or anxiety, with no present or prior history of an ED, and 78 healthy controls (Deas et al., 2011). The AN group reported significantly higher scores than both control groups on all three EMSs, with effect sizes demonstrating a higher difference between AN patients and healthy controls than between AN and the depression/anxiety group (Deas et al., 2011). Within the AN group, more maladaptive scores on Defectiveness, Failure, and Unrelenting Standards were associated with higher scores of eating psychopathology, dietary restraint, and eating, shape, and weight concerns (Deas et al., 2011). The researchers concluded that targeting negative perfectionism may play an important role in the treatment of AN, as the individuals with AN tended to report intense self-criticism and exceptionally high goals through perfectionistic schemas (Deas et al., 2011). This result, however, is unsurprising given that perfectionism is well-established as both a predisposing factor and characteristic of AN, as explored in Section 2.5.1a. Nevertheless, the positive association between the three perfectionistic EMSs and eating, weight, and shape concerns, may demonstrate that, although Young’s EMSs are not
eating, weight, and shape specific, these EMSs may underlie the presentation of these concerns in ED patients.

There is mounting support for the presence of maladaptive core beliefs in adult females with an ED, which have shown to be related to eating psychopathology, in particular bulimic behaviours; however, only a few studies have examined the relationship between EMSs and eating psychopathology in adolescent females (Cooper et al., 2006; Muris, 2006). Notably, these studies have analysed the reports of community samples only and not clinical ED samples (Cooper et al., 2006; Muris, 2006). One such study by Cooper et al. (2006) recruited a large community sample of adolescent females from secondary schools and then assessed the top and bottom 14% of scorers according to scores on the Eating Attitudes Test (EAT). The final sample included 52 high-scorers, who scored at or above the recommended clinical cut-off of 30 on the EAT, and 52 low-scorers, who scored 3 or below (Cooper et al., 2006). The mean age of the sample was 17.7 years and the average BMI was in the healthy range (Cooper et al., 2006). Fifteen schemas from the YSQ were examined, in which high-scorers reported significantly higher scores on 14 of the EMSs compared with the low-scorers (Cooper et al., 2006). Scores on the EMS Self-sacrifice did not differ between the two groups (Cooper et al., 2006). This study provides preliminary support for the relationship between EMSs and ED related symptoms in an adolescent sample and the use of the YSQ with adolescents.

Concurrently, Muris (2006) investigated the presence of EMSs in 173 secondary school students aged between 12 and 15 years, of which 87 were boys and 86 were girls. The aim of this study was to examine the relationship between EMSs and a range of psychopathological symptoms, including eating problems, self-reported personality traits, and the participants’ views of their parents’ rearing behaviours (Muris, 2006). For this study, Muris (2006) developed what he described as an age-downward version of the YSQ, which
measured the 16 EMSs, with modified wording and scoring procedures. The reliability of this version was assessed and concluded to show adequate internal consistency (Muris, 2006). Results highlighted that more eating problems were associated with higher maladaptive core beliefs for 12 of the 16 EMSs (Muris, 2006). The EMSs that were not significantly correlated with eating problems included Dependence, Vulnerability to Harm, Enmeshment, and Entitlement (Muris, 2006). EMSs were also related to other psychiatric symptoms, including depression, anxiety, and disruptive behaviours (Muris, 2006). The researchers concluded that the results tend to support the underlying presence of maladaptive schemas in the development and maintenance of more persistent psychiatric problems, such as EDs in adolescents, yet more research into the presence of maladaptive schemas in youth populations is necessary (Muris, 2006).

There have been a number of studies conducted to determine the presence of EMSs in EDs. Although there is a trend that EMSs are generally more maladaptive in ED groups compared with control groups, different researchers have found divergent results. To summarise the results of the research studies, Table 5.2 outlines the studies described above by identifying which EMSs were found to be significantly higher in an ED group compared with a control group, or those EMSs that were significantly correlated with ED psychopathology.
Table 5.2

EMSs Related to EDs or Significantly Higher in ED Samples from Previous Research

<table>
<thead>
<tr>
<th>EMS</th>
<th>Cooper et al., 2006</th>
<th>Deas et al., 2011*</th>
<th>Jones et al., 2005</th>
<th>Leung et al., 1999</th>
<th>Muris, 2006 **</th>
<th>Waller, 2003</th>
<th>Waller et al., 2002 ***</th>
<th>Waller et al., 2000</th>
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<tbody>
<tr>
<td>Abandonment</td>
<td>✓</td>
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<td>Mistrust</td>
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<td>Emotional Deprivation</td>
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<tr>
<td>Defectiveness</td>
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<tr>
<td>Social Isolation</td>
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<td>Dependence</td>
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<td>Vulnerability to Harm</td>
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<td>Enmeshment</td>
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<td>Entitlement</td>
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<td>Insufficient Self-control</td>
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<td>Subjugation</td>
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<td>Self-sacrifice</td>
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<td>Emotional Inhibition</td>
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<td>Unrelenting Standards</td>
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</table>
Table 5.2 - notes

Note. As no research with ED samples has used the YSQ-3, the newer EMSs are not included in the table, including Approval-seeking, Negativity, and Punitiveness. Social undesirability has shown to lack reliability and has not been investigated by all researchers, thus, it is also not reported. Dingemans et al were not included because they did not examine individual EMSs, but rather examined schema domains. Their results showed that, overall, the ED group reported significantly higher maladaptive schemas according to the domain scores compared with a control group. *Deas et al. (2011) only examined three EMSs related to perfectionism, including Defectiveness, Failure, and Unrelenting Standards. **Muris (2006) examined the correlations between eating problems and each EMS, rather than comparing groups; thus, the table presents the EMSs that were positively correlated with eating problems. ***Waller et al. (2002) did not examine group differences but rather correlations between EMSs and ED psychopathology, including Drive for Thinness, Bulimia, and Body dissatisfaction. The table indicates whether one or more of these variables were significantly correlated with an EMS.

From Table 5.2 it is evident that a number of EMSs are related to ED psychopathology and are reported as higher in ED samples; however, only three EMSs, including Emotional Deprivation, Social Isolation, and Emotional Inhibition, were consistently reported as higher in ED samples compared with control samples in each of the studies that measured these EMSs. Further research is necessary to determine if these three EMSs are central to the presentation of EDs; however, the research reviewed above is suggestive of this.

5.5 Summary

Recent research with ED samples, typically of adult females, alongside the results of Study 1 (presented in Chapter 4), has demonstrated that factors associated with ED psychopathology, such as maladaptive cognitions about eating, weight, and body shape, do not sufficiently describe the presentation of an individual with an ED. As such, a growing number of studies have examined the underlying maladaptive core beliefs in ED samples, using Young’s model of EMSs, which are not related to eating, weight, and shape. All of the studies conducted with clinical ED samples have examined an adult female sample (Deas et
al., 2011; Dingemans et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller, 2003; Waller et al., 2002; Waller et al., 2000), with only two studies specifically on adolescents, which included community samples (Cooper et al., 2006; Muris, 2006). Collectively, the studies demonstrate that EMSs tend to be more prevalent and maladaptive in ED samples than healthy control groups and that EMSs can be associated with ED psychopathology. The findings of previous studies, therefore, suggest that EMSs may be related to the development and maintenance of EDs.

Despite Emotional Deprivation, Social Isolation, and Emotional Inhibition being consistently reported in the research as being related to EDs and present among ED patients, it is important to recognise that Table 5.2 provides an overview of the comparison between ED and control groups, but when looking further within the studies there are conflicting results when considering the number of significantly different EMSs, alongside the differences between ED subgroups. There is a trend that ED patients tend to report significantly higher EMSs than individuals without an ED; however, each study found a varying number of significant differences in EMSs. Typically, the studies by Waller and colleagues (Leung et al., 1999; Waller, 2003; Waller et al., 2000) examined a number of bulimic ED diagnostic subtypes, for example, BN, AN-BP, and BED patients; thus, comparisons with a healthy control group tended to demonstrate a significant difference in EMS scores between the control group and one or more of these ED groups, but not the ED sample as a whole. Moreover, there was inconsistency in the differences between different ED subtypes. For instance, Waller et al. (2000) found no differences on EMS scores between ED subtypes, including BN, AN-BP, and BED patients; however, in a later study, Waller (2003) revealed that BED patients reported significantly higher scores on the Failure, Dependence, and Entitlement EMSs compared with BN-P patients. Despite the difficulty in establishing a discrete profile of EMSs for adult female ED patients presenting with bulimic
behaviours, Waller and colleagues’ results are an important foundation for research in this area.

Subsequent researchers have examined the differences in EMSs between different comparison groups, such as Jones et al. (2005) who examined adult females who self-reported currently having an ED and having recovered from an ED, and Deas et al. (2011) who examined perfectionism related EMSs between AN patients and individuals seeking treatment for depression or anxiety. Furthermore, Dingemans et al. (2006) compared the five defined schema domains, rather than individual EMSs. Given that each of these studies, investigating the presence of EMSs in EDs, vary so widely, it is difficult to derive a clear profile of which EMSs are relevant for ED patients, and, hence, which to target in clinical interventions.

Some of these researchers have attempted to highlight which EMSs are related to specific ED psychopathology (Deas et al., 2011; Dingemans et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller et al., 2002; Waller et al., 2000); however, again, few consistent findings have been revealed. For instance, in one study Waller et al. (2000) found that a higher frequency of binge eating was related to higher scores of Emotional Inhibition, but Jones et al. (2005) found that binge eating was positively correlated with Abandonment and Vulnerability to Harm. Similarly, Dingemans et al. (2006) found that a higher frequency of purging was associated with overall higher EMS scores, but other studies have found that purging was only related to Defectiveness (Waller et al., 2000). Therefore, it is difficult to conclude which EMSs are related to specific aspects of ED psychopathology.

Nevertheless, the previous literature provides initial support for the presence of EMSs in individuals diagnosed with an ED or presenting with eating problems. As this is a relatively recently researched area in the ED literature, the previous studies are important platforms for future research into the underlying cognitive content of ED patients. In
particular, the research with clinical ED samples has been conducted with only adult females, while adolescents have been examined in only community samples. Given that the onset of AN is typically during adolescence, it is also important to examine the EMSs in adolescent samples. Furthermore, few studies have examined the presence of EMSs in only AN patients. Despite Young’s addition of three EMSs in 2003, no research with ED patients has used the YSQ-3. Study 2, outlined in the following chapter, attempts to address these limitations.
6.1 Rationale

EDs are complex disorders, and their development and maintenance are influenced by a range of factors. It is thus crucial to build on current theories of the development and maintenance of EDs in order to improve interventions. To achieve this, researchers have examined the presence of maladaptive core beliefs stemming from pre-ED experiences, as maladaptive cognitions about eating, weight, and body shape, do not provide a sufficient account of the range of psychopathology experienced by individuals with an ED (Jones et al., 2007). It has been suggested that core ED characteristics, such as body dissatisfaction and preoccupation with eating, weight, and body shape, can be resilient to conventional ED treatments (Waller, Cordery, et al., 2007); thus, a more holistic approach to treatment that targets the range of factors that may underlie the ED psychopathology is necessary to improve treatment outcomes. As such, maladaptive schemas have predominantly been assessed in ED samples using Young’s model of EMSs, as schema therapy has been considered a possible addition to therapy for individuals not responding to conventional therapies (Waller, Cordery, et al., 2007). Prior to investigating whether schema therapy may be effective in treating individuals with an ED, the presence of EMSs and the particular EMSs relevant to EDs must first be established. EMSs have shown to be significantly higher among young adult females with an ED, particularly those presenting with bulimic behaviours, compared with healthy controls (Deas et al., 2011; Dingemans et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller, 2003; Waller et al., 2002; Waller et al., 2000). Little is known, however, about the EMSs specifically pertaining to AN. Furthermore, it is necessary to determine the presence of EMSs in adolescent females, given that this is the age...
at which AN most commonly develops, yet research examining EMSs in adolescents has not included clinical samples of adolescents with an AN diagnosis. Waller, Kennerley, et al. (2007) and Muris (2006) argue that there is a significant gap in studies examining EMSs in clinical adolescent samples, and that future research must concentrate on understanding the profile of EMSs in adolescent samples. To effectively determine whether EMSs are present in adolescent females with AN, it is necessary to compare an AN clinic sample with a matched control group who do not have EDs. By making such comparisons a common EMS profile for adolescent females with AN may be developed, and in turn may inform and direct therapeutic interventions.

Research reviewed in Chapter 3, alongside the results of Study 1, have demonstrated that there are differences in psychological and behavioural profiles between ED subtypes. Similarly, previous research of maladaptive schemas has investigated differences in EMSs between ED subtypes; however, consistent results in schema profiles of these groups have yet to be produced as many studies found varying or no differences between ED subtypes. Jones et al. (2007) suggested that this inconsistency may be due to different studies applying different alpha levels, to different recruitment strategies and samples in each study, or to the investigation of different DSM-IV diagnostic groups being examined in different studies. It is important, however, to examine the possible EMS profiles that may exist for different ED subtypes, as increasing research has highlighted that certain EMSs may be related to particular ED behaviours, such as binge eating, which are not present in all EDs. This knowledge may assist researchers and clinicians in understanding the core beliefs that may underlie the presentation of ED behaviours in different ED subtypes. Such information may assist in identifying the subtypes of individuals with EDs who are likely to benefit most from a schema-focused therapy, based upon their schema profile.
6.2 Aims

The overarching aim of the present study was to understand the EMSs underlying adolescent AN. Specifically, the first aim was to examine the differences in EMSs, general psychopathology, and problem behaviours between adolescent females, aged between 13 and 18 years, who presented to an outpatient ED treatment clinic compared with a community comparison group. The second aim of this study was to replicate the findings of Study 1; that two clinically distinct clusters can be extracted from a cluster analysis of AN clinic patients. The third aim was then to determine if the community group could be divided into two subgroups based on their high or low responses to an ED screen, and to then examine the differences in EMSs, general psychopathology, and problem behaviours between the cluster groups derived from the cluster analysis and the two community groups.

6.3 Hypotheses

In line with these aims, a number of hypotheses were proposed. First, it was hypothesised that the clinical sample would score significantly higher on EMSs, general psychopathology, and behavioural problems than the community sample. Given that previous research has shown mixed results on EMSs in ED samples, it is difficult to pose specific hypotheses regarding which EMSs are likely to be reported as high by the AN patients in this study. Second, it was hypothesised that two clusters would be extracted from the AN clinical sample using the scales of the Behavior Assessment System for Children adolescent self-report (BASC-2 SRP), and, further, that the characteristics of these clusters would be similar to the clusters found in Study 1, and thus labelled as Egosyntonic AN and Heterogeneous AN. Third, it was hypothesised that, in line with previous research, approximately 14% of the community sample would be identified as at risk of an ED. Fourth, if the second and third hypotheses were supported, it was then hypothesised that significant differences in scores on EMSs, general psychopathology, and behavioural problems would be
found between the four groups, with Heterogeneous AN patients scoring significantly higher than Egosyntonic AN patients, both clinical groups scoring significantly higher than both community groups, and the at-risk community groups scoring significantly higher than the Non-ED community group.

### 6.4 Method

#### 6.4.1 Participants

Two participant groups were recruited for this study; an AN patient group and a community comparison group. The AN patient group comprised adolescent females aged between 13 and 18 years with a primary diagnosis of AN or subthreshold AN, who were not hospitalised in relation to their ED at the time of invitation, with no presence of a severe psychiatric or medical condition preventing informed consent or fulfilment of study protocol, and with sufficient English comprehension skills. Fifty patients from the outpatient ED clinic at the Centre for Adolescent Health, the Royal Children’s Hospital (RCH), Melbourne, were invited to participate in person between February and September 2010. After September 2010 recruitment at the RCH was required to end due to the commencement of a randomised controlled trial within the ED clinic; thus, alternative ED clinics were sought. Subsequently, patients who presented for treatment at the following clinics were invited to participate. Seventeen patients from the Oak House, a private outpatient clinic for ED patients, were invited to participate via written correspondence between April and June 2010. Thirty-five patients from the adolescent outpatient clinic at the Monash Medical Centre, a teaching and research hospital for individuals living in the South Eastern suburbs of Melbourne, Australia, were invited to participate in person between August 2010 and March 2011. Eight patients from the Bayside Children’s Clinic, a private outpatient clinic for children and adolescents, were invited to participate by written correspondence in January 2011. Three patients from
The Melbourne Clinic, a private mental health hospital, were invited to participate via written correspondence in February 2011.

The community group comprised adolescent females, aged between 13 and 18 years, recruited from the same geographical sampling frame as the public clinical services participating in this study. Participants were required to have sufficient English comprehension and were excluded if they had a psychiatric or medical condition that prevented them from complying with the requirements of informed consent or the study protocol. These criteria were based only on conditions known to the school. As part of the study protocol, the community sample also completed the Eating Disorder Screen for Primary Care (ESP), an ED screening tool used to identify participants with a possible ED. Participants were recruited from four Victorian secondary schools in the North Western Metropolitan Region of the Child and Adolescent Mental Health Service Area of Melbourne, and one Victorian secondary school in the Melbourne South East Metropolitan Region. These regions represent the catchment areas for services at the Royal Children’s Hospital and Monash Medical Centre, which are the only regionalised services in this study. The five schools were all co-education schools; three were private secondary schools and two were government funded secondary schools.

6.4.2 Measures

A series of self-report measures were completed by both participant groups. An additional measure completed by the community comparison group was a brief ED screen, the ESP. Demographic information was also collected, including: date of birth; country of birth; primary language spoken at home; family type; number of siblings; whether they are a twin; family history of mental illness; menarche status; and age of menarche. These questions were designed specifically for this study and matched some of the information gathered in Study 1.
The *YSQ-3 short-form* is a 90-item self-report assessment of Young’s 18 EMSs (Young & Brown, 2003). Items ask the individual to rate how accurately a statement describes them on a six-point scale, including: (1) completely untrue of me; (2) mostly untrue of me; (3) slightly more true than untrue; (4) moderately true of me; (5) mostly true of me; and (6) describes me perfectly (Young & Brown, 2003). Higher scores are indicative of a greater presence of an EMS. The items are summed to give 18 schema scores, including: Abandonment; Mistrust; Emotional Deprivation; Defectiveness; Social Isolation; Dependence; Vulnerability to Harm; Enmeshment; Failure; Entitlement; Insufficient Self-control; Subjugation; Self-sacrifice; Approval-seeking; Negativity; Emotional Inhibition; Unrelenting Standards; and Punitiveness. These 18 EMSs constitute five proposed schema domains; however, domain scores are not customarily calculated. Descriptions of each schema domain and EMS were detailed in Table 5.1. The psychometric properties of the YSQ-3 have not been published; however, previous versions of the YSQ have shown adequate reliability and validity (Lee, Taylor, & Dunn, 1999; N. B. Schmidt et al., 1995; Welburn, Coristine, Dagg, Pontefract, & Jordan, 2002). The first study to investigate the psychometric properties of the YSQ, examined the original long-form measuring 16 EMSs, and found that all EMSs, except Social Undesirability, emerged from a factor analysis on data from a clinical sample (N. B. Schmidt et al., 1995). Overall, the YSQ showed adequate test-retest reliability and internal consistency, as well as the ability to predict psychological distress (N. B. Schmidt et al., 1995). Earlier versions of the YSQ have also shown good internal consistency ($\alpha > .82$), and discriminant validity in adult females diagnosed with an ED (Waller, Meyer, et al., 2001; Waller et al., 2000). Moreover, despite examining a community sample, a study by Van Vlierberghe, Braet, Bosmans, Rosseel, and Bögels (2010) demonstrated acceptable internal consistency for the YSQ-2 short-form scales ($\alpha > .71$) among adolescents aged between 12 and 18 years. The YSQ-3 short-form measures three
additional EMSs than the YSQ-2, and in the current sample the total measure demonstrated adequate reliability, $\alpha = .97$.

The YSQ does not have a compulsory scoring method; however, there are two possible scoring methods, the proportion of extreme scores and the mean scores. The *proportion of extreme scores* method involves summing the frequency of responses scored (5) *mostly true of me* and (6) *describes me perfectly*, for each EMS. Alternatively, the *mean scores* method simply involves calculating the mean score of items in each EMS. Waller, Shah, Ohanian, and Elliott (2001) compared the two scoring methods and found that the mean scoring method had greater discriminatory power when comparing a sample of BN patients, depressed patients, and a control group. The most referenced form of scoring in ED research has been to calculate the mean score of each EMS (Cooper et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller, 2003; Waller et al., 2002; Waller et al., 2000). Therefore, the mean scoring method for the YSQ was implemented in this study.

The **BASC-2 SRP** is a 176-item self-report measure of numerous aspects of behaviour, emotions, and personality for adolescents aged 12 to 21 years (Reynolds & Kamphaus, 2004). This measure was also used in Study 1, so detailed psychometrics of the BASC-2 SRP were outlined in Section 4.4.2.

The 21-item **Depression Anxiety Stress Scale (DASS)** was used as a measure of self-perceived depression, anxiety, and stress (Lovibond & Lovibond, 1995). Participants were required to indicate the extent to which each statement applied to them over the previous week on a four-point rating scale, including ‘did not apply to me at all’, ‘applied to me to some degree’, ‘applied to me to a considerable degree’, and ‘applied to me very much’.

DASS scales were scored according to the protocol outlined in the DASS manual. Higher scores typically indicate higher levels of psychopathology (Lovibond & Lovibond, 1995). The DASS has demonstrated good reliability for depression ($\alpha = .81$), anxiety ($\alpha = .73$), and
stress (α = .81) (Lovibond & Lovibond, 1995). Despite originally being developed to
measure psychopathology in adults, the DASS has been used widely in adolescent samples
also (Kauer et al., 2012; Willemsen, Markey, Declercq, & Vanheule, 2011). In the current
sample, all three scales of the DASS demonstrated adequate reliability: Depression α = .89;
Anxiety α = .83; and Stress α = .85.

The Eating Disorder Screen for Primary Care (ESP) is a brief measure designed to
indicate a possible ED, which involves responding yes or no to five items (Cotton, Ball, &
Robinson, 2003). The ESP was only completed by the community participants in order to
identify the proportion of participants in this group who may have a possible ED. The ESP
has been shown to have 100% accuracy in correctly identifying individuals with an ED, as
well as 71% accuracy in identifying healthy individuals as not having an ED (Cotton et al.,
2003). In particular, the items regarding satisfaction with eating habits and eating in secret
have shown to have high sensitivity to an ED (Cotton et al., 2003). In the current community
sample, the ESP did not demonstrate adequate reliability, α = .26. The ESP has a standard
scoring protocol whereby the number of ‘abnormal’ responses is summed and two or more
‘abnormal’ responses is considered to indicate a possible ED (Cotton et al., 2003). Given that
it has been demonstrated that the item regarding family history of an ED has little impact on
the ESP’s screening potential (Cotton et al., 2003), this item was not included in the
calculation of the number of abnormal responses. Thus, the present study used a score of two
or more out of the other four items to indicate a possible problem with eating in the
comparison group. It is expected that up to 14.6% of the general community would have AN
or subthreshold AN (Favaro et al., 2003; Fernandez et al., 2007; Keel et al., 2005; Kjelsas et
al., 2004; Morande et al., 1999; Sancho et al., 2007; Santonastaso et al., 1996).
6.4.3 Procedure

Approval to conduct this research was received from the Royal Children’s Hospital (RCH) Human Research Ethics Committee (HREC) and endorsed by the RMIT University HREC. Subsequent approval was received from the Southern Health HREC, and the directors and paediatricians of the private clinics involved. Approval for recruitment of the comparison group was received from the Department of Education and Early Childhood Development and the Catholic Education Office (see Appendix for HREC approval letters), as well as the school Principals from the participating schools.

Different recruitment strategies were applied for the AN participants from the RCH and Monash Medical Centre compared with the private clinics. Recruitment of the RCH and Monash Medical Centre participants was assisted by the clinic nurse co-ordinator who advised the researchers of the eligible patients based upon age and diagnosis. Patients were then introduced to the study by their paediatrician who provided a brief flyer on the study. Those interested in participating met with the researcher following their appointment and had the full study procedure explained and the adolescent and parent project information statements and consent forms provided. Participation was voluntary for all patients, and choosing not to participate did not affect the services available to them. Participants were given the option to complete the questionnaires in the waiting room, following their appointment, or to take the questionnaires home and return them in a supplied reply paid envelope.

Eligible patients from the private clinics were invited to participate via a letter of invitation that was sent to their home address with the adolescent and parent project information statements and consent forms. The letter was co-signed by the Director of the clinic, or the patient’s paediatrician, and the researcher. It was requested that consent forms be returned in the reply paid envelope provided, after which the participant was phoned by
the researcher and asked to complete the questionnaire either online or was sent a hard copy
in the mail. Written informed consent was provided by all participating adolescents and one
of their parents, or guardians, from the hospital and private clinics.

The participants from the community comparison group were invited to participate
through their school after the Principal had given consent for their students to be involved.
Originally, the students were invited to participate using a random selection method derived
by the researcher; however, as the response rate was typically not high, letters of invitation
were sent to all eligible students. More details of the originally proposed method of using a
matched age distribution is explained in further detail in Section 6.4.7 in relation to sampling.
Students were sent the participant and parent project information statements and consent
forms to their home via the school. Those who agreed to participate completed the
questionnaire at school, with the researcher present, at a time nominated by the Principal or
liaising staff member. Any student who agreed to participate but was absent on the day the
researcher visited the school, was sent the questionnaire to their home with a reply paid
envelope enclosed. Written informed consent was provided by all participating students and
one of their parents, or guardians.

Confidentiality was assured as each questionnaire comprised de-identified data, as
each questionnaire was identified by a number only. The master identification list and
personal information of participants were kept in a locked cabinet and were stored separately
to the numbered questionnaires. The questionnaires and participant personal information was
only accessible by the researcher.

6.4.4 Multiple Imputation

Complete data were available for 35 out of 36 participants from the AN clinic sample
and 110 out of 111 participants from the community sample. Data for the DASS were
missing for two participants, one from the AN clinic group and one from the community
group. To account for missing data, the procedure for multiple imputation used in Study 1 was used in this study for the two participants missing data for the DASS (see Section 4.4.4 for details of multiple imputation). The missing data from the DASS for both participants were found to be missing completely at random according to Little’s MCAR test, and the DASS scales showed some skew as expected, but the skewness was not considered serious enough to warrant transformation. Multiple imputation for the AN clinic and community comparison groups were conducted separately due to the anticipated differences between the two samples on their levels of psychopathology as measured by the DASS. The multiple imputation involved performing five imputations, generating five complete datasets. The mean value of these five imputations was then calculated for the missing DASS scales and entered into the original dataset.

6.4.5 Data Analysis

Data analyses were conducted using SPSS (v.20). First, differences between the AN clinic group and the community group were examined. Two single-factor between-subjects analyses of variance (ANOVA) were used to compare the groups on age at the time of the questionnaire and age at menarche. Chi-square analyses were then conducted to compare the groups on the demographic dependent variables, including: country of birth (Australia/other); primary language spoken at home (English/other); family type (traditional, defined by living with both parents/ non-traditional, defined by living with one parent or blended home); the number of siblings (only child/one/two/three/four/five or more); whether the participant is a twin (no/identical/non-identical/triplet); family history of mental illness (yes/no); and whether the participant had reached menarche (yes/no). Subsequently, a series of single-factor between-subjects multivariate analyses of variance (MANOVA) were conducted to compare the AN clinic group and the community group on EMSs, general psychopathology, and behavioural problems. For each of these analyses the independent variable was the
comparison group, with two levels: AN clinic group and community comparison group. The dependent variables were the 18 EMSs from the YSQ-3 for the first analysis, the five scales of the BASC-2 for the second analysis, and the three scales of the DASS for the third analysis.

Second, a two-step cluster analysis was conducted to replicate the two groups derived in Study 1. Importantly, nine AN patients were part of the clinical audit in Study 1 and also participated in Study 2, with their BASC-2 SRP responses being used in Study 2. To replicate the clusters derived in Study 1 these nine patients were removed from the cluster analysis in Study 2 to avoid confounding the analysis, and were then assigned to the same cluster group they were allocated to in Study 1 for further analyses. Five of the nine patients were from the Egosyntonic AN cluster and four from the Heterogeneous AN cluster in Study 1. Given that removal of the nine clinic patients from the Study 2 cluster analysis reduced the power of the analysis and that the demographic variables used in both studies, including age, family type, and family history of mental illness, did not contribute to differences between the clusters in Study 1, only the BASC-2 SRP scales were used for the cluster analysis in Study 2. Thus, the two-step cluster analysis was conducted on the 27 AN clinic patients, new to Study 2, using the five scales of the BASC-2 SRP.

Third, a calculation of the frequency distribution using the community participant’s scores from the ESP was used to determine the proportion of community participants who were identified as at-risk of an ED. Fourth, differences between the derived clusters and the two community groups were examined. Single-factor between-subject ANOVAS were conducted to compare the four groups on age at the time of questionnaire and the age at menarche. Chi-square analyses were conducted on the demographic variables outlined above. A series of single-factor between-subjects MANOVA were conducted to examine differences between the four groups on the YSQ-3, BASC-2 SRP, and DASS.
An α level of .05 was applied for all statistical tests. Effect sizes were calculated using Cramer’s $V$ for all Chi-square analyses (Small effect: $0.10 < V < 0.30$; Medium effect: $0.30 < V < 0.50$; Large effect: $V > 0.5$), $\eta^2$ for all of the multivariate analyses (Small effect: $0.10 < \eta^2 < 0.09$; Medium effect: $0.09 < \eta^2 < 0.25$; Large effect: $\eta^2 > 0.25$), and Cohen’s $d$ for all of the univariate analyses (Small effect: $0 < d < 0.2$; Medium effect: $0.2 < d < 0.8$; Large effect: $d > 0.8$) (Cohen, 1988).

6.4.6 Calculation of Effect size and Power Analysis

To calculate the sample size required for adequate power, it was first necessary to calculate an estimated population effect size. Effect size was estimated based on the results of three studies, by Cooper et al. (2006), Leung et al. (1999), and Waller, Meyer, et al. (2001). For each study, Cohen’s $d$ was calculated using the means and standard deviations for each EMS of two groups, typically an ED group and a control group. Cooper et al. (2006) compared the EMS scores of adolescent females who scored high and low on the Eating Attitudes Test; thus, these scores were used to calculate an effect size for each EMS. Leung et al. (1999) compared the EMS scores for three groups of ED patients and a healthy control group. For the purpose of calculating an estimated effect size for this study, the average of the three ED group means and standard deviations was calculated and compared with the control group for each EMS. Waller, Meyer, et al. (2001) compared the EMSs of an ED group and healthy control group using both the long and short forms of the YSQ. An effect size for each EMS on both the long and short form was calculated comparing the ED and control groups.

Upon calculating the effect size for each EMS in each study, the mean of the four effect sizes from the four comparisons was calculated for each EMS. The effect sizes calculated in each study, as well as the average of these effect sizes, are outlined in Table 6.1.
Notably, the effect sizes for only 15 EMSs are displayed due to these studies using earlier versions of the YSQ.
Table 6.1

*Calculations of Effect Size for ED and Control Group Comparisons*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Abandonment</td>
<td>1.11</td>
<td>1.42</td>
<td>1.66</td>
<td>1.32</td>
<td>1.38</td>
</tr>
<tr>
<td>Mistrust</td>
<td>1.52</td>
<td>1.86</td>
<td>1.31</td>
<td>1.11</td>
<td>1.45</td>
</tr>
<tr>
<td>Emotional Deprivation</td>
<td>1.17</td>
<td>1.37</td>
<td>1.06</td>
<td>1.10</td>
<td>1.17</td>
</tr>
<tr>
<td>Defectiveness</td>
<td>1.58</td>
<td>2.75</td>
<td>2.09</td>
<td>1.68</td>
<td>2.03</td>
</tr>
<tr>
<td>Social Isolation</td>
<td>0.90</td>
<td>2.64</td>
<td>1.32</td>
<td>1.13</td>
<td>1.50</td>
</tr>
<tr>
<td>Dependence</td>
<td>1.17</td>
<td>1.74</td>
<td>1.48</td>
<td>1.40</td>
<td>1.45</td>
</tr>
<tr>
<td>Vulnerability to Harm</td>
<td>1.09</td>
<td>1.96</td>
<td>0.93</td>
<td>0.95</td>
<td>1.23</td>
</tr>
<tr>
<td>Enmeshment</td>
<td>0.51</td>
<td>2.06</td>
<td>0.78</td>
<td>0.66</td>
<td>1.00</td>
</tr>
<tr>
<td>Failure</td>
<td>1.40</td>
<td>1.76</td>
<td>1.62</td>
<td>1.58</td>
<td>1.59</td>
</tr>
<tr>
<td>Entitlement</td>
<td>0.50</td>
<td>0.89</td>
<td>0.31</td>
<td>0.03</td>
<td>0.43</td>
</tr>
<tr>
<td>Insufficient Self-control</td>
<td>1.07</td>
<td>1.18</td>
<td>1.81</td>
<td>1.94</td>
<td>1.50</td>
</tr>
<tr>
<td>Subjugation</td>
<td>1.09</td>
<td>2.29</td>
<td>1.44</td>
<td>1.32</td>
<td>1.54</td>
</tr>
<tr>
<td>Self-sacrifice</td>
<td>0.32</td>
<td>1.93</td>
<td>0.95</td>
<td>0.82</td>
<td>1.00</td>
</tr>
<tr>
<td>Emotional Inhibition</td>
<td>0.83</td>
<td>2.31</td>
<td>1.48</td>
<td>1.16</td>
<td>1.44</td>
</tr>
<tr>
<td>Unrelenting Standards</td>
<td>0.48</td>
<td>2.50</td>
<td>0.92</td>
<td>0.76</td>
<td>1.16</td>
</tr>
</tbody>
</table>
In order to generate the most conservative sample size estimate, the EMS with the lowest average effect size, Entitlement, was used in the power calculation. Specifically, the required sample size estimate was calculated using GPower, with the estimated medium effect size of 0.43, 80% power, and a Type I error probability of .05. A ratio of two community participants to one clinic participant was applied. A two-tailed analysis was used in order to make the analysis as conservative as possible to reach adequate power. Results from the analysis showed that a total sample of 194 was required, comprising 65 clinic participants and 129 community participants to reach adequate power.

### 6.4.7 Calculation of Age Distribution for Community Group Recruitment

In an attempt to recruit a similar age distribution for both the clinical and community groups, the age distribution of the existing ED patient database at the Royal Children’s Hospital (RCH) was calculated. Due to the RCH AN clinic commencing in July 2008, together with the need to submit an application to the HREC in June 2009, the clinical patients used for calculating the age distribution were those who had attended between July 2008 and June 2009. Furthermore, patients were required to be female, aged between 13 and 18 years, and have received a primary diagnosis of AN or subthreshold AN. Twenty-eight patients fulfilled these criteria. As it was anticipated that recruitment would commence in 2010, the distribution was based on the expected ages of the 28 patients in 2010, which are outlined in Table 6.2.
Table 6.2

*Date of Birth Range and Expected Age and Year Level in 2010 for the Clinic Patients between July 2008 and June 2009*

<table>
<thead>
<tr>
<th>Date of Birth Range</th>
<th>2010 Expected Age</th>
<th>2010 Expected Year Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 May 1997 to 30 April 1998</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>1 May 1996 to 30 April 1997</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>1 May 1995 to 30 April 1996</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>1 May 1994 to 30 April 1995</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>1 May 1993 to 30 April 1994</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>1 May 1992 to 30 April 1993</td>
<td>18</td>
<td>12</td>
</tr>
</tbody>
</table>

The expected age and year level in 2010 of the 28 patients were determined based on date of birth. Of the 28 clinic patients, approximately 11% would be in Year 7, 7% in Year 8, 11% in Year 9, 21% in Year 10, 25% in Year 11, and 25% in Year 12. As it was planned that 50 female students would be recruited from each of the participating schools, each school was asked to recruit the following numbers of students per year level, presented in Table 6.3.
Table 6.3

*Number of Females Students Aimed to be Recruited from each Year Level*

<table>
<thead>
<tr>
<th>Year Level</th>
<th>Quantity to Recruit</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
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<tr>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

To allow for a 50% response rate, double the quantity were invited to participate per school. Unfortunately, the reality of recruitment made abiding by this age distribution a challenge at times; thus, all female students who volunteered to participate were accepted regardless of their age or year level.

### 6.5 Results

#### 6.5.1 AN Clinic Sample Characteristics

Of the 113 AN or subthreshold AN patients invited to participate from a number of ED clinics in Melbourne, Australia, 36 patients participated. Seventeen patients were recruited from the Royal Children’s Hospital (RCH), 12 from the Monash Medical Centre, 4 from the Oak House, 2 from the Melbourne Clinic, and 1 from the Bayside Children’s Clinic. At the time of completing the questionnaire package, participants were aged between 13 and 19 ($M = 16.46, SD = 1.29$). Notably, only one participant was 19 years old, which was outside the originally defined age range for this study. This participant was recruited through
a private clinic; thus, personal details of the patient were unknown until the questionnaires were returned. The patient’s responses to items on the YSQ-3, BASC-2, and DASS were not outliers in the study, so this patient was not excluded from the study. All patients had been diagnosed by trained clinicians within their clinician according to DSM-IV-TR criteria. Twenty (56%) participants had been diagnosed with AN and 12 (33%) with subthreshold AN, for not meeting full criteria for AN. The length of the disorder from the date of diagnosis to the date of the completed questionnaire ranged from less than one month to 63 months ($M = 11.70$, $SD = 12.61$). Diagnosis information was not provided for four patients from the Oak House, however, these patients were invited to participate due to having an AN type ED. The AN subtype of clinic patients was not obtained from their respective clinical setting. Two patients from the RCH did not have an official diagnosis date. Thirty-three (92%) patients had reached menarche, which occurred between the ages of 10 and 15 ($M = 12.53$, $SD = 1.26$).

Thirty-three (92%) patients were born in Australia. For 33 (92%) of the patients, English was the primary language spoken at home, while Cantonese, Romanian, and Serbian were the primary languages spoken at home for the other three patients. Twenty-six (72%) patients came from a traditional family, 9 (25%) came from a non-traditional family, and 1 (3%) patient did not provide information. Five (14%) patients were only children, 14 (39%) had one sibling, 15 (42%) had two siblings, and 2 (5%) had three siblings. No patient was a twin. Nineteen (53%) patients reported a family history of mental illness, 13 (36%) reported no history, and 4 (11%) did not provide information. The most commonly reported family mental illnesses were depression by 15 patients, anxiety by 6 patients, bipolar disorder by 4, and drug and alcohol abuse by 4.
6.5.2 Community Sample Characteristics

Via random selection, 16 secondary schools in the North West Metropolitan Region for Child and Adolescent Mental Health Services (CAMHS) were invited to participate, of which four agreed. Three were private secondary schools and one was a government funded secondary school. In the South East Metropolitan Region for CAMHS, 23 secondary schools were invited to participate, of which one government funded secondary school agreed to participate. A total of 111 female students volunteered to participate in the study, aged between 13 and 18 (\( M = 15.59, SD = 1.50 \)). One hundred (90%) participants had reached menarche and this occurred between the ages of 9 and 15 (\( M = 12.19, SD = 1.17 \)).

Ninety-five (86%) students were born in Australia. For 102 (92%) of the students, English was the primary language spoken at home. Eighty-five (77%) students came from a traditional family and 26 (23%) came from a non-traditional family. Seven (6%) students were only children, 43 (39%) had one sibling, 42 (38%) had two siblings, 9 (8%) had three siblings, and 10 (9%) had four or more siblings. One student was an identical twin, two were non-identical twins, and one was a triplet. Thirty-one (28%) students reported a family history of mental illness, 77 (69%) reported no history, and three (3%) did not provide information. The most commonly reported mental illnesses were depression by 17 students, drug and alcohol abuse by 9 students, anxiety by 7 patients, and bipolar disorder by 6 students.

6.5.3 Demographic Comparisons between AN Clinic and Community Groups

The AN clinic and the community groups were first compared on the demographic information collected. A between-subjects ANOVA on age at completing the questionnaire was significant, with the AN clinic participants (\( M = 16.46, SD = 1.29 \)) being significantly older than the community participants (\( M = 15.59, SD = 1.50 \)), \( F(1, 145) = 9.78, p = .002, d = 0.60, [0.22, 0.98] \). Age was not entered as a covariate in the subsequent analyses given that
the age difference is less than one year between the two groups and age of menarche, rather than current age, is considered an important factor in the development of AN, but age at menarche did not differ significantly between the two groups. Thus, no covariates were entered into the subsequent analyses. Chi-square analyses were performed on the categorical variables and are presented in Table 6.4.
### Table 6.4

**AN Clinic and Community Group Differences on Demographic Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>AN clinic (n = 36)</th>
<th>Community (n = 111)</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>$V$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country of Birth</td>
<td></td>
<td></td>
<td>0.89</td>
<td>.36</td>
<td>.08</td>
</tr>
<tr>
<td>Australia</td>
<td>91.7%</td>
<td>85.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>8.3%</td>
<td>14.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td></td>
<td>0.30</td>
<td>.58</td>
<td>.05</td>
</tr>
<tr>
<td>English</td>
<td>88.9%</td>
<td>91.9%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>11.1%</td>
<td>8.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family type</td>
<td></td>
<td></td>
<td>0.08</td>
<td>.78</td>
<td>.02</td>
</tr>
<tr>
<td>Traditional</td>
<td>74.3%</td>
<td>76.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-traditional</td>
<td>25.7%</td>
<td>23.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siblings</td>
<td></td>
<td></td>
<td>5.50</td>
<td>.36</td>
<td>.19</td>
</tr>
<tr>
<td>Only child</td>
<td>13.9%</td>
<td>6.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>38.9%</td>
<td>38.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two</td>
<td>41.7%</td>
<td>37.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td>5.5%</td>
<td>8.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td>0.0%</td>
<td>4.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five or more</td>
<td>0.0%</td>
<td>4.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As shown in Table 6.4, group and family history of mental illness was the only chi-square comparison to show a significant relationship. Examination of standardised residuals indicated that the high proportion of AN clinic patients reporting a family history of mental illness (2.2) contributed to the significant result.

### 6.5.4 Data Assumption Testing for Multivariate Tests

All scales of the YSQ-3, BASC-2 SRP, and DASS were assessed for normality using stem-and-leaf plots, boxplots, and Kolmogorov-Smirnov statistics. Although some variables exhibited some skew, the level of skew was not considered serious enough to warrant
transformation given the sample size and robustness of the analyses to be conducted. All scales demonstrated homogeneity of variance, except for seven of the 18 EMSs and the Depression scale of the DASS. As such, power transformations were conducted on the eight scales that did not demonstrate homogeneity of variance.

6.5.5 Multivariate Comparisons between AN Clinic and Community Groups

A series of single-factor between-subjects MANOVAs were conducted to compare the AN clinic group to the community group on the YSQ-3, BASC-2 SRP, and DASS scales. A significant multivariate effect was found between the AN clinic and community group on the YSQ-3 EMSs, Wilks’ Λ = .62, $F(18, 128) = 4.39$, $p < .001$, $\eta^2 = .38$ [.16, .42], the BASC-2 SRP scales, Wilks’ Λ = .78, $F(5, 141) = 7.83$, $p < .001$, $\eta^2 = .22$ [.09, .31], and the DASS scales, Wilks’ Λ = .86, $F(3, 143) = 7.91$, $p < .001$, $\eta^2 = .14$ [.04, .24]. Descriptive statistics for the two groups and follow-up univariate analyses of the EMSs and BASC-2 and DASS scales are presented in Table 6.5.
Table 6.5

Descriptive Statistics and Univariate Results on the Self-Report Measures for the AN Clinic and Community Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>AN clinic ($n = 36$)</th>
<th>Community ($n = 111$)</th>
<th>$F$</th>
<th>$p$</th>
<th>$d$ [95%CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abandonment</td>
<td>2.87 (1.22)</td>
<td>2.29 (1.02)</td>
<td>8.00</td>
<td>.005</td>
<td>0.54 [0.16, 0.92]</td>
</tr>
<tr>
<td>Mistrust</td>
<td>2.77 (1.23)</td>
<td>2.53 (1.02)</td>
<td>1.36</td>
<td>.25</td>
<td>0.22 [-0.15, 0.60]</td>
</tr>
<tr>
<td>Emotional Deprivation</td>
<td>2.50 (1.25)</td>
<td>2.05 (1.13)</td>
<td>4.89</td>
<td>.029</td>
<td>0.42 [0.04, 0.80]</td>
</tr>
<tr>
<td>Defectiveness</td>
<td>2.99 (1.35)</td>
<td>1.97 (1.00)</td>
<td>22.61</td>
<td>&lt;.001</td>
<td>0.91 [0.52, 1.30]</td>
</tr>
<tr>
<td>Social Isolation</td>
<td>3.46 (1.35)</td>
<td>2.31 (1.12)</td>
<td>25.68</td>
<td>&lt;.001</td>
<td>0.97 [0.58, 1.36]</td>
</tr>
<tr>
<td>Dependence</td>
<td>2.50 (1.11)</td>
<td>2.17 (0.83)</td>
<td>2.94</td>
<td>.088</td>
<td>0.33 [-0.05, 0.71]</td>
</tr>
<tr>
<td>Vulnerability to Harm</td>
<td>2.46 (1.23)</td>
<td>2.22 (1.06)</td>
<td>1.24</td>
<td>.27</td>
<td>0.21 [-0.16, 0.59]</td>
</tr>
<tr>
<td>Enmeshment</td>
<td>2.66 (1.04)</td>
<td>2.04 (0.92)</td>
<td>11.80</td>
<td>.001</td>
<td>0.66 [0.27, 1.04]</td>
</tr>
<tr>
<td>Failure</td>
<td>2.99 (1.66)</td>
<td>2.58 (1.16)</td>
<td>0.84</td>
<td>.36</td>
<td>0.18 [-0.20, 0.55]</td>
</tr>
</tbody>
</table>

*Note. Hypothesis test df = 1 and Error df = 145*
<table>
<thead>
<tr>
<th>Variable</th>
<th>AN clinic</th>
<th>Community</th>
<th>F</th>
<th>p</th>
<th>d [95%CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>($n = 36$)</td>
<td>($n = 111$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$M (SD)$</td>
<td>$M (SD)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement</td>
<td>2.80 (1.04)</td>
<td>2.76 (0.83)</td>
<td>0.06</td>
<td>.81</td>
<td>0.05 [-0.33, 0.42]</td>
</tr>
<tr>
<td>Insufficient Self-control</td>
<td>2.71 (0.98)</td>
<td>2.86 (0.98)</td>
<td>0.66</td>
<td>.42</td>
<td>0.16 [-0.22, 0.53]</td>
</tr>
<tr>
<td>Subjugation</td>
<td>2.92 (1.03)</td>
<td>2.38 (0.98)</td>
<td>7.96</td>
<td>.005</td>
<td>0.54 [0.16, 0.92]</td>
</tr>
<tr>
<td>Self-sacrifice</td>
<td>3.53 (0.93)</td>
<td>3.40 (1.00)</td>
<td>0.43</td>
<td>.51</td>
<td>0.13 [-0.25, 0.50]</td>
</tr>
<tr>
<td>Approval-seeking</td>
<td>3.30 (1.16)</td>
<td>2.96 (1.06)</td>
<td>2.53</td>
<td>.11</td>
<td>0.31 [-0.07, 0.68]</td>
</tr>
<tr>
<td>Negativity</td>
<td>2.98 (1.13)</td>
<td>2.64 (1.13)</td>
<td>2.44</td>
<td>.12</td>
<td>0.30 [-0.08, 0.68]</td>
</tr>
<tr>
<td>Emotional Inhibition</td>
<td>3.44 (1.16)</td>
<td>2.29 (1.01)</td>
<td>32.36 &lt;.001</td>
<td>1.09 [0.69, 1.49]</td>
<td></td>
</tr>
<tr>
<td>Unrelenting Standards</td>
<td>3.74 (1.47)</td>
<td>3.34 (1.02)</td>
<td>0.04</td>
<td>.85</td>
<td>0.04 [-0.34, 0.41]</td>
</tr>
<tr>
<td>Punitiveness</td>
<td>3.08 (1.29)</td>
<td>2.50 (1.00)</td>
<td>3.89</td>
<td>.05</td>
<td>0.38 [-0.00, 0.76]</td>
</tr>
<tr>
<td>BASC-2 SRP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Problems</td>
<td>53.53 (10.83)*</td>
<td>52.88 (10.38)*</td>
<td>0.10</td>
<td>.75</td>
<td>0.06 [-0.32, 0.44]</td>
</tr>
</tbody>
</table>

BASC severity ratings: *Normal; **At-risk; ***Clinically significant

Note. Hypothesis test df = 1 and Error df = 145
<table>
<thead>
<tr>
<th>Variable</th>
<th>AN clinic ($n = 36$)</th>
<th>Community ($n = 111$)</th>
<th>$F$</th>
<th>$p$</th>
<th>$d$ [95%CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalising Problems</td>
<td>61.81 (15.16)**</td>
<td>52.23 (11.43)*</td>
<td>16.12</td>
<td>&lt;.001</td>
<td>0.77 [0.38, 1.16]</td>
</tr>
<tr>
<td>Inattention/Hyperactivity</td>
<td>53.44 (11.20)*</td>
<td>54.23 (11.47)*</td>
<td>0.13</td>
<td>.72</td>
<td>0.07 [-0.31, 0.45]</td>
</tr>
<tr>
<td>Personal Adjustment</td>
<td>39.67 (12.98)**</td>
<td>48.59 (1.42)*</td>
<td>17.57</td>
<td>&lt;.001</td>
<td>0.80 [0.42, 1.19]</td>
</tr>
<tr>
<td>Emotional Symptoms Index</td>
<td>64.36 (15.59)**</td>
<td>51.72 (11.63)*</td>
<td>26.94</td>
<td>&lt;.001</td>
<td>1.00 [0.60, 1.39]</td>
</tr>
<tr>
<td>DASS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>18.94 (12.33)***</td>
<td>9.62 (9.09)*</td>
<td>19.59</td>
<td>&lt;.001</td>
<td>0.85 [0.46, 1.24]</td>
</tr>
<tr>
<td>Anxiety</td>
<td>12.14 (9.96)***</td>
<td>8.77 (8.99)**</td>
<td>3.60</td>
<td>.06</td>
<td>0.36 [-0.02, 0.74]</td>
</tr>
<tr>
<td>Stress</td>
<td>19.64 (11.03)***</td>
<td>12.41 (8.90)*</td>
<td>15.87</td>
<td>&lt;.001</td>
<td>0.76 [0.38, 1.15]</td>
</tr>
</tbody>
</table>

BASC severity ratings: *Normal; **At-risk; ***Clinically significant
DASS Depression, Anxiety, and Stress severity ratings: *Normal; **Mild; ***Moderate

*Note.* Hypothesis test df = 1 and Error df = 145
The AN clinic patients reported significantly higher scores than the community participants on seven of the 18 EMSs, including Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, Subjugation, and Emotional Inhibition. The AN clinic patients also reported significantly higher scores than the community participants on Internalising Problems and the Emotional Symptoms Index and lower scores of Personal Adjustment from the BASC-2 SRP. BASC-2 severity ratings indicated that the AN patients’ scores were classified as At-risk for the three scales, while community participants’ scores were all in a Normal range. Furthermore, DASS Depression and Stress scores were significantly higher in the AN clinic group compared with the community group. According to DASS clinical cut-off ratings, the AN patients reported moderately severe scores for Depression, Anxiety, and Stress, while the community participants reported normal levels of Depression and Stress, and mild levels of Anxiety.

6.5.6 Results of Cluster Analysis

As presented in Chapter 4, the results of Study 1 demonstrated that a homogenous sample of adolescent females diagnosed with either AN or subthreshold AN could be grouped into two distinct groups based on a range of eating, psychological, behavioural, and family variables, using a two-step cluster analysis. Importantly, no restriction was placed on the Study 1 analysis to derive a specific number of clusters. As in Study 1, a two-step cluster analysis was conducted using the five composite scales of the BASC-2 SRP, with no restriction on the data as to the number of clusters to be derived. Corresponding to Study 1 results, this analysis also revealed two clusters with all patients being effectively clustered. The nine patients from Study 1 were assigned to the same clusters as in Study 1; thus, 18 patients were in each of the two clusters. To determine the nature of these clusters, the BASC-2 SRP scales that produced group separation were analysed using a MANOVA. A significant multivariate effect was found between the two clusters on the BASC-2 SRP
scales, Wilks’ $\Lambda = .25$, $F(5, 30) = 17.88, p < .001$. Follow-up univariate analyses showed that, in support of the findings in Study 1, the two statistically derived AN clusters differed significantly on the Internalising Problems Composite, $F(1, 34) = 70.58, p < .001$, the Inattention/Hyperactivity Composite, $F(1, 34) = 8.94, p = .005$, the Personal Adjustment Composite, $F(1, 34) = 70.08, p < .001$, and the ESI, $F(1, 34) = 95.36, p < .001$. For each of these composite scores, Cluster 2 patients reported significantly more maladaptive psychological and behavioural scores than Cluster 1 patients. The School Problems Composite did not differ between the two clusters, which was not in line with the findings of Study 1. Nonetheless, the findings replicate the profiles developed in Study 1, thus, to maintain consistency with the reporting of Study 1 findings Cluster 1 will be referred to as Egosyntonic AN and Cluster 2 will be referred to as Heterogeneous AN. Further differences between the two clusters will be examined by comparing demographic variables and scale scores from the YSQ-3 and DASS in the following sections.

6.5.7 Proportion of Community Group At-risk of an Eating Disorder

The ESP was completed by the community group to identify participants that may have a possible ED. From the total sample, 34 (31%) reported not being satisfied with their eating patterns, 18 (16%) ate in secret, 60 (54%) reported that their weight affected the way they felt about themselves, and 6 (5%) reported currently suffering an ED or suffering an ED in the past. An agreement with two or more of the four items above, indicate that an individual may have a possible ED (see Section 6.4.2). Applying this scoring procedure, 36 (32%) students’ scores indicated a possible ED. Research suggests that a community sample will have a point prevalence between 0% and 3.9% for AN and between 0.7% and 14.6% for EDNOS (Favaro et al., 2003; Fernandez et al., 2007; Keel et al., 2005; Kjelsas et al., 2004; Morande et al., 1999; Sancho et al., 2007; Santonastaso et al., 1996). Therefore, 32% was an unexpectedly large proportion of the community sample responding with a score on the ESP
equal to or greater than two. In subsequent analyses the community group was divided into
two groups based on the responses to the ED screen: (1) At-risk community group,
encompassing the students who scored two or more on the ESP and may have, or have an
elevated risk for, an ED; and (2) Non-ED community group, encompassing those who scored
below two on the ESP.

6.5.8 Differences between the Four Comparison Groups

To achieve a clearer concept of the schema profiles that may exist and the associated
psychological and behavioural characteristics of the different groups, the resulting analyses
compared all four groups together (Egosyntonic AN patients, Heterogeneous AN patients,
At-risk community, and Non-ED community). First the demographic information was
analysed. A one-way between-subjects ANOVA between groups on age at completing the
questionnaire was significant, $F(3, 143) = 4.06, p = .008, \eta^2 = .08 [.01, .16]$. Tukey HSD
post-hoc tests showed one significant pairwise comparison as Heterogeneous AN patients ($M$
$= 16.74, SD = 1.22$) were significantly older than the Non-ED community participants ($M$
$= 15.49, SD = 1.55$), $p = .007$. Despite this significant difference, age was not entered as a
covariate in the subsequent analyses as age of menarche is considered the more important
factor in the development of AN rather than age in years, and there were no group differences
for age of menarche. Chi-square analyses were performed on the categorical variables and
are presented in Table 6.6.
Table 6.6

*Four Group Differences on Categorical Demographic Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Egosyntonic $(n = 18)$</th>
<th>Heterogeneous $(n = 18)$</th>
<th>At-risk $(n = 36)$</th>
<th>Non-ED $(n = 75)$</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>$V$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country of Birth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.31</td>
<td>.23</td>
<td>.17</td>
</tr>
<tr>
<td>Australia</td>
<td>100%</td>
<td>83.3%</td>
<td>80.6%</td>
<td>88.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0.0%</td>
<td>16.7%</td>
<td>19.4%</td>
<td>12.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.90</td>
<td>.83</td>
<td>.08</td>
</tr>
<tr>
<td>English</td>
<td>88.9%</td>
<td>88.9%</td>
<td>88.9%</td>
<td>93.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>11.1%</td>
<td>11.1%</td>
<td>11.1%</td>
<td>6.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.65</td>
<td>.30</td>
<td>.16</td>
</tr>
<tr>
<td>Traditional</td>
<td>61.1%</td>
<td>88.2%</td>
<td>77.8%</td>
<td>76.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-traditional</td>
<td>38.9%</td>
<td>11.8%</td>
<td>22.2%</td>
<td>24.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>
Table 6.6 continued

<table>
<thead>
<tr>
<th>Variable</th>
<th>Egosyntonic $(n = 18)$</th>
<th>Heterogeneous $(n = 18)$</th>
<th>At-risk $(n = 36)$</th>
<th>Non-ED $(n = 75)$</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>$V$</th>
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<td>One</td>
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<td>41.7%</td>
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<td>Two</td>
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<td>33.3%</td>
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<td>Three</td>
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<td>0.0%</td>
<td>8.3%</td>
<td>8.0%</td>
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<td>Four</td>
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<td>2.8%</td>
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<td>Five or more</td>
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<td>Twin</td>
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<td>Non-identical</td>
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Table 6.6 continued

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Heterogeneous $(n = 18)$</th>
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<th>Non-ED $(n = 75)$</th>
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<td>64.3%</td>
<td>34.3%</td>
<td>26.0%</td>
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<td>.011</td>
<td>.28</td>
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<td>65.7%</td>
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<td>Reached menarche</td>
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<td>.15</td>
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<td>100%</td>
<td>91.4%</td>
<td>90.7%</td>
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</tr>
<tr>
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<td>0.0%</td>
<td>8.6%</td>
<td>9.3%</td>
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</table>
As shown in Table 6.6, group and family history of mental illness was the only chi-square comparison to show a significant relationship. Examination of standardised residuals indicated that the relatively high number of participants in the Heterogeneous AN cluster with a history of mental illness in the family (1.8), and the relatively low number of participants in the Non-ED community group with a family history of mental illness (-1.4), contributed to the significant chi-square result.

Subsequently, a series of single-factor between-subjects MANOVAs were conducted to compare the four comparison groups on the YSQ-13, BASC-2 SRP, and DASS scales. A significant multivariate effect was found among the four groups on the YSQ-13, Wilks’ Λ = .36, $F(54, 376.25) = 2.90, p < .001$, $η^2 = .29 [.12, .22]$, the BASC-2 SRP, Wilks’ Λ = .51, $F(15, 384.12) = 7.04, p < .001$, $η^2 = .22 [.12, .26]$, and the DASS, Wilks’ Λ = .70, $F(9, 343.31) = 6.01, p < .001$, $η^2 = .14 [.06, .18]$. Descriptive statistics for the four comparison groups are presented in Table 6.7. Follow-up univariate analyses of comparisons on the YSQ-13 EMSs and BASC-2 and DASS scales are presented in Table 6.8.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Egosyntonic ((n = 18)) M(SD)</th>
<th>Non-ED ((n = 75)) M(SD)</th>
<th>At-risk ((n = 36)) M(SD)</th>
<th>Heterogeneous ((n = 18)) M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abandonment</td>
<td>2.34 (1.08)</td>
<td>2.07 (0.94)</td>
<td>2.74 (1.04)</td>
<td>3.40 (1.14)</td>
</tr>
<tr>
<td>Mistrust</td>
<td>2.27 (1.15)</td>
<td>2.29 (1.14)</td>
<td>2.49 (1.36)</td>
<td>3.27 (1.13)</td>
</tr>
<tr>
<td>Emotional Deprivation</td>
<td>2.18 (1.17)</td>
<td>2.29 (1.14)</td>
<td>2.41 (1.12)</td>
<td>2.82 (1.28)</td>
</tr>
<tr>
<td>Defectiveness</td>
<td>2.97 (1.48)</td>
<td>3.95 (1.03)</td>
<td>2.67 (1.28)</td>
<td>3.70 (1.18)</td>
</tr>
<tr>
<td>Social Isolation</td>
<td>1.84 (0.62)</td>
<td>2.28 (1.08)</td>
<td>1.73 (0.71)</td>
<td>1.93 (1.12)</td>
</tr>
<tr>
<td>Dependence</td>
<td>2.33 (0.87)</td>
<td>4.15 (1.39)</td>
<td>2.99 (1.11)</td>
<td>4.15 (1.39)</td>
</tr>
<tr>
<td>Vulnerability to Harm</td>
<td>1.84 (0.95)</td>
<td>3.14 (1.19)</td>
<td>2.31 (1.05)</td>
<td>3.14 (1.19)</td>
</tr>
<tr>
<td>Enmeshment</td>
<td>2.83 (1.21)</td>
<td>2.80 (0.98)</td>
<td>2.74 (1.04)</td>
<td>2.80 (0.98)</td>
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<tr>
<td>Failure</td>
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<td></td>
</tr>
<tr>
<td>Entitlement</td>
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Table 6.7 continued

<table>
<thead>
<tr>
<th>Variable</th>
<th>Egosyntonic ((n = 18))</th>
<th>Heterogeneous ((n = 18))</th>
<th>At-risk ((n = 36))</th>
<th>Non-ED ((n = 75))</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>M(SD)</td>
<td>M(SD)</td>
<td>M(SD)</td>
<td>M(SD)</td>
</tr>
<tr>
<td>Insufficient Self-control</td>
<td>2.40 (0.93)</td>
<td>3.02 (0.96)</td>
<td>3.22 (0.92)</td>
<td>2.69 (0.97)</td>
</tr>
<tr>
<td>Subjugation</td>
<td>2.36 (0.92)</td>
<td>3.47 (0.82)</td>
<td>2.67 (1.10)</td>
<td>2.24 (0.88)</td>
</tr>
<tr>
<td>Self-sacrifice</td>
<td>3.26 (0.84)</td>
<td>3.79 (0.97)</td>
<td>3.62 (0.99)</td>
<td>3.30 (0.99)</td>
</tr>
<tr>
<td>Approval-seeking</td>
<td>3.07 (1.13)</td>
<td>3.52 (1.17)</td>
<td>3.17 (1.14)</td>
<td>2.87 (1.02)</td>
</tr>
<tr>
<td>Negativity</td>
<td>2.25 (0.84)</td>
<td>3.71 (0.88)</td>
<td>3.09 (1.19)</td>
<td>2.43 (1.04)</td>
</tr>
<tr>
<td>Emotional Inhibition</td>
<td>3.29 (1.27)</td>
<td>3.58 (1.05)</td>
<td>2.56 (1.08)</td>
<td>2.16 (0.96)</td>
</tr>
<tr>
<td>Unrelenting Standards</td>
<td>3.48 (1.49)</td>
<td>3.99 (1.45)</td>
<td>3.48 (0.77)</td>
<td>3.27 (1.11)</td>
</tr>
<tr>
<td>Punitiveness</td>
<td>2.68 (1.04)</td>
<td>3.48 (1.41)</td>
<td>2.68 (1.09)</td>
<td>2.41 (0.95)</td>
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<tr>
<td><strong>BASC-2 SRP</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>School Problems</td>
<td>49.61 (8.08)*</td>
<td>57.44 (11.98)*</td>
<td>52.81 (9.90)*</td>
<td>52.92 (10.66)*</td>
</tr>
<tr>
<td>Internalising Problems</td>
<td>50.44 (9.84)*</td>
<td>73.17 (10.15)**</td>
<td>58.22 (11.55)*</td>
<td>49.36 (10.25)*</td>
</tr>
<tr>
<td>Inattention/Hyperactivity</td>
<td>47.67 (9.09)*</td>
<td>59.22 (10.25)*</td>
<td>56.14 (11.45)*</td>
<td>53.32 (11.45)*</td>
</tr>
</tbody>
</table>

BASC severity ratings: *Normal; **At-risk; ***Clinically significant
Table 6.7 continued

<table>
<thead>
<tr>
<th>Variable</th>
<th>Egosyntonic (n = 18)</th>
<th>Heterogeneous (n = 18)</th>
<th>At-risk (n = 36)</th>
<th>Non-ED (n = 75)</th>
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</thead>
<tbody>
<tr>
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<td>M(SD)</td>
<td>M(SD)</td>
<td>M(SD)</td>
<td>M(SD)</td>
</tr>
<tr>
<td>Personal Adjustment</td>
<td>49.39 (9.61)*</td>
<td>29.94 (7.36)***</td>
<td>43.03 (9.78)*</td>
<td>51.25 (9.70)*</td>
</tr>
<tr>
<td>Emotional Symptoms Index</td>
<td>52.39 (11.01)*</td>
<td>76.33 (8.68)***</td>
<td>58.58 (12.25)*</td>
<td>48.43 (9.81)*</td>
</tr>
<tr>
<td>DASS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>14.00 (10.16)***</td>
<td>23.89 (12.57)****</td>
<td>13.86 (10.81)**</td>
<td>7.59 (7.39)*</td>
</tr>
<tr>
<td>Anxiety</td>
<td>6.94 (5.68)*</td>
<td>17.33 (10.72)****</td>
<td>12.00 (9.16)***</td>
<td>7.23 (8.55)*</td>
</tr>
<tr>
<td>Stress</td>
<td>14.39 (11.15)*</td>
<td>24.89 (8.24)***</td>
<td>16.17 (8.56)**</td>
<td>10.61 (8.54)*</td>
</tr>
</tbody>
</table>

BASC severity ratings: *Normal; **At-risk; ***Clinically significant
DASS Depression, Anxiety, and Stress severity ratings: *Normal; **Mild; ***Moderate; ****Severe
Table 6.8

*Univariate Results & Post-hoc Tests of the Self-Report Measures of the Four Groups*

<table>
<thead>
<tr>
<th>Variable</th>
<th>F</th>
<th>p</th>
<th>$\eta^2$ [95%CI]</th>
<th>Tukey HSD (d)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C2 &gt; C1</td>
</tr>
<tr>
<td>Abandonment</td>
<td>9.92</td>
<td>&lt;.001</td>
<td>.17 [.06, .27]</td>
<td>0.96</td>
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<tr>
<td>Mistrust</td>
<td>4.71</td>
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<td>.09 [.01, .17]</td>
<td>0.88</td>
</tr>
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<td>Emotional Deprivation</td>
<td>4.86</td>
<td>.003</td>
<td>.09 [.01, .18]</td>
<td>-</td>
</tr>
<tr>
<td>Defectiveness</td>
<td>17.32</td>
<td>&lt;.001</td>
<td>.27 [.14, .37]</td>
<td>1.22</td>
</tr>
<tr>
<td>Social Isolation</td>
<td>13.32</td>
<td>&lt;.001</td>
<td>.22 [.10, .32]</td>
<td>0.78</td>
</tr>
<tr>
<td>Dependence</td>
<td>9.52</td>
<td>&lt;.001</td>
<td>.17 [.06, .26]</td>
<td>1.52</td>
</tr>
<tr>
<td>Vulnerability to Harm</td>
<td>7.40</td>
<td>&lt;.001</td>
<td>.13 [.04, .23]</td>
<td>1.52</td>
</tr>
<tr>
<td>Enmeshment</td>
<td>6.86</td>
<td>&lt;.001</td>
<td>.13 [.03, .22]</td>
<td>-</td>
</tr>
<tr>
<td>Failure</td>
<td>17.02</td>
<td>&lt;.001</td>
<td>.26 [.14, .36]</td>
<td>1.97</td>
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<tr>
<td>Entitlement</td>
<td>0.07</td>
<td>.98</td>
<td>.00 [.00, .01]</td>
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*Note. Univariate analyses Hypothesis test df = 3 and Error df = 143. C1 = Egosyntonic AN; C2 = Heterogeneous AN; AR = At-risk group; Non = Non-ED group*
Table 6.8  *continued*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$F$</th>
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<th>$\eta^2$ [95%CI]</th>
<th>Tukey HSD ($d$)</th>
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<tr>
<td></td>
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<td>C2 &gt; C1</td>
</tr>
<tr>
<td>Insufficient Self-control</td>
<td>4.03</td>
<td>.009</td>
<td>.08 [.01, .16]</td>
<td>-</td>
</tr>
<tr>
<td>Subjugation</td>
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<td>.16 [.05, .25]</td>
<td>1.28</td>
</tr>
<tr>
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<td>1.93</td>
<td>.13</td>
<td>.04 [.00, .10]</td>
<td>-</td>
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<tr>
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<td>.18 [.07, .27]</td>
<td>1.70</td>
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<tr>
<td>Emotional Inhibition</td>
<td>12.32</td>
<td>&lt;.001</td>
<td>.21 [.09, .30]</td>
<td>-</td>
</tr>
<tr>
<td>Unrelenting Standards</td>
<td>1.90</td>
<td>.13</td>
<td>.04 [.00, .10]</td>
<td>-</td>
</tr>
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<td>2.31</td>
<td>.079</td>
<td>.05 [.00, .11]</td>
<td>-</td>
</tr>
<tr>
<td>BASC-2 SRP</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>School Problems</td>
<td>1.75</td>
<td>.16</td>
<td>.04 [.00, .10]</td>
<td>-</td>
</tr>
<tr>
<td>Internalising Problems</td>
<td>27.22</td>
<td>&lt;.001</td>
<td>.36 [.23, .46]</td>
<td>2.27</td>
</tr>
<tr>
<td>Inattention/Hyperactivity</td>
<td>3.85</td>
<td>.011</td>
<td>.07 [.00, .15]</td>
<td>1.19</td>
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</table>

*Note.* Univariate analyses Hypothesis test df = 3 and Error df = 143. C1 = Egosyntonic AN; C2 = Heterogeneous AN; AR = At-risk group; Non = Non-ED group
<table>
<thead>
<tr>
<th>Variable</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$ [95%CI]</th>
<th>Tukey HSD (d)</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C2 &gt; C1</td>
</tr>
<tr>
<td>Personal Adjustment</td>
<td>26.87</td>
<td>&lt;.001</td>
<td>.36 [.23, .46]</td>
<td>2.29*</td>
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<tr>
<td>Emotional Symptoms Index</td>
<td>36.45</td>
<td>&lt;.001</td>
<td>.43 [.30, .52]</td>
<td>2.43</td>
</tr>
<tr>
<td>DASS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>13.82</td>
<td>&lt;.001</td>
<td>.22 [.10, .32]</td>
<td>-</td>
</tr>
<tr>
<td>Anxiety</td>
<td>8.05</td>
<td>&lt;.001</td>
<td>.14 [.04, .24]</td>
<td>1.27</td>
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<tr>
<td>Stress</td>
<td>13.43</td>
<td>&lt;.001</td>
<td>.22 [.10, .32]</td>
<td>1.08</td>
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</tbody>
</table>

*Note.* Univariate analyses Hypothesis test df = 3 and Error df = 143. C1 = Egosyntonic AN; C2 = Heterogeneous AN; AR = At-risk group; Non = Non-ED group

* Denotes relationships that were reversed. For example, the first pairwise comparison result shows that C1 > C2 on Personal Adjustment.
For the YSQ-3, 13 of the 18 EMSs demonstrated a significant univariate difference among the four groups. The five EMSs that did not differ among the four groups were Entitlement, Self-sacrifice, Approval-seeking, Unrelenting Standards, and Punitiveness. The strongest effect was seen with the Defectiveness EMS. Moreover, for the BASC-2 SRP, no univariate effect was found only for School Problems, and the Emotional Symptoms Index showed the strongest effect. All three DASS scales showed a significant univariate effect between the groups.

The first pairwise comparison between Egosyntonic AN and Heterogeneous AN clinic patients showed that Heterogeneous AN patients reported significantly higher scores than Egosyntonic AN patients on nine of the 18 EMSs, including Abandonment, Mistrust, Defectiveness, Social Isolation, Dependence, Vulnerability to Harm, Failure, Subjugation, and Negativity. Comparison of BASC-2 SRP scales showed that Heterogeneous AN patients reported significantly higher scores than Egosyntonic AN patients on Internalising Problems, Inattention/Hyperactivity, and the Emotional Symptoms Index, while Egosyntonic AN patients reported significantly higher levels of Personal Adjustment than Heterogeneous AN patients. BASC-2 SRP clinical severity ratings indicated that Heterogeneous AN patients scored in the Clinically Significant range for Internalising Problems, Personal Adjustment, and the Emotional Symptoms Index, while Egosyntonic AN patients scored in the Normal range for all scales. Comparison of the DASS scales showed no difference between the clusters in their level of Depression; however, Heterogeneous AN patients reported significantly higher levels of Anxiety and Stress than Egosyntonic AN patients. DASS severity ratings indicated that Heterogeneous AN patients reported severe Depression and Anxiety scores, and moderate Stress scores. On the other hand, Egosyntonic AN patients reported mild Depression scores and normal levels of Anxiety and Stress.
Subsequent examination of the remaining post-hoc comparisons showed that Heterogeneous AN patients reported higher scores than the Non-ED community participants on 12 of the 18 EMSs. There were three EMSs that did not differ between Heterogeneous AN and Egosyntonic AN patients, but were significantly higher among Heterogeneous AN patients than Non-ED participants, namely Emotional Deprivation, Enmeshment, and Emotional Inhibition. Heterogeneous AN patients also reported significantly higher scores than the At-risk community participants on six of the 18 EMSs. The At-risk community group reported significantly higher scores than Egosyntonic AN patients on three EMSs, including Failure, Insufficient Self-control, and Negativity. The At-risk community participants also reported significantly higher scores than Non-ED community participants on five of the 18 EMSs. Post-hoc tests also showed that Egosyntonic AN patients and Non-ED participants reported similar scores on 16 of the 18 EMSs, with Egosyntonic AN patients reporting significantly higher scores than Non-ED participants only on the Social Isolation and Emotional Inhibition EMSs.

Post-hoc tests for the BASC-2 SRP demonstrated that for both Internalising Problems and the Emotional Symptoms Index Heterogeneous AN patients and At-risk community participants reported significantly higher scores than Non-ED community participants. Heterogeneous AN patients also reported significantly higher scores than the At-risk community participants on these two scales. For the Personal Adjustment scale, Heterogeneous AN patients and At-risk community participants reported significantly lower adjustment levels than Non-ED community participants, and Heterogeneous AN patients reported significantly lower scores than At-risk community participants. Egosyntonic AN and Non-ED participants did not differ on any of the BASC-2 SRP scales. Notably, Heterogeneous AN patients reported Clinically Significant scores on the Internalising
Problems, Personal Adjustment, and Emotional Symptoms Index scales, while the other three comparison groups all scored in the normal range.

Post-hoc tests for the DASS scales showed that Heterogeneous AN patients reported significantly higher scores on all DASS scales compared with Non-ED community participants. Heterogeneous AN patients also reported significantly higher scores than At-risk community participants on Depression and Stress, but not on Anxiety. The At-risk community participants reported significantly higher scores than the Non-ED community participants on all DASS scales, while no post-hoc differences were found between At-risk community participants and Egosyntonic AN patients. Egosyntonic AN patients reported significantly higher levels than Non-ED community participants only on Depression. DASS severity ratings indicated that Heterogeneous AN patients reported severe levels of Depression and Anxiety, and moderate levels of Stress, while Egosyntonic AN patients reported mild levels of Depression, and normal levels of Anxiety and Stress. The At-risk community group reported mild levels of Depression and Stress, but moderate levels of Anxiety, while the Non-ED community group reported all psychopathology scores in the normal range.

6.6 Discussion

6.6.1 Overview

The aim of this study was to examine the differences in maladaptive schemas, general psychopathology, and behaviour problems in a sample of adolescent females with and without AN. The hypothesis anticipating that the AN clinic group would report significantly higher levels of EMSs, general psychopathology, and behavioural problems than the community group was generally supported by the analyses. The hypothesis that two clusters would be derived in the AN clinic sample was also supported. Upon comparing the two clusters on the BASC-2 SRP, Heterogeneous AN patients reported more maladaptive levels
of general psychopathology and behavioural problems than Egosyntonic AN patients; thus, the present findings replicated the results of Study 1, being that Heterogeneous AN patients reported a more maladaptive profile, overall, than Egosyntonic AN patients. Thus, the two clusters were labelled as Egosyntonic AN and Heterogeneous AN as in Study 1.

Subsequently, the hypothesis that AN patients who fell into the Heterogeneous AN profile derived from Study 1 would report significantly higher levels of EMSs, psychopathology, and behaviour problems than Egosyntonic AN patients was also mostly supported by the results. The hypothesis that the community group would be divided into an at-risk and no risk group was also supported by the results, but the proportion who fell within the At-risk group was larger than expected. Finally, the hypothesis that significant differences would exist between the four groups was also supported by the present findings.

The results demonstrated a number of general trends: (1) collectively, the AN clinic group reported a higher frequency of family history of mental illness and higher levels of EMSs, general psychopathology, and behaviour problems than the community group; (2) the two clusters derived in Study 1 were replicated in the AN clinic group in this study and comparisons between the clusters demonstrated that Heterogeneous AN patients presented with a more maladaptive schema profile, and greater levels of psychopathology and behaviour problems, compared with Egosyntonic AN patients; (3) Heterogeneous AN patients generally reported a more maladaptive profile compared with both community groups; (4) Egosyntonic AN patient scores on measures of EMSs, psychopathology, and behaviour problems closely resembled those of the Non-ED community participants, except for on only two EMSs and the Depression scale of the DASS; (4) from the community groups, the At-risk community participants, whose scores on the ED screen indicated a possible problem with eating, reported greater EMSs, general psychopathology, and behaviour problems than the Non-ED community participants.
6.6.2 Summary of Results of the AN Clinic and Community Group Comparisons

The first aim of this study was to determine if differences in EMSs, general psychopathology, and behavioural problems exist between an adolescent sample of females with and without AN. The results demonstrated that the adolescent females diagnosed with AN or subthreshold AN more frequently reported a family history of mental illness compared with adolescent females from the community; however, the two groups did not differ in family background, in terms of country of birth, primary language spoken at home, family type, the number of siblings they have, and whether they are a twin. Furthermore, the AN clinic group reported significantly higher scores on seven of the 18 EMSs compared with the community group. As such, the AN clinic group reported maladaptive core beliefs that: the important people in their lives would not always be there for them (Abandonment); their need for emotional support will not be fulfilled by those in their lives (Emotional Deprivation); they have a number of defects that make them unlovable (Defectiveness); they do not fit in (Social Isolation); they lack a clear sense of self-identity (Enmeshment); they are surrendering their control due to being coerced (Subjugation); and constrained spontaneity (Emotional Inhibition) (Young et al., 2003). Generally, the AN clinic group reported feeling a sense of disconnection, inadequacy, and inhibition compared with the community sample. The relationship between these EMSs and AN will be explored in more detail in Section 6.6.4.

Furthermore, according to BASC-2 SRP scores, the AN clinic patients reported significantly higher scores on Internalising Problems and the Emotional Symptoms Index and significantly lower levels of Personal Adjustment compared with the community participants. Notably, the AN clinic group scores for these three scales were classified in the at-risk category, while the community group scores were classified as normal (Reynolds & Kamphaus, 2004). According to Reynolds and Kamphaus (2004), interpretation of the
BASC-2 SRP scores indicate that the AN clinic group were experiencing serious emotional disturbance, suggesting that the patients are emotionally fragile and may have few coping resources. In line with results from the BASC-2 SRP, the DASS Depression and Stress scores were significantly higher in the AN clinic group compared with the community group. Clinical severity ratings indicated that the AN clinic patients reported moderately high levels of depression, anxiety, and stress, while the community participants reported normal levels of depression and stress, but mild levels of anxiety.

In summary, it is evident that the adolescent females with a clinical diagnosis of AN or subthreshold AN have reported more maladaptive EMS, psychological, and behavioural profiles compared with the community participants. Given that family history of mental health was significantly more frequent in the clinical group compared with the community group, the family problems may have contributed to the severity of EMSs, as EMSs are proposed to develop from childhood experiences. The EMS results support the trends found in previous research that ED patient groups typically reported significantly higher scores than healthy control groups on a number of EMSs (Cooper et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller, 2003; Waller et al., 2000). The seven EMSs that were significantly higher for the AN clinic group compared with the community group in the present study were also found in previous studies to be higher in ED groups compared with matched control groups (e.g., Cooper et al., 2006; Leung et al., 1999; Waller et al., 2000). Specifically, Leung et al. (1999) found that AN and BN patients reported significantly higher EMS scores than healthy control participants on all of the 16 EMSs measured. Furthermore, Waller et al. (2000) found that at least one of the ED groups investigated, including BN, AN-BP, and BED patients, reported significantly higher levels of maladaptive schemas for 15 of the 16 EMSs measured. Entitlement was the only EMS to show no difference between the groups (Waller et al., 2000); Entitlement also did not differ between the clinical and community groups in the
present study. Cooper et al. (2006) also found that non-clinical adolescents reporting high scores on the Eating Attitudes Test reported significantly higher EMS scores on 14 of the 15 EMSs measured compared with low scorers on the Eating Attitudes Test. Self-sacrifice was the only EMS not to differ between the two groups (Cooper et al., 2006), which is also consistent with the present results as Self-sacrifice did not differ between the AN clinic and community groups. It is evident that these previous studies found more significant differences between ED and matched control groups compared with the significant results in the present study. Importantly, in comparison to the present study, these previous studies not only examined older participants with different ED diagnoses, but also used previous versions of the YSQ. Another major difference between the present study and previous research is that the community group in the present study included the participants who may have a possible ED according to the ED screen, while previous research examined healthy controls without an ED. The inclusion of these participants may have contributed to the lower number of significantly different EMSs between the groups in the present study. Nonetheless, the present findings tend to provide evidence that EMSs play an important role in the presentation of AN in adolescent females.

6.6.3 Summary of Results of the Four Group Comparisons

The comparisons made between the AN clinic group and the community group demonstrated a general trend towards a more maladaptive profile of EMSs, psychopathology, and behavioural problems in the AN clinic patients. As two independent AN typologies were derived in Study 1 based on a range of eating, psychological, behavioural and family variables, it was considered whether these same two typologies could be extrapolated from the AN clinic data in Study 2. To achieve this, a two-step cluster analysis was conducted on the 27 AN clinic patients, new to the present study, using the scale scores of the BASC-2 SRP, which was a measure used in both studies. With no restrictions placed on the data, two
independent clusters were derived in this study. Based on the results of the BASC-2 SRP, the two clusters found in Study 2 resembled the BASC-2 SRP profiles of the two clusters found in Study 1, presented in Sections 4.5 and 4.6. These results tend to validate the typologies derived in Study 1, which will be explained in more detail in the forthcoming sections. Nonetheless, Study 2 expanded on the cluster profiles described in Study 1 by investigating EMSs and another general psychopathology measure, in addition to the adaptive and maladaptive psychological and behavioural constructs measured by the BASC-2 SRP.

The present study not only examined the differences between the two statistically derived AN clusters, but also highlighted that two community groups existed based on the results of the ED screen. Examination of the differences between the four comparison groups provided a more thorough investigation into the schema profiles of the four groups and the associated psychological and behavioural features. In fact, EMSs that were found to not differ between the AN clinic group and the community group, were shown to differ in the post-hoc tests comparing the four comparison groups: Egosyntonic AN patients; Heterogeneous AN; At-risk community group; and Non-ED community group. For example, the Vulnerability to Harm EMS showed no univariate effect in the comparison between the AN clinic group and the community group; however, dividing the AN clinic group into two groups and the community group into two groups lead to more fine-grained analyses, which found that Heterogeneous AN patients reported significantly higher scores on Vulnerability to Harm than Egosyntonic AN and Non-ED community participants. Furthermore, upon examining the effect sizes presented in Table 6.5, which compared the AN clinic and community groups collectively, and the effect sizes of the post-hoc tests presented in Table 6.8, which compared the four groups, it was evident that effect sizes increased by analysing the four groups. Given that a range of notable differences were found between the six
pairwise comparisons with the four groups, a summary of the general trends will be provided, followed by a schema, psychological, and behavioural profile for each group.

Replicating the results of Study 1, the first pairwise comparison showed that, overall, Heterogeneous AN patients reported a more maladaptive profile than Egosyntonic AN patients. Specifically, Heterogeneous AN patients reported a higher frequency of a family history of mental illness than Egosyntonic AN patients. Moreover, Heterogeneous AN patients reported significantly higher scores than Egosyntonic AN patients on nine EMSs, greater maladaptive scores on all scales of the BASC-2 SRP, excluding School Problems, and higher levels of Anxiety and Stress. The second pairwise comparison showed that Heterogeneous AN patients presented with a more maladaptive profile than Non-ED community participants, given that Heterogeneous AN patients reported higher scores than Non-ED community participants on 12 of the 18 EMSs, greater maladaptive scores on the Internalising Problems, Personal Adjustment, and Emotional Symptoms Index scales of the BASC-2 SRP, and higher scores on all DASS scales. The third pairwise comparison indicated that Heterogeneous AN patients reported higher scores than At-risk community participants on six EMSs, greater maladaptive scores on the Internalising Problems, Personal Adjustment, and Emotional Symptoms Index scales of the BASC-2 SRP, and higher levels of Depression and Stress. The fourth pairwise comparison indicated a few instances when the At-risk community group reported more maladaptive scores than Egosyntonic AN patients. Specifically, At-risk community participants reported higher scores than Egosyntonic AN patients on three EMSs, as well as more maladaptive levels of Inattention/Hyperactivity. The fifth pairwise comparison showed the differences between the two community groups. The At-risk community group reported significantly higher scores than the Non-ED community group on five EMSs, more maladaptive scores on the Internalising Problems, Personal Adjustment, and Emotional Symptoms Index scales of the BASC-2 SRP, and higher levels of
Depression, Anxiety, and Stress. Finally, the sixth pairwise comparison showed few differences between Egosyntonic AN patients and the Non-ED community participants, except for the Social Isolation and Emotional Inhibition EMSs and Depression scale, wherein Egosyntonic AN patients reported significantly higher mean scores than Non-ED community participants. A number of similarities and difference in the schema, psychological, and behavioural profiles were found between the four comparison groups. As such, a profile of each group is presented below.

6.6.3a Summary of Egosyntonic AN patients.

The Egosyntonic AN cluster encompassed 18 adolescent females who represented 50% of the AN clinic sample. Approximately 61% of Egosyntonic AN patients came from a traditional family, living with both parents, and approximately 39% came from a non-traditional family, in which their family is either split or blended. The majority of Egosyntonic AN patients also reported having two siblings (61.1%), of which none were a twin. Furthermore, 55.6% had reported a family history of mental illness, which most frequently included depression and anxiety illnesses. Approximately 83% of Egosyntonic AN patients had reached menarche, at the mean age of 12.50 years. From the self-report measures, Egosyntonic AN patients reported low scores on the Abandonment, Mistrust, Defectiveness, Social Isolation, Dependence, Vulnerability to Harm, Failure, Insufficient Self-control, Subjugation, and Negativity EMSs when compared with Heterogeneous AN patients and At-risk community participants. Three EMSs, namely Emotional Deprivation, Enmeshment, and Emotional Inhibition, were reported to a similarly high degree as Heterogeneous AN patients. Notably, Social Isolation and Emotional Inhibition EMSs, and DASS Depression, were the only continuous variables that were reported by Egosyntonic AN patients to be significantly higher than the Non-ED community participants. No clinical elevations were reported on the maladaptive psychological and behavioural scales of the
BASC-2 SRP, and Personal Adjustment scores were high. Furthermore, low levels of anxiety and stress were reported, with only mild levels of depression, according to the DASS scales. According to Young et al. (2003), individuals presenting with some form of psychopathology, yet reporting low levels of EMSs, may be reporting superficially low scores in order to avoid engaging with their negative feelings, or may unconsciously have difficulty accessing their emotions. It is proposed that this avoidance response may be learned due to the reduction of negative affect being reinforced, and, thus, becomes habitual for the individual (Young et al., 2003). According to schema theory, such low responses are likely to represent the schema avoidance coping style (Young et al., 2003). As described in Section 5.3.2, schema avoidance is an automatic process that allows an individual to avoid the situations, thoughts, or feelings associated with an EMS or that may trigger an EMS (Young, 1999). Egosyntonic AN patients may be avoiding accessing the emotions and cognitions measured by the items associated with the EMSs on which they have reported low scores. This is further supported by their high scores on Emotional Inhibition.

From the scoring manual of the BASC-2 SRP, Egosyntonic AN patient scores would suggest some denial or a reluctance to report problems in the areas of general psychopathology and personal adjustment (Reynolds & Kamphaus, 2004). It is suggested that individuals who have been clinically diagnosed with a mental illness, yet report low levels of psychopathology, according to the Emotional Symptoms Index, are likely to either be denying their symptoms, purposefully misrepresenting their symptoms in order to be presented in a more socially desirable manner, or may be unable to express their emotions (Reynolds & Kamphaus, 2004). These BASC-2 SRP results are consistent with the findings in Study 1, wherein Egosyntonic AN patients reported no clinical elevations on all of the BASC-2 SRP scales (see Section 4.5.3). Given that the interpretation of BASC-2 SRP scales indicates a possible denial of psychopathology rather than the absence of such problems, the
relatively low levels of depression, anxiety, and stress from the DASS may also be a denial of core psychological symptoms.

As Egosyntonic AN patients were diagnosed with AN or subthreshold AN, the interpretation of the low scores on the BASC-2 SRP, and the conclusions made in Study 1 (see Section 4.6.2), suggest that Egosyntonic AN patients may be denying their problems, rather than not experiencing them. Nevertheless, the results from the YSQ-3 suggest that, rather than a denial of symptoms, Egosyntonic AN patients may be presenting with a learned response of avoiding accessing their emotions and cognitions as a means of coping with the negative affect that would be anticipated among an AN clinic group of patients. Notably, Egosyntonic AN patients presented with significantly higher levels of Emotional Inhibition compared with Non-ED community participants, which highlights that Egosyntonic AN patients may be excessively inhibiting spontaneity in order to avoid disapproval, shame, or losing control of their impulses (Young et al., 2003). It must be considered whether this high level of emotional inhibition is related to the avoidance of accessing negative emotions and cognitions, particularly as one of the common areas in which inhibition may occur is in expressing vulnerability or communicating one’s feelings (Young et al., 2003).

6.6.3b Summary of Heterogeneous AN patients.

The Heterogeneous AN cluster encompassed 18 adolescent females who represented 50% of the AN clinic sample. Most Heterogeneous AN patients came from a traditional family (83.3%) and typically had one sibling (61.1%), with fewer patients having two siblings (22.2%) and being an only child (16.7%). A family history of mental illness was reported significantly more frequently by Heterogeneous AN patients (64.3%) than the other three comparison groups. All patients had reached menarche by the mean age of 12.56 years. Heterogeneous AN patients reported high scores in a range of EMS, psychological, and problem behaviour areas. Specifically, Heterogeneous AN patients reported significantly
higher scores than at least one of the three comparison groups on 12 of the 18 EMSs.
Moreover, Heterogeneous AN patients reported clinically significant elevations on the Internalising Problems and Emotional Symptoms Index scales of the BASC-2 SRP, and reported significantly low levels of personal adjustment, according to BASC severity ratings. Similarly severe levels of depression and anxiety and moderately high levels of stress were reported by Heterogeneous AN patients, according to DASS severity ratings.

According to the schema interpretations of the YSQ-3 and the scoring manuals of the BASC-2 SRP and DASS, Heterogeneous AN patient scores tend to indicate an extremely high level of distress and maladjustment across a range of psychological and behavioural areas (Lovibond & Lovibond, 1995; Reynolds & Kamphaus, 2004; Young et al., 2003). Young et al.’s (2003) definitions of the EMSs suggest that Heterogeneous AN patients have reported: a perception that significant others will not continue to be there for them (Abandonment); a conviction of not being able to trust others (Mistrust); an expectation that emotional needs will not be adequately met (Emotional Deprivation); a feeling that they are unlovable (Defectiveness); a sense that they do not fit in (Social Isolation); the inability to manage everyday responsibilities independently (Dependence); an exaggerated fear of imminent catastrophe (Vulnerability to Harm); a lack of a clear sense of identity (Enmeshment); an intense perception that they are inadequate (Failure); the surrendering of their control due to feelings of coercion (Subjugation); the excessive emphasis on negative aspects of situations (Negativity); and a lack of spontaneity (Emotional Inhibition). In general, it would seem that Heterogeneous AN patients report problems in a number of maladaptive areas. Notably, Young et al. (2003) proposed that patients reporting high levels of EMSs in the Disconnection and Rejection domain, specifically, Abandonment, Mistrust, Emotional Deprivation, Defectiveness, and Social Isolation, are hypothesised to be most damaged. Heterogeneous AN patients reported higher scores than Non-ED community
participants for each of these EMSs, which may explain why Heterogeneous AN patients reported high scores on a number of EMSs and on the maladaptive psychological and behavioural scales.

Specifically, according to the scale interpretations of the BASC-2 SRP, clinically significant low scores of personal adjustment and high scores of internalising problems may be an indication of serious psychological problems, emotional fragility, and a lack of support and effective coping resources (Reynolds & Kamphaus, 2004). Heterogeneous AN patients also reported serious emotional disturbance, according to the interpretation of the Emotional Symptoms Index (Reynolds & Kamphaus, 2004). Similarly, high scores on the DASS scales demonstrate a high level of distress among this group of patients (Lovibond & Lovibond, 1995).

Heterogeneous AN patients have reported a high level of EMSs in a range of schema domains, alongside a significant level of general psychological disturbance, when compared with the other three groups. The Heterogeneous AN profile of EMSs and psychopathology derived in the present study support the findings of Study 1, wherein Heterogeneous AN patients reported a high level of psychological and behavioural problems, as well as a more severe ED presentation. In addition to the eating pathology, psychopathology, behavioural problems, and family functioning examined in Study 1, the present findings demonstrated that Heterogeneous AN patients also reported a more maladaptive schema profile than Egosyntonic AN patients.

6.6.3c Summary of At-risk community participants.

The At-risk community group comprised 36 participants who represented 32% of the community group recruited from Victorian secondary schools. Most of the At-risk community participants lived with both parents (77.8%), and the majority have one or two siblings, with fewer reporting being an only child or having three or more siblings. A family
history of mental illness was reported by 34.3% of the group. Menarche was reached by 91.4% of the group at the average age of 12.09 years. From the ESP, 86% reported not being satisfied with their eating patterns, 39% reported eating in secret, 81% reported their weight affecting the way they feel about themselves, and 14% reported currently suffering or previously suffering with an ED. Results from the YSQ-3 demonstrated that the At-risk community participants were similar to the two AN clusters in many ways. In terms of understanding the possible schema profile of At-risk community participants, this group reported significantly higher levels of Failure, Insufficient Self-control, and Negativity than Egosyntonic AN patients. Furthermore, the At-risk community participants reported significantly higher scores than the Non-ED community participants on Abandonment, Defectiveness, Failure, Insufficient Self-control, and Negativity. The At-risk community participants reported significantly lower scores than Heterogeneous AN patients on six EMSs, but the At-risk community participants did not report lower EMS scores than Egosyntonic AN patients on any EMS. All BASC-2 SRP scales were in the normal range, despite scores for Internalising Problems, Personal Adjustment, and the Emotional Symptoms Index being significantly more maladaptive for At-risk community participants compared with both Egosyntonic AN patients and the Non-ED community participants. Nevertheless, the At-risk community participants reported mild levels of depression and stress, alongside moderate levels of anxiety, according to the DASS. All DASS scales were significantly higher than the Non-ED community participants.

According to the interpretation of EMS scores, the At-risk community group reported: a high perception that significant others will not continue to be there for them (Abandonment); a feeling that they are unlovable (Defectiveness); an intense perception that they are inadequate (Failure); the inability to employ sufficient self-control in order to attain personal goals (Insufficient Self-control); and the excessive emphasis on negative aspects of
situations (Negativity) (Young et al., 2003). Despite reporting significantly higher levels of emotional disturbance and lower personal adjustment than Egosyntonic AN and Non-ED community participants, the At-risk community participants did not report clinical elevations on the BASC-2 SRP measures; thus, no psychological and behavioural maladjustments were found from this measure. In contrast, results from the DASS indicate moderate psychopathology, which was significantly higher than Non-ED community participants. Thus, DASS results indicate that the community group who may have, or be at-risk of developing, an ED have reported lower psychopathology than clinical AN patients in some areas, yet higher psychopathology than their peers who are not reporting any significant problem with eating.

The At-risk community group is a difficult group to profile as it is unknown whether any participants have received a clinical diagnosis of an ED despite their scores from the ESP indicating a possible ED. Importantly, the At-risk community group has reported an overall more maladaptive schema and psychological profile than the community group with no ED. On occasion, the At-risk community group sits somewhere between Egosyntonic AN and Heterogeneous AN patients, in that they report more maladaptive EMSs and emotional disturbance than Egosyntonic AN patients report, but are similar to or less severe than Heterogeneous AN patients on other EMSs. Given that the At-risk community group reported higher levels of Failure, Insufficient Self-control, and Negativity than Egosyntonic AN patients, in addition to the high percentage reporting not being satisfied with their eating patterns and their weight affecting the way they feel about themselves, the At-risk group may represent a group of disordered eating individuals with body dissatisfaction who may not have the self-control over their eating as typically found in AN patients. The feelings of lack of self-control may also contribute to feelings of failure and negativity in this group.
Nonetheless, it is evident that more research is required within this adolescent community sample presenting with a possible ED.

6.6.3d Summary of Non-ED community participants.

The Non-ED community group comprised 75 participants who represented 68% of the community group recruited from Victorian secondary schools. Most Non-ED community participants lived with both of their parents (76%) and the majority had one or two siblings, with fewer reporting being an only child or having three or more siblings. Family history of mental illness was significantly lower in this group compared with the other three groups, with 26% of Non-ED community participants reporting mental illness in their family. The vast majority of Non-ED community participants had reached menarche (90.7%) at the mean age of 12.23 years. As was anticipated for this community sample of adolescent females who were not reporting a possible ED, low scores were reported on all EMSs and maladaptive scales of the BASC-2 SRP, alongside high levels of personal adjustment and normal levels of depression, anxiety, and stress.

6.6.3e Summary of group profiles.

The pairwise comparisons examining the two statistically derived AN clinic clusters and the two community comparison groups highlighted a number of significant differences in the schema, psychological, and behavioural profiles among the four comparison groups. Family history of mental illness was highlighted as possibly contributing to the severity of EMSs and associated psychopathology and behavioural problems. Specifically, Heterogeneous AN patients reported the highest frequency of family mental health problems and significantly higher levels of EMSs, psychopathology, and behavioural problems than the other three groups. At the other end of the spectrum, the Non-ED community participants reported the lowest frequency of family mental health problems and low scores on all measures of EMSs, psychopathology, and behavioural problems. Therefore, the present
results demonstrate a potential relationship between the presence of family mental health problems and the development of EMSs, particularly as EMSs are proposed to develop during childhood when the family plays an important role in childhood development.

In some ways the paired comparisons in the present study support the results of previously published studies that investigated EMSs in ED samples, however, in many ways the comparisons made in the present study are unique to this area of investigation and comparisons with previous research are difficult. For instance, the first pairwise comparison examined the differences between the Egosyntonic AN and Heterogeneous AN clusters and showed that Heterogeneous AN patients reported significantly higher scores than Egosyntonic AN patients on the Abandonment, Mistrust, Defectiveness, Social Isolation, Dependence, Vulnerability to Harm, Failure, Subjugation, and Negativity EMSs. These findings did not support the results of some previous studies that generally found no differences between different ED diagnostic groups (e.g., Leung et al., 1999; Waller et al., 2000). Specifically, Leung et al. (1999) found that BN patients reported significantly higher scores on only the Entitlement EMS compared with AN-R patients, but no other schema differences were revealed between these two groups. Furthermore, in a study of treatment seeking BN, AN-BP, and BED patients, Waller et al. (2000) found no differences between the ED groups on all of the 16 EMSs investigated. In contrast, a later study conducted by Waller (2003) showed that BED patients reported higher levels of Failure, Dependence, and Entitlement, compared with BN-P patients, which was partially supported by the present study that also found differences in Dependence and Failure between the two AN clusters. Evidently, the previous studies each examined different ED diagnostic groups from one another, which may explain the discrepancies in results. No study found quite as many significant differences as the present study did between the two AN clusters; however, the present study examined two AN subgroups that were derived from psychological and
behavioural characteristics as opposed to DSM-IV diagnostic classifications. These findings add further validity to the methods used in Study 1 to derive AN subtypes not using diagnostic criteria, and demonstrate that a homogeneous adolescent female sample, according to diagnosis and age, can be clustered into two independent typologies based on psychological and behavioural characteristics, and can differ significantly in EMSs.

The second pairwise comparison between Heterogeneous AN patients and Non-ED community participants showed that Heterogeneous AN patients reported significantly higher levels of EMSs on 12 of the 18 EMSs compared with Non-ED community participants. These findings resemble the results of the first comparison, wherein the AN clinic sample reported significantly higher scores on seven of the 18 EMSs compared with the whole community group, which supported the trends found in a number of previous studies that the ED patient groups typically reported significantly higher scores than healthy control groups on a number of EMSs (Cooper et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller, 2003; Waller et al., 2000).

The third and fourth pairwise comparisons examined the schema differences between the two AN clusters and the At-risk community group. No previous research has examined the EMSs in a clinically diagnosed ED group compared with a community group reporting a possible ED; thus, comparisons with previous research are limited. Nonetheless, as the present findings showed few differences between the At-risk community group and both the Egosyntonic AN and Heterogeneous AN clusters, these results more closely resemble the previous research conducted between ED diagnostic groups, wherein different ED diagnostic groups tended not to differ on their EMSs.

The fifth pairwise comparison examined the differences between the two community groups and showed that the At-risk community group reported higher levels of EMSs than the Non-ED community group. It is increasingly evident that adolescent females presenting with
an ED report greater maladaptive schemas than healthy controls, as both a clinically
diagnosed AN group and a community sample at-risk of a possible ED have both reported
higher levels of EMSs than community participants without an ED. The comparison between
the two community groups supports the results of Cooper et al. (2006) who examined a
community group at high risk of an ED compared with a community group at low risk of an
ED and found that the high risk ED group reported significantly higher scores than the low
risk group on 14 of the 15 EMSs examined.

The sixth pairwise comparison compared the Egosyntonic AN patients and the Non-ED community participants and found that only scores on the Social Isolation and Emotional Inhibition EMSs were higher in Egosyntonic AN patients. Although previous research has compared the EMSs of ED patients with healthy control participants, the previous studies have not highlighted a subgroup of ED patients who were reporting low levels of EMSs, and psychological and behavioural problems. Thus, this comparison is unique to previous research. Nonetheless, these results highlight a subgroup of AN patients who may be at risk of their ED going unnoticed, as Egosyntonic AN patients in this study have tended to deny their level of psychological problems.

In summary, the present findings highlighted the presence of four independent groups
who each presented with their own EMS, psychological, and behavioural profile.
Heterogeneous AN patients reported the highest levels of EMS, and psychological and
behavioural problems. Egosyntonic AN patients reported low levels across all domains,
which may demonstrate an avoidance of accessing emotions rather than the absence of
psychopathology. On the other hand, the At-risk community group represented a unique
group that reported higher levels of EMSs and psychopathology than Non-ED community
participants, but lower levels than the Heterogeneous AN patients in some instances. The
Non-ED community participants represent the healthy control group who, as anticipated,
reported low levels of EMSs and psychological and behavioural problems. The results of the present study support the general trends found in previous research that ED patients report higher levels of EMSs than healthy controls, but the present study is the first to examine a clinical group of adolescent females with AN compared with community groups and to further examine four unique and independent subgroups. Overall, it is evident that adolescent females with a clinical diagnosis of AN or subthreshold AN, and those from the community reporting a possible ED, reported greater EMSs and more psychological and behavioural problems than healthy adolescent females. Therefore, adding further support to the role of EMSs in the presentation of EDs in adolescent females.

6.6.4 Schema Profile for Adolescent Females with Anorexia Nervosa

The present results highlighted six EMSs that appeared to be characteristic of the adolescent females diagnosed with AN or subthreshold AN in this study, including Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition. These six EMSs were selected because each of these EMSs were reported by the combined AN group to be significantly higher than the combined community group. Furthermore, each of the EMSs fulfilled at least one of the following conditions: (1) the EMS was reported to a similarly high degree by both AN clusters; (2) Egosyntonic AN patients reported significantly higher EMS scores than Non-ED community participants, which only occurred on two occasions; or (3) the At-risk community group reported significantly higher EMS scores than the Non-ED community group, but did not differ from Egosyntonic AN patients.

According to Young et al. (2003), patients who report high levels of Abandonment perceive their emotional connections with significant others to be unstable, as significant others are perceived as emotionally unpredictable. Correspondingly, patients reporting high levels of Emotional Deprivation tend to expect that their need for emotional support will not
be met by the people in their life (Young et al., 2003). Three forms of emotional deprivation have been identified, including the absence of nurturance, empathy, and protection (Young et al., 2003). It has been hypothesised that patients reporting the Emotional Deprivation EMS tend to come from a ‘cold’ family environment (Young et al., 2003). Previous research has highlighted the important role the family can play in the development of AN (e.g., Baker et al., 2000; Francis & Birch, 2005; Ogle & Damhorst, 2000; Paxton et al., 1991; Pike & Rodin, 1991; Wertheim et al., 2002). This relationship was also evident in this study as the present findings demonstrated a higher frequency of family history of mental illness in AN patients compared with the Non-ED community participants, which was further supported by the high levels of Abandonment and Emotional Deprivation relating to the perceived lack of emotional support and connection with one’s family.

Young et al. (2003) further suggest that patients reporting high levels of Defectiveness perceive themselves to be flawed and unlovable to others. Such feelings of worthlessness may be higher in the AN patients in this study due to strong body dissatisfaction beliefs and low self-esteem, both of which are often present in individuals with an ED (see Section 2.5.1a). Moreover, patients reporting Social Isolation are proposed to feel they do not fit in or belong to any group or community outside their family (Young et al., 2003). It has been well documented that as AN progresses, individuals with AN tend to become isolated from their family and friends as they become increasingly preoccupied with their eating, weight, and shape (Bruch, 1978; Fairburn & Harrison, 2003; Garfinkel & Garner, 1982). This increasing isolation was demonstrated in the present study as the clinically diagnosed AN patients reported significantly higher scores on the Social Isolation EMS than the community groups. Such maladaptive beliefs of Defective and Social Isolation may have contributed to the high levels of Enmeshment present in the AN clinic patients in this study. Specifically, patients who reported high levels of Enmeshment are suggested to
have an undeveloped self (Young et al., 2003). As such, the AN patients may lack a clear sense of identity and adequate social development due to being overly involved with significant others, which often includes ones parents (Young et al., 2003). Young et al. (2003) proposed that the Enmeshment EMS may develop as a result of feelings of being smothered or, at the other extreme, rarely being cared for and guided. It has been hypothesised that a sense of Enmeshment develops from having one’s self-confidence undermined as a child (Young et al., 2003).

Correspondingly, it is suggested that patients reporting high levels of Emotional Inhibition lack spontaneity, are highly rational, and deny emotions to avoid criticism or losing control of their impulses (Young et al., 2003). Inhibition may occur in areas of inhibited anger, positive impulses, and expressing vulnerability, as well as endeavouring to maintain rationality at the expense of emotions (Young et al., 2003). Young et al. (2003) hypothesised that individuals reporting Emotional Inhibition often strive to meet rigid internalised rules and typically had a strict childhood wherein self-control and self-denial were encouraged over spontaneity. The Emotional Inhibition in the AN patients is consistent with previous research that has shown that AN patients are often characterised by control and emotional constraint (Pryor & Wiederman, 1996; Wonderlich et al., 2005). The interpretations of each of these six EMSs support existing knowledge of the factors associated with the development and maintenance of AN. The adolescent females diagnosed with AN or subthreshold AN in this study may be characterised as feeling a lack of emotional support, feeling socially isolated, needing to rely on others for guidance through life due to lacking their own self identity, and inhibiting emotional expression.

There are a number of previous research studies that have also found these six EMSs to be present in ED samples, as ED groups have reported higher scores than healthy control groups and no differences existed between ED subgroups (Cooper et al., 2006; Jones et al.,
The present findings support the results of Leung et al. (1999) who investigated the EMSs in adult females diagnosed with AN-R, AN-BP, and BN compared with a healthy control group, and found that each of these ED groups reported similarly high levels of Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition. These three ED groups also reported significantly higher levels of the six EMSs compared with the healthy control group (Leung et al., 1999). Waller (2003) also found that Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, and Emotional Inhibition were present in adult females with BN or BED at a higher level than healthy control participants. While Cooper et al. (2006) found that a non-patient adolescent group at high risk of an ED reported significantly higher scores than a healthy control group on all six EMSs found to be characteristic of adolescent females with AN in the present study. Muris (2006) also highlighted that eating problems were highly correlated with Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, and Emotional Inhibition in a non-clinical sample of adolescents. These previous studies were each supported by the present findings, which collectively demonstrate that Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, and Emotional Inhibition may be characteristic of ED patients. Enmeshment was not always found to be significantly higher in ED groups compared with healthy controls, but the previous studies either examined an older ED sample with a bulimia-type diagnosis (e.g., Waller, 2003) or investigated a non-clinical sample (e.g., Muris, 2006).

Furthermore, Waller et al. (2000) found that Abandonment, Emotional Deprivation and Emotional Inhibition were reported as significantly higher among adult females with AN-BP and BN compared with healthy controls, and AN-BP patients reported higher levels of Enmeshment than healthy controls. Moreover, AN-BP, BN, and BED patients reported significantly higher levels of Defectiveness and Social Isolation than healthy controls.
this study, the researchers concluded that four core beliefs were central to bulimia disorders, including Defectiveness, Emotional Inhibition, Failure, and Insufficient Self-control (Waller et al., 2000). Of these four EMSs, Defectiveness and Emotional Inhibition were the only EMSs that were found in the present study to be central to the presentation of AN patients. Notably, Waller et al. (2000) investigated an adult sample presenting with bulimia-type disorders, while the present study investigated an adolescent sample presenting with AN or subthreshold AN. Thus, despite differences in the other EMSs that may be more characteristic of different ED diagnostic groups, it must be considered whether Defectiveness and Emotional Inhibition are central to all EDs regardless of patient age and diagnosis.

Additionally, a study conducted by Jones et al. (2005) demonstrated that current ED sufferers, and those considered to be recovered, reported equally high scores of Abandonment and Emotional Deprivation, which was significantly greater than healthy controls. It was suggested by Jones et al. (2005) that maladaptive core beliefs about not having one’s emotional needs adequately met may be present in the cognitive organisation of EDs despite the current status of the disorder. This hypothesis was supported by the present findings as Abandonment and Emotional Deprivation were found to be significantly higher in both Heterogeneous AN and the At-risk community participants compared with Non-ED community participants. The fact that Jones et al. (2005) found that high levels of Abandonment and Emotional Deprivation exist in both current and recovered ED patients, alongside the present study demonstrating the presence in the AN clinic group and At-risk community participants, suggests that core beliefs of Abandonment and Emotional Deprivation may be underlying predisposing factors for the development of an ED.

Jones et al. (2005) have further proposed a number of EMSs that may be related to the maintenance of EDs, including Enmeshment and Emotional Inhibition, as current sufferers of an ED reported higher scores than individuals who have recovered from an ED and healthy
controls. The present study supports these findings of Jones et al. (2005) because
Enmeshment and Emotional Inhibition were significantly higher among Heterogeneous AN patients compared with both of the community groups, and Egosyntonic AN patients reported higher levels of Emotional Inhibition than Non-ED community participants. Thus, it may be suggested that Enmeshment and Emotional Inhibition are maintaining factors of AN for adolescent females who have received a formal diagnosis.

This notion of maintenance of AN has been further explored by U. Schmidt and Treasure (2006) who have proposed a maintenance model of AN that comprises emotional avoidance, obsessive compulsive traits, intrapersonal factors, which refers to the patients beliefs of the value of AN in their life, and interpersonal factors, which refers to the positive and negative family processes that may maintain the ED. Despite not directly measuring Young’s EMSs, there a number of similarities between the maintenance model proposed by Schmidt and Treasure (U. Schmidt & Treasure, 2006; Treasure et al., 2010), schema theory, and the EMSs characteristic of adolescent females with AN in this study.

Similar to Young’s theory of schema avoidance, the maintenance model proposes that individuals with AN avoid experiencing and expressing negative emotions as well as avoiding relationships and situations that may trigger such emotions (U. Schmidt & Treasure, 2006; Treasure et al., 2010). Furthermore, it is proposed in the maintenance model that individuals with AN develop strong positive beliefs about the utility of AN in their lives (Treasure et al., 2010). These pro-anorexia beliefs may be closely related to Young’s EMSs of Abandonment, Emotional Deprivation, Defectiveness, and Social Isolation, as according to the maintenance model, for an individual with AN, the AN provides them with support and encourages a sense of safety and belonging (U. Schmidt & Treasure, 2006). The interpersonal factors proposed in the maintenance model of AN resemble the notions of the Enmeshment and Emotional Inhibition EMSs. In relation to the Enmeshment EMS, the
maintenance model proposes that the development of the ability to function independently can be difficult for individuals with an ED as overprotective parenting may reinforce anorexic behaviours and not promote self-efficacy in the child (Treasure et al., 2010). Thus, in the maintenance model, Treasure et al. (2010) suggested that it is important for parents to encourage some level of independence for adolescents to develop a sense of autonomy, which may aid recovery from AN. The Emotional Inhibition EMS is evident in the maintenance model, as part of the theory of family processes that act as maintaining factors for AN proposes that poor emotional intelligence in the family may play a role in maintaining AN (Young et al., 2003). Specifically, a family may consider expressing one’s emotions as weak and dangerous; thus, for an individual with AN, inhibiting the expression of such emotions is safer, particularly as the AN acts as the buffer against needing to access negative emotions (Treasure et al., 2010).

In summary, the present findings suggest that EMSs of Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition may be characteristic of all adolescent females with AN. More research with this sample is necessary; nonetheless, these findings support the results of many previous researchers who found a greater presence of these six EMSs in ED samples compared with healthy control participants. All six EMSs highlighted in the present study to be characteristic of adolescent females with AN also support the maintenance model of AN proposed by Schmidt and Treasure (U. Schmidt & Treasure, 2006; Treasure et al., 2010).

In contrast to the existing theories of the development and maintenance of EDs, it was surprising that the Unrelenting Standards EMS was not characteristic of the adolescent females with AN in this study as no significant differences were found between any of the group comparisons for this EMS. Perfectionism is recognised as both a predisposing factor and characteristic of AN patients, as explored in Section 2.5.1a; however, perfectionism was
not found to be significantly higher among the AN clinic patients compared with the community groups. Perfectionism was measured by the Unrelenting Standards EMS, which is defined as the belief in striving to meet very high internalised standards in order to avoid criticism (Young et al., 2003). This finding does not support the results of many other researchers who found that ED groups reported significantly higher levels of Unrelenting Standards than healthy controls (e.g., Cooper et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller et al., 2000). Given that Unrelenting Standards scores were unexpectedly similar among all the adolescent female groups in the present study, despite the presence or absence of an ED, it must be considered whether society is rearing a generation of perfectionistic teenagers as a result of the social and academic pressures placed on young people today. These results may require replication with a larger AN clinical sample.

6.6.5 Clinical Implications

Knowledge of the EMSs of adolescent females with AN may have clinical implications for the use of schema therapy with this patient group. It has been suggested that schema-focused therapy is beneficial for individuals who are presenting with a chronic form of psychopathology (Young et al., 2003). In particular, schema-focused CBT may benefit ED patients who are not responding well to the well-validated treatments for EDs (Waller, Kennerley, et al., 2007). Importantly, it has been proposed that as CBT has a strong empirical basis, it should be the first line of treatment, with a schema focus being introduced after four to eight sessions if a patient is not responding well to CBT alone (Waller, Kennerley, et al., 2007). Given the significantly greater number and severity of EMSs reported by Heterogeneous AN patients than Egosyntonic AN patients, Heterogeneous AN patients may benefit most from schema-focused CBT. Nonetheless, Egosyntonic AN patients’ reports indicated a possible avoidance of acknowledging the EMSs to avoid
experiencing emotional distress, thus, this avoidance would also need to be targeted in therapy.

It is also important to consider the effects of the family in tailoring interventions for this group of adolescent females with AN or subthreshold AN. The AN clinic group mostly came from families with mental health problems, and, according to schema theory, the EMSs of the AN group were developed by experiences within those families. Therefore, it may be necessary to involve the family in the therapeutic approach in an attempt to address the deficits experienced by these adolescents, particularly as all of the AN patients are living in the family home. Waller, Cordery, et al. (2007) have asserted that it is beneficial to engage families in the therapy of the ED in their child, as the family can aid in supporting the concepts and practice of the therapy.

6.6.6 Limitations

The present findings must be considered in light of some limitations. A limitation of the present study is the small AN sample size. From the power analysis conducted to determine the necessary sample size to achieve adequate power, a clinic sample of 65 patients was required (see Section 6.4.6). However, to calculate these figures the EMS with the lowest average effect size estimate was used, namely Entitlement. Given that each of the other EMSs showed quite large mean effect size estimates (see Table 6.1), alongside the medium to large effect sizes found in the present study, the present researchers were confident that the smaller than anticipated clinic sample size would not affect the significant results, aside from the interpretation of the Entitlement EMS. The limited AN sample size was bound by a number of constraints. First, AN has a relatively small prevalence rate, affecting approximately 2% of the general population (see Section 2.3); thus, the number of clinical patients with AN is relatively low in comparison to other mental health disorders. Second, the clinic group under investigation in this study was quite specific in that only AN
or subthreshold AN patients were recruited, who were females aged between 13 and 18 years, from ED clinics in metropolitan Melbourne, Australia. Third, often related to a distorted body perception, patients with AN rarely recognise they have a problem with their eating (Bruch, 1973), do not want to gain weight or undergo treatment, and, thus, are a particularly difficult group to work with. Hence, recruitment of the AN clinic sample was difficult in this study. The researchers, therefore, actively attempted to expand the sample by inviting patients from most hospital clinics and a number of private clinics offering ED treatment to adolescents in metropolitan Melbourne.

Another limitation of the study was that the AN clinic patients were not all assessed and diagnosed following the exact same protocol. All patients were diagnosed according to DSM-IV-TR diagnostic criteria for AN by experienced practitioners; however, as patients were recruited from a number of different clinics, no uniform method was employed. Additionally, possible response bias of AN clinic patients must be considered given that 68% of patients who were approached did not participate in the study. Response bias may have a possible impact on the results; however, investigation into the factors that may differentiate the participants from the non-participants is not possible. Furthermore, although the community participants who encompassed the At-risk community group demonstrated a possible ED according to their responses to the ESP, it is unknown whether any of these participants had ever been clinically diagnosed with an ED. Moreover, the reliance on self-report is always a limitation in research; however, given that the results of Study 2 support the patient profiles derived in Study 1, wherein parent data was available to validate patient self-reports, this was not of major concern to the researchers.

6.6.7 Summary

This study endeavoured to conduct a cross-sectional assessment of the EMSs, general psychopathology, and behavioural problems reported by adolescent females, aged between 13
and 18 years, who presented for AN outpatient treatment compared with a community comparison group. Despite the limitations, there are a number of significant contributions that the present study may make to the investigation of EMSs in EDs. Scant literature has examined EMSs in adolescents, particularly an AN clinic group. The present study not only investigated the EMSs reported by adolescent females diagnosed with AN or subthreshold AN, but also made comparisons with a community group.

The present findings highlighted that family history of mental illness was the only demographic variable to differ between the comparison groups. The AN clinic patients more frequently reported a history of mental illness in their family than community participants, and Heterogeneous AN patients reported a greater frequency than the other three groups. The family mental health problems most commonly included depression, anxiety, bipolar disorder, and drug and alcohol problems. The current findings highlight that the presence of family mental health issues, which can be a predisposing factor of AN, may have contributed to the severity of EMSs in the AN clinic group, particularly as EMSs are proposed to develop from early childhood experiences within the family.

A two-step cluster analysis on the AN clinic group revealed two independent clusters, which replicated the behavioural and psychological profiles found in Study 1. Study 2, however, expanded the profiles with the addition of EMSs and a general measure of emotional distress. Similar to the results of Study 1, the present findings demonstrated that Heterogeneous AN patients reported an overall more maladaptive profile in terms of high levels of EMSs and general psychopathology. Interestingly, generally low scores on all measures for Egosyntonic AN patients initially appeared to represent a denial of symptoms, but according to schema theory may be a learned response of avoidance or emotional blunting to cope with negative affect.
The present findings have demonstrated the presence of EMSs in adolescent females with AN or subthreshold AN, and in a community group of adolescent females who may be at-risk of an ED, according to scores on the ESP. Notably, the At-risk community sample is a group that warrant attention in future research, as they appear to report similar levels of maladaptive cognitions and psychopathology as clinically diagnosed AN patients. This finding highlights the importance of prevention and early detection strategies that may be improved by enhancing the awareness of the signs and symptoms of EDs within school communities. Six EMSs appeared to be characteristic of all adolescent females diagnosed with AN or subthreshold AN, namely Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition. For adolescent females with AN or subthreshold AN schema-focussed CBT may be a useful therapeutic intervention to deal with the core beliefs that may underlie ED pathology by eliminating negative core beliefs and replacing them with positive schemas. Importantly, the present results also highlight that it is important to consider the differences in the schema profiles of the two AN clusters.
Chapter 7: General Discussion

7.1 Summary of Results

The aim of this thesis was to enhance the current understanding of AN by evaluating a broad set of characteristics of adolescent females with AN, which were not limited only to AN diagnostic criteria. The anticipated outcomes of this aim were (a) to provide a more detailed perspective to AN patients aside from eating, weight, and body shape related factors, (b) to assist clinicians and researchers in understanding AN patients from a perspective other than ED psychopathology, and (c) to inform other possible avenues for early intervention that may target these other factors. To achieve these outcomes two studies were conducted. Study 1 explored how a range of eating, medical, psychological, behavioural, and family factors could be used to group adolescent females diagnosed with AN or subthreshold AN into clinically valid and independent typologies. Study 2 investigated the presence of EMSs in adolescent females with and without AN in an attempt to develop a profile of the EMSs that may underlie the presentation of AN in adolescent females.

The two-step cluster analysis conducted in Study 1 derived two independent clusters that were differentiated by weight status, bulimic behaviours, impulse control, ED pathology, general psychopathology, behavioural problems, and family functioning. The two clusters reported no differences on whether patients came from a traditional or non-traditional family, had a family history of problem eating, a family history of mental illness, diagnosed mental health comorbidity, and amenorrhea. Egosyntonic AN patients were characterised as being typically underweight, with infrequent purging behaviours, infrequent self-harm ideations, and infrequent suicide ideations. Egosyntonic AN patients reported no clinical elevations on
ED psychopathology and general psychological maladjustment; however, they reported some level of ineffectiveness and affective problems. Egosyntonic AN patients also reported a positive level of personal adjustment, which was validated by parent reports that indicated low levels of externalising and internalising problems, and positive adjustment. Family functioning was also reported to be adaptive. Based on scale interpretations, it was concluded that Egosyntonic AN patients tended to demonstrate a masking, or general denial, of any eating and psychological problems. Alternatively, it may be interpreted that Egosyntonic AN patients reported lower psychopathology due to being content with their ability to control their low weight. In contrast, Heterogeneous AN patients were characterised by a healthy BMI, but a high level of ED pathology, binge eating, purging, self-harm ideations, and suicide ideations. Heterogeneous AN patients further reported clinically significant levels of ineffectiveness, interpersonal and affective problems, and general psychological maladjustment, alongside poor levels of personal adjustment. Heterogeneous AN parents also supported the patient reports by reporting that their daughters had high levels of behavioural, adjustment, and internalising problems. Based on scale interpretations, it was evident that Heterogeneous AN patients reported significantly high levels of maladjustment in a number of domains, which may be due to ‘failed anorexia’ syndrome in that Heterogeneous AN patients were not able to attain a low weight. The limited follow-up data also tended to demonstrate that Heterogeneous AN patients reported a poorer outcome than Egosyntonic AN patients, as indicated by the six-month medical follow-up and subsequent health survey.

Study 2 explored the presence of EMSs in adolescent females with AN or subthreshold AN compared with a community group. The findings from Study 2 tend to confirm the results of previous studies that found that adult females with an ED reported a greater severity of EMSs than healthy control participants (Jones et al., 2005; Leung et al.,
1999; Waller, 2003; Waller et al., 2000); however the present study examined EMSs in an AN adolescent sample. Specifically, Study 2 found that the adolescent females with AN or subthreshold AN reported significantly higher levels on a number of EMSs and higher levels of psychological and behavioural problems than the community participants.

A two-step cluster analysis was also conducted on the AN clinic participants in Study 2 in an attempt to replicate the two clusters derived in Study 1. Using the scores of the BASC-2 SRP, which was used in both studies, two clusters again emerged. The two clusters derived in Study 2 replicated the two clusters derived in Study 1 given that Heterogeneous AN patients reported an overall significantly more maladaptive profile than Egosyntonic AN patients in both studies. Specifically, Egosyntonic AN in both studies reported low levels of psychopathology and behavioural problems. In Study 1, Egosyntonic AN patients also reported no clinical elevations of eating pathology, and in Study 2, generally low levels of EMSs. Conversely, Heterogeneous AN patients in both studies reported high levels of psychopathology and behavioural problems. In Study 1, Heterogeneous AN patients also reported frequent bulimic behaviours, poor impulse control, and a high level of eating pathology, while in Study 2, Heterogeneous AN patients reported the highest level of EMSs. The combined results of both studies highlight the presence of two independent typologies of adolescent females with AN or subthreshold AN. Notably, these typologies were derived not from ED diagnostic criteria, but rather a global measure of general psychopathology, personality, and behaviours. The theoretical and clinical implications of these findings will be discussed in subsequent sections.

A subgroup emerged from the community group in Study 2, comprising 32% of the community participants whose scores on the ED screen indicated the presence of a possible ED. As such, the community group was divided into an At-risk group and Non-ED group. The At-risk community group reported few differences in their EMSs, behavioural problems,
and general psychopathology compared with the AN clusters. Furthermore, subsequent analyses comparing the two community groups highlighted that, similar to the AN clinic group, the At-risk group reported significantly higher scores on five EMSs, a number of behavioural problems, and general psychopathology, than the Non-ED participants. The reports from the At-risk group suggest that eating related psychopathology falls along a continuum; thus, it is suggested that this group requires more attention in future research.

Importantly, from Study 2, six EMSs appeared to be characteristic of AN in adolescent females. The AN clinic patients reported a tendency to perceive their need for a supportive emotional connection to be unstable (Abandonment), to expect their need for emotional support to not be met by others (Emotional Deprivation), to feel they are defective and unlovable (Defectiveness), to feel they do not fit in or belong (Social Isolation), to feel an over-involvement and reliance on significant others (Enmeshment), and to report a high sense of rationality and impulse control to avoid losing control and criticism (Emotional Inhibition). As Young et al. (2003) proposed these EMSs to have developed through childhood experiences, arguably before the development of the ED, it may be the case that these schemas are important in the development of EDs. Further, they are similar to the work of Treasure and Schmidt (U. Schmidt & Treasure, 2006; Treasure et al., 2010) who have proposed a maintenance model of AN; thus, EMSs may play a role in the development and maintenance of AN. These six EMSs, however, may also be a product of AN, thus, conclusions regarding the causal relationship between AN and EMSs cannot be made.

Overall, the two studies in this thesis have examined adolescent females diagnosed with AN or subthreshold AN from a perspective not limited to eating, weight, and body shape constructs. The theoretical and clinical implications of each of the studies, as well as the finding that two clinically distinct AN typologies were consistently extracted from the AN samples in both studies, will be discussed in the subsequent sections.
7.2  Theoretical Implications

7.2.1  Study 1 Theoretical Implications

The present studies appear to be the first in their respective research domains to examine AN in a clinical sample of adolescent females. Study 1 appears to be the first study to derive clinically interpretable typologies of adolescent females with AN using a range of constructs related to the wider clinical presentation of AN. Previous research has demonstrated the greater clinical utility of statistically derived cluster groupings compared with DSM diagnostic classifications (e.g., Clinton & Norring, 2005; Turner et al., 2010; Williamson et al., 1992). Other studies have also demonstrated the value of examining variables related to the wider clinical presentation of EDs, which are not specific to ED diagnostic criteria (e.g., Mizes & Sloan, 1998; Sloan et al., 2005; Turner & Bryant-Waugh, 2004; Turner et al., 2009; van der Ham et al., 1997; Welch et al., 1990). A small number of studies have highlighted that negative affect can be used to differentiate ED patients reporting the same level of dietary restraint (e.g., Chen & Le Grange, 2007; Grilo, 2004; Grilo et al., 2001; Stice, 2001; Stice & Agras, 1999), while other studies have highlighted the role of personality features in deriving typologies of ED patients (e.g., Claes et al., 2006; Espelage et al., 2002; Goldner et al., 1999; Holliday et al., 2006; Pryor & Wiederman, 1996; Strober, 1983). Although each of these previous studies has demonstrated some ED patient characteristics that can be used to create typologies, each study focused on a specific set of characteristics, for example, personality features or negative affect. Study 1, however, conducted a more global analysis of a range of eating, medical, psychological, behavioural, and family variables. This provided a comprehensive clinical snapshot of the characteristics with which the adolescent females with AN presented. The two statistically derived typologies demonstrated that natural groupings of these characteristics can be obtained,
defining patients by their general functioning in a number of areas rather than their ED diagnosis.

The two typologies derived in Study 1 most closely resembled the groupings found in the dietary restraint and negative affect research, wherein pure dieting and dieting-depressive groups were found (Chen & Le Grange, 2007; Grilo, 2004; Stice & Agras, 1999). Egosyntonic AN patients in Study 1 most closely resembled the pure dieting group, while Heterogeneous AN most closely aligned with the dieting-depressive group. Notably, Study 1 investigated the typologies in an adolescent female sample of AN outpatients, while the previous studies examined wider age groups, mixed genders, or multiple ED diagnostic groups (Chen & Le Grange, 2007; Grilo, 2004; Stice & Agras, 1999).

Another important feature of Study 1 was the inclusion of parent reports on their daughter’s psychopathology, general functioning, and behaviours. No previous research appears to have included such valuable information, which validated the patient self-reports in Study 1. It is also important to consider the theoretical implications of the results that the two typologies did not differ on diagnosed mental health comorbidity and amenorrhea status. Despite Axis I disorders being common among AN patients (as discussed in Section 2.4.3) and Heterogeneous AN patients in Study 1 reporting significantly higher levels of psychopathology than Egosyntonic AN patients, the two clusters did not differ on the presence of a diagnosed mental health comorbidity. Furthermore, the two clusters did not differ on their status of amenorrhea as both clusters comprised patients with amenorrhea and menstruating patients; this is despite amenorrhea being an essential diagnostic criterion for an AN diagnosis. These findings highlight that the presence or absence of a diagnosed mental health comorbidity and the presence of amenorrhea had no impact on the division of adolescent females diagnosed with AN or subthreshold AN into clinically independent groups. Importantly, these two aspects are related to the diagnosis of AN but did not
differentiate patients, while psychopathology and behaviours, which are not specific to an AN diagnosis, did differentiate patients. The finding that amenorrhea did not differentiate the two clusters, as patients with amenorrhea or menstruating females reported the same levels of eating pathology, psychopathology, and behavioural problems, adds support to the proposed DSM-V, in which the amenorrhea criterion for an AN diagnosis is removed (Attia & Roberto, 2009). These findings further support the potential use of examining factors beyond ED diagnostic criteria to develop clinically relevant typologies of adolescent females with AN.

7.2.2 Study 2 Theoretical Implications

Study 2 appears to be the first study to examine the presence of EMSs in an adolescent female sample of outpatients with AN or subthreshold AN compared with a community comparison group. Previous studies have shown that EMSs are more prevalent in ED samples than healthy controls; however, the studies that were conducted with clinical ED samples examined adult females (Deas et al., 2011; Dingemans et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller, 2003; Waller et al., 2002; Waller et al., 2000), and only two studies have examined adolescents, of which both only investigated EMSs in community samples rather than clinical samples (Cooper et al., 2006; Muris, 2006). Furthermore, unlike previous research that has typically found no differences between DSM ED groups in their EMSs, significant differences in EMSs were found between the two AN clinic typologies derived in Study 2. Notably, the present study derived the two AN typologies by conducting a cluster analysis using the BASC-2 SRP scales, which was based on general psychopathology and behaviours, rather than dividing the patient group based on their ED diagnosis.

The six EMSs found to be characteristic of all adolescent females with AN or subthreshold AN in Study 2, including Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition, may be linked to the theories of
development and maintenance of AN. Given that EMSs are proposed to develop in childhood or adolescence as a response to repeated toxic experiences (Young, 1999; Young et al., 2003), it may be that these six EMSs may predispose an individual to developing AN, particularly as the AN patients reported a significantly higher frequency of family mental health problems than community participants. Furthermore, the maintenance model of AN proposed by Treasure and Schmidt (Treasure & Schmidt, 2006; Treasure et al., 2010) suggests four constructs that are involved in the maintenance of AN, of which three seem to align with the six EMSs found in Study 2 to represent AN patients, including emotional avoidance, pro-anorexia beliefs, and interpersonal factors related to family processes. It must further be considered whether the high levels of EMSs in the AN patients are a consequence of the illness and semi-starvation, rather than involved in the development of AN. In Beck’s (1967) early theory of negative schemas in depression, it was proposed that despite negative schemas developing in childhood they remain dormant until psychopathology emerges, at which time the negative schemas are strong. Therefore, for the AN patients in Study 2 it may be that they developed these EMSs in childhood, but the EMSs were not expressed until the onset of the ED. Beck (1967) further proposed that with therapy the negative schemas diminish. Given that the present research was cross-sectional, future research should endeavour to examine EMSs longitudinally to determine if the presence of EMSs minimises as the patients recover from their ED, without the use of a specific schema-focused therapy. Importantly, this appears to be the first study to highlight these six EMSs to be characteristic of adolescent females with AN or subthreshold AN, so further research is necessary to replicate these findings and determine whether EMSs are predisposing or perpetuating factors of AN in adolescent females.
7.2.3 **General Theoretical Implications**

Upon combining the results from both of the studies reported here, two clinically distinct typologies of adolescent females with AN or subthreshold AN have consistently emerged. Importantly, the BASC-2 SRP was the measure used in both studies to assist with obtaining the two clusters. Given that the same two clusters were derived in both studies, reporting similar levels of psychopathology and behavioural problems, the clusters derived in Study 2 validated the clusters derived in Study 1. The results highlighted that typologies of adolescent females with AN or subthreshold AN can be derived by examining general patient characteristics, rather than focusing solely on ED diagnostic criteria. It appears that the BASC-2 SRP is a useful tool for statistically deriving subtypes of adolescent females with AN or subthreshold AN, without basing these subtypes on ED diagnostic criteria.

If the cluster profiles found in the two present studies are considered together, it appears that Egosyntonic AN patients were characterised as typically underweight, with no clinical elevations of eating pathology, low levels of psychopathology and behavioural problems, and typically low levels of a number of EMSs, but high levels of Emotional Deprivation, Emotional Inhibition, Enmeshment, and Social Isolation. Conversely, Heterogeneous AN patients were characterised as being a healthy weight, with significant eating pathology, and high levels of psychopathology, behavioural problems, and EMSs. Although Study 1 did not examine EMSs and Study 2 did not measure eating pathology and BMI, the combination of the cluster profiles from the two studies closely resembles the schema-focused model proposed by Waller and colleagues (Waller, Cordery, et al., 2007; Waller, Kennerley, et al., 2007).

The schema-focused model hypothesises that two schema avoidant processes are evident in ED patients presenting with restrictive and bulimic eating pathology (Waller, Cordery, et al., 2007; Waller, Kennerley, et al., 2007). Primary avoidance refers to an
individual avoiding activating negative cognitions in an attempt to avoid accessing negative emotions (Waller, Cordery, et al., 2007; Waller, Kennerley, et al., 2007). Waller, Cordery, et al. (2007) propose that primary avoidance in ED patients can manifest as restrictive behaviours. The theory of primary avoidance somewhat resembles the emerging profile of Egosyntonic AN patients in this thesis in that Egosyntonic AN patients in Study 1 were typically underweight, most likely achieved by dietary restraint. Egosyntonic AN patients in both studies reported low levels of all aspects of psychopathology and behavioural problems, and low scores on most EMSs in Study 2, yet they were diagnosed with AN by a psychiatrist and are in treatment for their AN. In interpreting the low EMS scores, it seems that Egosyntonic AN patients were avoiding accessing their EMSs to avoid triggering the associated negative emotions. Conversely, secondary avoidance refers to an individual blocking their awareness of negative affect after it has been triggered (Waller, Cordery, et al., 2007; Waller, Kennerley, et al., 2007). Waller, Cordery, et al. (2007) propose that particular behaviours, including binge eating and purging, as well as self-harm, are used to block the negative affect. This theory of secondary avoidance may resemble the profile of Heterogeneous AN patients, as frequent binge eating, purging, and self-harm ideation were reported by Heterogeneous AN patients in Study 1, and Heterogeneous AN patients in Study 2 generally reported high levels of EMSs.

The studies in this thesis have highlighted the emergence of two independent and clinically distinct typologies of adolescent females with AN or subthreshold AN. Although the two typologies tend to support the theories of primary and secondary schema avoidance, it is important to recognise that the clusters were not derived from examining these constructs. Specifically, the clusters were primarily derived from examining general psychopathology and behaviours, and then differences in EMSs were examined. Thus, the fact that the two clusters were derived from general functioning, rather than eating pathology
or schemas, but support existing theories of AN subtypes and schema theories, adds validity to the typologies derived. Furthermore, deriving these typologies by examining general psychopathology and behaviours and examining the other characteristics of the two groups, such as EMSs, provides a more comprehensive profile of adolescent females with AN or subthreshold AN. Importantly, the clusters derived are not dependent on the length of illness. Specifically, in Study 1 all patients completed assessment measures at their initial diagnosis. In Study 2, patients completed the BASC-2 SRP at varying stages in the disorder with the length of disorder varying from less than one month to 63 months. Given that the length of illness did not affect the scores on the BASC-2 SRP, the length of illness did not influence the replication of the two typologies derived in both studies.

Collectively, the results from the two studies in this thesis have demonstrated that understanding AN in adolescent females requires not only an understanding of their eating pathology, but an exploration of the other factors that may be associated with the development and maintenance of AN, including general psychopathology, behaviours, family factors, and the presence of EMSs. Seemingly homogeneous samples of adolescent females with AN or subthreshold AN were consistently divided into two clusters based on a range of psychological and behavioural characteristics that were not specific to their AN diagnosis. Considering the characteristics investigated in both studies together, the two groups tend to support the schema-focused model proposed by Waller and colleagues (Waller, Cordery, et al., 2007; Waller, Kennerley, et al., 2007), wherein the Egosyntonic AN cluster is aligned with primary avoidance and the Heterogeneous AN cluster is closely aligned with secondary avoidance. Given that adolescent females with AN were divided into two groups based on general psychopathology and problem behaviours, but then their eating pathology and reporting of EMSs closely aligned with the schema-focused model proposed by Waller and
colleagues (Waller, Corder, et al., 2007; Waller, Kennerley, et al., 2007), EMSs may play an important role in the development of AN; however, further research is necessary.

7.3 Clinical Implications

The two studies in this thesis aimed to build upon the current understanding of AN as it occurs in adolescent females by examining the patient characteristics underlying the presentation of AN, which are not specifically related to eating, weight, and body shape constructs. In doing so, clinicians may be provided with an understanding of their adolescent AN patients from a perspective other than their eating pathology to facilitate the provision of tailored treatment interventions to target the underlying characteristics.

Importantly, the studies in this thesis have demonstrated that individuals who do not meet the full DSM-IV-TR criteria for AN, may not be presenting with a less clinically severe variant of AN. Specifically, in Study 1 approximately half of the patients in Egosyntonic AN and all of the patients in the Heterogeneous AN cluster were diagnosed with subthreshold AN. In Study 2, five patients from Egosyntonic AN and seven patients from the Heterogeneous AN cluster were diagnosed with subthreshold AN. Importantly, Heterogeneous AN patients typically reported an overall more maladaptive profile than Egosyntonic AN patients in both studies, and the Heterogeneous AN cluster comprised patients with subthreshold AN. Thus, it is important to note that patients presenting with an ED that do not fulfil all the diagnostic criteria for AN can have the same psychological, behavioural, and EMSs as patients who fulfil all the diagnostic criteria for AN. It is then logical to question whether the diagnostic criteria for AN is too strict and should be reconsidered.

From Study 1 it was concluded that Egosyntonic AN patients may benefit from FBT as the first priority of this treatment is weight restoration (Lock, et al., 2010; Lock et al., 2001; Wallis et al., 2007), and this group reported a significantly low mean BMI. It was also
suggested that the Heterogeneous AN cluster may benefit from CBT or DBT due to the significant psychological and behavioural problems reported by this group. After conducting Study 2 and finding that Egosyntonic AN patients may be exhibiting schema avoidance, this group may also benefit from work on tolerating their fear of negative emotions and cognitions, for example mindfulness and DBT, once they are weight restored. Furthermore, the significantly higher presence of EMSs reported by Heterogeneous AN patients suggests that patients with this profile may benefit most from schema-focused CBT. Importantly, the findings from Study 2 suggest that the presence of family mental health problems may have contributed to the severity of EMSs in adolescent females in the Heterogeneous AN cluster; thus, it may be beneficial to involve the family in the therapeutic approach to target the deficits experienced during childhood that may have contributed to the development of EMSs.

In summary, findings from Study 2 have demonstrated a presence of EMSs in adolescent females with AN or subthreshold AN. It has been suggested that schema-focused therapy may be useful in the treatment of AN; however, clinical research is necessary to examine the utility of schema therapy in EDs. Furthermore, more research into the schema profiles of adolescent females with AN or subthreshold AN is necessary to determine if patients associated with the particular typologies derived in this thesis stand to benefit most from schema therapy. Importantly, the clinical implications of the results in the present studies must only be considered suggestive. Replication of the current findings is necessary to validate the cluster and schema profiles of adolescent females with AN or subthreshold AN.

7.4 Methodological Considerations

The findings of this thesis must be considered in light of some important methodological issues. Primarily, the representativeness of the studies’ samples, and the
generalisability of results beyond these samples, must be considered. The present studies did not examine any adolescent male participants; thus, findings cannot be generalised to males with AN. Given that males represent 10% of individuals diagnosed with AN, alongside the difficulty in recruiting a sufficient female sample of AN patients, recruiting a representative sample of adolescent males with AN was not feasible for the research in this thesis. Moreover, Study 1 patients are only representative of adolescent females with AN or subthreshold AN who presented to the ED clinic at the Royal Children’s Hospital (RCH) for AN treatment, who were aged between 13 and 18 years, and had completed all of the assessment measures at their initial diagnosis. Thus, it was initially considered that the clusters derived in Study 1 could not be generalised beyond the ED clinic at the RCH. Nevertheless, replication of the cluster groupings in Study 2 provided some reliability of the two clusters representing adolescent females diagnosed with AN or subthreshold AN in metropolitan Melbourne, Australia. Specifically, the patients in Study 2 were recruited from two regionalised hospital outpatient clinics, as well as three private clinics, encompassing a wide demographic of metropolitan Melbourne. Furthermore, the community group in Study 2 is mainly representative of adolescent females living in the North Western Metropolitan Region of Melbourne, who are attending a co-educational school, and who volunteered to participate in the study. Notably, only a small portion of the community group was recruited from the school in the South East metropolitan region of Melbourne. Thus, it must be considered whether socio-demographic factors may affect the results of the community comparison group, in addition to attending a co-educational school.

As with all research that relies on self-report data, the reliability and validity of participant responses must be considered. The use of self-report measures in Study 1 was not of major concern given that parent reports were used, which validated the patient self-reports. In Study 2, however, no such validation was available, yet the results from Study 1 were
replicated. It is also important to recognise the advantages of using self-report measures. First, each of the measures used in the present studies are well validated measures (as reported in Sections 4.4.2 and 6.4.2). Second, it has been suggested that self-report may be beneficial due to the respondent not needing to disclose potentially sensitive and embarrassing information directly to a researcher; thus, participants may be more honest in their responses than if they were being interviewed (Grilo, Masheb, & Wilson, 2001). Third, self-report measures are more cost effective than conducting interviews, and are less of a burden for participants. Furthermore, to encourage honest reporting, all participants in Study 2 were reminded that their information would remain anonymous and would not be passed on to their paediatrician, parents, or teacher.

Another limitation of the studies in this thesis was that AN patients were not diagnosed using a standardised measure. Although all patients were diagnosed according to DSM-IV-TR criteria, a quantifiable measure was not applied, for example, the Eating Disorder Examination (EDE). The use of the EDE questionnaire and the parent version of the EDE would have provided a more precise diagnosis at the time of the questionnaires being completed.

### 7.5 Suggestions for Future Research

In consideration of the unique nature of the present studies in examining adolescent females with AN or subthreshold AN, in conjunction with the limitations of the present studies, replication of the results of both studies is necessary. Future research should endeavour to replicate the two typologies of adolescent females with AN or subthreshold AN using a larger sample from a wider geographic region to validate the two clinically distinct typologies derived from this research. Furthermore, a standardised follow-up procedure of the patients in the two clusters in both studies should be conducted to better understand the treatment and personal outcomes of the two typologies, and to better inform early
intervention. In the present research, the BASC-2 SRP has been shown to be a useful tool in differentiating adolescent female AN patients based on variables outside of DSM-IV-TR diagnostic classifications; thus, future research may benefit from using the BASC-2 SRP to develop subtypes of AN patients. The present findings have highlighted the presence of EMSs in adolescent females with AN or subthreshold AN; however, replication of the results is necessary in a larger sample of adolescent females with and without AN. In particular, it will be important to determine if Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition EMSs are characteristic of adolescent females with AN using a larger sample and wider geographic region. It is further important to examine EMSs longitudinally to detect any changes in EMSs as AN patients recover from their ED. The present studies have highlighted a number of important characteristics of adolescent females with AN and subthreshold AN, but given the relatively novel nature of the two studies in their respective research domains, further replication of the present findings is necessary. Research that investigates the clinical utility for adolescent females with AN is also necessary, given the limited knowledge of the benefits of schema therapy in EDs.

7.6 Conclusions

The present studies endeavoured to examine adolescent females diagnosed with AN and subthreshold AN from a perspective beyond the scope of ED diagnostic criteria, in order to enhance the understanding of AN as it occurs in adolescent females. Study 1 findings demonstrated that a group of adolescent females, diagnosed with AN and subthreshold AN, could be grouped into two clinically relevant typologies based on a range of psychological, behavioural, health, eating, and family variables. Egosyntonic AN patients were more medically unstable, despite reporting lower levels of ED pathology, psychopathology, behavioural, and family problems than Heterogeneous AN patients. Conversely,
Heterogeneous AN patients reported significantly high levels of ED pathology, general psychopathology, behavioural problems, and family dysfunction. Limited follow-up data showed that Egosyntonic AN patients had better outcomes than Heterogeneous AN patients in terms of weight gain and other health outcomes. Study 2 findings demonstrated that EMSs are more prevalent in adolescent females with AN and subthreshold AN compared with community participants. The adolescent females with AN and subthreshold AN also reported a higher level of general psychopathology and behavioural problems than the community participants. In line with the results of Study 1, two clusters of AN patients were derived in Study 2 based on general functioning and, using the same cluster labels, Heterogeneous AN patients reported greater EMSs, psychopathology, and behavioural problems than Egosyntonic AN patients. Despite significant differences between the two AN clusters, six EMSs were identified as being characteristic of adolescent females with AN, including Abandonment, Emotional Deprivation, Defectiveness, Social Isolation, Enmeshment, and Emotional Inhibition. Overall, the present findings have added to the existing knowledge of the characteristics of AN by examining the constructs underlying the presentation of AN in adolescent females.

The results have highlighted two relatively consistent typologies of adolescent females with AN and subthreshold AN, which were not based on ED diagnostic criteria. Notably, these results demonstrated that patients diagnosed with AN and subthreshold AN reported similar levels of adaptive and maladaptive functioning; thus, those diagnosed with subthreshold AN should not be considered to be suffering a less severe variant of AN.

Although previous research has examined both typologies and EMSs in EDs, limited research has looked at these domains in a clinical AN adolescent sample, despite the onset of AN typically occurring during adolescence. The present findings suggest that different typologies of AN patients stand to benefit from different treatment approaches; however,
further research examining the typologies and EMSs in adolescent females with AN or subthreshold AN is necessary. Nonetheless, capturing the key characteristics that differentiate AN patients, and the EMSs most prevalent in the early stages of the disorder, is likely to assist clinicians in understanding their patients from a perspective other than their eating pathology. Thus, in the long term, replication of the present findings may assist in applying tailored interventions to target the characteristics underlying the presentation of AN, rather than solely treating ED behaviours and cognitions.
References


Appendix

Human Research Ethics Committee Approval Letters

The Royal Children's Hospital, Melbourne
 Flemington Road, Parkville
 Victoria, Australia, 3052

RCH CLINICAL AUDIT AND QUALITY ASSURANCE APPROVAL FORM

Please forward:
* completed 2 page Audit Form, with original signatures.
* and a 1 page project description

To the Ethics and Research Department, 1st Floor Main Building, RCH.

RCH REFERENCE NO: (Internal Use only)

PROJECT TITLE: Developing a clinical profile of eating disorder patients at the RCH: A prospective analysis.

DURATION: 12 months

INVESTIGATOR(S): Stephanie Romagnano, Dr Sophie Reid, Associate Professor John Reece, Dr Linsey Atkins, and Professor George Patton

Principal Investigator: Stephanie Romagnano

Appointment: PhD candidate at the Centre for Adolescent Health, Royal Children's Hospital and RMIT University

Mailing Address: RMIT University, Discipline of Psychology, PO Box 71, Bundoora 3083

Contact Phone Number: 0402 947 105 (mobile) / 9925 7524 (office)

I undertake that I have the necessary resources to conduct this clinical audit/quality assurance activity and I have discussed the likely impact of the project with all Departments to be involved.

PRINCIPAL INVESTIGATOR: ____________________________

(Dated) 9/29/2009

(Signature)
PROJECT TITLE: Developing a clinical profile of eating disorder patients at the RCH: A prospective analysis.

I authorise this project to be conducted in my Department. In my opinion, this project meets the requirements of clinical audit/quality assurance only, and does not require consideration by the RCH Ethics in Human Research Committee.

DEPARTMENT HEAD/DIRECTOR: Dr Peter Birleson
(Please print name) 
(Sig) .......................................................... 
(Date of approval) ...........................................

I authorise this project to be conducted in my Division. In my opinion, this project meets the requirements of clinical audit/quality assurance only, and does not require consideration by the RCH Ethics in Human Research Committee.

(ACTING) EXECUTIVE DIRECTOR: Mr John Stanway
(BRIAN LILLEY)
(Please print name) 
(Sig) ..........................................................
(Date of approval) ...........................................

RCH HREC CHAIR COMMENT:

Please confirm that the EDI-3, BACQ-2, and McMaster family functioning scales are normally undertaken as part of routine patient care in this group of patients.

If so, I agree this study can be approved as audit/low risk research.

E-mail from M. Kominstrup confirming that these are undertaken as part of routine care and included in client files.

I have reviewed this proposal and believe it fulfills all the requirements of clinical audit/quality assurance activity in accordance with NHMRC guidelines (2003) "When does quality assurance in health care require independent ethical review?"

Dr Arnold Smith
Chair, RCH Human Research Ethics Committee

11/9/2009
Date
RCH HUMAN RESEARCH ETHICS COMMITTEE APPROVAL

HREC REF. No: 29067 A

PROJECT TITLE: Determining avenues for the early intervention of eating disorders: Common cognitive schemas among adolescents with eating disorders compared with a control sample

DOCUMENTS APPROVED: See overleaf for full list of approved documents

APPROVED PROTOCOL: Technical Protocol v3 dated 15 Sep 09

PRINCIPAL INVESTIGATOR: S Reid

DATE OF ORIGINAL APPROVAL: 25th September 2009

DURATION: 36 months

DATE OF APPROVAL EXPIRY: 25th September 2012

SIGNED: ____________________________ 25/9/2009

COMMITTEE REPRESENTATIVE

APPROVED SUBJECT TO THE FOLLOWING CONDITIONS:

1. Any proposed change in protocol or any approved documents or the addition of any documents (including flyers, brochures, advertising material etc) and the reasons for that change or addition, together with an indication of ethical implications (if any), must be submitted to the Human Research Ethics Committee for approval prior to implementation.

2. The Principal Investigator must notify the Secretary of the Human Research Ethics Committee of:
   - Any serious adverse effects of the study on participants and steps taken to deal with them.
   - Any unforeseen events (e.g. protocol violations).
   - Investigators withdrawing from or joining the project.

3. A progress report must be submitted annually and at the conclusion of the project, with special emphasis on ethical matters.

4. All research information collected whilst individual participants are children must be kept until the individual turns 25 (I.e. 7 years after their 18th birthday).

Please note that it is the investigators responsibility to ensure that the RCH HREC Approval remains current for the entire duration of the project. Investigators undertaking projects without current HREC approval risk their indemnity, funding and publication rights.

DRUG/DEVICE TRIALS

5. The investigator(s) must report all internal SAEs (occurring in RCH participants) to the sponsor and the RCH HREC within 24-72 hours of occurrence.

6. The investigators must ensure that all externally sponsored Clinical Drug Studies have insurance coverage that is current for the duration of the study.
26 November 2009

Stephanie Romagnano  
PhD Candidate  
Discipline of Psychology  
PO Box 71  
Bundoora 3083

Dear Stephanie

**Project: Determining avenues for the early intervention of eating disorders: Common cognitive schemas among adolescents with eating disorders compared with a control sample**

I am pleased to advise that this project was noted and approved by the RMIT Human Research Ethics Committee at its meeting on 28 October 2009 as it meets the requirements of the *National Statement on Ethical Conduct in Human Research* (2007).

It is noted that as the project was originally reviewed and approved by the RCH Human Research Ethics Committee that you will be reporting to them. Please copy RMIT into any reports made to the RCH Human Research Ethics Committee.

If, as you proceed with your investigation you find reason to amend your research method, you should advise the RCH Ethics Committee and seek approval for the proposed changes. If you decide to discontinue your research before its planned completion you must also advise the Committee of this and of the circumstances. RMIT will also need to be advised of any amendments to the project.

All reports or communication regarding this project is to be forwarded to the Ethics Officer.

On behalf of the Human Research Ethics Committee I wish you well with your research.
Yours sincerely

A/Prof Barbara Polus
Chairperson
RMIT Human Research Ethics Committee

cc: Dr Peter Burke
Ethics Officer

A/Prof John Reece
Discipline of Psychology
2009_000413

Miss Stephanie Romagnano
Discipline of Psychology
Centre for Adolescent Health
RMIT University
PO Box 71
BUNDOORA 3083

Dear Miss Romagnano

Thank you for your application of 4 November 2009 in which you request permission to conduct a research study in government schools titled: Determining avenues for the early intervention of eating disorders: Common cognitive schemas among adolescents with eating disorders compared with a control sample.

I am pleased to advise that on the basis of the information you have provided your research proposal is approved in principle subject to the conditions detailed below.

1. Should your institution’s ethics committee require changes or you decide to make changes, these changes must be submitted to the Department of Education and Early Childhood Development for its consideration before you proceed.

2. You obtain approval for the research to be conducted in each school directly from the principal. Details of your research, copies of this letter of approval and the letter of approval from the relevant ethics committee are to be provided to the principal. The final decision as to whether or not your research can proceed in a school rests with the principal.

3. No student is to participate in this research study unless they are willing to do so and parental permission is received. Sufficient information must be provided to enable parents to make an informed decision and their consent must be obtained in writing.

4. As a matter of courtesy, you should advise the relevant Regional Director of the schools you intend to approach. An outline of your research and a copy of this letter should be provided to the Regional Director.

5. Any extensions or variations to the research proposal, additional research involving use of the data collected, or publication of the data beyond that normally associated with academic studies will require a further research approval submission.
6. At the conclusion of your study, a copy or summary of the research findings should be forwarded to Education Policy and Research Division, Department of Education and Early Childhood Development, Level 3, 33 St Andrews Place, GPO Box 4367, Melbourne, 3001.

I wish you well with your research study. Should you have further enquiries on this matter, please contact Jonathan Howcroft, Policy and Research Officer, Education Policy and Research, by telephone on (03) 9947 1892 or by email at <howcroft.jonathan.1@edumail.vic.gov.au>.

Yours sincerely

[Signature]

Dr Elizabeth Hartnell-Young
Group Manager
Education Policy and Research

01/12/2009

enc
Dear Mr Love

I am writing with regard to your research application received on 27 October 2009 concerning your forthcoming project titled *Determining avenues for the early intervention of eating disorders: Common cognitive schemas among adolescents with eating disorders compared with a control group*. You have asked approval to approach Catholic schools in the Archdiocese of Melbourne, as you wish to survey Year 7–12 female students.

I am pleased to advise that your research proposal is approved in principle subject to the nine standard conditions outlined below. Additionally, you are asked to remove from your proposed protocol the incentive of providing a $20 voucher for participating students.

1. The decision as to whether or not research can proceed in a school rests with the school’s principal, so you will need to obtain approval directly from the principal of each school that you wish to involve.

2. You should provide each principal with an outline of your research proposal and indicate what will be asked of the school. A copy of this letter of approval, and a copy of notification of approval from the university’s Ethics Committee, should also be provided.

3. A *Working with Children* (WWC) check – or registration with the Victorian Institute of Teaching (VIT) – is necessary for all researchers visiting schools. Appropriate documentation must be shown to the principal before starting the research in each school.

4. No student is to participate in the research study unless s/he is willing to do so and informed consent is given in writing by a parent/guardian.
5. You should provide the names of schools which agree to participate in the research project to the Knowledge Management Unit of this Office.

6. Any substantial modifications to the research proposal, or additional research involving use of the data collected, will require a further research approval submission to this Office.

7. Data relating to individuals or schools are to remain confidential.

8. Since participating schools have an interest in research findings, you should consider ways in which the results of the study could be made available for the benefit of the school communities.

9. At the conclusion of the study, a copy or summary of the research findings should be forwarded to this Office. It would be appreciated if you could submit your report in an **electronic format** using the email address provided below.

I wish you well with your research study. If you have any queries concerning this matter, please contact Mr Mark McCarthy of this Office.

The email address is <km@ceomelb.catholic.edu.au>.

Yours sincerely

[Signature]

Nancy Bicchieri
DEPUTY DIRECTOR
DATE 04 August 2010

PROJECT NO. 10175B

PROJECT TITLE Determining avenues for the early intervention of eating disorders: Common cognitive schemas among adolescents with eating disorders with a control sample

Participant Information Letter Version No. 2 dated 23 July 2010
Consent Form for Participant to Give Informed Consent Version No. 2 dated 23 July 2010
Parent/Guardian Information Letter Version 2 dated 23 July 2010

INVESTIGATOR(S) Dr Jacinta Coleman

HREC MEETING DATE 05 August 2010

APPROVAL 04 August 2010 to 04 August 2013

The Principal Investigator is required to notify the Administrative Officer, Research Directorate of:

1. Any change in protocol and the reason for that change together with an indication of ethical implications (if any)
2. Serious or unexpected adverse effects of project on subjects and steps taken to deal with them
3. Any unforeseen events that might affect continued ethical acceptability of the project
4. Any expiry of the insurance coverage provided in respect of sponsored trials
5. Discontinuation of the project before the expected date of completion, giving reasons
6. Any change in personnel involved in the research project including any study member resigning from Southern Health in the study team.

At the conclusion of the project or every twelve months if the project continues, the Principal Investigator is required to complete and forward an annual report to the Committee.

Annual report forms will be forwarded to the researcher.

SPECIAL CONDITIONS

None

SIGNED Committee Representative

DATE 04 August 2010

Please quote Project No. and Title for all correspondence