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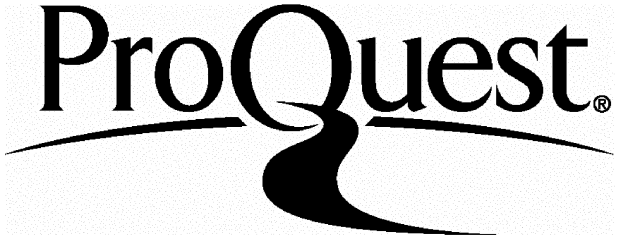
# TITLE: Development of the Persistence, Perseverance and Perfectionism Questionnaire (PPPQ): A measure of psychological correlates of eating pathology



ABSTRACT

Introduction:

This study involves the development of a measure of constructs hypothesised to be of importance in eating disorders, particularly anorexia nervosa. The constructs to be measured are persistence, perseverance and perfectionism.

Method:

Initial development involved defining the three constructs on the basis of previous literature. Next, possible items were developed for each of the constructs. These items were rated by a random sample of individuals according to how well they fitted each of the constructs. Items were retained if they were highly rated for one construct but for neither of the other two by the majority of respondents. The resulting measure, the Persistence, Perseverance and Perfectionism Questionnaire (PPPQ), was administered to 325 non-clinical participants for the purposes of factor analysis. Alongside the measure, participants completed measures of psychological functioning (the Brief Symptom Inventory) and eating disorder symptoms (the Eating Disorder Examination – Questionnaire form). Test retest reliability was established by administering the PPPQ twice, around 14 days apart.

Data analysis:

The main analysis consisted of factor analysis of the PPPQ items in order to establish the factor structure of the measure. Varimax rotation was used to determine factor loadings. Regression analyses were carried out to establish the validity of the measure, in particular, its relationship to measures of psychopathology including eating attitudes and behaviours.

Results:

Factor analysis resulted in a 22-item questionnaire, consisting of three subscales. These corresponded well to the theoretical constructs of persistence, perseverance and perfectionism. Regression analyses showed that each subscale had specific relationships to a range of forms of psychopathology. In particular, persistence appeared to be predict positive mental health, whilst perseverance was related to negative mental health outcomes (restrictive pathology). Perfectionism was also associated with psychopathology, but more

weakly than is perseverance.

Discussion:

The new questionnaire, the PPPQ, appears to be psychometrically valid and theoretically meaningful. However, both the psychometric structure and the relationships between the measure and psychopathology should be explored in further research with clinical populations.

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This thesis is for Gavin: Thank you for your support and patience for so long. I promise to go and get a proper job now.

Development of the Persistence, Perseverance and Perfectionism Questionnaire (PPPQ): A measure of psychological correlates of eating pathology

This study involves the development of a measure of constructs hypothesised to be of importance in eating disorders (the PPPQ). The constructs measured were persistence, perseverance and perfectionism. After a literature review, leading to working definitions of the three constructs and the generation of appropriate items, the measure was administered to a large non-clinical sample of students and working people. The resulting data were subjected to factor analysis and preliminary validation. It is proposed that in future the measure should be validated on a sample of individuals with clinically significant eating disorders. However, this was beyond the scope of the current study.

## 1. BACKGROUND

In this section, the literature relevant to the current study will be reviewed, leading to the development of the PPPQ questionnaire. The section begins with an introduction to eating pathology and eating disorders, including diagnosis and treatment. Next, cognitive and personality aspects of eating pathology relevant to the current study are reviewed and gaps in the literature identified. Finally, reasons for developing a new measure are described and the aims of the study are outlined.

### 1.1 Eating pathology and eating disorders

#### *1.1.1. Eating pathology*

Eating pathology can be defined as a group of behaviours and cognitions related to eating and/or weight and shape, which are extreme or outside the normal range. Behaviours may include bingeing and extreme weight control measures (e.g., fasting, extreme restriction of caloric intake, self-induced vomiting, use of laxatives, diuretics and enemas, and excessive exercise). Cognitions may include the over-identification of shape and weight with self-esteem, overvalued ideas about shape, weight and food, strong dissatisfaction with weight

(despite being of normal weight), and extreme fear of weight gain. Most authors would include in this definition some degree of impairment in terms of normal functioning (Wakefield, 1992). For example, a person with a high degree of eating pathology may have difficulty performing their job or may have restrictions to their social life as a result of their cognitions or behaviours. Of course, this begs the question of what is considered 'normal', which may vary across cultures. A further question concerns the distribution of eating- and weight-related cognitions and behaviours. For example, are they normally distributed, which would mean that a small number of individuals would have either very high or very low levels of these concerns, whilst the majority of individuals would score in the mid-range? Alternatively, it could be that the distribution is more bi-modal, so that individuals with high levels of eating pathology form a discrete group somewhat separate from the rest of the population. Such questions relate to a complex literature considering whether psychiatric diagnosis is 'carving nature at its joints', and are discussed by Meehl and others (Meehl, 1995).

### *1.1.2. Measurement of eating pathology*

Traditional psychiatric approaches have used a categorical system for measuring eating pathology, defining individuals as falling into a particular diagnostic group, such as anorexia nervosa (AN) or bulimia nervosa (BN), based on their possession of a particular group of symptoms. One advantage of a categorical approach is that is enables clinicians to summarise the information about a person's condition and facilitates communication amongst them. It is also useful in research, allowing comparability of different studies. However, some authors have recommended a dimensional approach as an alternative to categorisation. In this approach, individuals are described according to where they fall on one or more dimensions related to the construct of interest.

Using a dimensional approach to measuring eating pathology means that we can consider eating behaviours or cognitions as occurring somewhere along a range from normal to

abnormal. This approach has advantages over a purely categorical model of specific disorders in that it is often difficult to define where such categories begin and end and what counts as 'abnormal' or 'clinical'. For example, what level of 'weight concern' would be considered to be pathological rather than normal (Palmer, 1993)? Some authors have gone so far as to suggest that weight concern should not be pathologised, as it is a 'normative discontent' amongst young Western women (Rodin, Silberstein, & Striegel-Moore, 1984). Other difficulties with a categorical approach to measuring eating pathology include lack of agreement about whether or not individuals meet the diagnostic criteria currently in use (Lawrence, Campbell, Neiderman, & Serpell, 2003) and evidence that there is relatively fluid movement between the different eating disorder categories (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000). As Vandereyken and Pierloot point out, 'each classification is a product of a given assessment at a given moment, i.e. a snapshot or cross-section of temporarily observed characteristics' (Vandereyken & Pierloot, 1983). Some authors have criticised the whole idea of psychiatric diagnosis, claiming that diagnostic labelling is unhelpful, stigmatising and disempowering for the individual (Szasz, 1960).

However, it is unclear whether dimensional models are the most appropriate in all circumstances. The question of whether there is continuity or discontinuity between the normal range and pathological behaviours/cognitions has been the subject of much debate (Widiger, 1992). This question is particularly important when using research participants from the normal population to test hypotheses about clinical groups. Furthermore, in some circumstances, such as when deciding how best to use limited healthcare resources, it can be important to decide whether a level of eating distress or disorder is at the level of 'clinical significance' in terms of being above a certain level of severity and/or resulting in considerable distress or impairment of function.

In describing eating pathology using a dimensional approach, two continua are commonly used. These are 'bulimic tendencies' (which include bingeing and purging behaviours) and

'restrictive tendencies' (which include the tendency to restrict or control food intake). Both restrictive individuals and those with more bulimic tendencies are expected to score high on measures of weight and shape concern, but to score differently on other variables. It has been suggested that high scores on these continua are related to particular personality traits. For example those with high bulimic tendencies will tend to be more impulsive, whilst those with restrictive tendencies are likely to be more compulsive (Vitousek & Manke, 1994; Waller, Kennerley, & Ohanian, in press). This kind of approach is gradually gaining support within the eating disorders field (Meyer & Waller, 2000; Waller & Mijatovich, 1998; Waller, Quinton, & Watson, 1995). This literature overlaps with that described below regarding comorbidity between eating disorders and other conditions, in that personality disorders (which are commonly comorbid with the eating disorders) are more extreme manifestations of the common personality traits described above.

### *1.1.3. The categorical approach to measuring eating pathology: Eating disorders*

Having considered the difficulties in diagnosing specific eating disorders, it might be argued that the most effective approach would be to ignore sub-categories in the eating disorders, and simply to focus on the eating disorders as a whole. This could also include the 30-50% of patients who do not meet full diagnostic criteria (Fairburn & Harrison, 2003) but who still suffer clinically significant distress and/or impairment. (The question of whether an individual is inside or outside the main category of 'eating disorder' would, of course, remain). This approach has recently been described by Fairburn and colleagues in their 'transdiagnostic' model (Fairburn, Cooper, & Shafran, 2003). However, as much recent research still focuses on individual eating disorder diagnoses, I will now describe the diagnostic categories as they currently stand.

#### 1.1.3.1. Diagnostic criteria and main features

As defined in the Diagnostic and Statistical Manual of Mental Diseases, Version IV (American Psychiatric Association, 1994), the main eating disorders are anorexia nervosa

(AN), bulimia nervosa (BN) and eating disorder not otherwise specified (EDNOS). The International Statistical Classification of Diseases, version 10 (ICD-10, World Health Organisation, 1992) divides atypical eating disorders into 'atypical anorexia' and 'atypical bulimia'; otherwise, its categorisation is similar to that of DSM IV. DSM IV lists Binge Eating Disorders as a subcategory of EDNOS in the section for 'diagnostic categories in need of further research'.

Listed below are the diagnostic criteria of the main eating disorder categories as presented in the DSM-IV. The criteria have undergone many changes since they first entered the DSM categorisation, and have been the subject of much debate in the field (Hay, Fairburn, & Doll, 1996; Hsu & Lee, 1993; Nicholls, Chater, & Lask, 2000; Palmer, 1993; Williamson, Gleaves, & Salvin, 1992). Controversial issues have included the importance of 'weight phobia' for the diagnosis of an eating disorder (Hsu & Lee, 1993; Palmer, 1993), and the appropriateness of the current criteria for certain groups, such as children (Nicholls et al., 2000). However, the current criteria are presented here as they are widely used in the published literature. As such, they provide a framework for understanding the studies concerning eating disorders which are presented below.

Anorexia Nervosa: (American Psychiatric Association, 1994)

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 postmenarchal 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., estrogen, administration.)

Specify type:

*Restricting Type:* during the current episode of Anorexia Nervosa, the person has not regularly engaged in binge-eating or purging behavior (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)

Bulimia Nervosa: (American Psychiatric Association, 1994)

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

(1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than 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 behavior 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 behaviors 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

Nonpurging Type: during the current episode of Bulimia Nervosa, the person has used other

inappropriate compensatory behaviors, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas

Eating Disorder Not Otherwise Specified:

This designation can be used when the mental disorder appears to fall within the larger category (eating disorders) but does not meet the criteria of any specific disorder within that category.

1.1.3.2. Prevalence, incidence and course of the eating disorders

1.1.3.2.1 *Anorexia Nervosa*

There are widely different incidence data for AN. For example, a 1985 study (reported in Lucas et al; 1991) in the Netherlands found a rate of 18.4 per 100,000, whilst an American study conducted at around the same time found an incidence of 149.5 per 100,000 (Lucas et al; 1991). This variability is likely to be at least partly due to the use of different diagnostic tools. Prevalence of AN is about 0.3% in young women (Hoek & van Hoeken, 2003). Consensus suggests that the disorder is probably not increasing in frequency (Hoek & van Hoeken, 2003), although this might appear to be the case due to better clinical identification.

The natural course of AN is hard to determine due to measurement problems and drop out, but appears very variable, depending on treatment and other factors. However, meta-analyses suggest that 50-70% achieve intermediate or good long-term outcome (Pike, 1998). However, mortality rates are high, with adjusted mortality rates ranging from 1.2 to 12.82% (Agras et al., in press).

1.1.3.2.2 *Bulimia Nervosa*

The incidence of BN is around 12 per 100,000, whether measured in the UK (Turnbull et al., 1996), USA (Soundy et al, 1995) or the Netherlands (Hoek et al., 1995). Prevalence

differs widely depending on age and gender but appears to be around 1% in young women (Hoek & van Hoeken, 2003). Some authors claim that it may have increased in prevalence between 1988 and 1993 (Turnbull, Ward, Treasure, Jick, & Derby, 1996). However, recently presented data (Currin, Schmidt, Treasure, & Jick, 2004) suggests that this trend may have reversed in the period 1994 to 2000.

With regard to the course of BN, Fairburn and colleagues' study of a community sample of UK women with the disorder is particularly informative (Fairburn et al., 2000). Fifteen months after diagnosis, half to two thirds of these women still had some kind of eating disorder. In each year that they were followed up (up to a total of 5 years), about one third of those in remission relapsed, whilst about one third of those who had remained ill entered remission.

1.1.3.2.3 *Eating Disorder Not Otherwise Specified (EDNOS)*

Few data are available on this diagnostic group, despite evidence suggesting that it is the most common diagnosis of individuals presenting to eating disorder services (Turner & Bryant-Waugh, 2004; Williamson et al., 1992). Evidence suggests that Binge Eating Disorder (a sub-type of EDNOS) may be an unstable diagnosis, with individuals frequently moving in and out of a 'clinically significant' level of disorder (Fairburn et al., 2000). This may have some relevance to the discussion in above (section 1.1.1) regarding whether particular diagnoses are 'carving nature at its joints' (Meehl, 1995) or merely categorising those at one end of a normal distribution.

1.1.3.3. Treatment approaches

Research into the treatment of BN provides good evidence for the effectiveness of cognitive behaviour therapy (CBT) and interpersonal psychotherapy (IPT, Agras, Walsh, Fairburn, Wilson, & Kraemer, 2000; Fairburn et al., 1991; Fairburn, Kirk, O'Connor, & Cooper, 1986) in many cases. Outpatient treatment is usually appropriate unless the patient's medical

state is severely compromised (e.g. due to electrolyte imbalance) or there is co-morbid self harm/suicidality (National Institute for Clinical Excellence, 2004).

Less evidence is available regarding effective treatments for AN (Agras et al., in press). This deficit is at least partly due to the difficulty of conducting clinical trials, which in turn is due to the rarity of the condition, high rates of drop out (Mahon, 2000) and the fact that out-patient therapy is often interrupted by the need for in-patient admission (Crisp et al., 1991). Hence it has been difficult to carry out randomised controlled trials in this group, and the few trials that have been conducted have been dogged by methodological problems (Channon, de Silva, Hemsley, & Perkins, 1989; Dare, Eisler, Russell, Treasure, & Dodge, 2001). Various approaches have been explored in AN, including CBT, motivational therapy, behaviour therapy, focal psychodynamic therapy and family therapy. There is little consensus as to the most appropriate treatment for adults (Vitousek, 2001), although some evidence suggests that family therapy is most appropriate in adolescents (Eisler, Dare, & Russell, 1997). In-patient treatment may be necessary for AN, especially when weight is very low, in order for refeeding to take place in a supervised environment. However, this approach deals with physical needs rather than psychological ones. Recently published guidelines from the National Institute of Clinical Excellence (NICE, 2004) suggest at least one year of psychological follow-up should be given subsequent to discharge from in-patient treatment.

As overall outcomes from AN appear poor (Pike, 1998), the condition is often chronic (Strober, Freeman, & Morrell, 1997). It results in medical complications (Treasure & Szmukler, 1995), and mortality is high (Agras et al., in press). There is an urgent need for research leading to more effective treatments.

1.1.3.4. Challenges of treatment

Resistance to change is characteristic of both AN and BN, but is particularly associated with

AN (Serpell, Treasure, Teasdale, & Sullivan, 1999). The resistance can be understood as resulting from the valued or functional nature of eating disorders, meaning that patients see some positive aspects to their disorder and are at best ambivalent about change (Serpell et al., 1999; Treasure & Schmidt, 2001; Vitousek, Daly, & Heiser, 1991; Vitousek, de Viva, Slay, & Manke, 1995). Efforts have been made to explore the content of positive beliefs about the condition as held by individuals with AN. These vary between individuals, but are likely to include the beliefs that AN helps them feel safe and protected, that it provides simplicity in life, and that it helps them to avoid difficult emotions or situation (Serpell, Teasdale, Troop, & Treasure, *in press;* Serpell & Treasure, 2002). A number of individuals with AN appear to value it as a way to avoid the demands of adult sexuality and fertility (Crisp, 1980; Serpell et al., *in press*).

1.1.3.5. Co-morbidity

Co-morbid states and disorders are the rule rather than the exception in eating disorders (Braun, Sunday, & Halmi, 1994; Herzog, Keller, Sacks, Yeh, & Lavori, 1992; O'Brien & Vincent, 2003; Wonderlich & Mitchell, 1997; Zaider, Johnson, & Cockell, 2000). Co-morbid conditions are likely to contribute to poor outcome (Wentz-Nilsson, Gillberg, Gillberg, & Rastam, 1999).

The commonest Axis I co-morbid conditions include depression (Casper, 1998; Pollice, Kaye, Greeno, & Weltzin, 1997) and anxiety disorders (Godart, Flament, Perdereau, & Jeammet, 2002). Another common co-morbid condition in AN is obsessive compulsive disorder (OCD, Serpell, Livingstone, Neiderman, & Lask, 2002). OCD is present in around one third of adults with AN (O'Brien & Vincent, 2003; Rastam, Gillberg, & Gillberg, 1996; Thornton & Russell, 1997) and in up to 50% of children and adolescents with the disorder (Serpell, Hirani, Willoughby, Neiderman, & Lask, submitted). Co-morbidity with personality disorders is also common (Rosenvinge, Martinussen, & Ostensen, 2000).

In terms of comorbidity with personality disorder, Cluster C personality disorders such as Obsessive Compulsive Personality Disorder (OCPD) appear commonest in AN (Serpell et al., 2002). In contrast, BN is more likely to be associated with Cluster B personality disorders, particularly Borderline Personality Disorder (Carroll, Touyz, & Beumont, 1996). This is in keeping with dimensional conceptualisations of eating pathology described above, in which restrictive tendencies are often associated with compulsive traits, whilst BN is more commonly associated with impulsive features (Welch & Fairburn, 1996; Wiederman & Pryor, 1996). Where diagnosable personality disorders occur, they appear to be associated with greater chronicity of the eating disorder and poorer functioning (Inceoglu, Franzen, Backmund, & Gerlinghoff, 2000; Skodol et al., 1993).

*1.1.4. Summary*

Eating disorders, particularly those that include restrictive pathology, appear treatment-resistant and have a relatively poor prognosis compared to other psychiatric conditions (Agras et al., in press). The literature reviewed above suggests that this might be partly due to the valued nature of the eating behaviour, which leads to poor motivation for change.

The current study aims to explore whether particular personality or cognitive features are associated with restrictive pathology, with the extended hypothesis (not tested here) that these might also contribute to treatment resistance and chronicity. A clue to the nature of such features is given by exploring the common co-morbid conditions associated with AN. In the next section, the literature on personality features and cognitive styles will be reviewed, with a view to gathering more evidence on those features.

## 1.2 Personality and cognition in eating pathology

In this section, the literature relevant to personality and cognitive functioning in eating disorders will be reviewed. It is clear that there are overlaps between personality and cognition, even though they are generally characterised as distinct constructs. 'Thinking

styles' may influence personality features and possibly *vice versa*. For example, the personality literature has shown that perfectionism is characteristic of eating disorders: in parallel, cognitive studies are beginning to show rigidity and inflexibility in these individuals.

This section aims to tease out the three concepts – persistence, perseverance and perfectionism - that will be measured in the new scale. Briefly, persistence is the ability to stick with a behaviour or task even when it takes a long time or is difficult, perseverance encompasses the need to keep going with a behaviour even when it no longer serves a purpose, and perfectionism involves having high standards for one's own performance. These descriptions will be revised and refined into more specific definitions following the literature review.

*1.2.1. Personality in the eating disorders – a review*

It is helpful here to make a contrast between the concepts of *personality* (which has emerged from a primarily psychological tradition and is seen as dimensional) and *personality disorders* (which has emerged from a psychiatric tradition and is seen as categorical). This means that there is an overlap between the discussion of co-morbidity between eating disorders and personality disorders (see section 1.1.3.5) and work examining personality traits and features in eating disorders.

Vitousek and Manke (1994) conducted a thorough review of the personality literature in eating disorders. They point out that research in AN generally confirms the clinical impression that such individuals are often 'constricted, conforming and obsessional', whilst those with BN are more likely to be affectively unstable and impulsive. However, they point out that the measurement of personality features in this population is dogged by difficulties, one of which is the fact that they often emerge during adolescence. This aspect is problematic when attempting to make hypotheses about the aetiological role of personality features, as it makes it difficult to judge whether such traits pre-dated an eating problem that

developed during the teenage years (when personality tends to be in flux). However, Vitousek and Manke present data from several studies that examined pre-morbid personality traits in eating disorders. They confirm the suggestion that those who go on to develop restrictive AN tend to have shy, compliant, rigid and obsessional personalities, whilst those who develop an eating disorder with more bulimic symptoms often also showed more sociability, histrionic features and affective instability (e.g. Beumont, George & Smart, 1976, cited in Vitousek & Manke, 1994).

A second aspect of the eating disorders that complicates the interpretation of data from personality measures is the role of starvation. Starvation is known to have complex physiological consequences, which affect cognition and personality. This means that any personality changes that emerge during a period of malnourishment could be partly or entirely the result of physiological factors (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950). Hence, there is an important role for prospective studies that measure personality traits both during the acute stages of illness and some time after weight has been restored. Few such studies have been conducted to date (Gillberg, Rastam, & Gillberg, 1995; Wentz-Nilsson et al., 1999).

One important group of studies has used the Temperament and Character Inventory (TCI, Cloninger, Przybeck, Svrakic, & Wetzel, 1994) or its precursor, the Tridimensional Personality Questionnaire (TPQ, Cloninger, Przybeck, & Svrakic) to explore temperamental features in eating disorders. These two measures are based on Cloninger's biosocial model of personality, which divides personality into seven domains. These consist of four temperament domains (Harm Avoidance, Novelty Seeking, Reward Dependence and Persistence) and three character domains (Self-Directedness, Cooperativeness, and Self-Transcendence). The TPQ included only three dimensions of temperament (Harm Avoidance, Novelty Seeking, and Reward Dependence). The Persistence items in Reward Dependence were later separated and recognised as a separate dimension in the TCI.

Several researchers have studied the TCI and TPQ in the eating disorders and found differences between those with restrictive and bulimic characteristics. Bulik and colleagues (Bulik, Sullivan, Weltzin, & Kaye, 1995) showed marked temperamental differences between different eating disorder diagnoses. Participants with AN show greater reward dependence and harm avoidance, whilst those with BN score higher on novelty seeking subscales. Fassino and colleagues (Fassino, Abbate-Daga et al., 2002) used the TCI in their study, and largely confirmed the results of Bulik's study. They showed low novelty seeking in AN and high novelty seeking in BN. Both eating disorder groups showed high harm avoidance and low self-directedness. Interestingly, their participants with AN also had high scores on Persistence, a new subscale added to the TCI, intended to measure "resistance to extinction of previously rewarded behaviour". Participants with the binge-purge subtype of AN showed a profile midway between those with the restricting subtype of AN and those with BN.

It is important to point out that considerable inter-individual variability exists in the personality profiles of eating disorder sufferers, despite these commonalities. For example, it seems unlikely that a single personality type will be shown to account for all cases of AN. Instead, it is possible that a cluster of personality features, occurring together with other types of risk factors, might lead to the onset of an eating disorder in certain individuals. The same or different personality features may also have an important role in maintaining the condition once it has begun.

One such feature that has received a great deal of interest in recent years is perfectionism. Individuals with AN have consistently been shown to have high levels of perfectionism (Bastiani, Rao, Weltzin, & Kaye, 1995; Goldner, Cockell, & Srikameswaran, 2002), and some studies have also shown high perfectionism in BN (Blouin, Bushnik, Braaten, & Blouin, 1989; Goldner et al., 2002). However, findings have varied depending on the measures that have been commonly used. These include the perfectionism subscale of the Eating Disorders

Inventory (EDI, Garner, Olmsted, & Polivy, 1983) and two measures specifically developed to measure perfectionism. Confusingly, both measures are called the Multidimensional Perfectionism Scale. The first was developed by Frost (Frost, Marten, Lahart, & Rosenblate, 1990) and the second by Hewitt and Flett (Hewitt & Flett, 1991). Frost's measure has five subscales 'Concern over Mistakes'; 'Doubts about Actions'; 'Personal Standards'; 'Parental Expectations'; and 'Parental Criticism'. Hewitt and Flett's measure consists of three subscales: 'Self-oriented perfectionism' (high standards for the self); 'Other-oriented perfectionism' (high standards for others); and 'Socially-oriented perfectionism (the beliefs that others have high standards for the self). These measures are reviewed by Shafran and colleagues (Shafran & Mansell, 2001), who suggest that these multidimensional perspectives may be overinclusive of the concept of perfectionism.

It is worth considering what it means if perfectionism is high in individuals with eating disorders. Some studies have suggested that it might be a risk factor for onset of AN (Fairburn, Cooper, Doll, & Welch, 1999). This suggestion is supported by studies in which perfectionism appears to remain high after recovery from AN (Pia & Toro, 1999; Srinivasagam et al., 1995), implying that it is a stable feature rather than simply due to the effects of the illness (e.g. starvation).

A further difficulty in the literature has been the variability in the way perfectionism is defined. Some authors have suggested that it includes high standards for others as well as for the self (Hewitt & Flett, 1991), whilst Shafran and colleagues suggest that it is restricted to unrelenting standards for the self. Furthermore, they suggest that: "the defining feature of clinically significant perfectionism is the overdependence of self-evaluation on the determined pursuit (and achievement) of self-imposed personally demanding standards of performance in at least one salient domain, *despite the occurrence of adverse consequences.*" (Shafran, Cooper, & Fairburn, 2002, p773). This suggests some overlap with the concept of perseverance described below, where individuals continue with a particular behaviour

despite aversive consequences.

Further debate has concerned the question of whether perfectionism is invariably negative and associated with psychopathology, or whether it can sometimes be a beneficial trait (Bieling, Israeli, & Antony, 2004; Shafran et al., 2002; Shafran, Cooper, & Fairburn, 2003; Terry-Short, Owens, Slade, & Dewey, 1995). Shafran and colleagues have attempted to specifically define a version of perfectionism that they call 'clinical perfectionism', which is hypothesised to be an unhealthy trait (Shafran et al., 2002). However, it is not yet clear whether this trait is able to differentiate between those with psychological disorders and healthy 'high achievers'.

*1.2.2. Cognition in eating disorders*

Cognitive aspects of eating disorders are extensively reviewed by Cooper (1997b). Clinical observations have suggested that individuals with eating disorders have distressing automatic thoughts regarding weight and shape. Such suggestions have been confirmed by research studies. For example, Clark and colleagues (Clark, Feldman, & Channon, 1989) found that eating disorder patients had more distressing weight related cognitions than controls. Cooper and Fairburn (1992) used a concurrent verbalisation task to show that patients with eating disorders made more negative self-statements about eating, weight and shape than normal controls, whilst dieters fell between eating disorder patients and controls. Cooper also showed that individuals with eating disorders made more weight and shape related interpretations of ambiguous scenarios with negative self-related outcomes than those without eating disorders (Cooper, 1997a).

Studies using information processing paradigms (including the modified Stroop task and the Dot-probe paradigm) have been widely used to investigate the eating disorders. These studies have generally shown (unsurprisingly) an attentional bias, suggesting a pre-occupation with weight, shape and eating in such individuals (see Cooper, 1997b). However,

the interpretation of the Stroop methodology as simply reflecting biases in automatic attentional processes has recently received criticism (Lee & Shafran, 2004).

More recently, researchers have attempted to move away from a focus on weight, shape and eating and attempt to measure other aspects of cognition in eating disorders. Several researchers have shown that individuals with eating disorders also appear to have more unconditional negative self-beliefs than those without eating disorders. For example, Cooper and Hunt (Cooper & Hunt, 2000) showed similar levels of negative self-beliefs in patients with BN to those with depression, using a semi-structured interview methodology. Studies using Young's schema questionnaire (Schmidt, Joiner, Young, & Telch, 1995) have also shown the presence of such negative core beliefs (early maladaptive schemas) in eating disordered individuals (Leung, Waller, & Thomas, 1999). It is currently unclear whether the types of core beliefs differ amongst those with different sorts of eating disorders (Cooper, 2004; Leung et al., 1999).

Clinical reports of 'dichotomous' or 'black and white' thinking and the rigidity with which those with AN appear to stick to their planned dietary intake have led to attempts to discover whether people with eating disorders are more rigid or inflexible than controls. This work has often taken a neuropsychological perspective, using standard neuropsychological paradigms rather than those from experimental psychology.

*1.2.3. Neuropsychological findings*

Studies exploring the concept of 'set shifting' (a mental process concerned with shifting back and forth between different tasks) have examined the persistence of a learned expectation amongst individuals with AN and BN (Tchanturia, Morris, Surguladze, & Treasure, 2002; Tchanturia, Serpell, Troop, & Treasure, 2002). Early studies examined a perceptual illusion task (Tchanturia, Serpell et al., 2002). In this task, after a 'fixing period' (in which two balls of different sizes are repeatedly presented whilst the participant is blindfolded), two balls of

the same size are experienced as being of different sizes. This is a normal illusion, which generally persists for several consecutive presentations of the same-sized balls. However, the illusion appears to persist for longer in individuals with AN, who respond inflexibly (giving the same response each time the balls are presented). Those with BN also persist in an illusory response, but with a fluctuating style (i.e., they tend to alternate between one response and another). To eliminate the possibility that this effect was due to a more general perceptual difficulty in AN, a second study examined performance on both cognitive and perceptual set-shifting tasks, and again showed inflexible responding in AN (Tchanturia, Morris et al., 2002). This study showed that the effect was also present in women who had recovered from AN, removing the possibility that the effect was simply a result of nutritional deficits. This task has some obvious overlap with other tests of set-shifting, such as the Brixton (Burgess & Shallice, 1997) and the Wisconsin Card Sorting Task (Fassino, Piero et al., 2002). Hence, a recent study explored performance by ED patients on a battery of tests of set-shifting and cognitive flexibility (Tchanturia, Brecelj Anderluh et al., in press). These tests included: perceptual and cognitive set shifting tasks; the Trail Making Test (parts A and B .Kraverity, Rabe-Hesketh, Murray, & Frangou, 2003); and a picture set task (Surguladze, 1995). In this study, individuals with AN were broadly impaired on a range of set-shifting tasks, including the Trail Making version B, the Brixton and the perceptual set task. A fourth study by this group (Tchanturia, Morris et al., in press) showed that set-shifting difficulties were associated with retrospective reports of childhood obsessive compulsive traits, including inflexibility. This provides an intriguing hint that such difficulties might pre-date the onset of the eating disorder, and thus might be implicated in aetiology.

### *1.2.4. Neurobiology findings*

Recent research in neurobiology has attempted to understand whether a particular abnormality of brain function or structure might be implicated in the eating disorders. It is possible that such abnormalities might account for the phenomenology of eating disorders or for some of the cognitive or personality features described above.

Several studies have shown the presence of neurological soft signs in AN, such as dysdiadokinesis (Gillberg, Gillberg, Rastam, & Johansson, 1996; Wentz, Gillberg, Gillberg, & Rastam, 2000, p26.). Studies using structural scanning techniques have shown some structural changes in the brain, including widening of the cerebral cortical sulci, increased ventricular width, and subcortical changes affecting the thalamus and basal ganglia (Gordon, Lask, Bryant-Waugh, Christie, & Timini, 1997). Although most structural changes appear to normalise with weight restoration, some may persist (Katzman, Christensen, Young, & Zipursky, 2001). Studies of brain function using techniques such as Functional Magnetic Resonance Imaging (F-MRI) have shown decreased function in the inferior frontal and parietal regions, and some have shown increased activity in the caudate nucleus, the thalamus and the hippocampal-amygdala complex (Naruo, 2002).

Currently the findings from neurobiological studies are difficult to interpret, and it is not yet clear whether malnutrition could account for some of the findings. It will be important for future work to examine how any consistent findings could account for or relate to the neuropsychological and cognitive findings described above (Tchanturia, in press).

## 1.3 Important constructs

The review of personality and cognitive features above leads to the selection for further investigation of three constructs hypothesised to be of importance in eating pathology, particularly of the restrictive type. The constructs are conceived as dimensional, in that they are expected to be present to greater or lesser degrees in the normal population. However, it is suggested that they may cause problems if present to an extreme degree. The three concepts are described below.

### *1.3.1. Persistence*

Persistence can be defined as the ability to keep going with a behaviour or activity to reach a

goal, even when the task is difficult or takes a long time.

1.3.1.1. Persistence and psychopathology

Persistence is not generally associated with psychopathology in the literature. Instead it tends to be seen as a positive attribute, to be encouraged, especially in children. This is in contrast to the view of perfectionism described above, which suggests that it can, at least in some circumstances, be associated with psychological disorder/distress.

1.3.1.2. Persistence and eating pathology:

Clinical reports suggest that individuals with AN are hardworking, conscientious and thorough (Bruch, 1973). Initial reports of AN suggested that sufferers were high academic achievers, and this was interpreted as evidence that they were of above average intelligence. However, it seems more likely that high achievement is commonly a result of persistence and commitment to studies but often average IQ (Dura & Bornstein, 1989).

Cloninger's Temperament and Character Inventory (Cloninger et al., 1994) contains a subscale labelled Persistence. At first glance, this might appear to be measuring something similar to the definition given above, and has been shown to be elevated in AN (Fassino, Abbate-Daga et al., 2002). Cloninger suggests that the subscale measures "resistance to extinction of previously rewarded behaviour", and is intended to have neurobiological correlates. However, examination of the items included in the subscale suggest that is measuring something quite different and much broader than simply persistence. Example items include:

- *I am more of a perfectionist than most people*
- *I am usually so determined that I continued to work long after other people have given up*
- *I usually push myself harder than most people do because I want to do as well as possibly can*

The first of these appears to measure perfectionism, whilst the second appears more related to persistence as defined above. The third item appears to include aspects of both

persistence and perfectionism. Even the second item does not seem consistent with Cloninger's stated definition of 'resistance to extinction of previously rewarded behaviour', which suggests something closer to the definition of perseverance (given below). Alongside concerns about the face validity of this subscale, recent reports have suggested that the Persistence subscale may be less psychometrically robust than other TCI subscales (Brandstrom et al., 1998).

### *1.3.2. Perseverance*

Perseverance can be defined as the tendency to continue a particular learned response or behaviour, even when it ceases to be rewarding.

#### 1.3.2.1. Perseverance and psychopathology

Perseverance can be distinguished from persistence by being less consciously controlled and less goal-directed than persistence. It is likely to have some overlap with the neurobiological construct of perseveration (Ridley, 1994).

Little is known about the role of perseverance in other disorders. However, I would make a distinction between perseverance and the repetitive behaviour often seen in obsessive-compulsive disorder. OCD is motivated by an attempt (however misguided) to avoid future negative consequences (e.g., repeatedly brushing teeth to prevent tooth decay), whilst perseverance is not marked by this urge to avoid future negative consequences. Instead, the individual simply finds it difficult to terminate the behaviour.

#### 1.3.2.2. Perseverance and eating pathology

As reviewed above, experimental studies show that AN patients are poorer at set-shifting tasks than controls (Tchanturia, Brecelj Anderluh et al., in press; Tchanturia, Morris et al., 2002; Tchanturia, Serpell et al., 2002). Early reports suggest that this does not resolve on weight restoration (Tchanturia, Morris et al., 2002). Qualitative interviews with women with

AN suggest that one of the barriers to recovering from AN, even when motivated, is 'getting stuck' in eating-disordered behaviour (Serpell, 2000)

For example:

Young woman with AN: *I did actually start to lose weight because I thought I was .... fat. But then it just carried on...I mean I knew I wasn't fat after I'd lost quite a lot of weight, but then I just carried on...*

Interviewer: *And can you remember what the motivation was then?*

Young woman with AN: *Umm. Well I don't think... there was any motivation in it. It was just that I had to carry on 'cause I just couldn't do ... couldn't do anything else, couldn't turn it around.* (Serpell, 2000).

These pieces of evidence, along with clinical impressions of individuals with AN as rigid and inflexible, suggest that the concept of perseverance is worth further investigation in the eating disorders.

### *1.3.3. Perfectionism*

For the purposes of the current study, perfectionism can be defined as having exceptionally high standards for oneself.

#### 1.3.3.1. Perfectionism and psychopathology

Perfectionism has been implicated in psychological disorders such as depression (Enns, Cox, & Clara, 2002), for which it may be a risk factor, especially when high and unremitting standards are directed towards the self (Hewitt, Flett, & Ediger, 1996). In contrast, It is probably not elevated in anxiety disorders (Antony, Purdon, Huta, & Swinson, 1998). The role of perfectionism in a range of types of psychological distress has led to questions in the literature as to whether perfectionism is necessarily pathological or whether types of perfectionism can be distinguished. One type might be 'clinical' or 'neurotic', whilst another type is more normal (Hewitt & Flett, 1991; Hewitt, Flett, Besser, Sherry, & McGee, 2003;

Shafran et al., 2002; Shafran et al., 2003). Vitousek has summarised this argument by suggesting that we consider normal perfectionism to be what we (researchers, clinicians and other professionals) do, whilst we consider clinical perfectionism to be what our patients do (Vitousek, 2003).

1.3.3.2. Perfectionism and eating pathology

As described above, perfectionism is commonly high in AN and is sometimes high in BN too (Bastiani et al., 1995; Davis, 1997; Goldner et al., 2002; Hewitt, Flett, & Ediger, 1995; Srinivasagam et al., 1995). It has been implicated as a risk factor for AN (Fairburn et al., 1999; Slade, 1982).

## 1.4. Summary and operational definitions of terms used

Evidence from both clinical and research suggests that eating disorders, especially restrictive ones, are characterised by one or more personality traits or thinking styles. However, the literature is dogged by a lack of clarity in the definitions of terms, overlapping constructs, and poorly specified measures. There is not yet any way to adequately measure these constructs. Hence, the aim of this study was to develop a new measure, the Persistence, Perseverance and Perfectionism Questionnaire (PPPQ), and to establish its factor structure, validity and reliability in a non-clinical sample.

Persistence is defined as: 'the ability to continue or persist with an activity in order to reach a goal, even when the task is arduous or lasts for a long time'. Persistence is more likely to be voluntary (i.e., under some degree of conscious control). In the education literature, persistence is seen as a positive trait, to be encouraged in school-age children. It is defined as the ability to continue with a task until it is complete, even when that task is difficult (Lufi & Cohen, 1987).

Perseverance is defined as: 'a tendency to continue with a particular behaviour or activity

beyond the point at which this behaviour ceases to be appropriate or rewarding'. This is a relatively automatic process, which is not under conscious control. An example of this would be beginning a task or activity (e.g., brushing one's teeth or organising one's room), and needing to continue with it beyond the point at which the task is complete or where it is clear that it cannot be completed, and where it has no further potential perceived benefits.

Thus, the behaviours characteristic of persistence and perseverance may be similar, whilst the cognitive components will differ. For example, someone who brushes their teeth for three minutes might be persistent (deciding to do this for a long time because it is seen to be necessary, if arduous or boring) or they might be perseverant (i.e., continuing because once the activity has started it has a tendency to be continued rather than to stop).

Perfectionism is defined as: 'having high standards for oneself, wishing to do all activities in life to an extremely high level, along with the feeling that failing to be perfect in one domain means that one is a failure more generally as a person'. The behaviours associated with perfectionism are likely to be those that fit with these high standards, such as carefully checking that a piece of work is correct and attending to small details of a task, which others might ignore.

## 2. AIMS

i. To develop a measure of three characteristics thought to be important in eating disorders: persistence, perseverance and perfectionism.

ii. To establish the validity and reliability of the measure in a non-clinical sample.

This will require factor analysis of the data to enable examination of the psychometric structure of the measure, to establish whether the three components are psychometrically separable from one another. It is hypothesised that the constructs will be separable (i.e., that items developed for each aspect will load on separate factors). However, they are not expected to be orthogonal, as there is likely

to be some overlap.

iii. To validate the measure clinically.

This will be done by examining the relationships between the new measure and measures of general psychopathology (using the Brief Symptom Inventory, Derogatis & Melisaratos, 1983) and eating disturbance (using the Eating Disorders Examination – Questionnaire version, Carter, Stewart, & Fairburn, 2001; Fairburn & Beglin, 1994; Luce & Crowther, 1999). These relationships will allow for the generation of hypotheses about the importance of the constructs to be explored in future research.

It is predicted that PPPQ subscales will have specific relationships to eating-disordered behaviours and features (as measured by the EDE-Q). For example, it was hypothesised that Perfectionism would be associated with both bulimic and restrictive features, based on findings described in section 1.2.2, suggesting high levels of perfectionism in those with bulimic and restrictive features) Evidence described in sections 1.2.3 and 1.3.2.2. would suggest that Perseverance and possibly Persistence would be uniquely associated with restrictive features (such as wanting to have an empty stomach, fasting and having particular rules about what and when to eat).

## 3. METHOD

### 3.1. Design

As appropriate for measure development, this study began by generating items for the measure. After initial validation, these were subjected to factor analysis. Initial validity and test-retest reliability were also established.

### 3.2. Ethics

Ethical approval for the study was obtained from Camden and Islington Community Health Services Local Research Ethics Committee. The letter giving ethical approval for the study is

included in Appendix 1.

3.3. Development of the Persistence, Perseverance and Perfectionism Questionnaire PPPQ)

A thorough review of the three constructs to be measured in the instrument was conducted (see introduction), leading to the following operational definitions:

*3.3.1. Operational definitions of terms*

As far as possible, the three constructs were defined so that items generated did not overlap with one another, as this has been a problem with previous measures.

Persistence is: 'the ability to continue or persist with an activity in order to reach a goal, even when the task is arduous or lasts for a long time'. Perseverance is defined as: 'a tendency to continue with a particular behaviour or activity beyond the point at which this behaviour ceases to be appropriate or rewarding'. Perfectionism is: 'having high standards for oneself, wishing to do all activities in life to an extremely high level along with the feeling that failing to be perfect in one domain means that one is a failure more generally as a person'. (See section 1.4 for detailed definitions).

*3.3.2. Item generation*

Items were generated to tap each of the three constructs. Situations (e.g., going shopping) were used to aid generation of paradigmatic 'perseverant', 'persistent' and 'perfectionistic' responses to the same situation. For example, for the shopping situation, the three items generated for the constructs of persistence, perseverance and perfectionism respectively were:

- If an item I wish to buy is not available in one shop, I will continue trying different shops until I find one that stocks the item (persistence)
- When shopping in the supermarket, I walk down the aisles one-by-one until I have covered the whole store, even if I only need a couple of items (perseverance)

- When shopping in the supermarket, I check items off on a list as I put them in the trolley, so that nothing is forgotten (perfectionism)

Eleven items were generated for each construct, and these were randomised into a 33-item questionnaire for rating (see Appendix 2).

*3.3.3. Rating by independent raters*

The questionnaire (shown in Appendix 2) was given to 27 independent raters. These individuals were given the construct definitions (as in section 1.4 above) and were asked to rate each of the items according to how well they matched each of the three constructs of persistence, perseverance and perfectionism. Each item was rated for all three constructs using a 1-7 Likert type scale, where 1 corresponded to 'does not fit the definition at all' and 7 corresponded to 'fits the definition very well'.

Items were retained if the mean rating on one of the constructs was greater than 5 and if this mean was at least 1 standard deviation above the mean rating on the other two constructs. This meant that items retained appeared to be both relatively distinct and relatively pure descriptors of the construct.

Using these criteria, a total of 28 items were retained. Eight of these were rated as 'perseverance' items, 11 as 'persistence', and nine as 'perfectionism'. In all cases, the highest ratings corresponded to the constructs they were originally hypothesised to represent.

## 3.4. Main study

*3.4.1 Participants*

The participants consisted of a mixture of university students (at undergraduate and postgraduate level) and adults in full or part time employment. A total of 325 participants were recruited, as it has been suggested that at least 5 to 10 participants per item is required

for factor analysis (Field, 2000; Floyd & Widaman, 1995; Streiner & Norman, 1995). Table 1 shows the number of students and non-students recruited.

*Table 1: Participants recruited for the main study*

| University-Department | Number approached | Number who participated (%) |
|---|---|---|
| Undergraduate students | 1034 | 185 (17.89%) |
| Postgraduate students | 52 | 17 (32.69%) |
| Trainee clinical psychologists | 31 | 14 (45.16%) |
| Workers (full time) | -* | 109 |

*It was not possible to ascertain the number of working people who were approached because of the snowballing approach taken to recruitment.

*3.4.2 Measures*

Measures used in the current study (in addition to the PPPQ) were as follows:

3.4.2.1 Brief Symptom Inventory (BSI, Derogatis, 1993; Derogatis & Melisaratos, 1983)

The BSI was developed as a short version of the Symptom Checklist-90 (SCL-90, Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974; Derogatis, Rickels, & Rock, 1976), a well-validated measure of a range of psychiatric symptoms. The BSI consists of 53 items, which make up nine subscales: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. It is also possible to calculate a Global Severity Index, which is a measure of overall symptom severity on all subscales. Internal consistency was established by Derogatis (1993) in a study of 719 psychiatric outpatients. Cronbach's alphas were very good, ranging from 0.71 to 0.85. These findings have been confirmed in several other studies by independent investigators (reported in Derogatis, 1993). Test-retest reliabilities for the BSI subscales ranged from 0.68 to 0.91 in a sample of non-patients who completed the measure two weeks apart (Derogatis,

1993). Convergent validity has been established with the Minnesota Multiphasic Personality Inventory (Derogatis et al., 1976). This study also suggests that reducing the length of the SCL-90 to the 53-item BSI has not substantially reduced validity.

3.4.2.2 Eating Disorders Examination – Questionnaire version (EDE-Q, Carter et al., 2001; Fairburn & Beglin, 1994; Luce & Crowther, 1999)

The EDE-Q was developed as a questionnaire version of the Eating Disorders Examination (EDE, Z. Cooper, Cooper, & Fairburn, 1989; Fairburn & Cooper, 1993). The EDE is widely regarded as the instrument of choice for the assessment and diagnosis of eating disorders according to DSM-IV criteria. Luce and Crowther (1999) examined the psychometric properties of the EDE-Q in a group of female undergraduate students, and found that Cronbach's alpha coefficients for the four subscales ranged from 0.78 to 0.93. Test-retest reliability coefficients (over 2 weeks) ranged from 0.81 to 0.94 across the four subscales and from 0.57 to 0.70 for items measuring key eating disorder behaviours. Mond and colleagues (Mond, Hay, Rodgers, Owen, & Beumont, 2004) have confirmed the validity of the EDE-Q in a community sample, indicating good convergent validity on most items with the EDE interview. However, it suggested that use of the EDE-Q might result in higher subscale scores than the EDE, hence potentially overestimating symptoms slightly.

*3.4.3 Procedure*

Student participants were recruited via university lectures. If they chose to participate, they were asked to complete the package of measures (which included a brief information sheet and consent form) and return them via internal mail. Non-student participants were recruited via an email sent to colleagues and friends of the investigator, in which they were asked to consider participation in the study and also to pass the request on to their friends and colleagues. As a reward for participation, participants could be entered into a draw for a £40 book token by providing their address details. These were stored separately from their questionnaires in order to preserve anonymity. Participants were assured of anonymity and

confidentiality, and data were entered and stored in compliance with the Data Protection Act.

For test-retest purposes, a sub-set of participants were re-contacted and asked to complete the PPPQ only, between 7 and 14 days after they had originally completed it. Fifty-two participants (a mixture of students and working people) were contacted for this purpose. Forty-two completed and returned the measure, corresponding to a completion rate of 80.77%.

*3.4.4 Data analysis*

All analyses were conducted using SPSS Version 11.0. Factor analysis was used to establish the factor structure of the measure, in order to discover whether the constructs of persistence, perseverance and perfectionism were separable. Orthogonal (Varimax) rotation was used for the rotated solution. Traditional exploratory factor analysis, rather than Principal Components Analysis was used as this was consistent with the main goal of the study (to explore the multivariate factor structure of the measure, rather than to reduce the number of items (Floyd & Widaman, 1995). Inter-item correlations were calculated to check the psychometric properties of subscales and to determine critical items. For the establishment of test-retest reliability, Pearson's correlations and paired t-tests were conducted to compare subscale scores at time 1 and time 2.

Linear regression was used to establish the relationship of the new measure eating-related (measured using the EDE-Q) and general psychopathology (measured using the BSI). Linear regression is more appropriate than simple correlations to test the relationship between PPPQ subscales and psychopathology as it takes account of the interrelationships between the PPPQ subscales, rather than treating them as independent. Therefore, it does not require corrections to reduce the risk of Type I errors.

## 4. RESULTS

### 4.1. Demographics and descriptive statistics

Three hundred and twenty-five individuals participated in the study, completing the PPPQ, BSI and EDE-Q (in that order). They also provided basic demographic information, including weight, height, age, gender, and employment/student status. Those data are presented in Table 2.

*Table 2: Demographics of the sample. Means (standard deviations) are given for categorical variables, while N (%) is given for gender.*

| | *Overall sample (n=325)* | *Undergraduate students (n=185)* | *Postgraduate students (not including clinical psychology trainees) (n=17)* | *Clinical psychology trainees (n=14)* | *In paid employment (n=109)* |
|---|---|---|---|---|---|
| BMI | 22.34 (3.22) | 21.84 (2.87) | 23.17 (1.89) | 22.53 (2.48) | 23.16 (3.81) |
| Age | 22.44 (6.64) | 20.36 (2.00) | 28.65 (4.36) | 26.36 (1.50) | 30.54 (7.34) |
| Gender | 254 female (78.2%) | 148 female (80.0%) | 12 female (70.6%) | 14 female (100%) | 80 female (73.4%) |

Due to small numbers, the four categories were collapsed into two for some of the later analyses. One group consisted of undergraduate and postgraduate students (not including clinical psychology trainees), while the other consisted of clinical psychology trainees and participants who were in paid employment.

Table 3 shows means on BSI subscales for the current sample, comparing them with published norms (Derogatis & Melisaratos, 1983). Mean scores for the current sample generally fall between published norms for adolescents and adult. A higher proportion of the current sample were female than in published norms.

*Table 3: Means (SD) on BSI subscales and comparison with norms*

| *BSI subscale* | ***Current study (n=325)*** | *Adult non-patient norms (n=974)** | *Adolescent non-patient norms (n=2402)** |
|---|---|---|---|
| Global | **0.63 (0.51)** | 0.30 (0.31) | 0.83 (0.59) |
| Somatization | **0.45 (0.55)** | 0.29 (0.40) | 0.63 (0.64) |
| Obsessive compulsive | **1.01 (0.69)** | 0.43 (0.48) | 0.94 (0.75) |
| Interpersonal sensitivity | **0.91 (0.85)** | 0.32 (0.48) | 0.99 (0.84) |
| Depression | **0.68 (0.74)** | 0.28 (0.46) | 0.82 (0.79) |
| Anxiety | **0.66 (0.64)** | 0.35 (0.45) | 0.78 (0.68) |
| Hostility | **0.62 (0.61)** | 0.35 (0.42) | 1.02 (0.86) |
| Phobic anxiety | **0.30 (0.56)** | 0.17 (0.36) | 0.54 (0.64) |
| Paranoid ideation | **0.62 (0.69)** | 0.34 (0.45) | 1.13 (0.82) |
| Psychoticism | **0.49 (0.64)** | 0.15 (0.30) | 0.73 (0.73) |
| Age (years) | **22.44 (6.64)** | 46.0 (14.7) | 15.8 (1.1) |
| Gender | **21.8% male** | 50.7% male | 66.5% male |

* Derogatis & Melisaratos, 1983

Table 4 shows similar data for the EDE-Q, comparing the current sample with adolescent (Carter et al., 2001) and adult (Fairburn & Beglin, 1994; Mond et al., 2004) norms. Data are shown (where available) for the four EDE-Q subscale scores, the EDE-Q global score, and the frequency of key behaviours (bingeing and purging) among those who engaged in these behaviours. This sample's mean subscale scores are comparable with published norms, although the current sample contains a small proportion of males (whilst published norms have exclusively studied females).

*Table 4: Mean scores on EDE-Q subscales in current and previously published samples, including proportion reporting Objective Bulimic Episodes (OBEs), percentage reporting purging and mean frequencies of these behaviours*

| Subscale | **Current study (n=325)** | Carter et al, 2001 (n=808) | Mond et al, in press (n=195) | Fairburn & Beglin, 1994 (n=243) |
|---|---|---|---|---|
| Global | **1.39 (1.20)** | 1.6 (1.4) | 1.42 (1.04) | 1.55 (1.21) |
| Restraint | **1.44 (1.43)** | 1.4 (1.0) | 1.29 (1.27) | 1.25 (1.32) |
| Eating Concern | **0.73 (1.07)** | 2.2 (1.7) | 0.59 (0.84) | 0.62 (0.86) |
| Weight Concern | **1.59 (1.47)** | 1.8 (1.7) | 1.64 (1.31) | 1.59 (1.37) |
| Shape Concern | **1.99 (1.54)** | 1.6 (1.4) | 2.16 (1.44) | 2.15 (1.60) |
| Percentage participants who reported OBEs in last 28 days | **16.61%** | 21.0%[1] | 3.08%[3] | NA |
| Number of OBEs/28 days in those who binged | **5.54 (6.26%)** | 3.8 (3.3) | 13.3 (12.5) | NA |
| Percentage participants who reported purging in last 28 days | **3.69%** | 4.08%[2] | 1.03% | NA |
| Number of purges/28 days in those who purged | **1.0 (0.0)** | 3.6 (3.2)[1] | n/a | NA |
| Age (years) | **22.44 (6.64)** | 13.4 (0.5) | 35.3 (8.5) | 26.6 (5.5) |
| BMI | **22.34 (3.22)** | 20.0 (3.0) | ** | ** |
| Gender | **78.2% female** | 100% female | 100% female | 100% female |

[1] N.B. Frequencies in this study were determined for last 14 days.
[2] Frequencies were reported for vomiting only
[3] Percentage reporting OBEs on both the EDE and the EDE-Q

4.2. Factor analysis

As factors were not expected to be totally independent, a rotated solution was tested. Oblimin rotation failed to converge in 25 iterations. Hence, a Varimax rotation was used.

A suggested by Floyd and Widaman (1995) in their review of the use of factor analysis in the development of clinical instruments, two criteria were used in determining the number of factors to retain. Factors were included if they had Eigenvalues greater than one (indicating that a significant amount of total variance is accounted for by the factor) and if they also lay to the left of a change in angle on a scree plot of Eigenvalues. Both of these criteria indicated that a three-factor solution was the most appropriate. This also fitted with the study hypotheses. Therefore, the analysis was repeated, this time forcing a three-factor solution (with Varimax rotation). A cut-off of .40 was set for item loading on a factor. If a factor loaded on more than one factor at .40 or greater, it was included in the factor on which its loading was highest. The loadings of items on each of the three factors is shown in Table 5.

*Table 5: Results of Factor Analysis (Varimax rotation*

| *Item number* | Item | *Factor 1 Persist-ence* | *Factor 2 Persev-erance* | *Factor 3 Perfect-ionism* |
|---|---|---|---|---|
| 20 | I tend to keep going with a long task until it is complete, rather than giving up quickly | **.669** | .067 | .274 |
| 12 | People describe me as someone who can stick at a task, even when it gets difficult | **.668** | -.173 | .301 |
| 4 | If I have a problem in my relationship, I will work hard at sorting it out, even if this takes a long time. | **.623** | .066 | -.183 |
| 5 | Once I have decided to do something, I keep going until I reach my goal | **.622** | -.123 | .293 |
| 14 | When reading a book or magazine, I keep going until I have read all the necessary material, even when the concepts are difficult to understand. | **.543** | .179 | .160 |
| 15 | If I try to solve a problem or puzzle, I do not stop until I find an answer. | **.539** | .151 | .292 |
| 11 | If a friendship seems to be running into difficulties, I will keep trying to resolve things, in case it's just a hiccup. | **.526** | .336 | -.095 |
| 23 | If I am trying to get to an appointment but my car has broken down, I do my best to get there in time by investigating other routes (e.g., finding out if I can get a bus, train or taxi) | **.453** | .066 | .160 |
| *13 | I set high standards for myself | **.475** | .011 | .459 |
| 26 | I keep trying to sort out problems in a relationship, even if I know it's not going to survive. | .234 | **.580** | -.191 |
| 1 | Sometimes I find myself continuing to do something even when there is no point in carrying on. | -.031 | **.544** | .023 |
| 3 | Even when I do something very carefully, I often feel that it is not quite right | -.159 | **.519** | .281 |
| 28 | When shopping in the supermarket, I walk down the aisles one-by-one until I have covered the whole store, even if I only need a couple of items. | .046 | **.503** | .102 |
| *25 | If I do something less than perfectly, I feel like a failure. | .139 | **.486** | .465 |
| *19 | When reading a book or magazine, I carefully plan my reading so that I make sure I do not miss any important parts. | .232 | **.483** | .355 |
| 6 | When calling a tradesman to arrange for him to come to my home, I may continually ring and leave messages on the same number, even though I know that they are not being picked up or responded to. | -.032 | **.478** | .161 |
| 2 | When I phone someone to get a decision, if I get an engaged tone then I tend to keep ringing back every minute or so, even when the deadline for the decision has passed. | -.084 | **.468** | .078 |
| 21 | When studying for an important test, I tend to stay up working late into the night, even though I know I am no longer taking in the material and that the studying will not help my performance. | .091 | **.458** | .087 |
| 7 | When reading a book or magazine, I often feel that I must begin at the first page and read through to the very end, even if some of the parts are of no interest. | .149 | **.435** | .107 |

| | | | | |
|---|---|---|---|---|
| 16 | When calling a tradesman to arrange for him to come to my home, I would make sure I had all the relevant paperwork and measurements ready. | .212 | .111 | **.690** |
| 10 | If I have an appointment, I always check my travel arrangements carefully in advance to make sure that I have plenty of time to get there and not be late. | .035 | .063 | **.626** |
| 9 | I hate making mistakes | .236 | .349 | **.528** |
| 24 | If I have an important test coming up, I am likely to plan carefully which topics I will need to cover, making a revision timetable to ensure I get everything done. | .049 | -.063 | **.514** |
| 18 | One of my goals is to be perfect in everything I do | .305 | .420 | **.481** |
| 17 | When calling a tradesman to arrange for him to come to my home, I try all the contact numbers I have for him in the hope of catching him. | .133 | .279 | **.458** |
| *22 | When studying for an important test, if I have decided to revise a topic, I keep going until I have finished, rather then getting distracted by other things. | .309 | .094 | **.437** |
| *27 | If I have an important appointment and am running very late, I will keep trying to get there, even though I have missed the appointment time. | .304 | .386 | .078 |
| *8 | If an item I wish to buy is not available in one shop, I will continue trying different shops until I find one that stocks the item. | .203 | .326 | .224 |
| | Eigenvalue | 6.19 | 2.42 | 1.60 |
| | Percent variance accounted for | 22.1% | 8.64% | 5.70% |
| | Cronbach's alpha | .761 | .637 | .704 |
| | Mean score for total sample | 3.37 | 2.15 | 3.20 |
| | Standard deviation | 0.61 | 0.61 | 0.77 |

* Asterisked items were not included in the final scales for theoretical reasons (see text) or because they did not load sufficiently strongly on any scale.

All item loadings were positive, indicating that there were no items that needed to be reverse scored. Factor 1 corresponded to the hypothesised construct of Persistence, Factor 2 corresponded to the construct of Perseverance, and Factor 3 corresponded to Perfectionism. Therefore, those labels are used hereafter for the scales. Next, Item-total correlations were calculated to examine the contribution of each item to the factor. After examining the items on each subscale, a decision was made to remove the following items for conceptual reasons:

Factor 1 (Persistence): Item 13 was removed because it appeared to reflect perfectionism rather than persistence.

Factor 2 (Perseverance): Items 19 and 25 were removed because they appeared to reflect perfectionism rather than perseverance.

Factor 3 (Perfectionism): Item 22 was removed because it appeared to reflect persistence rather than perfectionism. However, item 17 was retained in this factor, despite the fact it had been included at the development stage to tap persistence. This was because it can also be interpreted as reflecting perfectionism.

After removal of these items, Cronbach's alphas for the three subscales were calculated, and are shown in Table 5. Cronbach's alpha for Factor 2 (Perseverance) is slightly below 0.7, which is less than would be ideal (Nunally, 1978). This might be addressed in future research by generating further items for this subscale.

Intercorrelations between subscales are shown in Table 6. These were generally low to moderate, suggesting that the subscales are reasonably independent (and therefore that they measure different constructs).

*Table 6: Intercorrelations between subscales of the PPPQ*

| | *Persistence* | *Perseverance* |
|---|---|---|
| Persistence | - | - |
| Perseverance | .216** | - |
| Perfectionism | .474** | .385** |

** Correlation is significant at the .01 level (2-tailed).

4.3. Characteristics and scoring of the final version of the PPPQ

Following the factor analysis, the final measure was formulated by re-randomising the remaining items. The final version of the PPPQ consists of 22 items, divided into three subscales (see Appendix 5): Persistence (eight items – numbers 3, 6, 7, 12, 14, 15, 19, 21); Perseverance (eight items – numbers 2, 5, 8, 11, 13, 17, 20, 22); and Perfectionism (six items

– numbers 1, 4, 9, 10, 16, 18)[1]. Scores on each subscale are calculated by taking the item mean for the subscale (i.e., adding scores and dividing by the number of items)[2]. Hence, possible scores range from 1 (if individual answered 'not at all true of me' to all items on a subscale) to 5 (if individual answered 'totally true of me' to all items on a subscale).

If there are missing data for one item on the subscale, the subscale score can still be calculated taking the mean of the remaining items. However, if more than one item on a subscale has missing data, then the subscale should not be calculated. (This procedure has been followed for the current analysis.) Appendix 5 shows the revised measure.

4.4. Test-retest reliability

Participants in this part of the study were asked to complete the measure between seven and 14 days after it had initially been completed, based on guidelines suggested by Streiner and Norman, (1995) and others. Fifty-two potential participants were approached, of whom forty-two completed the PPPQ both times. However, some took longer than two weeks to return the questionnaire, due to holidays or other commitments. To reduce the risk of data being influenced by intervening life events, it was decided to include only those participants who had completed the measure within three weeks of its initial completion. This left 39 participants for this part of the analysis, of whom 21 (54%) were students (undergraduate or postgraduate) while the remaining 18 (46%) were working. The mean time between the two completions for the test-retest group was 9.51 days (SD = 3.34; range = 4 to 19 days).

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[1] These item numbers correspond to items in the 22-item version of the PPPQ (presented in Appendix 5), rather than the original 28-item version.

[2] Although a scoring method based on item weights would be somewhat more accurate than the item mean method, Floyd and Widaman (1995, p295.) point out that, in practice, there is little difference in factor scores using the two methods and that the item mean method is generally preferable as it makes subscales easier to calculate and interpret.

Pearson's correlations and paired T-tests were conducted to compare subscale scores on the PPPQ at Time 1 and Time 2. Results are shown in Table 7. Test-retest reliability for the PPPQ appears to be adequate, as the subscale scores at Time 1 and Time 2 were strongly and significantly correlated and because there was no significant difference in scores over time.

*Table 7: Test-retest analyses*

| | *Mean score* | | *Pearson's correlations* | | *t-tests* | | |
|---|---|---|---|---|---|---|---|
| | *Time 1* | *Time 2* | *r* | *P* | *t* | *df* | *P (2-tailed)* |
| Persistence | 3.442 | 3.349 | .89 | <.001 | 1.784 | 38 | NS |
| Perseverance | 1.915 | 1.918 | .795 | <.001 | .052 | 37 | NS |
| Perfectionism | 3.115 | 2.970 | .728 | <.001 | 1.744 | 38 | NS |

4.5. Relationship between PPPQ subscales and demographic variables

Pearson's correlations were calculated between the PPPQ subscales, age and BMI. As ten correlations were conducted, the p-value was set to .005 to reduce the likelihood of a Type I error resulting from multiple correlations. Significant correlations were found between age and perseverance ($r = -.29$, $p < .001$), and between BMI and age ($r = .20$, $p < .001$). No other correlations were significant.

A one-way analysis of variance (ANOVA) was conducted to compare PPPQ scores in students and participants in paid employment. Students (mean = 2.27, SD = 0.60) scored significantly higher on the Perseverance subscale than non-students (mean = 1.99, SD = 0.59) ($F$ (1,311) = 17.72, $p < .001$). No other differences were significant. As the students were significantly younger than working people, this analysis was repeated with age as a covariate. The students and working people no longer showed a significant difference on Perseverance ($F$ (1,310) = 0.73, NS. Therefore, it can be concluded that age was the key factor in differences in perseverance, rather than student status. This was confirmed by the

finding of a significant negative correlation between age and Perseverance (r = -0.29, P=0.001).

T-tests were conducted to examine gender differences in PPPQ subscale scores. No significant differences were found.

4.6. The PPPQ as a predictor of general psychopathology: Regression analyses with the BSI

Linear regression was used to test the relationship between PPPQ subscales and psychopathology. The P-value was set to .05.

In order to determine what independent variables to include in the regression analyses, correlations were examined between the BSI and EDE subscales, age and BMI. Due to multiple correlations, a conservative P-value of .001 was set for significance, to reduce the likelihood of a type 1 error. Age was significantly negatively correlated with BSI Global and with BSI subscales of Somatic, Hostility, Paranoid Ideation and Psychoticism. It was not correlated with any EDE-Q subscales. BMI showed significant positive correlations with EDE-Q Global and with the EDE-Q subscales of Shape Concern and Weight Concern.

As age showed significant correlations with several BSI subscales, it was included in the analyses as a potential predictor of general psychopathology (Table 7). BMI was significantly correlated with several EDE-Q subscales. Therefore, it was included in the analyses as a potential predictor of eating pathology only (Table 9). The dependent variable for the first regression analysis was BSI global score. Next, the regression was repeated with each BSI subscale in turn as the dependent variable. Results are shown in table 8.

*Table 8: Multiple regression analyses, testing PPPQ subscales as predictors of BSI subscales (including age as an independent variable).*

| | *Overall effect* | | | *Independent predictors* | | | |
|---|---|---|---|---|---|---|---|
| BSI subscale: | F | P | % variance | Variable | T | Beta | P |
| Global | 24.06 | .001 | 23.3% | Persistence | 3.28 | -.19 | .001 |
| | | | | Perseverance | 7.36 | .42 | <.001 |
| | | | | Perfectionism | 2.05 | .13 | .04 |
| | | | | Age | 2.14 | -.11 | .03 |
| Somatization | 11.71 | <.001 | 12.4% | Persistence | 1.36 | -.08 | NS |
| | | | | Perseverance | 4.68 | .28 | <.001 |
| | | | | Perfectionism | 0.82 | .05 | NS |
| | | | | Age | 2.78 | -.16 | .006 |
| Obsessive compulsive | 24.88 | <.001 | 24.0% | Persistence | 3.29 | -.19 | .001 |
| | | | | Perseverance | 7.71 | .44 | <.001 |
| | | | | Perfectionism | 2.07 | .13 | .04 |
| | | | | Age | 1.66 | -.09 | NS |
| Interpersonal sensitivity | 17.80 | <.001 | 18.2% | Persistence | 3.41 | -.21 | .001 |
| | | | | Perseverance | 5.96 | .35 | <.001 |
| | | | | Perfectionism | 2.85 | .18 | .005 |
| | | | | Age | 1.23 | -.07 | NS |
| Depression | 14.5 | <.001 | 15.1% | Persistence | 4.32 | -.26 | <.001 |
| | | | | Perseverance | 5.24 | .31 | <.001 |
| | | | | Perfectionism | 1.91 | .12 | NS |
| | | | | Age | 1.65 | -.09 | NS |
| Anxiety | 14.30 | <.001 | 14.9% | Persistence | 1.70 | -.10 | ns |
| | | | | Perseverance | 6.00 | .36 | <.001 |
| | | | | Perfectionism | 0.95 | .06 | NS |
| | | | | Age | 1.54 | -.09 | NS |
| Hostility | 8.52 | <.001 | 9% | Persistence | 2.35 | -.15 | .02 |
| | | | | Perseverance | 3.97 | .25 | <.001 |
| | | | | Perfectionism | 0.75 | .05 | NS |
| | | | | Age | 2.33 | -.14 | .02 |
| Phobic anxiety | 14.5 | <.001 | 15.1% | Persistence | 1.33 | -.08 | NS |
| | | | | Perseverance | 5.80 | .35 | <.001 |
| | | | | Perfectionism | 2.46 | .16 | .02 |
| | | | | Age | 0.52 | .03 | NS |
| Paranoid ideation | 16.51 | <.001 | 17.0% | Persistence | 2.33 | -.14 | .02 |
| | | | | Perseverance | 5.78 | .34 | <.001 |
| | | | | Perfectionism | 2.13 | .14 | .03 |
| | | | | Age | 1.97 | -.11 | .05 |
| Psychoticism | 13.29 | <.001 | 14.0% | Persistence | 2.64 | -.16 | .009 |
| | | | | Perseverance | 5.32 | .32 | <.001 |
| | | | | Perfectionism | 1.13 | .07 | NS |
| | | | | Age | 2.24 | -.13 | .03 |

As shown in Table 8, Perseverance was consistently the best predictor of psychopathology, as

measured by the BSI. It significantly positively predicted all BSI subscales. Where Perfectionism was predictive of psychopathology (Global BSI, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Phobic Anxiety and Paranoid Ideation), it was a less powerful predictor than Perseverance. In contrast, Persistence was negatively associated with most types of psychopathology (high Persistence predicts low scores on all but three BSI subscales).

4.7. The PPPQ as a predictor of eating pathology: Regression analyses with the EDE-Q

Regressions were conducted to examine PPPQ and BMI as predictors of each EDE-Q subscale and of each relevant EDE-Q behavioural item (total number of objective bulimic episodes; total number of purging episodes; fasting; food avoidance; and the desire to have an empty stomach). Results of these analyses are shown in Table 9.

*Table 9: Regression analyses with EDE-Q subscales as dependent variables*

| | *Overall effect* | | | *Independent predictors* | | | |
|---|---|---|---|---|---|---|---|
| EDE subscale: | F | P | % variance | Variable | T | Beta | P |
| Global | 10.42 | <.001 | 11.8% | Persistence | 1.45 | -.09 | NS |
| | | | | Perseverance | 3.20 | .19 | .002 |
| | | | | Perfectionism | 1.80 | .12 | NS |
| | | | | BMI | 5.09 | .29 | <.001 |
| Restraint | 4.06 | .003 | 3.9% | Persistence | .31 | -.02 | NS |
| | | | | Perseverance | 2.09 | .13 | .04 |
| | | | | Perfectionism | .23 | .02 | NS |
| | | | | BMI | 3.43 | .19 | .001 |
| Eating concern | 5.90 | <.001 | 6.3% | Persistence | 2.34 | -.15 | .02 |
| | | | | Perseverance | 2.48 | .15 | .01 |
| | | | | Perfectionism | 2.02 | .14 | .04 |
| | | | | BMI | 3.06 | .17 | .002 |
| Weight concern | 15.30 | <.001 | 16.1% | Persistence | 1.09 | -.07 | NS |
| | | | | Perseverance | 3.32 | .19 | .001 |
| | | | | Perfectionism | 1.93 | .12 | NS |
| | | | | BMI | 6.62 | .35 | <.001 |
| Shape concern | 13.08 | <.001 | 14.0% | Persistence | 1.41 | -.09 | NS |
| | | | | Perseverance | 3.66 | .21 | <.001 |
| | | | | Perfectionism | 2.49 | .16 | .01 |
| | | | | BMI | 5.21 | .28 | <.001 |
| Total OBEs | 3.10 | .02 | 2.7% | Persistence | 1.76 | -.11 | NS |
| | | | | Perseverance | .23 | .01 | NS |
| | | | | Perfectionism | .56 | .04 | NS |
| | | | | BMI | 3.13 | .18 | .002 |
| Total purges | .28 | ns | .01% | Persistence | .53 | .04 | NS |
| | | | | Perseverance | .82 | .05 | NS |
| | | | | Perfectionism | .69 | -.05 | NS |
| | | | | BMI | .29 | -.02 | NS |
| Fasting | 2.57 | .04 | 2.0% | Persistence | .48 | .03 | NS |
| | | | | Perseverance | 2.88 | .18 | .004 |
| | | | | Perfectionism | .30 | -.02 | NS |
| | | | | BMI | .85 | .05 | NS |
| Avoid foods | 4.43 | .002 | 4.4% | Persistence | .53 | -.03 | NS |
| | | | | Perseverance | 1.45 | .09 | NS |
| | | | | Perfectionism | .29 | -.02 | NS |
| | | | | BMI | 4.02 | .23 | <.001 |
| Empty stomach | 4.38 | .002 | 4.3% | Persistence | .01 | -.001 | NS |
| | | | | Perseverance | 3.55 | .22 | <.001 |
| | | | | Perfectionism | .63 | .04 | NS |
| | | | | BMI | .25 | -.01 | NS |

As can be seen in Table 9, Perseverance is also positively associated with eating-related

pathology, significantly predicting scores on all EDE-Q scales. Perserverance was not predictive of items related to bulimic tendencies (number of objective bulimic episodes or number of purge episodes in the last 28 days). It is possible that this is because of the small range for these behaviours. However, Perseverance was positively related to some restrictive behaviours (fasting, the desire for an Empty Stomach), but not all (Food Avoidance). Perfectionism was significantly positively predictive of eating concern and shape concern but not of any of the items associated with bulimic or restrictive tendencies. Again, in contrast, Persistence was negatively predictive of eating concern. However, it was not reliably associated with any other EDE-Q subscales or items.

## 5. DISCUSSION

### 5.1 Summary of findings

This thesis reports the use of factor analysis to develop a new questionnaire of features thought to be related to restrictive psychopathology. Sufficient participants (325) were recruited relative to the number of items in the original PPPQ. The results of the factor analysis appear to be psychometrically valid and are theoretically interesting. Three subscales emerged, corresponding to the constructs of persistence, perseverance, and perfectionism. These showed good psychometric properties, fitting a theoretical understanding of the three concepts. Test-retest reliability was good.

Results of the regression analyses suggest clear relationships between perseverance, persistence and various types of psychopathology in a non-clinical population. These findings should be extended to clinical populations to confirm the findings.

In particular, Perseverance was associated positively with psychopathology (both general and eating disorder related), suggesting that it is an unhealthy trait. Perfectionism was also associated with psychopathology, but more weakly than persistence. This suggests that, in common with previous research, it is a negative trait. However, in the current study,

perfectionism appears to be of less importance than perseverance. In contrast, persistence was negatively associated with psychopathology, leading to the possibility that this trait is protective/healthy.

The initial suggestion that perseverance is higher in students than in working people was not confirmed by a one-way ANOVA, which demonstrated that the effect was due purely to age. Correlational analyses confirmed that older people have lower levels of perseverance than younger people. However, the current study included participants from a restricted age range (most were aged from late teens to thirties). Further research should examine age effects in the whole age range.

5.2. Limitations

The cross-sectional design of the current study does not allow us to determine the direction of causation. For example, it is not possible to say whether high perseverance leads to psychopathology or the opposite. Two possible types of studies could help to clarify this picture. Firstly, in order to obtain stronger evidence for a causal relationship, prospective or retrospective studies would be needed, in order to determine whether perseverance pre-dates the onset of psychopathology. Prospective studies are psychometrically robust but are expensive and time-consuming. Retrospective studies are easier to carry out, but tend to suffer from measurement error as they rely on participants' recall.

A second approach would be to examine whether high levels of perseverance are involved in the maintenance of psychological conditions. It seems plausible to predict that those with high levels of perseverance will find it harder to recover from psychological disorders, and their condition will hence be more chronic than those who have lower levels of perseverance. Perseverant features may also make it harder for individuals to benefit from certain kinds of therapy. Such hypotheses could be tested in relatively short-term prospective outcome studies by administering the PPPQ at first presentation at mental health services, then

measuring outcome from the psychological difficulties over time.

A further limitation of the current study concerns the measurement of clinical concepts in non-clinical participants. Levels of psychopathology in the current sample are generally low, as would be expected in a community sample. Hence it is not possible to draw strong conclusions about relationships between the PPPQ and other measures in individuals with psychopathology at clinically significant levels. An important focus of future research should be replication in a range of clinical groups.

A further issue is that there may be differences in the social desirability of the different subscales. In particular, perseverance items are likely to be interpreted as more pathological than items on the other two subscales, which may be interpreted as more socially desirable. It is possible that this led to differential responding depending on social desirability. This possibility could be examined in future research by incorporating a measure of socially desirable responding.

Finally, although preliminary validation of the PPPQ has been performed and is described in this thesis, further work is still required. For example, Cronbach's alpha is rather low for one subscale (Perseverance). Future work might usefully generate more items for this subscale. The fact that perseverance was a strong predictor of psychopathology in spite of its relatively low Cronbach's alpha suggests that these findings may be an underestimate of the effects involved. It is possible that generating items that result in greater internal consistency might improve the predictive power of the subscale still further.

### 5.3. Relationship of findings to previous literature

The PPPQ was developed following a review of three main areas of the literature. Firstly, the phenomenology of the eating pathology and eating disorders was described, identifying the often intractable nature of AN and exploring some possible reasons for this. Secondly,

cognitive aspects of eating disorders were reviewed, highlighting a convergence of evidence towards rigid or perseverant responding in AN. Finally, personality features were explored, with a focus on the concept of perfectionism and its role in aetiology and maintenance.

The current findings have implications for all three of these areas. Firstly, the concept of perseverance may have potential to change our understanding of treatment resistance. Resistance, particularly in AN, has often been understood to result from the personally valued nature of the eating disorder (Serpell et al., *in press;* Serpell et al., 1999; Vitousek, Watson, & Wilson, 1998). If an association between perseverance and restrictive pathology is confirmed in future research, this might suggest that such individuals are 'treatment resistant' not only because of the valued aspects of the disorder, but also because their perseverant style makes it difficult for them to change their ingrained behaviour (e.g., restricting food intake, fasting, sticking to a rigid diet regime). If links to other types of psychopathology are confirmed, it is possible that perseverance will also have implications for intractable cases in other disorders.

Secondly, the findings can be related to the current debate on the nature of perfectionism (Hewitt et al., 2003; Shafran et al., 2003; Vitousek, 2003). Findings suggest that perfectionism can be understood differently from current conceptualisations and that it can be successfully distinguished from related concepts. The current measure includes a perfectionism subscale, but some conceptualisations of perfectionism would include features that are labelled as persistence or perseverance in the PPPQ. For example, if concepts of 'positive perfectionism' include persistence-like features, this would be inconsistent with Shafran and colleagues statement that "When the pursuit of excellence is functional and positive, it has little clinical relevance" (Shafran et al., 2002, p774). It is noteworthy that Shafran's definition of clinical perfectionism is presented in terms of having high standards *even when there are costs.* It is possible that such a definition encapsulates some elements of perseverance (as measured by the PPPQ).

Thirdly, the development of the PPPQ has implications for studies of rigidity and perseverant responding in set-shifting tasks, as conducted by Tchanturia and others. The perseverance subscale is likely to have overlap with rigidity as measured by Tchanturia and colleagues in neuropsychological studies (Tchanturia, Brecelj Anderluh et al., in press; Tchanturia, Morris et al., in press; Tchanturia, Morris et al., 2002; Tchanturia, Serpell et al., 2002). Further research could explore whether individuals who score high on a perceptual rigidity task or other measures of set-shifting also show high perseverance on the PPPQ. This would lead to a further question of whether neurobiological correlates can be identified for perseverance or other PPPQ subscales.

5.4. Research implications and future work

This study has considerable implications for research, but further work is needed - firstly to refine the instrument itself (Smith & McCarthy, 1995), and secondly to investigate the relationship of the measure to psychopathology. The second of these has been described in section 5.2 (above). Hence, only the first will be covered here.

Smith and McCarthy (1995) point out that measure development is commonly inadequate because researchers fail to satisfy certain essential requirements for the development of a psychometrically sound instrument. These include:

1. Checking the dimensional/hierarchical structure of the measure (e.g., using factor analysis)
2. Establishing the internal consistency of subscales
3. Determining content homogeneity of subscales
4. Including items that differentiate at an appropriate level of severity
5. Checking the psychometric properties of the instrument by replicating in a different population or populations.

The first two of the above requirements have been met in the current study. However, future development work should be devoted to addressing the remaining three stages.

Determination of content homogeneity (criterion 3) was begun in the current study by using independent raters to rate the degree to which each item fitted a specific construct. However, as recommended by Smith and McCarthy, this process should be repeated, possibly by asking raters to rate the degree to which each items fits with both the subscale construct, other constructs in the measure and other, related but separate constructs. This provides a check that items are actually measuring the subscale construct itself, and not a related construct that happens to be highly correlated with the subscale construct.

Criterion 4 (the inclusion of items that discriminate at the desired level of intensity) is difficult to perform as yet, when so little is known about the relationship of subscale constructs (particularly Perseverance) to psychopathology. Once future research has determined the degree of perserverance that is required for an impact on psychopathology, this criterion can be examined. If, as hypothesised, perseverance is associated with psychopathology (such as restrictive tendencies), it is likely that the discriminating power of items on the Perseverance subscale will be reduced in a clinical population (such as a group of individuals with AN).

The final criterion could be addressed as part of a study of individuals with clinically significant psychological difficulties. Ideally this should consist of individuals with AN, BN and a range of other psychopathologies, as well as a group of non-clinical participants. This would enable the factor structure to be replicated in a non-clinical group, as well as establishing factor structure and psychometric properties in clinical groups. Such a study would also begin to address the second set of questions posed at the start of this section, regarding the clinical significance of the PPPQ measure.

5.5. Clinical implications

If future research confirms that perseverance is associated with a range of forms of psychopathology, it will be important to establish the role of this construct in the development and maintenance of psychological disorders. It is clear that difficulties in changing a behaviour once it has begun or been learned might make it more difficult for people to benefit from therapy, to change unhelpful behaviours, and thus to recover from psychological distress. It is possible that the construct of perserverance has implications both for the content of therapies and also for the way in which they are conducted. It may be that perseverance needs to be tackled directly in therapy by helping people to be more flexible. Tchanturia (personal communication) is currently piloting the use of therapies used in cognitive rehabilitation to improve cognitive flexibility with individuals with eating disorders, and this is a promising avenue for investigation.

If suggestions of persistence being associated with psychological health (i.e., possibly having a protective role) are confirmed in future research, this would also have clinical implications. Firstly, such a finding would aid our understanding of why some people appear to show resilience to developing psychological disorders, despite having a number of risk factors (Bouvier, 2003). Secondly, there are some suggestions from the education literature that children can be trained to become more persistent, and adaptations of these techniques might be a useful addition to current therapy techniques. Such ideas might also have a role in preventing the development of psychopathology.

## 6. REFERENCES


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7. APPENDICES

Appendix 1: Ethics

THE UNIVERSITY OF WARWICK

# MEMO

**To:** Lucy Serpell

**From:** Caroline Meyer

**Re:** Ethics approval

**Date** 21st August 2003

Dear Lucy,

**The Perfectionism, Persistence and Perseverance (PPP) Questionnaire: The development of a measure of personality features in anorexia nervosa**

I have shown the project protocol and measures to John Pickering who is chair of the Psychology Research Ethics Committee here at Warwick. Given that you have already gained local ethics approval, he has taken Chair's action and is happy for the research to proceed.

Best wishes

Dr Caroline Meyer

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# Camden and Islington Community Health Service
# LOCAL RESEARCH ETHICS COMMITTEE

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24 July 2003

Dr Lucy Serpell
145A Devonshire Road
London
SE23 3LZ

Dear Dr Serpell

**LREC Ref: 03/30** (please quote in all further correspondence)
**Title: The Perfectionism, Persistence and Perseverance (PPP) Questionnaire: the development of a measure of personality features in anorexia nervosa**

Thank you for submitting the above project for ethical consideration. The Committee gave careful consideration to your proposal at its meeting on 21 July 2003. I am pleased to inform you that the Local Research Ethics Committee has no ethical objections to your project proceeding. However please note the following:

- The Committee suggested that to avoid confusion you might wish to use the term "perseveration" rather than "perseverance".
- The Committee would also like to remind you that as your project involves recruitment of UCL students as participants, you must contact the UCL Registrar, Martin Butcher (m.butcher@ucl.ac.uk), to inform him of your project and also inform Mr Butcher of the names of the students who participate. You must also ensure that any relevant notification or "approval" procedures necessary to recruit students from Warwick University are also followed correctly.
- Please could you correct the LREC name on the information sheets so that it reads Camden & Islington Community Health Service Local Research Ethics Committee.

This opinion has also been communicated to the North Central London Community Research Consortium, with who you have registered your project as a Camden & Islington Mental Health and Social Care Trust employee.

**The following conditions apply to this project:**

- You must write and inform the Committee of the start date of your project. The Committee (via the Local Research Ethics Committee Administrator or the Chair at the above address) must also receive notification:

  a) when the study commences;
  b) when the study is complete;
  c) if it fails to start or is abandoned;
  d) if the investigator/s change and
  e) if any amendments to the study are made.

- The Committee must receive immediate notification of any adverse or unforeseen circumstances arising out of the project.

It is the responsibility of the investigators to ensure that all associated staff, including nursing staff, are informed of research projects and are told that they have the approval of the Ethics Committee and management approval from the body hosting the research.

The Committee will require a copy of the report on completion of the project and may request details of the progress of the research project periodically (e.g. annually for longer projects).

If data are to be stored on a computer in such a way as to make it possible to identify individuals, then the project must be registered under the Data Protection Act 1998. Please consult your department data protection officer for advice.

Failure to adhere to these conditions set out above will result in the invalidation of this letter of no objection.

**Please forward any additional information/amendments regarding your study to the Local Research Ethics Committee Administrator or the Chair at the above address.**

Yours sincerely

Theodore

Stephanie Ellis
Chair, LREC

Appendix 2: Draft questionnaire items given to raters

August 2003

Dear friend / colleague

*PERSISTENCE, PERFECTIONISM AND PERSEVERANCE*

As part of my clinical psychology doctorate, I need to complete a piece of research. My plan is to develop a questionnaire to tap three elements that may be important in the aetiology and course of anorexia nervosa. I have called the three elements 'perfectionism', 'persistence' and 'perseverance'. However, as each of these terms has been used in a range of ways in the literature, I give definitions below.

Before I can do this, I need to be clear about what sort of items best reflect the constructs that I want to measure. I would very much appreciate your help in rating some potential questionnaire items, according to how well they represent each element.

> **Perseverance** is defined as: 'a tendency to continue with a particular behaviour or activity beyond the point at which this behaviour ceases to be appropriate or rewarding'. This is a relatively automatic process, which is not under conscious control. An example of this would be beginning a task or activity (e.g., brushing one's teeth or organising one's room) and needing to continue with it beyond the point at which the task is complete and has no further potential perceived benefits. It is important to distinguish between this type of perseverance and the repetitive behaviour often seen in obsessive-compulsive disorder (OCD). OCD is motivated by an attempt to avoid future negative consequences (e.g., repeatedly brushing teeth to prevent tooth decay). Perseverance is not marked by this urge to avoid future negative consequences.
>
> **Persistence** is: 'the ability to continue or persist with an activity in order to reach a goal, even when the task is arduous or lasts for a long time'. Persistence is more likely to be voluntary (i.e., under some degree of conscious control). In the education literature, persistence is seen as a positive trait to be encouraged in school-age children. It is defined as the ability to continue with a task until it is complete, even when that task is difficult (Lufi & Cohen, 1987).
>
> Note that the behaviours characteristic of persistence and perseverance may be similar, whilst the cognitive components will differ. For example, someone who brushes their teeth for 3 minutes may be persistent (deciding to do this for a long time because it is seen to be necessary, if arduous or boring) or they may be perseverant (i.e. continuing because once the activity has started it has a tendency to be continued rather than to stop).
>
> **Perfectionism** is: 'having high standards for oneself, wishing to do all activities in life to an extremely high level along with the feeling that failing to be perfect in one domain means that one is a failure more generally as a person'. The behaviours associated with perfectionism are likely to be those which fit with these high standards, such as carefully checking that a piece of work is correct and attending to small details of a task which others might ignore.

HOW YOU CAN HELP

To choose items for the questionnaire, I would like your help in deciding which items best represent each of the three elements. Please rate the following statements for each of the three elements, using a scale from 1 to 7. For example, if you feel that the first statement fits

fairly well with the definition of perseverance, you might give it a score of 5. In contrast, if you feel it does not fit the definition at all, you would give it a score of 1.

Please note that I am not interested in *your* behaviour or attitudes, but rather in how well each item reflects the three constructs.

Remember, score each item three times, according to how well it fits each of the definitions of perseverance, persistence and perfectionism. These should be scored on a 1-7 scale, where 1 is 'doesn't fit the definition at all' and 7 is 'fits the definition very well'.

| | Perseverance score (1-7) | Persistence score (1-7) | Perfectionism score (1-7) |
|---|---|---|---|
| 1. Sometimes I find myself continuing to do something even when there is no point in carrying on. | | | |
| 2. When I phone someone to get a decision, if I get an engaged tone then I tend to keep ringing back every minute or so, even when the deadline for the decision has passed. | | | |
| 3. Even when I do something very carefully, I often feel that it is not quite right | | | |
| 4. If I have a problem in my relationship, I will work hard at sorting it out, even if this takes a long time. | | | |
| 5. Once I have decided to do something, I keep going until I reach my goal | | | |
| 6. When calling a tradesman to arrange for him to come to my home, I may continually ring and leave messages on the same number, even though I know that they are not being picked up or responded to. | | | |
| 7. When reading a book or magazine, I often feel that I must begin at the first page and read through to the very end, even if some of the parts are of no interest. | | | |
| 8. If an item I wish to buy is not available in one shop, I will continue trying different shops until I find one that stocks the item. | | | |
| 9. If a friendship is running into difficulties, I keep trying to resolve things, even though I know it's hopeless. | | | |
| 10. I hate making mistakes | | | |
| 11. If I have an appointment, I always check my travel arrangements carefully in advance to make sure that I have plenty of time to get there and not be late. | | | |

| | | | |
|---|---|---|---|
| 12. If a friendship seems to be running into difficulties, I will keep trying to resolve things, in case it's just a hiccup. | | | |
| 13. People describe me as someone who can stick at a task, even when it gets difficult | | | |
| 14. I set high standards for myself | | | |
| 15. When reading a book or magazine, I keep going until I have read all the necessary material, even when the concepts are difficult to understand. | | | |
| 16. If I try to solve a problem or puzzle, I do not stop until I find an answer. | | | |
| 17. When calling a tradesman to arrange for him to come to my home, I would make sure I had all the relevant paperwork and measurements ready. | | | |
| 18. In a relationship, even if things are going well, I still work as hard as I can at keeping the relationship going. | | | |
| 19. I have habits that I find it hard to change, no matter how much I try. | | | |
| 20. When calling a tradesman to arrange for him to come to my home, I try all the contact numbers I have for him in the hope of catching him. | | | |
| 21. One of my goals is to be perfect in everything I do | | | |
| 22. When reading a book or magazine, I carefully plan my reading so that I make sure I do not miss any important parts. | | | |
| 23. I tend to keep going with a long task until it is complete, rather than giving up quickly | | | |
| 24. When shopping in the supermarket, I check items off on a list as I put them in the trolley, so that nothing is forgotten. | | | |
| 25. When studying for an important test, I tend to stay up working late into the night, even though I know I am no longer taking in the material and that the studying will not help my performance. | | | |
| 26. When studying for an important test, if I have decided to revise a topic, I keep going until I have finished, rather then getting distracted by other things. | | | |

| | | | |
|---|---|---|---|
| 27. If I am trying to get to an appointment but my car has broken down, I do my best to get there in time by investigating other routes (e.g., finding out if I can get a bus, train or taxi) | | | |
| 28. If I have an important test coming up, I am likely to plan carefully which topics I will need to cover, making a revision timetable to ensure I get everything done. | | | |
| 29. If I do something less than perfectly, I feel like a failure. | | | |
| 30. I keep trying to sort out problems in a relationship, even if I know it's not going to survive. | | | |
| 31. If I have learned to do something in a particular way, I find it difficult to change and do it in a different way, even if the circumstances have changed. | | | |
| 32. If I have an important appointment and am running very late, I will keep trying to get there, even though I have missed the appointment time. | | | |
| 33. When shopping in the supermarket, I walk down the aisles one-by-one until I have covered the whole store, even if I only need a couple of items. | | | |

Thank you very much for your help.
If you have any further comments about the definitions or questionnaire items, please make them below.

Appendix 3: Original PPPQ

PPPQ-28

This questionnaire contains a number of statements about how people might behave or think. Please read each item carefully and place a tick in the box which most applies to you.

| | Not at all true of me | A little true of me | Somewhat true of me | Very true of me | Totally true of me |
|---|---|---|---|---|---|
| 1. Sometimes I find myself continuing to do something even when there is no point in carrying on. | | | | | |
| 2. When I phone someone to get a decision, if I get an engaged tone then I tend to keep ringing back every minute or so, even when the deadline for the decision has passed. | | | | | |
| 3. Even when I do something very carefully, I often feel that it is not quite right | | | | | |
| 4. If I have a problem in my relationship, I will work hard at sorting it out, even if this takes a long time. | | | | | |
| 5. Once I have decided to do something, I keep going until I reach my goal | | | | | |
| 6. When calling a tradesman to arrange for him to come to my home, I may continually ring and leave messages on the same number, even though I know that they are not being picked up or responded to. | | | | | |
| 7. When reading a book or magazine, I often feel that I must begin at the first page and read through to the very end, even if some of the parts are of no interest. | | | | | |
| 8. If an item I wish to buy is not available in one shop, I will continue trying different shops until I find one that stocks the item. | | | | | |
| 9. I hate making mistakes | | | | | |
| 10. If I have an appointment, I always check my travel arrangements carefully in advance to make sure that I have plenty of time to get there and not be late. | | | | | |
| 11. If a friendship seems to be running into difficulties, I will keep trying to resolve things, in case it's just a hiccup. | | | | | |
| 12. People describe me as someone who can stick at a task, even when it gets difficult | | | | | |
| 13. I set high standards for myself | | | | | |
| 14. When reading a book or magazine, I keep going until I have read all the necessary material, even when the concepts are difficult to understand. | | | | | |
| 15. If I try to solve a problem or puzzle, I do not stop until I find an answer. | | | | | |
| 16. When calling a tradesman to arrange for him to come to my home, I would make sure I had all the relevant paperwork and measurements ready. | | | | | |

| | Not at all true of me | Slightly true of me | Somewhat true of me | Very true of me | Totally true of me |
|---|---|---|---|---|---|
| 17. When calling a tradesman to arrange for him to come to my home, I try all the contact numbers I have for him in the hope of catching him. | | | | | |
| 18. One of my goals is to be perfect in everything I do | | | | | |
| 19. When reading a book or magazine, I carefully plan my reading so that I make sure I do not miss any important parts. | | | | | |
| 20. I tend to keep going with a long task until it is complete, rather than giving up quickly | | | | | |
| 21. When studying for an important test, I tend to stay up working late into the night, even though I know I am no longer taking in the material and that the studying will not help my performance. | | | | | |
| 22. When studying for an important test, if I have decided to revise a topic, I keep going until I have finished, rather then getting distracted by other things. | | | | | |
| 23. If I am trying to get to an appointment but my car has broken down, I do my best to get there in time by investigating other routes (e.g., finding out if I can get a bus, train or taxi) | | | | | |
| 24. If I have an important test coming up, I am likely to plan carefully which topics I will need to cover, making a revision timetable to ensure I get everything done. | | | | | |
| 25. If I do something less than perfectly, I feel like a failure. | | | | | |
| 26. I keep trying to sort out problems in a relationship, even if I know it's not going to survive. | | | | | |
| 27. If I have an important appointment and am running very late, I will keep trying to get there, even though I have missed the appointment time. | | | | | |
| 28. When shopping in the supermarket, I walk down the aisles one-by-one until I have covered the whole store, even if I only need a couple of items. | | | | | |

Thank you very much for completing this questionnaire.

Appendix 4: Revised PPPQ organised by subscale, showing item numbers for the original and revised versions of the measure

| *Subscale* | *Item # in revised* | *Item # in original* | *Item* |
|---|---|---|---|
| Persistence | 7 | 20 | I tend to keep going with a long task until it is complete, rather than giving up quickly. |
| | 12 | 12 | People describe me as someone who can stick at a task, even when it gets difficult. |
| | 19 | 4 | If I have a problem in my relationship, I will work hard at sorting it out, even if this takes a long time. |
| | 15 | 5 | Once I have decided to do something, I keep going until I reach my goal. |
| | 6 | 14 | When reading a book or magazine, I keep going until I have read all the necessary material, even when the concepts are difficult to understand. |
| | 14 | 15 | If I try to solve a problem or puzzle, I do not stop until I find an answer. |
| | 3 | 11 | If a friendship seems to be running into difficulties, I will keep trying to resolve things, in case it's just a hiccup. |
| | 21 | 23 | If I am trying to get to an appointment but my car has broken down, I do my best to get there in time by investigating other routes (e.g., finding out if I can get a bus, train or taxi). |
| Perseverance | 2 | 26 | I keep trying to sort out problems in a relationship, even if I know it's not going to survive. |
| | 22 | 1 | Sometimes I find myself continuing to do something even when there is no point in carrying on. |
| | 17 | 3 | Even when I do something very carefully, I often feel that it is not quite right. |
| | 20 | 28 | When shopping in the supermarket, I walk down the aisles one-by-one until I have covered the whole store, even if I only need a couple of items. |
| | 13 | 6 | When calling a tradesman to arrange for him to come to my home, I may continually ring and leave messages on the same number, even though I know that they are not being picked up or responded to. |
| | 8 | 2 | When I phone someone to get a decision, if I get an engaged tone then I tend to keep ringing back every minute or so, even when the deadline for the decision has passed. |
| | 11 | 21 | When studying for an important test, I tend to stay up working late into the night, even though I know I am no longer taking in the material and that the studying will not help my performance. |
| | 5 | 7 | When reading a book or magazine, I often feel that I must begin at the first page and read through to the very end, even if some of the parts are of no interest. |
| Perfectionism | 18 | 16 | When calling a tradesman to arrange for him to come to my home, I would make sure I had all the relevant paperwork and measurements ready. |
| | 4 | 10 | If I have an appointment, I always check my travel arrangements carefully in advance to make sure that I have plenty of time to get there and not be late. |
| | 1 | 9 | I hate making mistakes. |
| | 9 | 24 | If I have an important test coming up, I am likely to plan carefully which topics I will need to cover, making a revision timetable to ensure I get everything done. |
| | 10 | 18 | One of my goals is to be perfect in everything I do. |

| | | | |
|---|---|---|---|
| | 16 | 17 | When calling a tradesman to arrange for him to come to my home, I try all the contact numbers I have for him in the hope of catching him. |

Appendix 5: Revised 22 item PPPQ (after factor analysis)

PPPQ-22

This questionnaire contains a number of statements about how people might behave or think.

Please read each item carefully and place a tick in the box which most applies to you.

| | Not at all true of me | A little true of me | Somewhat true of me | Very true of me | Totally true of me |
|---|---|---|---|---|---|
| 1. I hate making mistakes | | | | | |
| 2. I keep trying to sort out problems in a relationship, even if I know it's not going to survive. | | | | | |
| 3. If a friendship seems to be running into difficulties, I will keep trying to resolve things, in case it's just a hiccup. | | | | | |
| 4. If I have an appointment, I always check my travel arrangements carefully in advance to make sure that I have plenty of time to get there and not be late. | | | | | |
| 5. When reading a book or magazine, I often feel that I must begin at the first page and read through to the very end, even if some of the parts are of no interest. | | | | | |
| 6. When reading a book or magazine, I keep going until I have read all the necessary material, even when the concepts are difficult to understand. | | | | | |
| 7. I tend to keep going with a long task until it is complete, rather than giving up quickly. | | | | | |
| 8. When I phone someone to get a decision, if I get an engaged tone then I tend to keep ringing back every minute or so, even when the deadline for the decision has passed. | | | | | |
| 9. If I have an important test coming up, I am likely to plan carefully which topics I will need to cover, making a revision timetable to ensure I get everything done. | | | | | |
| 10. One of my goals is to be perfect in everything I do. | | | | | |
| 11. When studying for an important test, I tend to stay up working late into the night, even though I know I am no longer taking in the material and that the studying will not help my performance. | | | | | |

| | Not at all true of me | A little true of me | Somewhat true of me | Very true of me | Totally true of me |
|---|---|---|---|---|---|
| 12. People describe me as someone who can stick at a task, even when it gets difficult. | | | | | |
| 13. When calling a tradesman to arrange for him to come to my home, I may continually ring and leave messages on the same number, even though I know that they are not being picked up or responded to. | | | | | |
| 14. If I try to solve a problem or puzzle, I do not stop until I find an answer. | | | | | |
| 15. Once I have decided to do something, I keep going until I reach my goal. | | | | | |
| 16. When calling a tradesman to arrange for him to come to my home, I try all the contact numbers I have for him in the hope of catching him. | | | | | |
| 17. Even when I do something very carefully, I often feel that it is not quite right. | | | | | |
| 18. When calling a tradesman to arrange for him to come to my home, I would make sure I had all the relevant paperwork and measurements ready. | | | | | |
| 19. If I have a problem in my relationship, I will work hard at sorting it out, even if this takes a long time. | | | | | |
| 20. When shopping in the supermarket, I walk down the aisles one-by-one until I have covered the whole store, even if I only need a couple of items. | | | | | |
| 21. If I am trying to get to an appointment but my car has broken down, I do my best to get there in time by investigating other routes (e.g., finding out if I can get a bus, train or taxi). | | | | | |
| 22. Sometimes I find myself continuing to do something even when there is no point in carrying on. | | | | | |

Thank you very much for completing this questionnaire.
Please check that you have answered each question and that you have put the date at the top of the questionnaire