Examining the prevalence and potential correlates of anxiety in Irish women.

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Declaration

I declare that this thesis that I have submitted to Dublin Business School for the award of Higher Diploma in Psychology is the result of my own investigations, except where otherwise stated, where it is clearly acknowledged by references. Furthermore, this work has not been submitted for any other degree.

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Abstract

Anxiety is a leading cause of global disability and is twice as prevalent in women as compared to men. The Global Burden of Disease registry states that 7.9% of Irish women struggle with anxiety, higher than the international average of 4.6%. This study sought to examine the prevalence and potential correlates of anxiety in an Irish sample of women. The study found 27.3% of participants reported a previous diagnosis of anxiety whereas 60.9% of participants demonstrated symptoms of anxiety ranging from mild to extremely severe. The study found positive strong correlations between levels of measured anxiety and a previous diagnosis of anxiety, a previous diagnosis of depression, perceived stress and rumination. Given the personal and economic burden of anxiety on women, it is imperative that research continues into why women experience anxiety at such high levels, what is causing it and what treatments are more suitable for women specifically.

1.   Introduction

1.1.   <u>Prevalence and Impact of Anxiety</u>

Globally, anxiety disorders now represent one of the leading causes of disability according to the World Health Organisation (WHO) (WHO, 2017). A recent WHO report based upon 2015 data confirmed that 3.6% of the global population were living with anxiety with the disorders affecting 4.6% of females as compared to 2.6% of males (WHO, 2017). Using the Global Burden of Disease (GBD) study, as produced by the Institute for Health Metrics and Evaluation, Richie and Roser (2018) confirm the global prevalence of anxiety was 4% in 2016 which relates to 275 million individuals worldwide; 4.7% of these are females and 3% are males. The average age of onset of anxiety is 11 years of age and the lifetime costs of identifying and treating anxiety in western countries is currently higher than healthcare costs associated with heart disease and cancer (Donner & Lowry, 2013). A recent systematic review on anxiety has shown that the prevalence has already reportedly surpassed depression within certain sub-populations, namely younger population and females (Remes, Brayne, van der Linde & Lafortune, 2016).

Looking to Ireland specifically, the GBD report for 2016 extrapolates the overall national prevalence of anxiety disorders to 5.9%, with 7.9% of females and 4.1% of males affected (GBD Collaborative Network, 2016). The prevalence of anxiety disorders has been steadily increasing every year both globally and in Ireland (WHO, 2017; GBD Collaborative Network, 2016). Anxiety disorders rank as the 6th health problem in Ireland overall, causing the most disability as measured by years lived with disability (GBD Collaborative Network, 2016). Given the clinical and economic burden on society caused by anxiety disorders, it is incumbent upon mental health researchers and professionals to continue investigating the mechanisms and effects of anxiety to improve diagnosis and treatments, with particular emphasis on incorporating gender differences.

In Ireland, research examining anxiety specifically in females is minimal. A PubMed search conducted using the keywords 'women', 'anxiety', and 'Ireland' generated 143 publications. Once the publications were filtered for primary morbidity conditions such as obstetric issues, only 6 publications remained examining anxiety in women in Ireland. Each of these 6 publications was in a specific societal situation e.g. lack of exercise or domestic abuse. This study seeks to examine the prevalence of anxiety in a general population sample in Ireland as this is a population that has not been examined before, and measure possible predictive factors for the disorders, specifically younger age, perceived stress, previous diagnosis of depression or anxiety, a previous traumatic event, parental status and level of rumination.

1.2.   Anxiety as a Mental Health Disorder

The Diagnostic and Statistical Manual of Mental Disorders 5 defines anxiety as a group of disorders that all have features of excessive anticipatory fear or worry with related behavioural disturbances such as cautious or avoidant behaviour, and physiological changes such as motor tension and autonomic over-activity (American Psychiatric Association, 2013). Types of anxiety disorders include generalised anxiety disorder (GAD), agoraphobia, social anxiety disorder, specific phobias, selective mutism, separation anxiety disorder and panic disorder (American Psychiatric Association, 2013). In DSM-4, acute stress disorder (ASD), post-traumatic stress disorder (PTSD) and obsessive compulsive disorder (OCD) were classified as anxiety disorders but were re-classified in DSM-5 as Trauma- and Stressor-Related disorders and Obsessive-Compulsive, Stereotypic and Related disorders. Given the relatively recent reclassification of ASD, PTSD and OCD to different categories outside anxiety disorders, much of the published literature in anxiety includes these disorders and thus will be included here (American Psychiatric Association, 2000; American Psychiatric Association, 2013).

Anxiety as a mental health disorder seems to arise as a maladaptive stress response (Altemus, 2006). In the face of stress, evolution has coded into humans the fight or flight response whereby the organism's reaction to a potentially life-threatening situation is to flee or fight based upon this selectively advantageous response to ensure survival (Barlow, 2002). To achieve this response, almost instantaneous biological responses occur. The cardiovascular system is activated which results in raised arterial pressure and decreased peripheral pressure to ensure vital organs are sufficiently perfused (Barlow, 2002). Pupils dilate presumably to give the individual a larger viewing window. Digestive activity is suspended as it is non-essential which often results in a 'sick stomach' or vomiting which is seen as a reflexive action to eliminate possibly ingested poisonous substances. Often the individual experiences an urge to urinate thus voiding any storage capabilities to allow full focus on the threat (Barlow, 2002). Breathing often becomes rapid and shallow in an effort to ingest more oxygen to encourage increased blood flow and circulate more oxygen to the brain (Barlow, 2002).

These natural and evolutionary responses to fear however have the potential to become maladaptive in humans and this results in similar responses to a perceived future threat rather than an actual threat; this is anxiety (Barlow, 2002). Symptoms of fear in the face of genuine threat, and anxiety, have corresponding states along a converging continuum. Overt motor responses to fear include escape, whereby this manifests as avoidance in anxiety. Somato-visceral reactions in fear including heart palpitations, trembling and nausea become recognisable muscle tension in anxiety (Barlow, 2002). Barlow (2002) suggests that the most recognisable symptom of anxiety, worry, is the result of a verbal-subjective reaction which actually originated as thoughts of imminent threat in a fear state. The anxious state leads to chronic hypervigilance in the individual; anxiety has been described as the "unsuccessful search for safety" (Woody & Rachman, 1994).

1.3.   Sex Differences in Anxiety

There is a well described sex imbalance in anxiety with far more women being diagnosed with anxiety disorders as compared to men (Remes et al, 2016; Pigott, 2003; Donner et al, 2013; Christiansen, 2015). Most research finds that women are almost twice as likely to be affected by anxiety with this ratio persisting across age and socio-economic background (Richie et al, 2018; Remes et al, 2016; WHO, 2017). Within the family of anxiety disorders, sex differences with a bias towards females are observable in all disorders except social anxiety disorder and obsessive compulsive disorder. Sex differences in these disorders are not always significant (Christiansen, 2015).

Research into why anxiety occurs at a higher level in women has been limited by the fact that much of the available research is not specifically related to females. Less than 2% of studies in the research of the brains involvement in memory, learning, fear conditioning and fear extinction have been conducted on females, with the remainder on males (Christiansen, 2015). One of the key issues with researching anxiety in women is the inability to develop appropriate animal models. Although neuroanatomy and physiology across female rodents and women is sufficiently comparable for other diseases, relevant differences in reproductive and hormonal cycles compromise the investigation of neurobiological and endocrine effects in anxiety (Donner et al, 2013). Additionally, animal models of female mice actually seem to exhibit lower anxiety behaviour as compared to male mouse models when using anxiety inducing stressor tests. For example, after chronic restraint stress, male rats show impairment of spatial memory or object recognition whereas female rats do not (Altemus, 2006). It remains to be determined however if the differences in these responses however are adaptive or maladaptive. Memory loss after a traumatic experience in male rodents could be seen as an adaptive coping response (Donner et al, 2013).

Similar responses have been reported in humans. Kirschbaum, Pirke and Hellhammer (1993) demonstrated that women exhibited lower hypothalamic-pituitary–adrenal (HPA) axis activation as compared to male counterparts during a Trier Social Stress Test (TSST). This laboratory test serves to induce an anxiogenic state that reliably activates the HPA axis. Physiologically women demonstrated lower stress response, as measured by salivary cortisol responses, but conversely they reported higher levels of distress after the test (Donner et al, 2013). Women could have a lower stress response but with a higher vulnerability to stress (Donner et al, 2013). Additionally, mental health disorders such as anxiety are inherently phenomenological, demonstrated through subjective experience rather than observable behaviour, a factor that cannot be examined using animal models (Donner et al, 2013). Much of the animal research to date on mental disorders has preoccupied itself with depression the behaviours exhibited by these animal models could equally be interpreted as anxiety rather than depression (Altemus, 2006).

1.4.   Anxiety in Women

Sex differences in anxiety disorders with a bias towards women are reported universally across cultures indicating a biological component. However cultural and gender differences have also been shown to impact anxiety disorders in males and females and it can be challenging to decipher whether biological or cultural influences are manifesting the anxiety (Christiansen, 2015). From a biological perspective, several brain regions in females have been implicated in neurological research examining fear and anxiety including the prefrontal cortex, hippocampus and extended amygdala complex as well as gonadal hormones (Christiansen, 2015). Gonadal hormones such as oestrogen, progesterone and testosterone all exhibit strong effects on anxiety behavior, all effected through activation or suppression of the HPA axis thus impacting anxiety related neurological systems and fear extinction in women and men (Christiansen, 2015).

That women experience much higher fluctuations in hormone levels throughout the course of their lifetime has implications for increased sensitivity to anxiety. Changes in the level of oestrogen and progesterone throughout puberty, menstruation, pregnancy, lactation and menopause affect HPA axis reactivity, glucocorticoid feedback sensitivity and gamma-aminobutyric acid (GABA) connections in the brain causing less stability in homeostatic systems for women (Christiansen, 2015).

Altemus (2006) has suggested that increases in oestrogen causing an anxiolytic effect has developed from an evolutionary perspective. In ancient times, most women would have spent the majority of their adulthood from puberty to menopause either pregnant or lactating which suppresses the HPA axis effecting a reduction in anxiety-like behaviours which is beneficial to the offspring (Altemus, 2006). However, it is a relatively recent change in society that women no longer do this and so the protective effect of increased oestrogen is lost thus increasing susceptibility to anxiety and depression in today's women. Women's primary defense against anxiety and depression has been rendered useless by today's societal norms (Christiansen, 2015).

Anxiety is also seen as a maladaptive state of hypervigilance and again it has been suggested that there is an evolutionary perspective here. Given that women are the bearers of offspring, it behoves them to be more protective or selective when it comes to choosing a mate and caring for their offspring (Altemus, 2006). And so during periods when choosing a mate for sexual reproduction is the primary motivator, rather than times of pregnancy and lactation, more vigilant and aggressive behaviours are beneficial (Donner et al, 2013). These evolutionary perspectives are supported by evidence such as the observed reduction in self-reported anxiety scores in women during the peripartum and lactation periods (Donner et al, 2013).

However, it would seem this genetic vulnerability is further compounded by cultural and societal effects (Christiansen, 2015). Women are exposed to different triggers and stressors that are linked to anxiety such as sexual and domestic abuse, sexism and low socioeconomic status (Swim, Hyers, Cohen & Ferguson, 2001). It has been shown that women who suffered sexual abuse as children seem to present as adults with a higher risk of PTSD and panic disorder (Donner et al, 2013).

From a cultural perspective also, expectations of gender roles and femininity versus masculinity can have an effect of anxiety behaviours. Christiansen (2015) has reported that males are more encouraged as children to confront fearful situations as compared to women for whom avoidance is encouraged. This greater exposure can manifest in later life as a better fear extinction response in males. Both masculine and feminine behavior has been found to correlate with anxiety behavior, for example both men and women exhibiting feminine behaviours score higher on anxiety reports (Christiansen, 2015).

1.5. Anxiety in younger women

A recent systematic review of the literature on anxiety found that women under the age of 35 also seem to be disproportionately affected by anxiety disorders with a peak in anxiety being recorded in early adulthood across all geographical locations and cultures reviewed (Remes et al, 2016). The higher prevalence of anxiety in younger women has also been highlighted by the WHO (WHO, 2017). It is suggested that younger women experience higher levels of anxiety as this is the life stage most likely to be marked by extensive hormonal fluctuations through puberty, menstruation, pregnancy and lactation (Christiansen, 2015).

Research into the incidence of anxiety in younger populations has shown that the age of onset for anxiety does not differ between boys and girls however the rate at which girls develop anxiety disorders increases faster from the onset age as compared to boys; by the age

of 6 twice as many girls as boys have experienced an anxiety disorder (Lewinsohn, Gotlib, Lewinsohn, Seely & Allen, 1998) The same research found that anxiety could not be explained by social roles and norms in adolescents, lending to the perspective that girls vulnerability to anxiety is genetic rather than environmental. Throughout adolescence, there is a preponderance of female's experiencing anxiety disorders as compared to males, with females also achieving significantly higher scores on symptom measurements, and reporting higher numbers of symptoms, as compared to males (Lewinsohn et al, 1998).

1.6.   Anxiety in Women with Comorbid Depression

It has been well described in the literature that anxiety disorders are often strongly associated with comorbid depression and it has been found that generalised anxiety disorder shares a common genetic pathway with major depression in women (Breslau, 2002; Maier, Gansicke, Freyberger et al, 2000; Shear, Cloitre, Pine & Ross, 2005; Mineka, Watson & Clark, 1998). The Epidemiologic Catchment Area (ECA) program of the National Institute of Mental Health in the US found that 47% of respondents meeting the lifetime criteria for major depression also met the criteria for a coexisting anxiety disorder (Pigott, 2003). Studies have also shown that episodes of anxiety in girls and adolescents are strong predictors of depression and suicide attempts later in life (Christiansen, 2015). Clinically many of the symptoms of both conditions overlap and co-diagnosis occurs frequently in both men and women. It has been suggested that the hormonal response to stress patterns over long periods of time in both men and women may contribute to a first anxiety disorder and the differential patterns may elicit the development of comorbid depression later in life (Christiansen, 2015).

Research has shown women with Generalised Anxiety Disorder (GAD) are more like to have co-morbid depression than men with GAD (Pigott, 2003). Prospective data from female twins suggests that 30% of the variance in GAD is accounted for by genetic factors with the remainder accounted for by environment factors and similar genetic factors

determine the liability for major depression and GAD. Therefore, a vulnerability to both GAD and depression may arise from the same genotype with environmental factors mediating which disorder arises (Pigott, 2003). Comorbid depression is also extremely common in individuals with Panic Disorder (PD) with estimates suggesting a 50 to 75% lifetime risk for major depression in panic disorder (Pigott, 2003).

1.7.   Anxiety in Women After a Previous Trauma

Much evidence has been amassed supporting the development of anxiety after an adverse experience in earlier life and his has been suggested that the manifestation of mental disorders may arise from epigenetic modifications that occur immediately after the trauma thus transforming brain physiology and stress coping strategies (Nemeroff, 2004; McEwen, 2003; Donner et al, 2013). A community survey conducted in Canada and published in 1996 demonstrated that reports of childhood physical and sexual abuse were significantly higher in those with anxiety disorders than in age- and gender-matched controls. Women in the study with panic disorder, which represented 60% of the anxiety cohort, reported more sexual abuse than women with other anxiety disorders (Stein, Walker, Anderson & Hazen, 1996).

Although a previous traumatic experience can result in a variety of different anxiety disorders, primarily panic disorder (PD) and post-traumatic stress disorder (PTSD) seem to manifest. Women are generally more likely to develop PTSD although it still remains unclear as to whether this is because women have an inherent increased vulnerability to stress as compared to men, or women experience an earlier average onset of trauma, or the fact that women experience far more sexual trauma which results in increased societal victimisation as a result as compared to physical or combat violence (Donner et al, 2013). Interestingly dysfunction of the HPA axis as a result of PTSD occurs in both genders but it would seem that women with PTSD exhibit lower physiological results of the stress response e.g. lower levels of salivary cortisol as compared to men but higher self-report higher levels of distress

and irritability (Meewisse, Reitsma, de Vreis, Gersons & Olff, 2007; Kelly, Tryka, Anderson, Price & Carpenter, 2008). Clarity on this particular divergence exhibited by women remains to be realised (Donner et al, 2013).

1.8.   Anxiety in Women who are Biological Mothers

As already discussed, fluctuating levels of gonadal hormones such as oestrogen and progesterone throughout a woman's lifetime have been implicated in the increased prevalence of anxiety disorders in women, marked by periods of pregnancy and lactation. Once the woman is pregnant, and during the postpartum period, it would seem HPA axis activity is suppressed as an evolutionary attempt to elicit a different set of behaviours which are desirable for this time, specifically nurturing, caring and receptive behaviours (Donner et al, 2013). Neurochemical hormones such as oxytocin and prolactin can modulate anxiety and fear responses and it has been shown that breastfeeding mothers experience decreased anxiety as compared to bottle feeding mothers (Lane, Keville, Morris, Kinsella, Turner & Barry, 1997; Yonkers Ramin, Rush, Navarrete, Carmod, March, Heartwell & Leveno, 2001; Mezzacappa and Katkin, 2002).

However, becoming a mother can result in a strain on mental health for many women as it represents a period of dramatic transition for the individual often accompanied by physical distress and this can easily transform into postnatal depression (Leahy-Warren, McCarthy & Corcoran, 2011). Prevalence rates of postnatal depression are currently recorded globally in first world countries as approximately 1 in 10 mothers (World Health Organisation, 2008). Locally in Ireland, prevalence rates have been recorded as 13% of new mothers by the Health Service Executive and between 11.5% and 28.6% in the literature (Health Service Executive, 2016; Leahy-Warren et al, 2011; Cryan, Keogh, Connolly, Quinlan & Daly, 2001)

In the last decade the research focus has turned to postnatal anxiety, a relatively newly identified condition that can exist with or independently of postnatal depression (Paul, Downs, Schaefer, Beiler & Weisman, 2013). Evidence is suggesting postnatal anxiety may occur at higher rates than postnatal depression (Miller, Pallant & Negri, 2006). Symptomatology of postnatal anxiety include excessive worrying, feeling restless or on edge or irritable and can result in muscle tension or chest tightness. Postnatal depression on the other hand often presents with longer, more severe symptoms and is often characterised by low energy rather than the higher or 'restless' energy seen in anxiety (Austin & Highet, 2017). Postnatal anxiety can be more difficult to diagnose accurately and is often misinterpreted as postnatal depression (Matthey, Barnett, Howie & Kavanagh, 2003).

1.9.   Anxiety in Women as Related to Stress

The adaptive response to stress is a mechanism that promotes survival of the organism in the face of potentially life threatening situations (Barlow, 2002). However, as already discussed, disturbances in the activity of the HPA axis are identified in mental disorders such as anxiety and depression and these disturbances are clearly exacerbated by stress (Gold & Chrousos, 2002). Research into the link between stress and ill-health began in the 1930's by Hans Selye. His contention that prolonged stress, or chronic stress, can produce physical and mental ill-health is now widely accepted today (Ray, Gulati & Rai, 2017). In physiological medicine it is well established that biological adaptations to accommodate physical insult such as an increase in blood pressure are a healthy response in the short term but a sustained increase in blood pressure leads to far more life-threatening consequences such as a stroke. The same concept is suggested for mental ill-health in that adaptive reactions such as the stress response are suitable and appropriate in the short term but sustained stress response in the face of real or perceived danger leads to mental disorders such as anxiety (Ray et al, 2017).

It is well established in the literature and clinic that stress and anxiety are closely interlinked that anxiety is often referred to as the psychophysiological signal of the stress response (Ray et al, 2017).   Stressors have been shown to actually structurally remodel brain regions and it has been suggested that a single acute episode of stress can trigger a sequence of events in the brain that precipitates structural remodelling in the amygdala within hours, which can lead to the eventual onset of an anxiety disorder (Pawlak, Rao, Melchor, Chattarji, McEwen & Strickland, et al. 2005).

The relationship between sex differences and stress and how this impacts anxiety is still unclear. Acute or chronic stressors are precipitating factors for anxiety and women seem to have an inherent increased vulnerability to stress; chronically stressful or traumatic events often precipitate anxiety disorders such as PTSD (Nugent, Tyrka, Carpenter & Price, 2011; Ray et al, 2017).   Individuals with PTSD can actually experience neurodegeneration and hippocampal shrinkage (Oosthuizen, Wegener, & Harvey, 2005). The specific relationship between sex differences and stress and how this impacts anxiety is still unclear.

1.10.   Anxiety in Women as a Function of Rumination

The concept of rumination is probably the newest construct to be proposed as a factor in anxiety. First proposed by Nolen-Hoeksema in 1991, it is known as the state of emotional distress caused by the tendency to focus repetitively on the symptoms of the distress as well as the potential meaning, causes and consequences of these symptoms without trying to solve the contributory problems (Nolen-Hoeksema, 1991). It is a similar construct to worry and has been found to prolong anxious moods (Blagden & Craske, 1996). Ruminators tend as such questions of themselves as 'why is this happening' and remain hyper vigilant to their surroundings to find certainty or an answer. It is proposed that this uncertainty and hyper vigilance are the contributing factors to the precipitation of anxiety (Nolen-Hoeksema, 2000).

It has been found that women have a tendency to ruminate more than men and this could be a contributory factor to mental disorders such as anxiety issues (Hankin, 2008). The increased rumination in females is seen in more girls than boys even at a young age; it tends to appear by age 9 (Nolen-Hoeksema & Girgus, 1994). Anxiety in adolescents has also been associated with increased rumination in adolescent girls but not boys (Donner et al, 2013). Interestingly, it may be the fact that females have a higher tendency to ruminate more so than males that creates a recall bias in women which may contribute to more women reporting symptoms of anxiety (Christiansen, 2015). McLean and Anderson (2009) have been proposed that sex differences in rumination is mediated by three beliefs that negative emotions are harder to control, negative events are harder to control and positivity in a relationship is a personal responsibility. Each of these belief systems is seen to be endorsed more by women as compared to men (McLean & Anderson, 2009).

1.11   Objectives of this study

Anxiety is a leading mental health issue globally and locally here in Ireland. Research on anxiety specifically in women and the associated unique physiological, neurological, genetic and cultural challenges is still in its infancy and as detailed here, often inconclusive. Research on anxiety in Ireland is generally is quite limited, even more so on women specifically. In light of this paucity of Irish data on anxiety in women and the associated etiological factors, this study will seek to measure a potential prevalence of the disorder in a sample population of women in Ireland and examine possible correlational factors such as age, perceived stress, previous diagnosis of depression and/or anxiety, the occurrence of a previous traumatic event, parental status and level of rumination. Using the anxiety subscale of the DASS-21, a sample population of Irish women between the ages of 18 to 45 will be assessed for anxious symptomatology. This will indicate mean levels of anxiety in the sample population and whether the percentage of the overall population who

demonstrate anxiety reflects the extrapolated Global Burden of Disease registry data that states 7.9% of Irish women experience anxiety (GBD, 2016). The testable research hypotheses will then include the following:

(i)   a positive relationship will be observed between higher levels of anxiety and younger women,

(ii)   higher levels of anxiety will be seen in women are biological parents,

(iii)   higher levels of anxiety will be seen in women who have had a previous diagnosis of depression,

(iv)   higher levels of anxiety will be seen in women who have had a previous diagnosis of anxiety,

(v)   higher levels of anxiety will be seen in women who have had a previous traumatic experience,

(vi)   a positive relationship will be observed between higher levels of anxiety and higher perceived levels of stress, and

(vii)   a positive relationship will be observed between higher levels of anxiety and higher levels of rumination.

2.   Method

<u>2.1.   Participants</u>

Participants were sampled from the general population with access to online social media platforms, using convenience and snowball sampling. Three specific social media platforms were selected, Facebook, Twitter and LinkedIn. The researcher advertised the survey as an open link to the survey along with a brief blurb on the research project across each social media platform. A request was also provided within the blurb to send the survey link forward to ensure snowball sampling across social and personal networks.

Participants were instructed prior to beginning the questionnaire that they must be female, resident in Ireland and aged between 18 to 45 to participate. All participants were advised that participation was voluntary and anonymous and no incentive, monetary or otherwise, would be provided for completion. All participants were consented prior to beginning the questionnaire. The questionnaire was opened on 22nd January 2019 and closed on 17th February 2019. Throughout this 4-week period 160 women completed the questionnaire however 18 were excluded from the final analysis as they fell outside of the stated age range for inclusion. In total, therefore 143 women resident in Ireland and between the ages of 18 to 45 inclusive were included in the final analysis.

<u>2.2   Design</u>

A quantitative, correlational design using non-probability convenience and snowball sampling was tested. A questionnaire was designed to include a demographic section composed of researcher-developed questions relating to participants age, parental status, previous diagnoses of anxiety or depression and previous traumatic incident. This section was followed by the Depression, Anxiety and Stress-21 (DASS-21) questionnaire (Lovibond & Lovibond, 1995), the Perceived Stress Score (PSS) questionnaire (Cohen, Kamarck &

Mermelstein, 1983) and the Ruminative Response Score (RRS) questionnaire (Treynor,

Gonzalez & Nolen-Hoeksema, 2003).

Anxiety, as measured by the DASS-21 anxiety subscale, was the dependent variable

and the independent variables included age, biological parental status, previous diagnosis of

depression, previous diagnosis of anxiety, recognition of a previous traumatic event,

perceived stress and level of rumination.

2.3.   Materials

Data was collected using an online quantitative questionnaire composed of an

information sheet followed by four contiguous sections of questions, giving a total of 68

items to be completed by the participant, see Appendix 1. The four sections included a series

of demographic question assessing 5 of the 7 independent variables, the DASS-21 survey, the

PSS survey and the RRS survey, see Appendix 1 (Lovibond et al, 1995; Cohen et al, 1983;

Treynor et al, 2003).

The DASS-21 questionnaire is a non-diagnostic, 21-item, Likert scale, self-reported measure

of depression, anxiety and stress composed of 3 different subscales; each subscale scores for

a measure of depression, anxiety and stress separately (Lovibond et al, 1995). The

depression subscale assesses dysphoria, hopelessness, devaluation of life, self-deprecation,

lack of interest / involvement, anhedonia and inertia through questions such as "I couldn't

seem to experience any positive feeling at all". The anxiety scale assesses autonomic arousal,

skeletal muscle effects, situational anxiety, and subjective experience of anxious affect

through questions such as "I experienced trembling (e.g. in the hands)". The stress scale is

sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous

arousal, and being easily upset, irritable and impatient through questions such as "I found it

hard to wind down". Participants are asked to score each question from 0 (did not apply to

me at all) to 3 (applies to me very much or most of the time) depending on how they felt over

the previous week. Scores for depression, anxiety and stress are then calculated by summing

the scores for the relevant items and multiplying the score by 2 as the shortened DASS-21

was used rather than the longer form DASS-42. Subscale scores can then be compared

against cut-off scores for normal, mild, moderate, severe and extremely severe levels of each

relevant emotion, see Table 2.1 (Lovibond et al, 1995). The severity labels used in DASS-21

are used to describe the full range of scores within the sample population, so a participant

falling into the 'mild' category indicates the person is above the population mean but

potentially still far below the typical severity of someone seeking help for anxiety. The level

of severity does not apply to the disorder itself. The reliability of the DASS-21, assessed

using Cronbach's alpha, is acceptable for the depression, anxiety and stress scales, .91, .84

and .90, respectively (Crawford & Henry, 2003). Four studies have directly tested the

construct validity of the DASS scale and evidence presented suggests that the DASS does

possess adequate convergent and discriminant validity (Lovibond et al, 1995; Crawford et al,

2003)

Table 2.1 *Recommended cut-off scores for conventional emotional severity labels*

	Depression	Anxiety	Stress
Normal	0 – 9	0 – 7	0 – 14
Mild	10 – 13	8 – 9	15 – 18
Moderate	14 – 20	10 – 14	19 - 25
Severe	21 – 27	15 – 19	26 – 33
Extremely Severe	28+	20+	34+

The Perceived Stress Scale (PSS) is a 14-item Likert scale of self-reported assessment

of daily situations in the participant's life that they would appraise as stressful; it is

measuring the participant's perception of stress (Cohen et al, 1983). Questions include

examples such as "How often have you felt that you were unable to control the important things in your life?" and participants are asked to score each question between 0 indicating they never feel like that and 4 indicating they feel like that very often over the past month. 4 of the 14 questions (questions 4, 5, 7 and 8) are reverse scored and the totals are summed giving a range between 0 and 40. The individuals scores can then be compared against a range of scores indicating low, moderate or high perceived stress (Cohen et al, 1983). A score between 0 and 13 indicates low perceived stress, between 14 and 26 indicates moderate perceived stress and between 27 and 40 high perceived stress.   The reliability of the PSS was initially measured against three sample populations and the coefficient alpha reliability for the PSS was .84, .85, and .86 in each of the three samples and substantial construct validity was reported (Cohen et al, 1983).

The Ruminative Response Scale (RRS) is a 22-item Likert scale of self-assessed levels of reflective pondering and brooding that is related to, but not confounded by, depression (Treynor et al, 2003). Rumination is the process of focusing on the causes, symptoms and consequences of distress compulsively rather than on solutions (Nolen-Hoeksema, 1998). Participants are asked to indicate how often they generally think about the following items when they feel sad, down or depressed. Items include examples such as "how often do you think about how hard it is to concentrate" and participants can indicate a range from 1 meaning almost never to 4 meaning almost always. Nolen-Hoeksema et al (1999) found the average rumination score for women is 42.0 and for men 39.64.   The 22 questions on the RSS are summed to give a final score for the participant.

2.4   Procedure

On 22nd January 2019 the full questionnaire went live and was uploaded to the researcher's social media accounts, specifically Facebook, LinkedIn and Twitter with a public invitation to complete the questionnaire assuming they met the inclusion criteria. An

invitation was also extended to all observers to share the survey link across social media platforms and personal networks to ensure snowball sampling.

All participants were initially met with an information sheet explaining the objective of the study and that participation would include answering a series of short questions on stress and anxiety and should take no longer than 15 minutes to complete. Participants were reassured that the questions had been widely used in research previously but if negative feelings arose, contact information for support services would be provided on the final page. Participants were also informed there would be no direct benefit provided for participating in the study. Lastly, participants were reminded participation was completely voluntary and all responses were anonymous and untraceable to the individual, see Appendix 1. After reviewing the information sheet, all individuals were consented to participate. The online survey remained open to data collection for 28 days and was closed at 10.00pm on 17th February 2019 with 160 responses.

2.5   Ethics

This study was completed in line with the Psychological Society of Ireland (PSI) guidelines and received approval from the Dublin Business School Ethics Board (Psychological Society of Ireland, 2011). The target sample population was a general, non-vulnerable population. However, due to the topic of the questionnaire, participants were informed that completion may present minor negative feelings. Participants were therefore advised they could decline or withdraw consent to participate at any time prior to completing the survey, all personal information will be anonymized and contact information for the Irish College of General Practitioners 'Find a GP' service and Aware Depression Service would be provided at the end of the questionnaire should they need further support. One particular demographic question, namely question 4, "Have you ever experienced an event in your life that you would consider traumatic such as violence or a bereavement of a loved one?" could

cause distress and so to minimize any risk of distress was left only as a yes/no answer with no further detail to be provided.

The sample population was adequately informed of the risks of participation and the possible outcome of their information as per the information sheet provided at the beginning of the online questionnaire. Each participant provided consent before participating. Participants were informed that all data would be collected in a de-identified way and then aggregated. The aggregated, anonymised data would be stored on a password protected computer and encrypted using bitlocker drive encryption. Responsibility for the data would remain with the researcher.

2.6   Statistical Analysis

Both descriptive and inferential statistics were assessed. Descriptive statistics will be provided for the dependent (criterion) and independent (predictor) variables. The dependent variable will be anxiety, as measured by the anxiety subscale of the DASS-21 instrument (Lovibond et al, 1995). The independent variables will include the participants age, biological parental status, previous diagnosis of depression, previous diagnosis of anxiety, recognition of a previous traumatic event, perceived stress and level of rumination.

If the dependent variable is normally distributed, the inferential statistics will involve a series of parametric tests including independent t-tests to assess the impact of previous traumatic experience, previous diagnosis of depression, previous diagnosis of anxiety and biological parental status on the dependent variable anxiety. A Pearson's r correlation will analyse the relationship between age and anxiety and linear regressions will assess the impact of perceived stress and rumination on anxiety levels of the sample population.

If the dependent variable is not normally distributed, the inferential statistics will involve a series of non-parametric tests including Mann-Whitney U tests to assess the impact of previous traumatic experience, previous diagnosis of depression, previous diagnosis of

anxiety and biological parental status on the dependent variable anxiety. Spearman rho correlations will analyse the relationship between age and anxiety, perceived stress and anxiety and rumination and anxiety in the sample population.

3.   Results

3.1.   Descriptive Statistics

In total, 143 women between the ages of 18 to 45 and resident in Ireland were included in the final analysis. 17 participants were removed for breaches of inclusion criteria. See Table 3.1 for descriptive statistics of the sample population. The mean age of the sample population was 37.07 (SD=5.35), 70.6% were biological mothers and 66.4% reported that they had undergone a traumatic experience in their earlier life. 33.6% and 27.3% reported a previous diagnosis by a healthcare professional of depression or anxiety respectively, and 16.8% of the population had received a diagnosis of both depression and anxiety.

In the overall sample population, 60.9% of women reported anxiety symptomatology ranging from mild to extremely severe, see Table 3.3. Additionally, 53.8% and 70.6% of participants reported depression and stress symptomatology across the mild to extremely severe range, see Table 3.2 for frequency of severity in the population. Mean and standard deviation (SD) measures for each psychological variable as measured through the DASS-21, PSS and RRS instruments are presented in Table 3.3. The DASS-21 subscales report mean scores of 12.63 (SD = 10.21), 13.16 (SD = 11.67) and 21.30 (SD = 11.05) for anxiety, depression and stress respectively. These mean scores indicate measures of moderate anxiety, mild depression and moderate stress in the sample population. A mean score of 30.29 (SD = 7.69) on the Perceived Stress Scale indicates high perceived stress. A mean score of 27.59 (SD = 16.23) on the Ruminative Response Scale is lower than previously reported mean scores for women. In the seminal Nolen-Hoeksema et al study (1999), women were found to score 42.0 on average on this scale.

Table 3.1 *Descriptive Statistics of Sample Population and Relevant Demographic Conditions*

Variable		Number (N = 143)	Percentage frequency (%)	Mean	SD
Age Range	18 - 25	5	3.4		
	26 - 30	11	7.6		
	31 - 35	35	24.8		
	36 - 40	51	35.6		
	41 - 45	41	28.6		
	Total	143	100	37.07	5.35
Parental Status	Not a biological mother	42	29.4		
	A biological mother	101	70.6		
	Total	143	100		
Previous History of Diagnosed Depression	No Previous Diagnosis	95	66.4		
	Previous Diagnosis	48	33.6		
	Total	143	100		
Previous History of Diagnosed Anxiety	No Previous Diagnosis	104	72.7		
	Previous Diagnosis	39	27.3		
	Total	143	100		
Previous Experience of a Traumatic Event	No Previous Experience	48	33.6		
	Reported Previous Experience	95	66.4		
	Total	143	100		

Table 3.2 *Percentage Frequency of levels of severity of anxiety, depression and stress per DASS-21*

	Normal (%)	Mild (%)	Moderate (%)	Severe (%)	Extremely Severe (%)
Anxiety	39.2	7.0	16.8	9.1	28.0
Depression	46.2	12.6	19.6	7.0	14.7
Stress	29.4	13.3	17.5	23.1	16.8

Table 3.3 *Descriptive statistics for levels of anxiety, depression and stress, perceived stress and level of rumination*

| Variable	N	Mean	Std. Deviation
Anxiety per DASS-21 subscale	143	12.63	10.21
Depression per DASS-21 subscale	143	13.16	11.67
Stress per DASS-21 subscale	143	21.30	11.05
PSS Score	143	30.29	7.69
RRS Score	143	27.59	16.23

3.2. Inferential Statistics

Normality of distribution was examined for the dependent variable, anxiety as measured by the anxiety subscale in the DASS-21, and found to be non-normally distributed, see graph 3.1. Therefore, a series of non-parametric tests were run as described in section 2.6. Analysis of the data revealed that there was a positive relationship between level of anxiety in the sample population and a previous diagnosis of depression, a previous diagnosis of anxiety, level of perceived stress and level of rumination. Age, parental status and previous traumatic experience did not affect level of anxiety in the sample population. Normality of distribution for DASS-21 depression and stress subscales is also provided, see graphs 3.2 and 3.3 respectively.
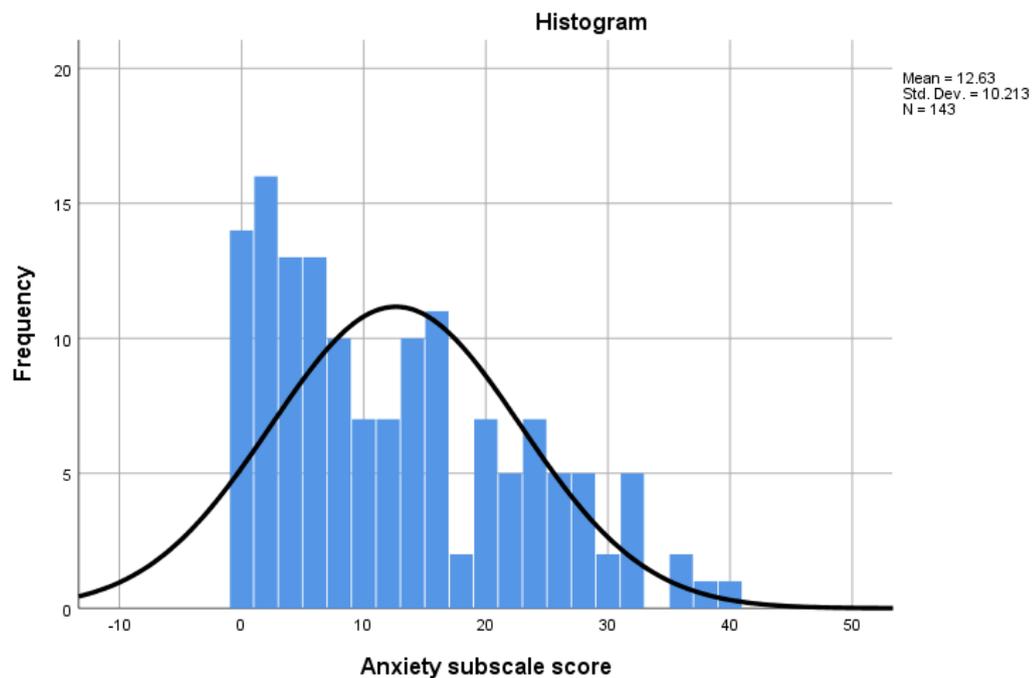
Graph 3.1 *Distribution of Anxiety as the Dependent Variable*
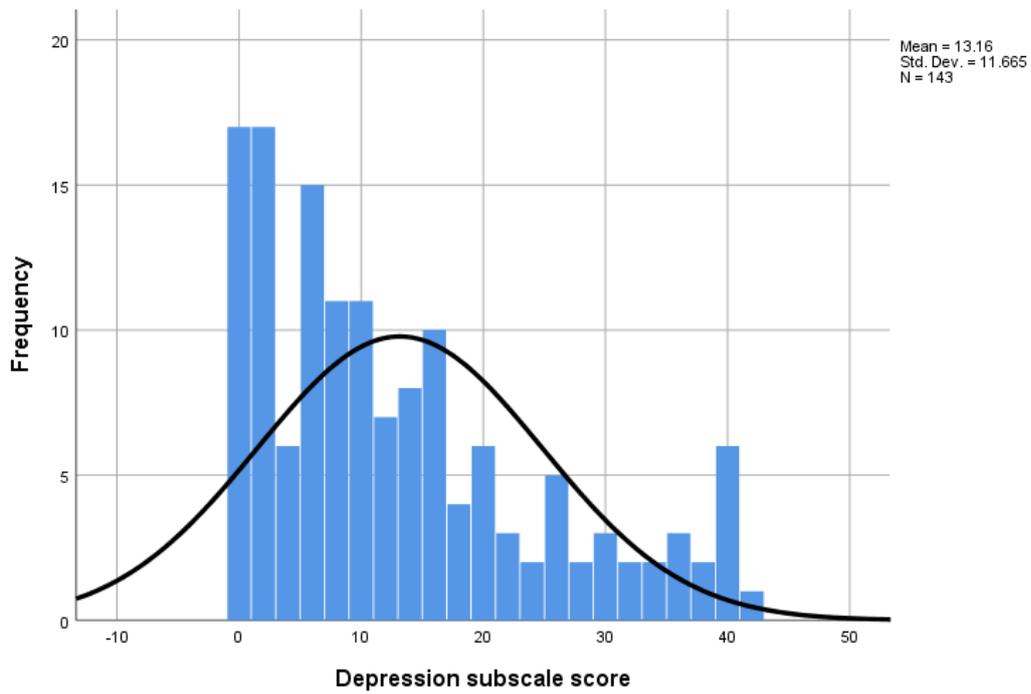
Graph 3.2 *Distribution of Depression Variable per DASS-21 Depression Subscale*
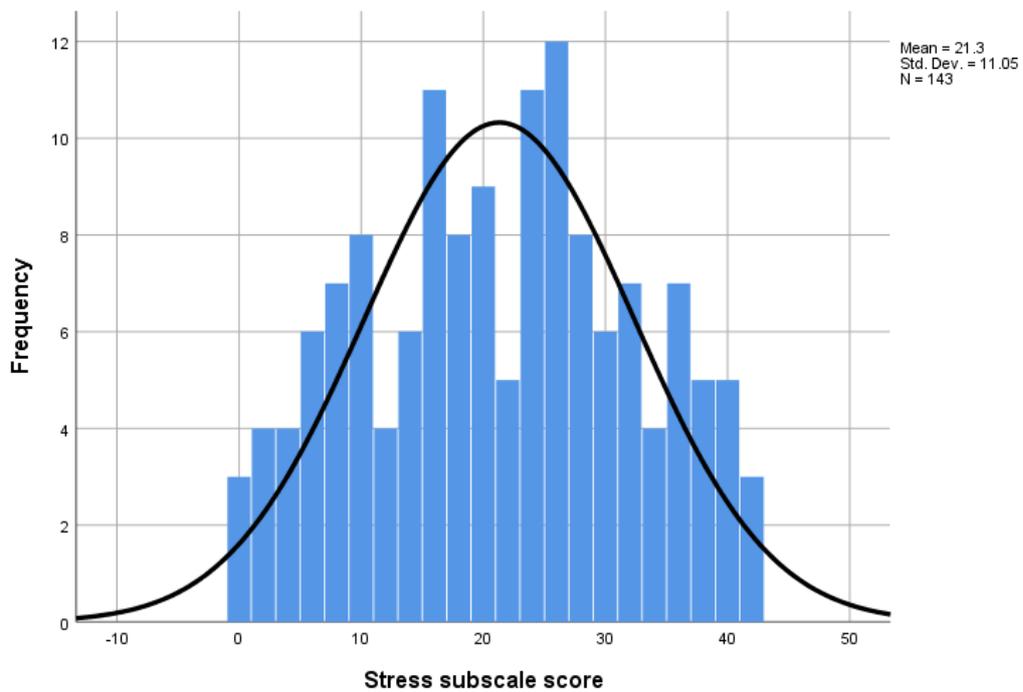
Graph 3.3 *Distribution of Stress Variable per DASS-21 Stress Subscale*

3.2.1   Age and Anxiety

A Spearman's rho correlation test was run to assess if there was a correlation between age and level of anxiety. The test found that there was no significant association between anxiety and age ($rs(143) = -.06$, $p = .453$). The null hypothesis stated there would be no difference between level of anxiety and therefore the null cannot be rejected. This result deviates from what has been reported in the literature. The study did restrict the age range from 18 to 45, and as only 3.4% of the sample population were aged within the emerging adult category (age 18 – 25) as compared to 64.2% in the 36 – 45 age range, this could indicate the population was insufficiently distributed to show a true correlation between age and level of anxiety.

3.2.2   Parental Status and Anxiety

A Mann-Whitney U test was run to analyse whether there was a difference between anxiety levels in women who were mothers (N=101) and those who were not (N=42). The test revealed that the group who were not biological mothers (mean rank = 78.11) and the group who were biological mothers (mean rank = 69.46) did not differ significantly ($z = -1.14$, $p = .254$). The null hypothesis stated there would be no difference between level of anxiety between the two groups and therefore the null cannot be rejected. As discussed in the introduction, there are mixed opinions on whether having a biological child has a protective affect against anxiety or is a vulnerability factor for anxiety. As this result is non-significant, it cannot be taken as instructive in this case. The group who were not biological mothers also only represent 29.4% of the population and so more balance between the two groups would be needed. Additionally, there was wide diversity within the group who were biological mothers; the number of children per participant ranged from 1 (20.2%) to 4 (6.1%) and the age when participants first gave birth ranged from 18 (0.9%) to 44 (0.9%).

3.2.3   Previous Diagnosis of Depression and level of measured anxiety

A Mann-Whitney U test was run to analyse whether there was a difference between anxiety levels in women who had previously received a diagnosis of depression (N=48) and those who had not (N=95). The test revealed that the group with no previous diagnosis of depression (mean rank = 58.58) and the group with a previous diagnosis of depression (mean rank = 98.56) did differ significantly (z = -5.47, p < .001). The null hypothesis stated there would be no difference between level of anxiety between the two groups and therefore the null can be rejected. Individuals with previous diagnoses of depression, representing 33.6% of this sample population, experience anxiety more so than those who have not had previous diagnosed depression. This reflects the literature that states there is a high level of overlap of comorbidity with depression and anxiety.

3.2.4   Previous Diagnosis of Anxiety and level of measured anxiety

A Mann-Whitney U test was run to analyse whether there was a difference between anxiety levels in women who had previously received a diagnosis of anxiety (N=39) and those who had not (N=104). The test revealed that the group with no previous diagnosis of anxiety (mean rank = 61.49) and the group with a previous diagnosis of anxiety (mean rank = 100.04) did differ significantly (z = -4.97, p < .001). The null hypothesis stated there would be no difference between level of anxiety between the two groups and therefore the null can be rejected. Individuals with previous diagnoses of anxiety, representing 27.3% of this sample population, reported higher levels of anxiety as compared to those who had received no previous diagnosis. This could highlight a question of efficacy and longevity over current anxiety treatments as those who have already been diagnosed with anxiety are still reporting anxious symptomatology.

3.2.5   Previous Traumatic Experience and Anxiety

A Mann-Whitney U test was run to analyse whether there was a difference between anxiety levels in women who had previously experienced a traumatic event (N=95) and those who had not (N=48). The test revealed that the group with no previous experience of a traumatic event (mean rank = 68.66) and the group with a previous experience of a traumatic event (mean rank = 73.69) did not differ significantly (z = -.688, p = .491). The null hypothesis stated there would be no difference between level of anxiety between the two groups and therefore the null cannot be rejected. Individuals with previous experience of trauma, representing 66.4% of this sample population, reported no higher levels of anxiety as compared to those who had not. This was a challenging variable to manage given the subjectivity of the phrase 'traumatic experience'. A traumatic experience is an inherently subjective event. Additionally, the researcher was also mindful to limit the questioning around this variable to mitigate the risk of negative emotions around recall of a traumatic experience. Therefore, this result may not be particularly instructive as the question was so general. More detailed research around types of traumatic experience and how it is linked to types of anxiety such as PTSD would be more valuable.

3.2.6   Perceived Stress and Anxiety

A Spearman's rho correlation test was run to assess if there was a correlation between perceived stress level and level of anxiety. The test found that there was a strong positive significant relationship between perceived stress and anxiety (rs(143) = .645, p <.001). Therefore, the null hypothesis is rejected. This relationship can account for 41.60% of variation of scores. This result supports what has been identified in the literature in that high and / or sustained levels of stress are key components in the development of anxiety, see section 1.9. The distribution of perceived stress was also measured in the sample population, see graph 3.4.
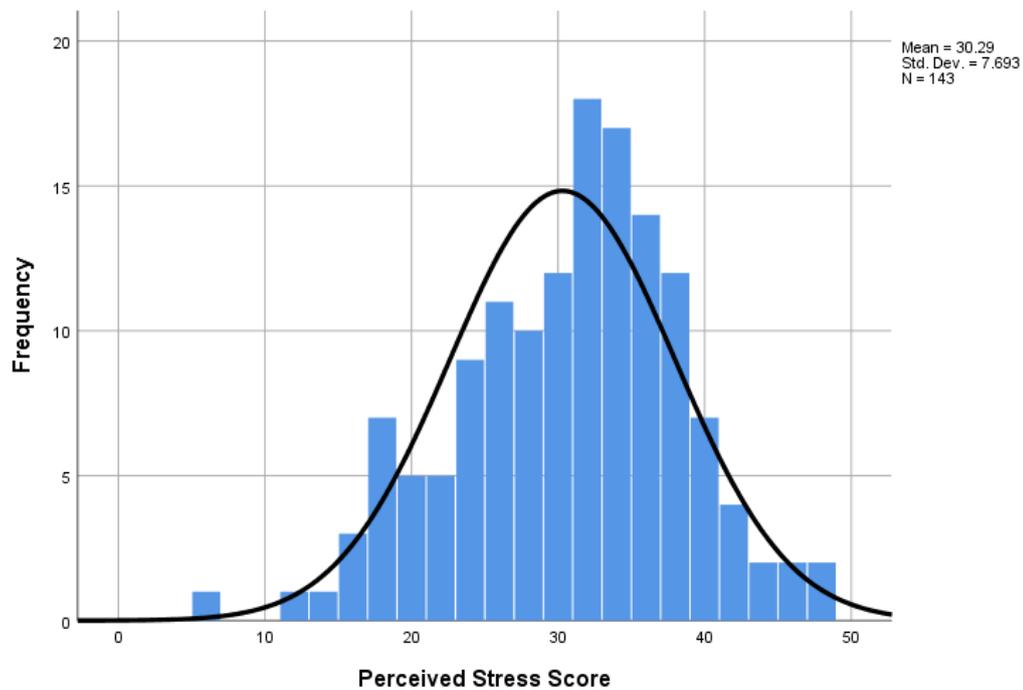
Graph 3.4 *Distribution of Perceived Stress in the Sample Population*

3.2.7 Rumination and Anxiety

A Spearman's rho correlation test was run to assess if there was a correlation between rumination and level of anxiety. The test found that there was a strong positive significant relationship between rumination and anxiety ($rs(143) = .632$, $p < .001$). Therefore, the null hypothesis is rejected. This relationship can account for 39.94% of variation of scores. Nolen-Hoeksema (2000) has proposed that the uncertainty related to rumination through constant self-reflection and questioning, along with the associated hyper vigilance this questioning causes, are the contributing factors to the precipitation of anxiety (Nolen-Hoeksema, 2000). The distribution of rumination was also measured in the sample population, see graph 3.5.
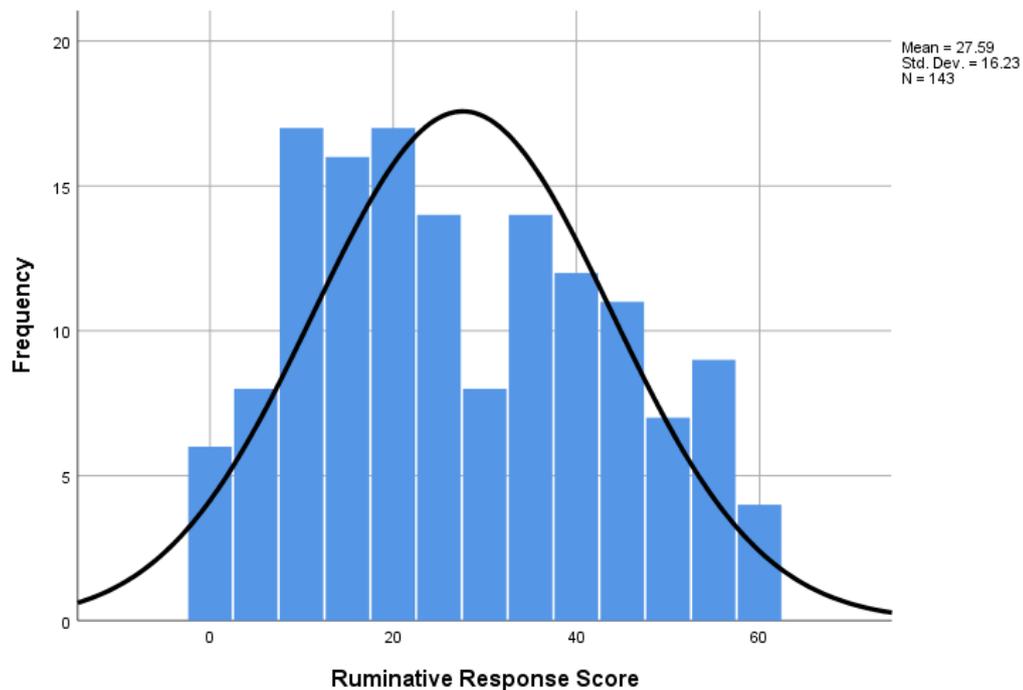
Graph 3.5 *Distribution of Rumination in the Sample Population*

3.2.8   Additional Results

Given that Remes et al (2016) found a difference in anxiety levels between those who were under 35 and those above 35, the participants were grouped into these categories i.e. below 35 and 35 and above, and a Mann Whitney-U test was run. The test revealed that the group below 35 (N=38) (mean rank = 75.92) and the group 35 and above (N=105) (mean rank = 70.58) did not differ significantly (z = -.683, p = .495). The sample here is heavily weighted however to those who are 35 and over in an approximate 2.7:1 ratio.

It was discussed in section 1.8, that breastfeeding mothers experience decreased anxiety as compared to bottle feeding mothers due to elevated levels of oxytocin and prolactin in breastfeeding mothers; hormones which have an anxiolytic effect. Therefore, among those who were biological mothers in the sample population, the participants were asked whether they exclusively breast or bottle fed their child(ren) or used both modalities. To assess whether anxiety levels differed between those women who exclusive bottle fed and those who used breastfeeding or a combination of breast and bottle feeding, a Mann Whitney-

U test was run. The test revealed that the group who exclusively bottle fed (N=45) (mean rank = 62.29) and the group who used breastfeeding supplemented with bottle feeding (N=56) (mean rank = 41.93) did differ significantly (z = -3.483, p < .001). Those who only bottle fed their child(ren) reported significantly higher levels of anxiety. This result is interesting but limited in that the diversity within the group of biological mothers was wide. For example, within those who breastfed, the length of time breastfeeding ranged from 4 to 260 weeks.

4.   Discussion

<u>4.1   Key Findings</u>

The aim of this research was to examine the prevalence and correlates of anxiety in a sample of Irish women from the general population. The research hypotheses sought to establish whether there was a relationship between higher levels of anxiety and younger women, whether higher anxiety is seen in women who are biological parents, have had a previous diagnosis of depression, have had a previous diagnosis of anxiety or have had a previous traumatic experience in Irish women. Additionally, the psychological factors of perceived stress and rumination were examined to establish whether there was a positive relationship between higher levels of anxiety and higher perceived levels of stress and higher levels of anxiety and higher levels of rumination.

It was found that 60.9% of the sample population were experiencing symptoms of anxiety ranging from mild to extremely severe, see Table 3.2. Of note, within the sample population, 28.0% of the participants reported extremely severe symptoms of anxiety. 27.3% of the sample population reported receiving a previous diagnosis of anxiety. This represents a far higher prevalence of anxiety in a sample population of Irish women as compared to the extrapolated 7.9% presented in the Global Burden of Disease study (GBD, 2016). No correlation was found between age and level of anxiety in the population. No impact of parental status or previous traumatic experience was reported on level of anxiety. Higher levels of anxiety were found in individuals with previous diagnoses of depression or anxiety. Strong positive correlations were found between levels of perceived stress and rumination and level of anxiety.

The lack of relationships found between level of anxiety and age, parental status or previous trauma deviates from the reported literature. Anxiety and age has been reported to be prevalent at higher rates in younger people according to the World Health Organisation

(WHO, 2017). However, the literature has yet to identify with hypothesis driven research if this trend towards younger populations can be confirmed, and specifically what age groups are most vulnerable. The higher rates of anxiety seen in younger females could correlate to higher levels of reporting of the disorder rather than an actual difference in prevalence.

Anxiety and parental status is a particularly complex area for women, influenced by large societal and cross-cultural effects and biological effects such as hormonal fluctuations (Christiansen, 2015). As discussed in the literature, the data generated to date on the effect of becoming a biological parent and levels of anxiety has been largely inconclusive as it has proven difficult to pick apart what is being caused by biological influences and what is being driven by self, and cultural, expectations of women today (Donner et al, 2013; Christiansen, 2015). The results of this piece of research must be taken within the context of the sample population which was quite diverse from a parental status perspective in terms of age range of mothers, number of children and feeding modalities deployed for their child(ren). Interestingly however, a significant difference was found in levels of anxiety between those mothers who exclusively bottle fed their child(ren) and those who breastfed exclusively or used a combination of both. Both groups were relatively balanced in terms of numbers. Given the diversity of the overall sample population however, this result is interesting but exploratory at best.

Participants experience of previous traumatic experience did not show a correlation with level of anxiety although again this is a challenging area to discern a relationship with anxiety given the lack of information asked of the participants. To mitigate any ethical concerns around asking questions of participants that could elicit negative recall or emotions, the researcher restricted the question to a simple yes/no answer which is most likely to be insufficient to discern a result. Within the population 66.9% of the participants responded yes to experiencing a previous traumatic event. As discussed in section 1.7, previous trauma

has been linked to the development in later life of panic disorder and post-traumatic stress disorder primarily (Donner et al, 2013). Given that there was no way to delineate in the sample population the different types of anxiety potentially existing, along with the inherent subjectivity of the phrase 'previous traumatic experience', the lack of a clear positive result on this hypothesis can be accounted for given the paucity of information provided.

Positive relationships were found between level of anxiety and those who had received a previous diagnosis of depression or anxiety. Those that had received a previous diagnosis of either depression or anxiety are still displaying symptomatology of anxiety which raises questions over the accuracy of previous diagnoses of depression given that symptoms of both conditions are different. The hallmark of depression is low energy and dysphoria whereas anxiety is consistently characterized by high energy and arousal (Christiansen, 2015). As discussed in section 1.6 however, the conditions clinically are seen to overlap and co-morbidity is relatively common (Pigott, 2003).

Those with previous diagnoses of anxiety who are still exhibiting anxious symptomatology may raise questions around the lack of adequate treatment and support for this condition. This has interesting implications for a more recent area of research i.e. gender bias as an implicit bias in healthcare towards women. The World Health Organisation has recognized that communication between healthcare workers and female patients can be authoritarian in many countries which inhibits a woman's willingness to disclose, often stigmatized, issues of psychological or emotional distress. It also recognizes that implicit gender biases in healthcare workers is a challenge and usually leads to under- or over-treating women in particular (WHO, 2016). Additionally, however it could speak to adherence to treatment that has been prescribed for women. The literature to date has proven scarce, and inconsistent, when examining the difference between women and men and adherence to

treatment for anxiety including pharmacological and psychological interventions (Christiansen, 2015).

A strong positive correlation between anxiety and perceived stress was measured. Levels of high perceived stress were noted in the overall sample population. Anxiety has been referred to as the psychophysiological signal of the stress response whereby chronic stress has been shown to actually cause structural remodelling in the amygdala which can lead to the precipitation of a maladaptive stress response and ultimately anxiety (Ray et al, 2017). Given that over 60% of the sample population exhibited anxious symptomatology and 28% of the overall population showed extremely severe symptoms, it is understandable that high levels of stress would also be witnessed in such a population. Interestingly, levels of perceived stress were reported as higher than actual stress symptomatology as reported on the DASS-21 subscale. This speaks to an interesting dynamic, as discussed in section 1.3, between how lower physiological demonstrations of stress such as HPA axis activity are often seen in both women and female animal models as compared to male counterparts. Donner (2013) has suggested that women could have a lower stress response but with a higher vulnerability to stress and this research adds to this evidence that perception of stress is higher in women rather than actual symptomatology demonstrated.

A strong positive correlation was also measured between anxiety and rumination, although interestingly the mean rumination score for the population was lower than the average previously reported for women. Barlow (2002) discussed that one of the most recognised symptoms of anxiety is worry. Rumination is by its essence the internalized repetitive focus on distress and Blagden and Craske (1996) have discussed the construct as similar to worry. Those who ruminate tend to obsess on possible negative outcomes and as such remain hypervigilant to their surroundings. Hypervigilance and the "unsuccessful search for safety" are also hallmarks of anxious behavior (Woody & Rachman, 1994).

Nolen-Hoeksema has also proposed that the uncertainty and hyper vigilance associated with rumination are the contributing factors to the precipitation of anxiety (Nolen-Hoeksema, 2000).

4.2   Strengths and Limitations

A key limitation of this research is the low sample size which has resulted in a non-normally distributed dependent variable. As a result, the tests run were non-parametric and so less robust. For a variable such as anxiety, which is by its nature something that occurs at a low prevalence in general populations, a particularly large sample size would be needed to get a more accurate picture of the disorder in a general population. Additionally, a response bias is suspected given that completion of such a questionnaire to participate in the research would presumably only appeal to those who are particularly interested in, or afflicted with, the disorder. Lastly, the research only measured one point in time and emotional states can be quite transitory. Ideally prevalence of any disorder should be measured on a repeated basis.

Strengths of the research included the fact that this was one of the first pieces of research looking only at general population Irish women. It is well established that mental illness is on the rise and disorders such as anxiety are heavily weighted towards women. To date however the literature looking solely at women is still preliminary. Country specific research is always valuable for disorders such as anxiety that have strong social and cultural effects to help elucidate particular culture-specific issues that may be present, such as social isolation associated with immigrants, older versus younger populations and religious versus secular populations.

4.3   Implications and Future Research

Some important implications of this research are the two fold consequences of societal effects on women and the biological effects on women with anxiety. From a societal

perspective, this research and other literature raises questions on how the diagnosis and treatment of anxiety for women in Ireland is being managed. Although concerns around sample size and response bias in this research have already been discussed, there remains a large difference in the proposed percentage of Irish women with anxiety at 7.9% of the general population from the Global Burden of Disease registry and the data presented here. 28% of the overall sample population reported extremely severe symptomatology of anxiety. This raises an issue about the veracity of data used currently relating to prevalence of anxiety in Irish women.

This coupled with the insight that those with a previous diagnosis of anxiety, and therefore presumably have received a treatment regimen, are still demonstrating anxious symptomatology suggests Irish women may be receiving a diagnosis but insufficient treatment, or alternatively, they are not adhering to the treatment prescribed. The latter issue again speaks to cultural influences in that Irish women may not feel comfortable taking medication for mental disorders. There is a large body of work to be undertaken here to normalise anxiety in Irish society for women and to ensure women are receiving and adhering to appropriate treatments.

Secondly, relating to biological influences on anxiety which know no geographical boundaries, the difference reported between stress and anxiety symptomatology and the levels of perceived stress remains an interesting phenomenon reported in the previous literature and reflected here. The fact that physiological symptoms of stress and anxiety are being reported at lower rates as compared to the perception of threat in women occurs in both human studies and animal models and so speaks to a biological rationale still to be elucidated. This occurrence is potentially present in Ireland, as seen in this data, which reflects other countries and research and warrants continued further investigation as to why this occurs in women.

Generally, anxiety is still an important topic that warrants a lot more research in Ireland, particularly in women given that the 2:1 prevalence rate appears to be present here as well as other global regions. This should be proactively confirmed however with research examining mental health disorders in a gender specific way in Ireland as there is a significant increase in men now reporting mental health concerns also. Each factor that was assessed in the demographic section of the research is worthy of research unto itself in Ireland they each presents a complex area for research with both biological and cultural aspects affecting mental health. As an example, age demographics in Ireland now have particular vulnerabilities associated with them. Stress and anxiety in the emerging adult demographic are no longer associated with poor job prospects as compared to the same demographic a decade ago, but they do face into a potential housing crisis.

4.4   Conclusion

In conclusion, this research sought to examine the prevalence of anxiety in Irish women given that global reports indicate this mental disorder is on the increase internationally and affects women in a 2:1 ration as compared to men. 27.3% of the sample population reported a previous diagnosis of anxiety and 60.9% reported symptoms of anxiety, ranging from mild to extremely severe. Of note, 28% of the sample population reported anxiety symptoms of extreme severity. This represents a far higher prevalence of anxiety in a sample population of Irish women as compared to the extrapolated 7.9% presented in the Global Burden of Disease study (GBD, 2016). Participants age, parental status and previous traumatic experience were found to have no impact on level of anxiety, whereas a previous diagnosis of depression or anxiety, level of perceived stress and level of rumination were found to have a strong relationship with level of anxiety in the sample population.

Anxiety is a serious and distressing disorder that causes chronic psychological and physical disorders for those affected by it. Rarely does a disorder have such a preponderance

towards one sex over the other and yet research into understanding the incidence and treatment of this disorder is weighted heavily towards male physiology. It is imperative for women that the condition is normalised in society to ensure necessary support structures are built and social stigma is mitigated against. Biological research must also ensure gender bias is neutralised to enable suitable diagnosing procedures and treatments are tailored appropriately to the unique female physiology and societal pressures they face.

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Appendix 1

INFORMATION SHEET & CONSENT FORM

Examining the prevalence and potential correlates of anxiety in Irish women

My name is Mary Maguire and I am conducting research in the Department of Psychology at Dublin Business School that is examining the prevalence and potential correlates of anxiety in Irish women. This research is being conducted as part of my studies and will be submitted for examination.

This research aims to examine levels of anxiety and some factors that may be causing it in Irish women who are between the ages of 18 – 45 (inclusive) and are permanently resident in Ireland. If you are within this age range and reside permanently in Ireland, then you are invited to consider participating. You will be asked a variety of short questions on your own levels of stress and anxiety and while the survey asks some questions that might cause some minor negative feelings, it has been used widely in research. If any of the questions do raise difficult feelings for you, contact information for support services are included on the final page.

Your participation will involve completing the following anonymous questionnaire which should take no longer than 15 minutes of your time. If you decide to participate, I would ask that you complete the questionnaire fully.

There will be no direct benefit provided to you, monetary or otherwise, by participating in the study however research like this can make an important contribution to our understanding of anxiety and why it effects women in greater numbers. The findings from this research may be presented to external audiences and/or submitted for publication in peer-reviewed journals however no individual participant will be identified.

Participation is completely voluntary and so you are not obliged to take part.

Participation is anonymous and so responses cannot be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected.

The questionnaires will be securely stored in electronic and encrypted format on a password protected computer.

If you consent to complete this questionnaire and thus participate in the study, please tick the following box. If you would rather not proceed, you are free to exit this questionnaire now.

I give my consent to participate in this study

Should you require any further information about the research, please contact

Mary Maguire, xxxxxxxx.

Thank you for taking the time to complete this survey.

QUESTIONNAIRE

Section 1

1. What is your age in years:

2. Parental Status
   a. Do you have biological children?
      i. No
      ii. Yes
   b. If yes, how many children do you have?
      i. X
   c. How old were you when you first gave birth?
      i. X
   d. Did you breast or bottle feed your children?
      i. Breast
      ii. Bottle
   e. If you breast fed your child(ren), for how long on average did you breastfeed them?
      i. X

3. Previous diagnosis of anxiety or depression
   a. Have you ever been diagnosed by a Health Care Professional with a type of depression?
      i. No
      ii. Yes
   b. If yes, at what age were you diagnosed with a type of depression?
   c. Have you ever been diagnosed by a Health Care Professional with a type of anxiety disorder?
      i. No
      ii. Yes
   d. If yes, at what age were you diagnosed with a type of anxiety disorder?

4. Have you ever experienced an event in your life that you would consider traumatic such as violence or a bereavement of a loved one?
   a. No
   b. Yes

Section 2

Please read each statement and select 0, 1, 2 or 3 which indicates how much the statement applied to you **over the past WEEK**. There are no right or wrong answers and although some questions are similar, please treat each question as separate. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree or a good part of time

3 Applied to me very much or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (e.g. in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3

15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

Section 3

Please read each statement and indicate your response by selecting a response that indicates how often you felt or thought a certain way **over the past MONTH**. There are no right or wrong answers and although some questions are similar, please treat each question as separate. Do not spend too much time on any statement.

The rating scale is as follows:
0 Never
1 Almost Never
2 Sometimes
3 Fairly Often
4 Very Often

1	How often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2	How often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3	How often have you felt nervous and "stressed"?	0	1	2	3	4
4	How often have you dealt successfully with day to day problems and annoyances?	0	1	2	3	4
5	How often have you felt that you were effectively coping with important changes that were occurring in your life?	0	1	2	3	4
6	How often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4

7	How often have you felt that things were going your way?	0	1	2	3	4
8	How often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
9	How often have you been able to control irritations in your life?	0	1	2	3	4
10	How often have you felt that you were on top of things	0	1	2	3	4
11	How often have you been angered because of things that happened that were outside of your control?	0	1	2	3	4
12	How often have you found yourself thinking about things that you have to accomplish?	0	1	2	3	4
13	How often have you been able to control the way you spend your time?	0	1	2	3	4
14	How often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Section 4

Please read each statement and select 0, 1, 2 or 3 which indicates how much the statement applies to you generally. There are no right or wrong answers and although some questions are similar, please treat each question as separate. Do not spend too much time on any one statement.

The rating scale is as follows:
0 Almost never

1 Sometimes

2 Often

3 Almost always

1	You think about how alone you feel	0	1	2	3
2	You think "I won't be able to do my job if I don't snap out of this"	0	1	2	3
3	You think about your feelings of fatigue and achiness	0	1	2	3

4	You think about how hard it is to concentrate	0	1	2	3
5	You think "What am I doing to deserve this?"	0	1	2	3
6	You think about how passive and unmotivated you feel.	0	1	2	3
7	You analyse recent events to try to understand why you are depressed	0	1	2	3
8	You think about how you don't seem to feel anything anymore	0	1	2	3
9	You think "Why can't I get going?"	0	1	2	3
10	You think "Why do I always react this way?"	0	1	2	3
11	You go away by yourself and think about why you feel this way	0	1	2	3
12	You write down what you are thinking about and analyse it	0	1	2	3
13	You think about a recent situation, wishing it had gone better	0	1	2	3
14	You think "I won't be able to concentrate if I keep feeling this way."	0	1	2	3
15	You think "Why do I have problems other people don't have?"	0	1	2	3
16	You think "Why can't I handle things better?"	0	1	2	3
17	You think about how sad you feel.	0	1	2	3
18	You think about all your shortcomings, failings, faults, mistakes	0	1	2	3
19	You think about how you don't feel up to doing anything	0	1	2	3
20	You analyse your personality to try to understand why you are depressed	0	1	2	3
21	You go someplace alone to think about your feelings	0	1	2	3
22	You think about how angry you are with yourself	0	1	2	3