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Mental health, loneliness and challenges of postgraduate research students during the COVID-19 pandemic

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Abstract

The COVID-19 pandemic has disrupted the lives of university students across the UK as they were forced to transition to remote working due to lockdown and social distancing measures. Much of the existing literature focuses on undergraduate students and ignores, or generalises to, postgraduate research (PGR) students, a small student population that faces distinct challenges. The pandemic's impact on PGR students included disruption to data collection, lack of access to on-campus equipment, resources and facilities, funding uncertainty and a minimal in-person contact with academic peers and supervisors, which led to a decline in their mental health and a rise in loneliness. However, most of the available evidence comes from English universities and does not differentiate between Masters and doctoral students' experiences.

Thus, using online questionnaires and interviews, the current mixed methods thesis examined levels of depression, anxiety, stress and loneliness in 72 PGR students studying at one Welsh university, explored the challenges and experiences they faced, and their opinions of the wellbeing support provided by their university during the COVID-19 pandemic. The study also compared mental health and loneliness scores between genders and Masters and doctoral students.

Study results showed most PGR students were experiencing moderate depression, mild anxiety, low stress and moderate loneliness, however there were no differences between gender or course type. Students experienced an array of challenges but the negative impact of working in isolation, not being able to interact in-person with others and the University's lack of specific support for PGR students was shared by all participants. University policymakers should tailor informal wellbeing support and communications to the needs of PGR students and review existing PGR-focused wellbeing interventions with PGR students to decide which initiative would be most effective at enabling these students to thrive in the research environment.

Declarations and statements

1. I, Isobel King, hereby declares that the work presented in this thesis has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

2. I, Isobel King, declare that the thesis is the result of my own investigations, except where otherwise stated and that other sources are acknowledged by footnotes giving explicit references and that a bibliography is appended.

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5. I, Isobel King, declare that the University's ethical procedures have been followed and that ethical approval has been granted.

Signed: 

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ACHA	American College Health Association
AM	Attributional model of loneliness
APA	American Psychiatric Association
BCA	Beck's cognitive theory for anxiety
CGS	Council for Graduate Schools
COVID-19	Coronavirus disease 19
DASS	Depression, Anxiety and Stress Scale
DP	Depression prototype
ECDC	European Centre for Disease Prevention and Control
ET	Evolutionary theory
GABA	Gamma-aminobutyric acid
GAD	Generalised anxiety disorder
GAS	General adaptation syndrome
GHQ	General Health Questionnaire
HD	Hopelessness theory of depression
HEA	Higher Education Academy
HEFCW	Higher Education Funding Council for Wales
HESA	Higher Education Statistics Agency
HPA	Hypothalamic-pituitary-adrenal
LGBTQ+	Lesbian, gay, bisexual, transgender and queer and others
LGBQ+	Lesbian, gay, bisexual and queer and others
LP	Loneliness prototype
MDD	Major depressive disorder
NUS	National Union of Students
ONS	Office for National Statistics
PGR	Postgraduate research
PGT	Postgraduate taught

PHQ	Patient Health Questionnaire
PRES	Postgraduate research experience survey
PSS	Perceived Stress Scale
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
SELSA	Social and Emotional Loneliness Scale for Adults
SELSA-S	Social and Emotional Loneliness Scale for Adults Short Form
SG	Stress-generation model
STEM	Science, technology, engineering and mathematics
TMS	Transactional model of stress
TNBI	Transgender, non-binary and intersex
UCLA	University of California, Los Angeles
WHO	World Health Organization

1. Introduction

Mental health difficulties are prominent in today's society. Most mental health conditions develop by the age of 25 years (Kessler et al., 2007), meaning university students are at particularly high risk (Aronin & Smith, 2016; The Insight Network, 2019, 2020; Unite Students, 2016). Depression and anxiety are the most common disorders seen in UK students, with 49-69% feeling depressed (National Union of Students (NUS), 2013, 2015) and 55-77% feeling anxious (NUS, 2013, 2015). Even more students report individual symptoms of these conditions. Stress and loneliness, though not mental health conditions, are also commonly felt by university students (Aronin & Smith, 2016; The Insight Network, 2019; NUS, 2013, 2015; Unite Students, 2016), and are even more prevalent in those who have a mental health difficulty (Unite Students, 2016), demonstrating the comorbid relationship between these conditions.

Contributing to poor mental health are the academic challenges university students face throughout their university journey. These include the transition into university, a demanding academic workload and uncertainty about life after graduation (Bitsika, Sharpley & Rubenstein, 2010; Knoesen & Naudé, 2018). 'Non-traditional' students face extra challenges related to their gender and sexuality, ethnicity, international status, disability and care responsibilities (Ali & Bagheri, 2009; Goldberg et al., 2018; Lizotte & Simplican, 2017; Moreau & Kerner, 2015; Sherry et al., 2010; Woodford et al., 2014). This is in addition to the common stressors that young adults can experience (Holmes & Rahe, 1967; Pett & Johnson, 2005; Renner & Mackin, 1998), such as relationship formation and breakdown, changes to physical appearance, major illness, financial concerns and an unstable job market.

However, the student mental health literature is dominated by samples using undergraduate students, combining undergraduate and postgraduate students or not specifying the type of postgraduates that are included, for example, taught or research Masters or doctoral students. Prevalence of mental health symptoms differs between these groups, with undergraduates typically displaying worse depression and anxiety symptoms (Wyatt & Oswalt, 2013) but lower stress levels than postgraduates (Ickes et al., 2015; Levecque et al., 2017), while mixed conclusions exist regarding differences between Masters and doctoral students (Alageel et al., 2021; Hyun et al., 2006; Patel,

2015). As PhD degrees are a higher level and of longer duration than Masters courses, differences in mental health and loneliness levels might be expected between Masters and doctoral students, albeit perhaps smaller than those seen between undergraduate and postgraduate students. Undergraduate data, therefore, should not be generalised to postgraduate students, in particular postgraduate research (PGR) students.

The PGR degree structure is vastly different from undergraduate and postgraduate taught (PGT) courses as it only consists of an independent research project and oral examination compared to the module and exam-based structure of taught courses. The nature of PGR study is associated with different challenges too, such as greater self-regulated learning and motivation, research isolation, work-life balance conflict and financial and career uncertainty (Evans et al., 2018; McLaughlin & Sillence, 2018). Furthermore, PGR students, in particular doctoral students, usually take on multiple roles during their study, such as the student, researcher and teacher (Compton & Tran, 2017). This can create confusion around their identity at university and ambiguity in their position as students because they could be perceived as staff members in certain situations (Cornell, 2020). The challenges PGR students face, and the mental health implications, have been recently exacerbated due to the global coronavirus disease 19 (COVID-19) pandemic.

The COVID-19 pandemic has caused severe disruption to society. National lockdowns beginning in March 2020 enforced social distancing guidelines, global travel restrictions and business closures, including universities. The challenges associated with working from home, such as lower productivity, research disruption, poor work-life balance, care responsibilities and isolation from academic peers and supervisors, are examples of how PGR students have been affected (Bogosavljevic et al., 2021; Burridge et al., 2020; Byrom, 2020; Camerlink et al., 2021; Kappel et al., 2021; Lambrechts & Smith, 2020; Suart et al., 2020). As a result, PGR students' mental health was negatively impacted (Bogosavljevic et al., 2021; Lambrechts & Smith, 2020), and existing feelings of depression, anxiety, stress and loneliness have all been exacerbated. For example, Chirikov et al. (2020) found rates of depression had doubled from pre-pandemic figures to 31% in Masters and 36% in doctoral students, while anxiety had increased from 26% to 36% in Masters and 43% in doctoral students. However, most UK-based studies do not specify the proportion of participants

studying in each country or differentiate results (Burridge et al., 2020; Byrom, 2020; Goldstone & Zhang, 2021; Goldstone et al., 2021; Lambrechts & Smith, 2020). Those studying in devolved UK nations, such as Wales, may have been impacted differently to students studying in England, and across the world, because restrictions differed in each country (Institute for Government, 2021). Further research into students studying in Wales, Scotland and Northern Ireland is necessary to see if this is the case.

In response to the pandemic, students undertook activities in a bid to improve their mental health themselves, such as exercise, connecting remotely with friends and family, hobbies and relaxation activities (Kappel et al., 2021; Staser, 2021; Suart et al., 2020; Wang et al., 2020). For universities, student wellbeing support provisions were amplified but this was received with mixed opinions.

Before the pandemic, there was low uptake of university wellbeing services by PGR students, despite experiencing mental health difficulties (Hyun et al., 2006; Waight & Giordano, 2018). Accessibility, a low perceived need, lack of awareness and low service efficacy were some of the barriers they cited as reasons for not accessing university wellbeing support (Horwitz et al., 2020; Waight & Giordano, 2018). In particular, the perception that universities tailor their support towards undergraduates and do not consider the distinct needs of PGR students who sit on the boundary between student and staff was a thought shared by many (Priestley et al., 2021; Waight & Giordano, 2018).

Low service use and students' negative views of wellbeing support continued into the pandemic (Burridge et al., 2020; Goldstone et al., 2021), with particular emphasis on universities' prioritisation of undergraduates for wellbeing and academic support. Since mental health difficulties were the most frequently cited reason for PGR students thinking about quitting their degree during the pandemic (Advance HE, 2021), imminent policy change to improve PGR student mental health and loneliness and enhance the student experience for the duration of the pandemic and beyond is essential. Timely research seeking students' opinions on university provisions, therefore, is imperative.

1.1. Purpose and aims of the current study

PGR students can experience mental health difficulties and loneliness due to the independent nature of PGR study. The COVID-19 pandemic has exacerbated these symptoms, worsened research isolation and created barriers to students' progress. Although the impact of the pandemic among PGR students has been well-documented, there are limitations to the existing literature. There is a lack of research that differentiates mental health and loneliness levels between Masters and doctoral students, instead only using doctoral students or combining data with research staff. There is also a lack of research focusing on PGR students studying in Wales. The purpose of this study, therefore, is to fill this gap in the literature by comparing the mental health and loneliness levels of Masters and doctoral students in Wales during the COVID-19 pandemic, and explore PGR students' experiences of the pandemic. It will also add to the small body of existing literature that investigates PGR students' views of university wellbeing support. The study's findings will be compiled to form recommendations to improve PGR students' university experience. This will be achieved using a mixed methods design combining questionnaire and interview data to generate a rich, detailed understanding that is substantiated by participants' own experiences and opinions.

Specifically, the aims of this study are to:

1. Examine levels of depression, anxiety, stress and different types of loneliness in PGR students.
2. Explore how the pandemic has affected PGR students' living and study situations and ability to study.
3. Identify activities or strategies PGR students used to maintain their mental wellbeing.
4. Assess PGR students' use and views of different types of University wellbeing support.
5. Identify the factors PGR students perceive as barriers to accessing University wellbeing support.
6. Identify recommendations to improve the wellbeing support and overall University experience for this population.

1.2. Thesis structure

Chapter 1 has introduced the context of the study and has identified the purpose and the aims of the study. Chapter 2 will review the existing literature on university student mental health before and during the COVID-19 pandemic, specifically focusing on PGR students and the limitations surrounding the research into this population. Chapter 3 will present how the research will be conducted. The adoption of a mixed methods research design using questionnaires and interviews will be justified, and the methods of collecting and analysing the quantitative and qualitative data will be described. Chapter 4 will state the current study's findings. The quantitative questionnaire and qualitative interview data will be integrated to form a rich and detailed analysis of PGR students' mental health, loneliness and experiences during the pandemic. Chapter 5 will compare the current study's findings with existing research to discuss the contributions that this thesis makes to the literature. Recommendations for university policymakers and future research will be suggested. The strengths and limitations of the study will also be discussed.

2. Literature review

2.1. Mental health

Mental health difficulties are increasing in incidence in today's society. Mental health is defined as "a state of wellbeing in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (World Health Organization (WHO), 2004, p. 11). Depression and anxiety are the most prevalent conditions in the UK, with 3 in 100 people experiencing depression each week, 6 in 100 experiencing anxiety and 8 in 100 experiencing comorbid depression and anxiety (McManus et al., 2016). The presence of mental health issues also has serious physical health implications, such as increasing the risk of cardiovascular disease, diabetes, high blood pressure and, consequently, early mortality (WHO, 2004).

The landscape is similar for university students. A global study conducted by WHO discovered a 31% prevalence of any mental disorder in nearly 14,000 students (Auerbach et al., 2018), a 9.7% increase from two years prior (Auerbach et al., 2016). In the UK, 12-42.3% of students reported they had a mental health 'issue' (Aronin & Smith, 2016; Unite Students, 2016) or 'problem' (The Insight Network, 2019, 2020), and 21.5-26.6% reported they had received a mental health diagnosis (The Insight Network, 2019, 2020). In the US, 12.8-15.2% reported receiving one mental health diagnosis in their lifetime to date (American College Health Association (ACHA), 2019, 2020). Students are at particularly high risk of mental health problems because three quarters of mental health conditions develop by the age of 25 years (Kessler et al., 2007). The following sections further explore the prevalence and theory of depression, anxiety and stress, the mental health variables commonly reported by students and assessed in this study.

2.1.1. Depression

Depression is a common mental disorder in young people in England, with a prevalence of approximately 2.3% in 16-24 year olds and 3.5% in 25-34 year olds (McManus et al., 2016). Depression manifests as low mood and energy, loss of enjoyment for normal activities, low self-esteem, sleep and eating problems and

suicidal ideation (WHO, 2020a). DSM-5 criteria state that someone with a low mood experiencing 2-4 symptoms that cause significant distress for at least two weeks would be diagnosed with a minor depressive episode (American Psychiatric Association (APA), 2013). A major depressive episode is characterised by the presence of five or more symptoms.

Depression is one of the most prevalent mental disorders in university students. A YouGov poll found that 27% of students declared a mental health problem, 77% of whom specified that this was depression (Aronin & Smith, 2016), representing 1 in 5 of the 1,061 total participant sample. Another study found that 12% of students self-reported a mental health condition, with 79% of these reporting depression (Unite Students, 2016). UK national reports estimate between 10.2-12.0% of students have received a depression diagnosis (The Insight Network, 2019, 2020) and 32-69% experience feelings of depression (NUS, 2013, 2015; Unite Students, 2016). Regarding depressive symptoms, 63-77% of UK students reported lacking energy or motivation (NUS, 2013, 2015; Unite Students, 2016), 66-80% feeling unhappy (NUS, 2013, 2015), 40-62% feeling hopeless (NUS, 2013, 2015) and 34% feeling uninterested in previously enjoyable activities (Unite Students, 2016). In the US, 22% of 13,373 students had received a depression diagnosis within their lifetime (ACHA, 2020), compared to 19.3% of 38,769 students a year prior (ACHA, 2019).

2.1.2. Anxiety

Anxiety is "an emotion characterised by apprehension and somatic symptoms of tension in which an individual anticipates impending danger, catastrophe or misfortune" (APA, n.d., Definition 1). Symptoms listed in the DSM-5 include restlessness, worry, irritability, muscle tension, difficulty concentrating, increased blood pressure and sleep disruption (APA, 2013). Anxiety can be beneficial, such as enhancing motivation, but becomes pathological and diagnosable when anxiousness and worry feel uncontrollable and cause significant distress to the individual for at least six months (APA, 2013). Of all anxiety disorders, generalised anxiety disorder (GAD) is the most prevalent in young people, with approximately 6.3% of 16-24 year olds and 6.1% of 25-34 year olds in England screening positive for GAD (McManus et al., 2016). GAD is different from other anxiety disorders in that people worry about

all domains of their life, rather than specific aspects, such as hygiene (obsessive compulsive disorder) or socialising (social anxiety disorder).

Anxiety is similar in prevalence in university students to depression, with 74% of students declaring a mental health condition specifying they had anxiety (Aronin & Smith, 2016), while Unite Students' (2016) survey found over 80% of students who had a mental health condition specified an anxiety disorder. UK national reports estimated between 8.4-11.2% of students had received an anxiety diagnosis (The Insight Network, 2019, 2020), and 55-77% experienced feelings of anxiety (NUS, 2013, 2015). 29.6% of US students reported they had received an anxiety diagnosis in their lifetime to date (ACHA, 2020), 6.1% higher than 2019 data (ACHA).

2.1.3. Stress

Psychological stress is commonly described as "the degree to which you feel overwhelmed or unable to cope as a result of pressures that are unmanageable" (Mental Health Foundation, 2021b, para. 1). Stress manifests mentally, such as difficulty concentrating and feeling overwhelmed, physiologically, such as muscle tension and headaches, and through behavioural changes, for example being irritable and changes in dietary and sleep habits (Mental Health Foundation, 2021b). Stress can have serious physical health implications if it becomes chronic, such as cardiovascular disease, cancer, diabetes, and early mortality (WHO, 2004).

As with the general population, where over eight in ten 18-24 year olds are said to be overwhelmed with stress (Mental Health Foundation, 2018), feeling stressed is an experience felt by almost all students at university. Between 62-87% of UK university students often or always feel stressed (NUS, 2013, 2015; Unite Students, 2016) and 63% of students say that their stress levels interfere with their daily activities (Aronin & Smith, 2016). Stress levels also differ if students have a mental health condition. 85% of students who had a mental health condition in Unite Students' (2016) research felt stressed, compared with 59% of those who did not. US national data shows 48.8% of 38,679 students felt moderately stressed in the past 30 days (ACHA, 2019), while 27.1% felt a high level of stress, increasing further in 2020 to 49.1% for moderate and 31.8% for high stress (ACHA, 2020).

2.2. Loneliness

Loneliness is defined as an "unpleasant experience that occurs when a person's network of social relations is deficient in some important way, either quantitatively or qualitatively" (Perlman & Peplau, 1981, p. 31). Other definitions commonly mentioned in the literature are slightly different to the above (de Jong Gierveld, 1987; Weiss, 1973, as cited in Zirpoli, 1986), but all feature the same three characteristics: 1. Loneliness is a subjective feeling; 2. Loneliness arises from a deficiency in at least one aspect of a person's social network, and, 3. Loneliness is a distressing feeling.

It is important to distinguish loneliness from social isolation as they are terms that are commonly, but incorrectly, used interchangeably. Social isolation is the physical lack of social relationships (de Jong Gierveld et al., 2006), therefore is an objective description of aloneness. Despite most loneliness definitions including a low quantity of relationships (de Jong Gierveld, 1998), they can occur both simultaneously and separately. Someone who is considered socially isolated may not feel lonely if the small number of relationships they have fulfils their needs or if they prefer to be alone. Similarly, someone considered lonely may have numerous relationships, but they are not of sufficient quality to meet their needs. This demonstrates that loneliness and social isolation are related but distinct states of aloneness.

It was proposed by Weiss (1973) as cited in de Jong Gierveld et al. (2006) that we experience two types of loneliness: emotional loneliness, when there is no strong, intimate relationship provided by a partner or spouse, and social loneliness, where there is a lack of wider community support from friends or colleagues. Cutrona (1982) stated that individuals should have a wide support network with a diverse range of relationships to offer different types of support. This is because weak friendships do not provide the intimacy of a best friend or partner, nor can a partner replace the support from a friendship group. Having a mix of stronger and weaker relationships lowers the chance of someone becoming lonely because their range of social needs are being fulfilled (de Jong Gierveld et al., 2006; Zirpoli, 1986), and lowers the likelihood of comparisons being made to others' relationships (Cutrona, 1982), which often occurs when someone's relationships are unfulfilling.

Approximately one third of UK university students often or always feel lonely (Aronin & Smith, 2016; The Insight Network, 2019; Unite Students, 2016). Loneliness is more prevalent in those with a mental health condition, with 58% often or always feeling

lonely compared to 26% of those without a mental health condition (Unite Students, 2016). National data from the US found that just under half of students surveyed screened positive for loneliness (ACHA, 2019, 2020). The national papers cited above included only one question asking students if, or how often, they felt lonely (Aronin & Smith, 2016; The Insight Network, 2019; Unite Students, 2016) or used cut-off scores to categorise students as 'lonely' and 'non-lonely' (ACHA, 2019, 2020). Published peer-reviewed journal articles are more likely to use validated questionnaires that produce a numerical score to make comparisons between demographic groups or to view correlations with other variables. Such articles, that investigate associations between mental health and loneliness, and their findings, are discussed in more detail in the following paragraphs.

2.3. Mental health and loneliness comorbidities

Depression, anxiety and stress tend to exist simultaneously. Of the people who reported feeling stressed in the Mental Health Foundation's (2018) study, 51% also felt depressed and 61% felt anxious. For students, 14-15.2% report receiving a comorbid depression and anxiety diagnosis (ACHA, 2019, 2020). In the UK, Jenkins et al. (2020) found 27.8% of students screened positive for both depression and anxiety using the Patient Health Questionnaire-2 (PHQ-2; Kroenke et al., 2003) and Generalized Anxiety Disorder-2 scale (GAD-2; Kroenke et al., 2007). Using the PHQ-9 (Kroenke et al., 2001), Eisenberg et al. (2007) reported 50.1% of students who screened positive for GAD also screened positive for depression, but only 30.4% of those screening positive for depression were positive for GAD, consistent with results two years later (Eisenberg et al., 2009b). An in-depth study by Skipworth (2011) using 2009 ACHA data found that students who had real (current diagnosis of) or perceived (experiencing symptoms of) depression reported significantly higher stress than those who did not. Correlational studies also tend to find strong positive correlations between depression and anxiety in university students in England (Jenkins et al., 2020) and South Africa (Makhubela, 2021), and between depression, anxiety and stress in undergraduates from Germany (Nann, 2018) and education postgraduates from Malaysia (Vasugi & Hassan, 2019). While Nann (2018) and Vasugi and Hassan (2019) did include correlational analysis of the depression, anxiety and stress subscales in the Depression, Anxiety and Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995),

other studies using the same instrument (Beiter et al., 2015; Cage et al., 2020) or the longer version (DASS; Iqbal et al., 2015; Shete & Garkal, 2015) failed to assess the relationships between the three subscales, therefore more investigation into the correlations between these three interlinked constructs should be undertaken.

Loneliness is known to be strongly correlated with (Diehl et al., 2018), and accurately predict (Copeland, 2017; Makhubela, 2021), depression. This is possibly due to shared symptoms or traits that lonely and depressed people exhibit. A lonely person prototype was created by Horowitz et al. (1982), who asked 40 students with varying levels of loneliness to describe the thoughts, feelings and behaviours of a typical lonely person. Eighteen characteristics that were mentioned by 20% or more of participants were included in the final prototype (see Appendix A). Using the same methodology, Horowitz et al. (1982) also created a depressed person prototype. A new cohort of 40 students, whose depression levels were not assessed prior, constructed a prototype containing 40 characteristics of depression (Appendix A). Ten out of the 18 loneliness characteristics were found in the depression prototype, such as *thinks "I am inferior"*, *feels sad and unhappy* and *isolates self from others*. This strongly suggests that someone who is lonely also shows many symptoms of depression. Conversely, it is less likely that a depressed person would show symptoms of loneliness due to the broad range of characteristics listed in the depressed person prototype. Horowitz et al. (1982) confirmed this prediction, reporting a stronger likelihood that a lonely person would also be depressed (.45) than a depressed person being lonely (.29).

There is less conclusive evidence of a relationship between loneliness, anxiety and stress, as that regarding the loneliness-depression association. Positive correlations have been found between anxiety and overall (The Insight Network, 2019), emotional and social loneliness (Diehl et al., 2018) and isolation (McIntyre et al., 2018), however loneliness was not reported to be associated with anxiety in undergraduates attending South African universities (Makhubela, 2021). Regression analyses, on the other hand, report loneliness to predict greater levels of both anxiety and stress in British undergraduates (Richardson et al., 2017) and US students (Copeland, 2017), although the relationship was unidirectional, with neither anxiety nor stress successfully predicting loneliness. More recently, Ramos (2020) reported the opposite, that stress did predict stronger feelings of loneliness in students, however only one question

assessed loneliness and two questions assessed stress. This raises doubts about the validity of these findings compared to those based on standardised measures, such as the UCLA Loneliness Scale (Russell et al., 1978) used by Copeland (2017), GAD-7 (Spitzer et al., 2006) used by Richardson et al. (2017) and the Perceived Stress Scale (PSS; Cohen et al., 1983) used in both studies.

Overall, mental health difficulties, such as depression, anxiety and stress, and loneliness are prevalent in young adults and across the university student population. They are often experienced simultaneously due to their shared characteristics, such as sadness, nervousness and isolation. These negative feelings arise due to a variety of experiences students have as they progress through university.

2.4. University challenges

There is extensive research into the challenges that university students face over their academic career. Contributing factors that all students can encounter during their university journey are identified in the following paragraphs.

University challenges begin during first-year undergraduates' transition from high school or college to university. The university transition brings more independence, greater academic expectations and workloads, financial concerns and, for some, uncertainty about future beyond university (Student Minds, 2019). Most first-year students live at their parents' home for their whole life before university (Pittman & Richmond, 2008), so moving out to different accommodation, and sometimes relocating far distances away from the family home, is expected to be a stressful event (Lu, 1994).

Problems relating to academic work are arguably one of the biggest sources of stress for students of all ages and years of study (Aronin & Smith, 2016). The prospect of, and undertaking, exams and coursework is often cited by students as stress-inducing (Bitsika, Sharpley, & Rubenstein, 2010; Denovan & Macaskill, 2016; Hurst et al., 2013; Knoesen & Naudé, 2018; Morton et al., 2014; NUS, 2013), with over 90% of UK students finding exams and assessments stressful (NUS Scotland, 2010), and has been linked to higher levels of depression (McIntyre et al., 2018). The challenging nature and amount of university work (Bitsika, Sharpley, & Rubenstein, 2010; Knoesen & Naudé, 2018; Student Minds, 2019) and difficulty understanding academic

language (Knoesen & Naudé, 2018) have also been cited as contributing factors to poor mental wellbeing.

Lack of resources, such as time and finances, are also frequently mentioned stressors for students. Many students believe it necessary to sacrifice time allocated for activities they find enjoyable to make time for studying due to demanding workloads and pressure to succeed (Bitsika, Sharpley, & Rubenstein, 2010). Spending more time studying creates an unhealthy work-life balance (Hurst et al., 2013), which has been negatively associated with depression and anxiety (Sprung & Rogers, 2020) and stress (NUS, 2013; Sprung & Rogers, 2020). As well as long study hours, less financial freedom due to expensive living costs means students have fewer opportunities for recreational activities and socialisation (Bitsika, Sharpley, & Rubenstein, 2010; Knoesen & Naudé, 2018; Mattanah et al., 2010; Morton et al., 2014), which can lead to a decrease in perceived social support and a subsequent decline in mental health (Eisenberg et al., 2007). Furthermore, financial distress is shown to increase as students progress through university (Cooke et al., 2004; Gutter & Copur, 2011) due to the debt amassed over the course of their degree (Roberts et al., 2000), with undergraduates estimated to owe £50,000 following graduation (Institute for Fiscal Studies, 2017). Some students, however, manage a part-time job alongside their studies to increase their income (Andrews & Wilding, 2004), which is likely to heighten stress further due to loss of time for studying and leisure (Gaedke et al., 2012).

Other challenges students face include relationships (Hurst et al., 2013) and uncertainty about the future (Aronin & Smith, 2016), as well as stressors that all young adults can face (Holmes & Rahe, 1967; Pett & Johnson, 2005; Renner & Mackin, 1998). Failure to create new, and maintain existing, relationships can lead to a decrease in perceived social support and subsequent decline in mental health (Eisenberg et al., 2007). Worries about life after graduation are cited by many students (Bewick et al., 2010), particularly by final year students who face an unfamiliar life out of university and uncertain job prospects (Perrone & Vickers, 2003).

2.5. Postgraduate students

Postgraduate students are an overlooked population in research into mental health and wellbeing (Student Minds, 2019), particularly in the UK (Guthrie et al., 2017). The

majority of mental health studies either solely focus on undergraduates or combine both undergraduate and postgraduate data to provide an overall result. This is concerning considering most literature that is available provides evidence for poor mental health and wellbeing in the postgraduate population.

To the author's knowledge, the only research published in the past five years that specifically reported the diagnoses of mental health conditions in UK postgraduates was conducted in 2017 by the Higher Education Academy (HEA, 2017a, 2017b). These studies found approximately 3.4% of 142,000 UK postgraduates self-reported a diagnosed mental health condition. This is 18% lower than national figures estimating that 21.4% of 25-34-year-olds in the general population showed signs of depression and anxiety (Office for National Statistics (ONS), 2019a). Large-scale UK studies and figures tend to report the proportion of people experiencing mental health difficulties but not clinical diagnosis, which would explain the large percentage difference between the above findings.

The same issue is observed in US academic research, where the questionnaires used measure the severity of symptoms rather than reporting the number of participants with diagnosed mental health conditions. Evans et al. (2018) reported US postgraduates were six times more likely to screen positive for depression (41%) and anxiety (39%) compared to the general US population (6% for both depression and anxiety). Another US study found 35.2% of postgraduates showed signs of mild depression and 34.4% of moderate to severe depression (Garcia-Williams et al., 2014). They also found 52% showed signs of anxiety, with over 95% feeling nervous often, and 88.7% feeling stressed, confirming the idea that postgraduate students are highly vulnerable to experiencing mental distress. A Saudi Arabian study in 2019 found 87% of postgraduates screened positive for depression and 78.5% screened positive for anxiety (Alageel et al., 2021). Reporting diagnosis figures, nationwide US data found 32.9% of graduate students reported ever receiving a mental health diagnosis (ACHA, 2019). This was regardless of whether the students were in remission or the diagnosis was no longer relevant, therefore the figure may be lower if it only contained students who had a current mental health diagnosis.

Most publications examining postgraduate wellbeing do not separate data between different types of postgraduate course (Eisenberg et al., 2007; Evans et al., 2018;

Garcia-Williams et al., 2014; Ray et al., 2019; Wyatt & Oswalt, 2013), for example doctorate vs research Masters vs taught Masters. The few studies that have, reported conflicting findings. A study of 3,121 US students by Hyun et al. (2006) found PhD students were 8% less likely than Masters students to report depressive symptoms, however Patel's more recent article in 2015 reported PhD students felt more depressed than Masters students (47% vs 37%, respectively). Alageel et al.'s (2021) research found no significant difference between Masters and PhD students' depression and anxiety scores. No studies that directly compared research and taught Masters students in all year groups were found, however Higher Education Statistics Agency (HESA) data in Thorley's (2017) review of wellbeing in UK higher education revealed that only 2% of PGR and 1.9% of PGT home students who were enrolled in their first year of study disclosed a mental health condition to their institution. This aligns with the HEA's two UK national reports that found 3.3% of 57,689 research (2017a) and 3.5% of 84,556 taught (2017b) postgraduates were currently diagnosed with a mental health condition. Two years later, Advance HE (2019), formerly the HEA, recorded levels of overall mental wellbeing in research students. They found that almost a quarter of postgraduate researchers were satisfied with life and felt happy (both 23%) and 35% thought life was worthwhile. Life satisfaction and happiness were lower than figures from the UK 20- to 29-year-old general population (28.5% and 32.3%, respectively; ONS, 2019a) but more research students thought life was worthwhile (32% for people aged 20-29).

Eighty percent of students surveyed by Cornell (2020) agreed that research could be lonely and isolating. Other studies report over half of postgraduates feel severely lonely (Garcia-Williams et al., 2014) and a fifth of 398 students feel socially isolated (Ray et al., 2019). Loneliness was also found to be negatively correlated with wellbeing in postgraduates studying science, technology, engineering and mathematics (STEM) disciplines (Anderson, 2017). US data found approximately 41.6% of graduate students screened positive for loneliness (ACHA, 2019, 2020).

Most studies comparing postgraduates with undergraduates report a slightly lower prevalence of poor mental health indicators in postgraduate students. Eisenberg et al. (2007) and Wyatt and Oswalt (2013) investigated differences in depression and anxiety symptoms between undergraduate and postgraduate students. Using the PHQ-

9 (Kroenke et al., 2001), Eisenberg et al. (2007) reported more undergraduates than postgraduates screened positive for depressive (13.8% vs 11.3%) and anxiety (4.2% vs 3.8%) disorders, although these differences were not significant. Participants in Wyatt and Oswalt's (2013) research were asked about *feelings and behaviours often associated with poor mental health*, and significantly more undergraduates than postgraduates felt depressed (29.1% vs 27.2%) and anxious (56.1% vs 43.8). Prevalence was notably higher compared to figures reported by Eisenberg et al. (2007), which might be explained by the different measures of mental health used. Research showing undergraduates with worse mental health may also be explained by a previously mentioned suggestion that undergraduate students who are more mentally healthy are more likely to progress to postgraduate study than those who have mental health conditions (Wyatt & Oswalt, 2013).

A more recent study by Levecque et al. (2017) using the 12-item General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988) investigated the prevalence of psychological distress and mental health disorder symptoms in 3,659 PhD students against a comparison group of 332 undergraduates. They found more PhD students showed signs of psychological distress (51.1%) and a mental health disorder (31.8%) than the comparison group (30.6% and 14.6%, respectively). Ickes et al.'s (2015) coping methods research found 43.2% of 666 postgraduates and 39.5% of 473 undergraduates felt very stressed in the last thirty days, but the difference was not significant. As previously mentioned, using different questions for different variables of mental health can produce differing results that make it difficult to compare studies. Regarding the sample demographic, postgraduate students in Levecque et al.'s (2017) study made up 91.7% of the sample, and were all PhD students, compared to 58% in Ickes et al. (2015), 52.7% in Eisenberg et al. (2007) and 11.1% in Wyatt and Oswalt's (2013) samples, neither of whom mentioned whether their participants were taught or research Masters or PhD students. As previously mentioned, prevalence of mental health symptoms differs between Masters and doctoral students (Hyun et al., 2006; Patel, 2015), so this factor could have also contributed to the conflicting findings.

Another caveat when interpreting mental health results is self-selection bias. Postgraduates who are struggling may be more inclined to take part in mental health studies as a method of reaching out for support, while those who have mild or no

problems may not feel it necessary to take part in such research, thus potentially painting an overly negative picture of the mental health of postgraduate students. On the other hand, studies showing a low prevalence of mental health issues may be explained by postgraduates not participating because they feel too stressed and busy to complete questionnaires, thus underreporting the true extent of prevalence in this population.

2.5.1. Challenges for postgraduates

Difficult transitions into postgraduate study were frequently reported by participants in Tobbell and O'Donnell's study (2013), particularly by mature students or those who did not enter immediately after graduation from their undergraduate degree. Postgraduates who had had a break from academia did not feel competent in writing assignments and stated that staff did not provide support, such as providing writing workshops to assist them. As expected, younger students and those who had recently finished their undergraduate degree felt more confident in preparing and writing assignments and navigating online resources and databases (Tobbell & O'Donnell, 2013). However, students who immediately enter postgraduate study from their undergraduate degree are at a risk of burnout, as reported in medical students (Guang et al., 2020), in that their continuous involvement with academia can lead to emotional exhaustion. This suggests that the postgraduate transition brings different challenges to different students, which calls for different types of support during the first few months of study.

A major challenge students encounter is the increased independence, and amplified risk of loneliness and social isolation, that often accompanies postgraduate study (Cornell, 2020). Taught postgraduate students have a similar course structure to undergraduate degrees, in that they have modules and contact hours where they can regularly interact with staff and peers. Research students, on the other hand, usually have one or more research projects they complete individually and report to one or two staff as supervisors. There is a huge diversity of research project topics covered by postgraduate students within the same department (McLaughlin & Sillence, 2018), unlike in undergraduate degrees where students enrolled on the same modules can talk with others about their learning. This means that research students may not feel able to discuss their work with their peers despite sharing office space (Reeve & Partridge,

2017), leading to academic isolation which might then evolve into emotional loneliness (McLaughlin & Sillence, 2018).

The sense of independence, loneliness and isolation in postgraduate research is also attributed to others' lack of understanding about the nature of research degrees. These courses do not have taught 'lessons', a structure that is often the norm since primary school, so those not involved in this field of academia, such as family members, may not easily understand the very specific struggles research students face (McLaughlin & Sillence, 2018). This may lead to unsuitable support (McLaughlin & Sillence, 2018), or students not disclosing issues at all, which could enhance feelings of loneliness and social isolation, a prediction supported by Ray et al. (2019) who found postgraduates felt less isolated if they could confide in family and friends. Therefore, research students should be encouraged to seek guidance from individuals in their academic circle to discuss issues shared by the research community, and to also educate their support networks outside of academia about the nature of research degrees and communicate the support that would be most beneficial to them.

The sense of independence in postgraduate research culture is also influenced by study mode. Part-time students spend less time on campus than those studying full-time, so do not have the same opportunities to interact with peers and discuss their research (Advance HE, 2020; Higher Education Academy, 2017a; McLaughlin & Sillence, 2018). However, part-time research students had higher wellbeing scores, were overall happier and experienced less anxiety than full-time students in Advance HE's (2020) study. Studying part-time means students are enrolled for double the full-time course duration, enabling them to spend more time on other commitments, such as a part-time job or caring for children, which might lower their stress levels surrounding their university work.

Postgraduate students may reach out to supervisors with concerns, however an ineffective supervisor-student relationship can be detrimental to student wellbeing. Evans et al. (2018) recorded 2,274 postgraduate students' opinions on their relationship with their tutors. Of the 40% of students who displayed indicators of depression or anxiety, approximately half revealed they did not consider their tutor provided adequate mentorship or support and did not 'feel valued' by their supervisor. Students who perceived their supervisor as approachable and willing to give support

were less likely to feel depressed (Hyun et al., 2006; Milicev et al., 2021), anxious (Milicev et al., 2021) and lonely (Zirpoli, 1986). These findings reinforce the importance of having a healthy supervisor-student relationship, not only to maximise academic potential but to ensure students' mental health does not begin to decline.

Another widely discussed issue is the substantial workload postgraduate students must manage in order to achieve this success (Brown, 2013; McLaughlin & Sillence, 2018; Student Minds, 2019; Tobbell & O'Donnell, 2013). To manage their workload, doctoral students spend an average of 47 hours per week working on the PhD (Cornell, 2020) which is significantly higher than the 31 hours per week completed by undergraduates (Cornell, 2020). As well as their own dissertation, PGR students, but mainly doctoral students, are contractually obliged to teach or mentor undergraduate classes (Patel, 2015). The resulting lack of time leads to an unhealthy work-life balance and an increased likelihood of depression or anxiety (Evans et al., 2018), but was not found to be associated with social isolation (Ray et al., 2019). Fewer PGR students with a mental health condition were happy with their work-life balance compared to those with no mental health condition (39% vs 62%, respectively, HEA, 2017a). Postgraduate students should be educated on how to maintain a healthy work-life balance once they begin their course to reduce the risk of their mental health declining.

Other challenges shared by both postgraduates and undergraduates are financial concerns (Patel, 2015; Student Minds, 2019) and career uncertainty (Patel, 2015). Hyun et al. (2006) reported that postgraduate students who were confident they could afford their degree had better wellbeing than those who were not. Regarding uncertainty about life after graduation, Patel (2015) also reported that higher depression levels were significantly predicted by postgraduates who had a negative outlook on their future career.

Although most PGR students submit their thesis, there are a number of students who fail to complete their degree and drop out. 30-43% of doctoral students admitted they had considered withdrawing from their studies (Pyhältö et al., 2012; van Rooij et al., 2021), but actual withdrawal rates vary. Park (2005) reported 37% of PGR students dropped out of university between 1992-2001, while attrition rates for PhD degrees range between 17-70% (Jiranek, 2010; Jones, 2013; Rigler et al., 2017; Spronken-Smith et al., 2018) and 23% for Masters degrees (Council for Graduate Schools (CGS),

2013). Differences between academic disciplines can explain the wide range of percentages reported as humanity disciplines tend to have higher attrition rates than STEM subjects (Golde, 2005; Park, 2005; Spronken-Smith et al., 2018).

There are a variety of factors students give for quitting their degree. A systematic review of 163 articles published after 2000 by Sverdlik et al. (2018) concluded low internal motivation was the most critical influence for doctoral students to drop out of university, followed by the supervisor relationship, different expectations and fewer financial opportunities to support their studies. A review of 79 articles published from 2010 onwards by Rigler et al. (2017) reported the supervisor relationship, student isolation, lack of students' preparedness to undertake a PhD and financial concerns were key factors for doctoral student attrition. Individual articles also cited low motivation (Spronken-Smith et al., 2018), an incompatible or unsupportive supervisor relationship (Golde, 2005; van Rooij et al., 2021), loneliness and isolation (Golde, 2005; van Rooij et al., 2021), a disparity between students' and department's expectations (Golde, 2005), low project ownership and understanding (Devos et al., 2017), mental health and medical reasons (Devos et al., 2017; Spronken-Smith et al., 2018) and a demanding work-life imbalance (Spronken-Smith et al., 2018) as reasons for dropping out. Additionally, studies using university enrolment records found higher attrition rates in students who were home-domiciled (Park, 2005), part-time (Park, 2005; Spronken-Smith et al., 2018) and had not previously studied at their current university (Park, 2005). Pyhältö et al. (2012) also reported doctoral students who had considered quitting were more anxious, stressed and exhausted and were less interested in their degree than those who had not had these thoughts.

These qualitative (Devos et al., 2017; Golde, 2005;) and quantitative (Park, 2005; Pyhältö et al., 2012; Spronken-Smith et al., 2018; van Rooij et al., 2021) articles used participants studying in Europe (Devos et al., 2017; Park, 2005; Pyhältö et al., 2012; van Rooij et al., 2021), New Zealand (Spronken-Smith et al., 2018) and the US (Golde, 2005). All but one article excluded Masters students from their analysis (Park, 2005). This demonstrates that more research is needed to examine the rates of PGR students considering quitting, but also actual attrition rates in Masters students and their reasons for doing so.

2.6. Sociodemographic factors

The rise in mental health conditions in the student population is attributed to an increasingly diverse demographic of students enrolling in universities. The 'traditional' UK university student is described as young, "male, white, middle class and able-bodied, an autonomous individual unencumbered by domestic responsibilities, poverty or self-doubt" (Leathwood & O'Connell, 2003, p. 601), and whose characteristics meant they were less vulnerable to mental health issues (Royal College of Psychiatrists London, 2011). 'Non-traditional' students are typically identified as "mature students, those who have entered through alternative routes, those with qualifications other than the standard A levels, those with a long-term disability, students from working class backgrounds and students from minority ethnic groups" (Leathwood & O'Connell, 2003, p. 601). The prevalence of mental health symptoms and loneliness in 'non-traditional' postgraduate students, and the specific challenges they face during university, are highlighted in the following paragraphs. Unfortunately, there is limited evidence specifically looking at postgraduates as a whole group, PGR students, or which differentiates findings between undergraduates and postgraduates. In light of this, studies containing undergraduates or generalised student samples will also be included in this review.

2.6.1. Gender and sexuality

The literature investigating prevalence and severity of mental health conditions, negative wellbeing and loneliness in men and women presents mixed findings. Most studies report females have poorer mental health compared to males in generalised student samples (Bore et al., 2016; Ramos, 2020; Wiseman et al., 1995). In PGR students, females report greater stress than males (Byrom et al., 2020) but no difference in mental wellbeing. Comparing undergraduate and postgraduate students, Eisenberg et al. (2007) reported more female postgraduates screened positive for depression and anxiety than males, and more female undergraduates screened positive for anxiety. The common finding that females have worse mental health is likely due to the overrepresentation of females in most studies (Ellis et al., 2014), and the reality that men tend to underreport mental health issues (Johnson & Crenna-Jennings, 2018). The culture of the 'macho' man, or male stoicism, has led to the stigmatisation of men's mental wellbeing (Schultz & Moore, 1986, as cited in Ponzetti, 1990), causing men to feel hesitant to express their feelings or seek support due to the negative social

consequences that may arise as a result (Lynch et al., 2018; Misner, 2015; Sagar-Ouriaghli et al., 2020; Wiseman et al., 1995), as noted by one male PhD student in Brown's (2013) article who would often deal with the issues himself. As a consequence of not reaching out for support, more than two thirds of student suicides in the UK are committed by male students (Hawton et al., 2012; ONS, 2018). ONS (2018) annual data compiled between 2012-2017 for England and Wales found suicide rates were higher for male postgraduates (5.4 deaths per 100000) and undergraduates (7.1 deaths per 100000) compared to female students (2.0 in postgraduates and 3.0 in undergraduates). These concerningly high statistics for male suicide call for investigations into why men do not disclose certain mental health symptoms.

Loneliness figures tend to indicate that males often feel more lonely than female students in postgraduate (Zirpoli, 1986) and unspecified student samples (Salimi, 2011; Schultz & Moore, 1986, cited in Ponzetti, 1990; Wiseman et al., 1995). Ramos (2020), however, found females were lonelier than males in an unspecified US student sample. Future research should investigate further into male loneliness and explore how these feelings can be alleviated.

Prevalence of mental health issues is greater still in transgender, non-binary and intersex (TNBI) and lesbian, gay, bisexual, queer and other (LGBQ+) students. Research looking at LGBTQ+ postgraduate students, however, is extremely scarce. Studies using an unspecified student sample showed greater depression and anxiety levels in LGBTQ+ students (Anderssen et al., 2020; Borgogna et al., 2018; Oswalt & Lederer, 2017; Woodford et al., 2014) compared to cisgender and heterosexual students. Research has found that these minority students also feel lonelier (Anderssen et al., 2020; The Insight Network, 2019) than cisgender and heterosexual students, while others have reported no significant differences in PGR student mental wellbeing and stress (Byrom et al., 2020) or loneliness in postgraduate (Ray et al., 2019) and unspecified student (Ramos, 2020) samples.

University campuses can be perceived as a hostile environment for LGBTQ+ students. These groups are at a significantly higher risk of receiving physical and verbal abuse and harassment on campus (Aparicio-García et al., 2018; Przedworski et al., 2015; Woodford et al., 2014), and frequently experience misgendering by other students and staff (Goldberg et al., 2018). As a result, these students resist presenting themselves in

a way they truly wish to due to fears for their safety, as reported by 66% of 91 postgraduates in Goldberg et al.'s (2018) research.

2.6.2. Ethnicity, cultural differences and international students

Students of an ethnic minority might be considered more susceptible to developing mental health conditions. Chen et al. (2019) analysed secondary survey data in a US national dataset of 67,308 US undergraduates. Feelings of depression were more prevalent in ethnic minority students compared to White students (37.9% vs 34.1%, respectively), but feelings of anxiety and loneliness were less prevalent (56.3% vs 59.1% for anxiety and 60.4% vs 61.1% for loneliness, respectively). Eisenberg et al. (2007) reported students identifying as an 'Other' ethnicity were four times more likely to screen positive for depression than White students but found no association with anxiety. Byrom et al. (2020) found being an ethnic minority PGR student was not associated with stress or mental wellbeing. For international students, The Insight Network (2020) reported a significantly lower likelihood of international students being anxious or lonely, but no associations were found by Eisenberg et al. (2007) or Byrom et al. (2020). Chen et al.'s (2019) sample contained only undergraduates, Eisenberg et al. (2007) had 34.2% undergraduates and 65.8% postgraduates, Byrom et al. (2020) surveyed just PGR students and The Insight Network (2020) did not mention the type of students in their sample. This difference, along with the proportions of ethnic minority (22.3-39.3%) and international (15.4-18.3%) students and range of questions used to measure mental health, may explain the varying results.

Cultural differences explain how ethnic minority and international students can feel excluded and have a negative university experience. 16.7% of international students revealed they had difficulties adjusting to Western cultural norms when they first arrived at their US university (Sherry et al., 2010), with over 60% feeling their culture was misunderstood. Muslim students have identified various physical and social challenges (Ali & Bagheri, 2009; Asmar et al., 2004). Hostility towards, and assumptions about, their religion and culture were commonly reported by veiled women interviewed in Koller's (2015) study, consisting of four undergraduate and two postgraduate Muslim-American women, as they must deal with the stigma about wearing hijabs and niqabs (Ali & Bagheri, 2009; Asmar et al., 2004; Koller, 2015).

Language barriers pose an added challenge to students whose first language is not English, as reported by Ray et al. (2019) who found non-native speaking postgraduate students felt lonelier and more socially isolated than their English-speaking counterparts. Sherry et al. (2010) linked this to a misunderstanding of common slang and mispronunciation of foreign names. Additionally, financial issues are troublesome for international students (Sherry et al., 2010). Fewer international postgraduates mentioned this in Sherry et al.'s (2010) qualitative survey because they were eligible for university grants, however undergraduates desired more financial aid.

2.6.3. Disability

Students with disabilities face additional challenges to studying compared to non-disabled students. A review of the existing literature by Lizotte and Simplican (2017) revealed PhD students with disabilities tend to experience the same academic challenges as undergraduates, such as a lack of provisions, for example staff appearing reluctant to accommodate for individual needs (HEA, 2007; Kendall, 2016), as well as social challenges, like perceiving that staff hold negative attitudes towards them because of their disability (Gurbuz et al., 2019; HEA, 2007; Kendall, 2016). This is disputed by Mattocks and Briscoe-Palmer (2016) who surveyed 70 PhD students attending UK universities, of which 75% identified as a minority student (female, BAME or disabled in this case). None of the students with disabilities agreed that their supervisor or faculty staff were unsupportive to their studying, however the universities where these students were based had a disability support department, so students were probably receiving adequate support already.

Furthermore, 63% of disabled students in Mattocks and Briscoe-Palmer's (2016) study were worried about their mental or physical health, compared to 47% of non-minority students, which was cited as a contributor to thinking about quitting their degree. Supporting this, in studies comprising a mixed analysis of samples containing undergraduates and postgraduates with disabilities (86.4% vs 12.1% in Coduti et al., 2016; 69.2% vs 19.2% Masters and 11.5% PhD in Gurbuz et al., 2019), disabled students were found to be significantly more depressed (Gurbuz et al., 2019) and anxious (Coduti et al., 2016; Gurbuz et al., 2019) than non-disabled students. Regarding loneliness and isolation, Hadidi and Khateeb (2013) reported higher loneliness and social isolation scores in disabled students in an unspecified sample.

Research with postgraduates has found no significant difference (Ray et al., 2019) or that non-minority students felt slightly more isolated than non-disabled students (29% vs 25%, respectively, Mattocks & Briscoe-Palmer, 2016).

2.6.4. Relationship status

There is very little research exploring the influence of relationship status on PGR student mental health and loneliness. Studies that do examine these variables in postgraduates suggest married students have higher mental wellbeing (Panahi et al., 2013) and are less likely to report mental health issues (Hyun et al., 2006) or be lonely (Zirpoli, 1986) compared to single students, but this was not found for those who were just in a relationship (unmarried). Studies with a combination of undergraduates and postgraduates reported participants in any romantic relationship had significantly lower loneliness scores than single students (Diehl et al., 2018; Ramos, 2020). Other research found only students in a relationship (Braithwaite et al., 2010) or who were married (Eisenberg et al., 2007) had better mental health, while Bore et al. (2016) found no association with relationship status in undergraduates. Interestingly, students in relationships have been found to engage less with campus activities (Waterman et al., 2017), putting them at greater risk of developing social loneliness because they would have fewer platonic relationships to provide social support (Weiss, 1973, as cited in de Jong Gierveld et al., 2006). This demonstrates the importance of receiving support from a variety of sources.

2.6.5. Living situation

Most literature comparing the influence of living situation on students' mental health tend to focus on undergraduates living on or off campus. Some show living in campus residences with others protects students from anxiety (Eisenberg et al., 2007) and stress (Beiter et al., 2015), and that living alone increases emotional loneliness (Diehl et al., 2018), while others report no associations with depression (Beiter et al., 2015; Eisenberg et al., 2007) or anxiety (Beiter et al., 2015). These findings tend not to be relevant for postgraduates as most do not live on campus (Eisenberg et al., 2007; Wyatt & Oswalt, 2013). Zirpoli (1986) compared levels of loneliness in PGR students living off-campus alone or with peers, partner, spouse or parents. The only significant differences showed lower levels of loneliness in students living with their spouse

compared to those living with their parents or with peers. Further research should be carried out to explore how living situation is associated with mental health and loneliness symptoms in PGR students, as well as its influence on other aspects, such as academic work.

2.6.6. Student parents

Student parents are another population that faces unique challenges. Again, much of the existing literature concentrates on undergraduates, often with a heavy imbalance of female participation. Hassell (2018) interviewed 3 female and 1 male final year undergraduates from 2 Welsh universities. Moreau and Kerner (2015) interviewed 38 female and 2 male undergraduate and postgraduates from 10 universities in England. Stone and O'Shea (2013) interviewed 15 female and 4 male undergraduates from 1 Australian university. Participants in these studies discussed the pressure on them to dedicate sufficient time to their studies while spending time caring for children, which often required their personal time to be neglected, as well as managing the emotional and physical toll that manifests as a result, such as guilt, depression, anxiety, stress and isolation (Hassell, 2018; Moreau & Kerner, 2015; Stone & O'Shea, 2013).

Unsurprisingly, the demands of being a student parent appeared more detrimental to female participants than to the male participants (Hassell, 2018; Moreau & Kerner, 2015; Stone & O'Shea, 2013), who did not mention having difficulties juggling multiple responsibilities. In contrast, female participants' narratives paralleled the traditional gender stereotype of females undertaking household and care duties (Stone & O'Shea, 2013). Even in studies with all-female samples, such as Gerrard and Roberts (2006), who interviewed 8 mothers living with a partner and 4 lone mothers, and Hinton-Smith (2015), who exchanged email chats with 77 single mothers, the number and impact of challenges faced by mothers studying at university appear far greater than those of fathers.

In addition, financial constraints pose challenges for some student parents (Gerrard & Roberts, 2006; Hassell, 2018; Hinton-Smith, 2015; Moreau & Kerner, 2015; Stone & O'Shea, 2013), such as childcare costs and having a reduced income than previously. This is a more notable issue for postgraduates as they do not qualify for UK government childcare grants, unlike undergraduates. One postgraduate in Moreau and

Kerner's (2015) study interpreted this lack of additional funding as society preventing mothers from pursuing anything higher than an undergraduate degree. Others mentioned the pressure on them to fulfil the expectations of PhD students, such as teaching and attending conferences, which present time conflicts with care responsibilities.

The only study that solely investigated postgraduate student parent experiences and support provisions was by Springer et al. (2009), who surveyed sociology department directors from 40 US universities rather than postgraduates themselves. Overall, there seemed to be a range of support specific to postgraduate student parents being delivered across campus, such as family-friendly activities (35%) and spaces (30%), like changing facilities or feeding areas, and reduced childcare fees (35%). Not so prevalent types of support were faculty education to understand needs of student parents (0%), accessible professional development opportunities (5%) and parent support groups (7.5%). This purposive sample was obtained because Springer et al. (2009) presumed that, since a high percentage of sociology postgraduates are females, a considerable number might be mothers, meaning these findings may not be generalisable to other faculties. A broader investigation into the views of postgraduate student parents from different disciplines and levels of postgraduate study on university provisions, therefore, are needed, particularly as postgraduate courses in the UK tend to enrol more parents than undergraduate courses (Brooks, 2012).

2.6.7. Academic discipline

Mixed findings have been revealed in studies assessing differences in mental health and wellbeing by students' academic discipline. No differences have been reported for depression and anxiety (Scheidegger, 2020), stress (Byrom et al., 2020; Scheidegger, 2020) and overall wellbeing (Byrom et al., 2020) in US doctoral and UK PGR students, respectively. The risk of developing a mental health problem was also not significantly higher or lower between Flemish PhD students' disciplines (Levecque et al., 2017). In the US, Hyun et al. (2006) found humanities postgraduates were 11% more likely to report a mental health issue than other disciplines, while Ray et al. (2019) reported significantly more postgraduate nursing students felt socially isolated than students on other health-related courses (40.7% vs 10.3-28.6%, respectively). Engineering postgraduates in Malaysia were found to have the lowest wellbeing scores compared

to those studying languages, agriculture, education, medicine and sciences, who had the highest average wellbeing score (Panahi et al., 2013). This shows that there is a handful of disciplines where students may be more susceptible to poor mental health, wellbeing and isolation. A deeper exploration into departmental differences for PGR students, particularly loneliness, would enable universities to tailor the support delivered to meet different departments' needs.

Overall, university students encounter numerous challenges in their journey through higher education. PGR students face distinct challenges, as well as non-traditional students such as the LGBTQ+ population, ethnic minorities and international students and students with disabilities or dependents, however there is considerably less research specifically investigating this population compared to undergraduates or PGT students. The research that has investigated non-traditional PGR students has found mixed conclusions. The resulting detriments to student mental health present a need for universities to offer services to support a variety of students with a variety of issues. The following section will briefly discuss current provisions and use of university support services and the barriers that PGR and other students perceive to prevent them from accessing these services.

2.7. Support services

Although there are vast numbers of people reporting their mental health difficulties and/or screening positive for mental health conditions, there are considerably fewer people actually seeking support. In the UK general population, approximately 36% of adults with self-reported mental health problems reach out for support (Mental Health Foundation, 2021a; Salaheddin & Mason, 2016), of which 59% seek support for depression and 48% for anxiety (Mental Health Foundation, 2021a). In students, 88% report experiencing mental distress (NUS, 2013) and 47-55.9% ask for support for this issue (Batchelor et al., 2019; NUS, 2015). Cage et al. (2020) investigated multiple factors that may predict UK students' use of university wellbeing support. They reported students with higher stress levels were more likely to seek informal support, but students with higher depression levels were more likely to have no intention of seeking any support. Anxiety was not associated with any help-seeking behaviour, and none of these variables were linked to seeking formal help. This suggests that students' help-seeking behaviours depend on the mental health difficulty they are currently

experiencing. Cage et al.'s (2020) sample mainly consisted of undergraduates so the same cannot be implied for PGR students, thus warranting further quantitative investigation.

Almost all UK doctoral students experience mental distress during their time as a PGR student (98.2%), but only 69.1% seek mental health support for these feelings (Waight & Giordano, 2018). These authors reported 20.2% visited their GP for help, 16.9% approached their academic department, 12.5% sought support from their university's wellbeing service and 11.8% attended counselling external to their university. Students also reported other, less frequently mentioned, sources of support, such as from their students' union or faith and community groups. In the US, 30.9% self-reported seeking wellbeing support while enrolled as a PGR student despite 44.7% experiencing emotional difficulties (Hyun et al., 2006). 26.7% of the sample attended on-campus services, 10.5% found services off-campus and 5% received support from both on- and off-campus sources. The same study also found increased depression and stress levels positively predicted help-seeking behaviour. Hyun et al. (2006) also compared service usage between postgraduate degree types and gender. They found no significant difference between Masters and doctoral students, but reported females were more likely to use on-campus wellbeing services (Hyun et al., 2006). Garcia-Williams et al (2014) also reported females were more likely to seek support than males. The discrepancy between students' perceived need for mental health support and actual service use can be attributed to several barriers that are reviewed in the following paragraphs.

Stigma and concerns about privacy are cited by 15.2- 21.8% of postgraduate students as being a barrier to accessing university wellbeing support (Horwitz et al., 2020; Waight & Giordano, 2018). Waight and Giordano (2018) reported 22.9% of doctoral students felt embarrassed that they need help and 21.3% did not approach services or people at their university for fear of the consequences, with particular concern that their academic supervisors will become aware of their struggles. However, younger undergraduates (aged 18-19 years) are more likely than postgraduates to attribute stigma as a deterrent to accessing support, with Horwitz et al. (2020) reporting 39.1% of young undergraduates citing this barrier. Older undergraduates (aged 20-25 years) were not significantly more likely than postgraduates to report stigma as a barrier. This

concurs with other studies finding high self-stigma of help-seeking behaviours in younger students (Aronin & Smith, 2016; Eisenberg et al., 2009a; Rafal et al., 2018).

Stigmatisation of help-seeking is particularly heightened in male students (Eisenberg et al., 2009a; Horwitz et al., 2020; Rafal et al., 2018; Sagar-Ouriaghli et al., 2020), who are deterred from seeking support from places where female students may negatively judge them (Sagar-Ouriaghli et al., 2020). This, unfortunately, translates to fewer males accessing support for their mental health compared to female students (Garcia-Williams et al., 2014; Misner, 2015), supported by Hyun et al. (2006) who found 18.7% of male postgraduates had self-reported ever accessing campus wellbeing support compared to 34.8% of females.

The taboo of mental health problems and wellbeing services may contribute to some PGR students' lack of awareness of the services available. When asked where they would first look to get wellbeing advice, over half of doctoral students in Waight and Giordano's (2018) study said they would visit the NHS website (53.8%). 27.5% of students would look on other websites and 25% would look on their university's support webpages, while just 11.3% would visit the student support department in person and less than 10% would look at their students' unions or faculty's website. Strikingly, 23.9% would not know who to speak to at their university and 40.6% would never have thought to get information or advice about their mental health from their university's wellbeing service (Waight & Giordano, 2018). This shows that UK universities are not doing enough to promote their services to PGR students compared to other students, of whom 42-81.5% were aware of their university's wellbeing support (The Insight Network, 2019, 2020; NUS, 2013, 2015). Similarly, Hyun et al. (2006) reported 25.8% of postgraduates were not aware of the wellbeing support offered by their universities, with a greater proportion of males being unaware of on-campus support (32.8% vs 17.9% of females).

Even if students are aware of services available to them, they may doubt the efficacy and quality of support on offer. 25.6% of postgraduates in Horwitz et al.'s (2020) study said they did not access support because the services would not be useful for their problem. This coincides with a common perception from postgraduates that universities tailor their wellbeing support to undergraduates' needs, for example drastically reducing or shutting down support services during the summer holiday

period (Priestley et al., 2021) and focusing on undergraduate-specific issues like exams (Waight & Giordano, 2018). Although PGT and undergraduate students do not differ much in terms of challenges, PGR student daily life is varied and vastly different from an undergraduate's (Compton, 2017; McPherson et al., 2018), so PGR students' perceived disregard of university services for their needs may be a key reason why PGR students do not use their university's support. The quality of services may, in fact, be an issue for much of the student population, as 7.2% of younger undergraduates and 4.2% of older undergraduates in Horwitz et al.'s (2020) study mentioned this as a barrier.

A low need for support is also cited by postgraduates as a barrier to accessing university wellbeing services (40.8%; Horwitz et al., 2020). PGR students may only recognise their need for wellbeing support once they are experiencing severe mental health difficulties, rather than reaching out early, because some believe that mental health difficulties are a normal part of research culture (Horwitz et al., 2020; Patel, 2015). However, it is even more common for undergraduates to think they do not need support, with 54.5% identifying this barrier in Horwitz et al.'s (2020) study. Perceiving a low need for support may be influenced by other barriers, such as stigma or time issues. Students may convince themselves they do not need support because of their fear of others finding out they are seeking help or that service opening times are too inconvenient, thus worsening symptoms.

Another barrier that may prevent PGR students from stepping inside support services is accessibility. Postgraduate students were more likely to say that financial concerns (52.7%) and time issues (69.2%) were a barrier to accessing university support in Horwitz et al.'s (2020) study, but the difference was only significant with younger undergraduates (46.3% and 64.2%, respectively). PGR students reported a perceived inability to take time out of their day to attend support sessions, with services being in inconvenient locations, such as the wellbeing department being located on a different campus, and having inconvenient opening times that clash with their schedules (Horwitz et al., 2020; Waight & Giordano, 2018). Surprisingly, long waiting times were not as frequently mentioned as predicted in other studies (Priestley et al., 2021), with only 16.3% of Horwitz et al.'s (2020) participants citing this as a barrier. This is despite many universities reporting large surges in demand for wellbeing support and

counselling services (Thorley, 2017), and government data in recent years revealing waiting lists for university counselling services are just under two months long (Campbell, 2019). Waiting lists for referrals, therefore, may not be a significant deterrent to students wanting to seek help for their mental health compared to other factors.

Overall, there is a variety of barriers that have been identified as preventing PGR students from seeking support from university wellbeing services. Postgraduates are more likely to report practical barriers, such as time and location issues and financial concerns, whereas undergraduates are more likely to report social barriers, such as not thinking they need help, stigma of help-seeking and questioning the ability of services. However, the studies that compared the views of undergraduates and postgraduates, such as Horwitz et al. (2020), who surveyed 3,358 students in the US (26.7% postgraduates, 47.2% younger and 26.1% older undergraduates), and Rafal et al. (2018), who surveyed 1,242 male students in the US (26.2% postgraduates), did not differentiate their analysis between postgraduate degree types. Hyun et al. (2006), however, did separate their survey analysis of 2,119 doctoral and 693 Masters students at one US university. The only study solely investigating postgraduate researchers was by Waight and Giordano (2018), who analysed 559 questionnaires from UK PhD students and conducted six focus groups with 35 PhD participants to gain further insight. A critique of Waight and Giordano's (2018) research is that just under half of the focus group participants had experience with receiving university support before, which was over-representative compared to the wider student population, suggesting potential bias in the data towards either more positive or more negative experiences. The small body of literature exploring UK PGR students' views calls for further research into this specific student population who face certain challenges and barriers that may not be considered by university student services.

2.8. Impact of the coronavirus pandemic

COVID-19, or coronavirus disease 19, is a recently discovered contagious respiratory disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2, Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, 2020). COVID-19 is highly transmissible and was declared a pandemic by the World Health Organization on 11th March 2020 (2020b). Infection occurs when people are

exposed to contaminated respiratory droplets released through breathing, talking, coughing and sneezing, and risk of infection increases when people are in close proximity to each other and indoors (Wang et al., 2021). Symptoms include breathing difficulties, coughing, fever, headache, fatigue and loss of sense of smell and taste (European Centre for Disease Prevention and Control (ECDC), 2021). Most infected individuals develop symptoms, however a third remain asymptomatic (Oran & Topol, 2021), a significant factor responsible for the soaring rates of infection across the globe. Approximately 17.3 million cases, 692,439 hospitalisations and 155,754 deaths have been recorded in the UK as of 31st January 2022 (UK Health Security Agency, 2022). The following paragraphs will discuss how the COVID-19 pandemic has affected society and higher education.

2.8.1. COVID-19 impact on society

The COVID-19 pandemic has changed the daily lives of people across the world. On 23rd March 2020, the UK government enforced a national lockdown. A stay-at-home order was imposed, banning all non-essential social contact and travel, which led to the closure of educational institutions, businesses and public areas. Self-isolation rules were introduced for individuals and their households who were displaying symptoms and for those with underlying health conditions. Social distancing and wearing facemasks around others was required, as was increased hygiene practises, such as regular hand washing and cleaning household surfaces. Since the first lockdown, the UK government has shifted its stance on COVID-19 rules, from tiered localised restrictions to two further national lockdowns in November 2020 and January 2021. At the time of thesis submission, face coverings were a legal requirement in shops and on public transport, but were only strongly advised for secondary, further and higher education settings, in England (UK Government, 2022). In Wales, face coverings were a legal requirement in all indoor public places, including educational settings, and on public transport, but were not mandatory in hospitality settings (Welsh Government, 2021).

2.8.2. COVID-19 impact on postgraduate research students

Following government orders in March 2020, nearly all UK universities ceased on-campus operations to prevent the spread of COVID-19 among students and staff. This

upheaval affected many aspects of students' university life and, with it, came severe impacts on PGR mental health and loneliness. Between 73-82.7% of PGR students stated their mental health was impacted by the COVID-19 pandemic (Bogosavljevic et al., 2021; Lambrechts & Smith, 2020), with poor mental wellbeing and high mental distress prevalent (Byrom, 2020), in comparison to lower rates in studies with just undergraduates (Evans et al., 2021) or generalised student samples (Dodd et al., 2021; NUS, 2020c).

For depression, Chirikov et al. (2020) reported 31% Masters and 36% PhD students screened positive for major depressive disorder (MDD) in May-July 2020, twice as high as the 15% average for all postgraduate students measured 14 months earlier. Similarly for undergraduates, 34.3% screened positive for depression in April-May 2020 compared to 13.8% six months prior (Evans et al., 2021), suggesting all students felt a similar effect. Odriozola-González et al. (2020) and Wang et al.'s (2020) data suggest otherwise. PGR students in Spain had significantly lower depression DASS-21 scores than undergraduates (Odriozola-González et al., 2020), while Wang et al. (2020) found doctoral students in the US had significantly lower depression scores than the undergraduate sample, and Masters students' scores were only significantly lower than first year students' scores. The same study also reported Masters students scored higher for depression than doctoral students, but this difference was not significant.

Anxiety levels have also seen an increase during the pandemic, with GAD prevalence climbing from 26% pre-pandemic to 36% in Masters and 43% in PhD students (Chirikov et al., 2020), however Evans et al.'s (2021) undergraduate data reported no significant difference. Mixed postgraduate (Dodd et al., 2021) and Masters (Odriozola-González et al., 2020) student samples reported lower anxiety than undergraduates, but not PhD student samples (Odriozola-González et al., 2020). Wang et al. (2020) produced similar data to their depression findings – PhD students were significantly less anxious than the undergraduate sample and Masters students' anxiety was lower than only final year undergraduates'. Again, no significant difference between the higher anxiety scores in Masters versus doctoral students was found. Evans et al.'s (2021) pre-pandemic data was collected in October 2019 with mainly first year students who were likely anxious about beginning university, and Wang et al.'s (2020)

data collection period was during the exam period. The timing of these data collections may explain the non-significance seen in Evans et al.'s (2021) longitudinal data and Wang et al.'s (2020) final year student anxiety.

Stress levels in PGR students during the COVID-19 pandemic have also been investigated, but not as widely as depression and anxiety. Odriozola-González et al. (2020) found similar results to their anxiety data, with Masters students' stress levels being significantly lower than undergraduates, but there was no significant difference for PhD students. However, research examining PGR stress during the pandemic tends to focus on work-related stress rather than feelings of stress in general. For example, Byrom (2020), who surveyed 1,063 PhD students and 3,763 research staff in April 2020, reported 50% of the sample felt stressed about work, while data in Camerlink et al.'s (2021) June 2020 survey of 37 PhD students and 79 research staff showed individuals were stressed about a more demanding workload. Qualitative studies report stress arising from trying to maintain a work-life balance (Álvarez et al., 2021) and produce high-quality work (Burridge et al., 2020). Studies measuring general stress found 79% of PGR students felt stressed (Goldstone, 2020). Using a general measure of stress is useful to determine overall stress levels, however it is beneficial to understand the sources of stress. This can be achieved by using context-specific measures of stress, such as feelings of stress about not being able afford rent.

Although Odriozola-González et al. (2020) used a validated questionnaire to measure mental health, they did not conduct any statistical comparisons to test whether the higher depression scores in Masters students and higher anxiety and stress scores in PhD students were significantly different, despite analysing them separately against undergraduates' scores. This analysis should be included in future research to confirm whether varying levels of mental health recorded in pre-pandemic studies between students pursuing different types of postgraduate course (Alageel et al., 2021; Hyun et al., 2006; Patel, 2015) is also seen during the COVID-19 pandemic, as the evidence so far has proved inconclusive (Chirikov et al., 2020; Odriozola-González et al., 2020; Wang et al., 2020).

In addition to depression and anxiety, loneliness has been a highly researched topic during the pandemic. Lack of interaction with family, friends, peers, and other people in general have left approximately two thirds of PGR students feeling lonely

(Bogosavljevic et al., 2021; Goldstone et al., 2021), with qualitative data also including loneliness as a dominant feature of the pandemic (Bogosavljevic et al., 2021; Brinkert et al., 2020; Camerlink et al., 2021). Shockingly, one postgraduate student in Bogosavljevic et al.'s (2021) study was quoted saying "isolation equals depression", showing the severe impact that social restrictions had on people's mental health.

Reflecting large-scale studies with the UK general population (Bu et al., 2020; Fancourt et al., 2021; ONS, 2021), PGR student groups at risk of poor mental wellbeing and greater depression, anxiety, stress and loneliness levels in the pandemic are females, LGBTQ+ individuals, some ethnic minority groups, those with a disability or physical or mental health condition, those with care responsibilities and those studying arts and humanities or social science courses (Byrom, 2020; Chirikov et al., 2020; Goldstone & Zhang, 2021; Odriozola-González et al., 2020). These show more consistent results compared to pre-pandemic studies (Byrom et al., 2020; Coduti et al., 2016; Eisenberg et al., 2007; Gurbuz et al., 2019; Hyun et al., 2006; Levecque et al., 2017; Panahi et al., 2013; Ray et al., 2019; Scheidegger, 2020). This demonstrates the universal impact of the pandemic on PGR students across the globe.

When interpreting these studies, it is worth considering the data collection period in relation to the pandemic's duration. Longitudinal UK general population data has shown fluctuating depression, anxiety and stress levels over the past 18 months that tend to follow the tightening and easing of UK restrictions, lockdown durations and seasonal changes (Chandola et al., 2020; Fancourt et al., 2021; ONS, 2021). For example, PHQ-9 depression and GAD-7 anxiety scores recorded in Fancourt et al.'s (2021) weekly surveys were highest in March 2020 and elevated levels were seen in October 2020 through to January 2021, which coincide with national lockdown periods, while lower scores were seen in June to August 2020 and March 2021 onwards. Loneliness levels remained fairly constant throughout the pandemic (Chandola et al., 2020; ONS, 2021), with small variations aligning with restriction and seasonal changes. Cross-sectional studies showing differing prevalence of mental health symptoms and loneliness may have been carried out weeks or months apart, in which time symptoms could have risen or fallen. In light of this, the author will be mindful of this issue in the current study.

2.8.3. Challenges for postgraduate research students during COVID-19

Working from home was a major aspect of the pandemic that impacted PGR study (Brinkert et al., 2020; Goldstone et al., 2021). Three quarters of 701 UK PhD students stated that having to work from home negatively affected their PhD study (Lambrechts & Smith, 2020), with most of the 76% of students who mainly worked on campus pre-pandemic agreeing with this statement. Consequently, only 29.1% were satisfied with working from home during the pandemic (Lambrechts & Smith, 2020). Unsuitable working environments were cited by many students (Kappel et al., 2021; Lambrechts & Smith, 2020; Suart et al., 2020), which had knock-on effects on their productivity levels. 37-93% said they had seen a considerable reduction in productivity (Camerlink et al., 2021; Kappel et al., 2021; Lambrechts & Smith, 2020; Suart et al., 2020), and the severity of this impact influenced the magnitude of their decline in wellbeing, with those who reported a greater negative impact experiencing lower wellbeing (Lambrechts & Smith, 2020) and higher stress levels (Camerlink et al., 2021) compared to those who reported less impact.

However, some reports show some students perceived working from home had a positive effect on their productivity (Camerlink et al., 2021), particularly for part-time students who were already accustomed to remote working (Lambrechts & Smith, 2020). Furthermore, a global study by Aristovnik et al. (2020) revealed that postgraduate students believed working from home enhanced their academic output, possibly because the time usually spent doing other activities, such as commuting, could now be allocated to studying. Undergraduate and general student samples, however, reported difficulties in adapting to working from home in a distracting environment and feeling less productive (Aristovnik et al., 2020; Son et al., 2020; Wang et al., 2020).

As a result of the lockdown and working from home measures being implemented, many PGR students had to deal with disruptions to their research topics and methodologies, a noted risk factor for stress (Camerlink et al., 2021). 89.2% of students in Lambrecht and Smith's (2020) study reported that the lockdowns impacted their research plans because of limited access to libraries, laboratories, equipment and software based on campus, causing disrupted data collection and analysis (Brinkert et al., 2020; Burridge et al., 2020; Byrom, 2020; Lambrechts & Smith, 2020). For example, 63% of doctoral students stated that the pandemic had negatively affected

their data collection and 48% reported a negative impact on data analysis (Byrom, 2020). Additionally, STEM and laboratory-based students appeared to be disproportionately disadvantaged by campus closures as they could not carry out practical work needed for their studies (Burridge et al., 2020; Goldstone & Zhang, 2021; Myers et al., 2020). To resolve issues caused by the pandemic, many students were forced to revise their project design (Brinkert et al., 2020; Burridge et al., 2020; Goldstone et al., 2021; Lambrechts & Smith, 2020), resubmit new ethics applications (Lambrechts & Smith, 2020) or utilise the current state of the world and steer their research focus towards COVID-19 (Álvarez et al., 2021).

However, not all students faced the same issues. 20% of PGRs in Byrom's (2020) study reported COVID-19 had a positive impact on their literature review, compared to just 37% who said the opposite. Those in a writing phase may have been, on the whole, largely unaffected by the restrictions to laboratories, specialist software and issues related to participant recruitment and data collection, so could make more progress than those who were forced to review their project plans. Conversely, some students may have adapted well to the postponement of data collection and easily transitioned to writing (Camerlink et al., 2021). Additionally, not studying in a communal office space may have enabled students writing their literature review to concentrate with fewer distractions, potentially leading to a greater output over a shorter space of time. These findings suggest that postgraduates in different stages of their research may have been impacted differently.

In particular, students with care responsibilities or involved with home-schooling children appear to have been severely affected by the pandemic. Of the 25-38% of PhD students and research staff with children, over three quarters agreed there had been an increase in their care responsibilities during the pandemic (Byrom, 2020; Camerlink et al., 2021). Unsurprisingly, most found it difficult to study or work while caring for children (Byrom, 2020; Camerlink et al., 2021; Lambrechts & Smith, 2020; Suart et al., 2020), which was attributed to time constraints (Álvarez et al., 2021). Several parents in Camerlink et al.'s (2021) study resorted to work late into the night when the house was quiet, which they perceived as a contributor to burnout and fatigue.

However, loss of work productivity did not appear to be influenced by the level of care involvement. In Camerlink et al.'s (2021) research, 32 female and 13 male participants

had children, and 7 females and 3 males were caring for a family member (the number of PhD students and research staff with care responsibilities was not distinguished in the document). Productivity was significantly lower for those with care responsibilities than those without, but there was no difference between those with moderate or intense involvement with care, nor was there a gender difference in productivity for those with care responsibilities. Although Camerlink et al.'s (2021) findings combine data for both students and staff caring for children and adults, it still suggests that student parents' ability to work was negatively affected by the pandemic regardless of the time invested into caring for children, and that this population have endured many difficulties on top of the challenges shared with those who do not have children.

PGR students' work-life balance was severely affected as a result of working from home. The literature consistently shows students were struggling to find a satisfactory work-life balance due to the blurred lines between home and work life (Álvarez et al., 2021; Burridge et al., 2020; Camerlink et al., 2021; Lambrechts & Smith, 2020). For example, Kappel et al. (2021) surveyed 74 PGR students and 136 research staff in July 2020 and found 30% of respondents reported their work-life balance was swayed towards working, while students in Camerlink et al.'s (2021) study found themselves spending more time working each day. This relates to Goldstone et al. (2021) who found more individuals were studying for over 50 hours per week compared to pre-pandemic figures, suggesting that students found it difficult to stop working. At the other end of the spectrum, there were also more individuals working for less than 30 hours a week, with a drop in the average number of hours worked per week from 37.6 to 32.4 hours. Severe disruption to students at certain stages in their research, for example, the suspension of laboratory data collection, or other commitments, such as childcare, may have caused more people to reduce their working hours. Indeed, 24% of Kappel et al.'s (2021) participants reported a work-life imbalance towards personal responsibilities. Contrastingly though, the same study also reported 27% of their participants perceived they had a better work-life balance than before the pandemic, in that they were satisfied with their distribution of work and home life. Individuals' varied opinions on their work-life balance further support the suggestion that not all PGR students were affected by working from home in the same way.

Skills and training workshops, such as writing seminars or software tutorials, and continuing professional development opportunities were also adapted to online delivery due to working from home guidance (Byrom, 2020), but students had mixed opinions about the availability of these opportunities. 61.4% of students in Lambrecht and Smith's (2020) study thought they were less accessible compared to times before the pandemic. These students were more likely to be full-time or in later years of study, so would be more likely to have attended in-person sessions with greater access to on-campus facilities. Part-time students and distance learners, on the other hand, were more likely to report an increase in accessibility, as the widespread conversion to online delivery meant they could attend sessions remotely, rather than visiting campus. Conversely, a greater percentage of part-time students in Advance HE's (2020) Postgraduate Research Experience Survey (PRES) stated seminars held by universities were not accessible for them, often due to them being scheduled during hours where they would be working in their full-time job. This shows there is greater diversity in part-time students' individual circumstances than full-time students', and that organisations must carefully deliberate the most appropriate times for PGR workshops to be held.

As well as studying, PGR students' supervision has been impacted by the pandemic. Meetings between supervisors and supervisees have mainly been held via video conferencing programmes (Aristovnik et al., 2020), which has coincided with a drop in student satisfaction of PGR supervision. Notably, only 63.5% of students were happy with meeting provisions during lockdown compared to 82.2% before the pandemic (Lambrechts & Smith, 2020). This may be explained by the lack of interpersonal connection that is usually felt when supervisors and PGR students are talking to each other in the same room (Kumar et al., 2021). Other UK research, however, has found students, on the whole, were pleased with the support they received from their supervisor (Burridge et al., 2020). Many students mentioned that their supervisors provided pastoral support, increased the number of meetings and assisted in redesigning research and applying for extensions. Praise for supervisors was also identified in quantitative research, with 66% agreeing their supervisor has supported students as best they can (Byrom, 2020) and 85% saying their supervisor helped them adjust their research design (Goldstone et al., 2021). The considerably greater reports of satisfaction with supervisor support in Goldstone et al.'s (2021)

study was likely due to the January 2021 data collection period, when remote supervision had become routine, compared to April and May 2020 (Byrom, 2020; Lambrechts & Smith, 2020) when the pandemic, and relevant adjustments, were still in their infancy.

In-person separation from academic peers has also been noted as a key negative feature of the pandemic (Álvarez et al., 2021; Kee, 2021; Lambrechts & Smith, 2020). 49.7-69.4% of PGR students have felt less connected to their peers during the COVID-19 pandemic (Bogosavljevic et al., 2021; Goldstone & Zhang, 2021), which has been attributed to studying in a solitary working environment (Kappel et al., 2021) and resulted in lower productivity (Burridge et al., 2020). This loss was recognised by 63% of Kappel et al.'s (2021) participants who found working from home difficult because of the limited social contact they had with their academic fellows. It is the lack of these spontaneous, casual encounters that do not involve booking timeslots or sending online invitations that PGR students miss (Kee, 2021).

Other concerns PGR students frequently mentioned were financial and career related. 64.5-75.0% felt worried about their financial situation (Bogosavljevic et al., 2021; Byrom, 2020; Goldstone, 2020; Johnson et al., 2020), and 38.1% agreed the pandemic had a negative effect on their finances (Lambrechts & Smith, 2020). Students most likely to agree were those who had to fund their studies themselves, usually through part-time employment alongside their studies. Lambrechts and Smith (2020) reported the biggest job losses were for students in people-facing roles, such as graduate teaching assistants, whereby 44.8% were in a role before the pandemic compared to 22.7% at present, as there are currently fewer opportunities for on-campus demonstrator opportunities (Bogosavljevic et al., 2021). There was a less dramatic impact for research assistants, with only a quarter losing their job during the pandemic (12.6% vs 8%, respectively), reflecting the ease with which this role can be adapted to remote working. As well as current employment status, prospects about an uncertain future job market are also widespread (Bogosavljevic et al., 2021; Kappel et al., 2021), showing that PGRs contend with worries about both their present and future circumstances.

Working from home, restricted access to facilities required for research and loss of productivity has meant universities across the globe updated their policies to include

COVID-19 as a valid reason for requesting an extension to candidature and thesis deadlines (Byrom, 2020). Indeed, 38.8-77.0% of postgraduate students were concerned they would not finish their thesis by the deadline (Advance HE, 2020, 2021; Bogosavljevic et al., 2021; Goldstone et al., 2021; Lambrechts & Smith, 2020), compared to 21% of PhD students at 48 UK universities in 2018 (Byrom et al., 2020). Lambrechts and Smith's (2020) study was conducted in April 2020, when the long-term impact of the pandemic was not as apparent as it was during Bogosavljevic et al.'s (2021) and Goldstone et al.'s (2021) data collection periods (July 2020 and January 2021, respectively), which may explain the wide percentage range. However, in both the March to May 2020 and February to May 2021 data collection periods, Advance HE (2020, 2021) found 77% of students were doubting they would finish by their deadline. Regardless, the high proportion of students questioning the likelihood of them meeting their deadline demonstrates the severe delay the pandemic has caused for students' research and future plans, such as careers and personal life.

The pandemic's impact may also have led PGR students to consider quitting their degree. Approximately a quarter of PGR students admitted experiencing thoughts about quitting (Advance HE, 2021; Goldstone et al., 2021). Mental health difficulties were the most frequently cited reason in Advance HE's (2021) survey, with 27.4% of these students reporting this (6.7% of the total participant sample). Unsatisfying work-life balance, financial concerns and insufficient research support were also frequently mentioned. As pre-pandemic studies report similar issues for PGR students physically withdrawing from university (Devos et al., 2017; Rigler et al., 2017; Spronken-Smith et al., 2018; Sverdlik et al., 2018), as well as distance learning and isolation that are cardinal features of the pandemic (Rigler et al., 2017; van Rooij et al., 2021), universities may see more PGR students withdrawing from study during the pandemic compared to previous years.

The literature shows that PGR students have suffered during the COVID-19 pandemic emotionally, academically and financially. The little research suggesting otherwise is scarce, which could be attributed to: 1. Publication bias; 2. Students who are not struggling are not inclined to make their voices heard or 3. The negative impact is so widespread across the global PGR student population that researchers are hard pushed to find results that oppose this. This is despite individual countries implementing their

own COVID-19 restrictions. As devolved nations, Wales, Scotland and Northern Ireland set their own COVID-19 rules separately to England. Much of the existing research generalise their findings to the entire UK PGR student population, but as demonstrated by longitudinal data (Chandola et al., 2020; Fancourt et al., 2021; ONS, 2021), the severity and timing of restrictions could influence PGR students' experiences, suggesting there may be differences in the mental health, loneliness and experiences of students in each UK nation. This highlights the need for research, such as the current study, to gain more insight into the experiences of PGR students studying in these devolved nations during the pandemic and, subsequently, what needs to be done to support them.

2.8.4. Activities during lockdown

With the increased time spent at home and fewer opportunities to participate in activities elsewhere, many individuals undertook activities at home to manage their wellbeing. Although many of these activities were used to cope with the stressors imposed by the pandemic, it is beyond the scope of this thesis to interpret these from a coping perspective (see Lazarus & Folkman, 1984). The current thesis presents a descriptive account of the lockdown activities students did during the pandemic to cope with pandemic-related stress. Exercise has been the most popular activity PGR students have used, with 39.7-85% mentioning some form of physical activity or exercise (Kappel et al., 2021; Misca & Thornton, 2021; NUS, 2020a, 2020b; Son et al., 2020; Suart et al., 2020). Staying in contact with friends and family, too, was another common activity students used, with 34-67.1% mentioning video and phone calls, Zoom quizzes or texting (Son et al., 2020; Wang et al., 2020). Other common activities were undertaking hobbies (e.g., arts and crafts), reading, doing relaxation activities (e.g., meditation, practising self-care, mindfulness, positive thinking), gardening and other outdoor activities, watching television and films, gaming, listening to and playing music, cooking, playing with pets, turning to religion and seeking self-help resources (Kappel et al., 2021; Misca & Thornton, 2021; NUS, 2020a, 2020b, 2020c; Son et al., 2020; Staser, 2021; Suart et al., 2020; Wang et al., 2020). As mentioned when discussing work-life balance, students established and maintained daily routines to ease the transition to working from home (NUS, 2020a, 2020b; Son et al., 2020; Suart et al., 2020). Students also revealed they drank alcohol,

smoked, ate comfort food, isolated themselves and expressed negative emotions to help them cope (Misca & Thornton, 2021; NUS, 2020c; Son et al., 2020; Staser, 2021; Wang et al., 2020).

Most studies measuring students' daily activities analysed a generalised student sample (NUS 2020a, 2020b, 2020c; Son et al., 2020; Wang et al., 2020), meaning there is little evidence specifically exploring what PGR students did during lockdown to improve their wellbeing (Kappel et al., 2021; Staser, 2021; Suart et al., 2020). Pre-pandemic data revealed postgraduate students were more likely to use positive coping methods to deal with their stress, such as exercise and social support, compared to undergraduates who were more likely to use smoking and drugs to cope (Ickes et al., 2015). It would be insightful to compare the activities PGR students used during the pandemic to improve their mental health with those reported in pre-pandemic studies.

2.8.5. Support during the COVID-19 pandemic

University wellbeing support services and services providing academic advice and guidance have been more important than ever during the COVID-19 pandemic. Data suggests, however, that PGR students in the UK have mixed opinions with universities' provision. Just over a third of students in Byrom (2020) and Goldstone et al.'s (2021) studies agreed their institution had put significant effort into offering general support to their students, which was associated with higher mental wellbeing (Byrom, 2020), whereas 60-67% of students in Goldstone (2020) and Lambrechts and Smith's (2020) studies felt there was sufficient support offered by their universities.

Regarding mental health and wellbeing support, 55% of Goldstone et al.'s (2021) sample of 994 PGR students received some kind of wellbeing support, but less than half found it useful. Relatively low uptake of, and satisfaction with, services during the pandemic have been attributed to services being unsuitable for PGR students' needs (Goldstone & Zhang, 2021), service closures (Burridge et al., 2020) and services being in such high demand that they were impossible to access (Burridge et al., 2020).

Rather than wellbeing support, however, much of the COVID-19 literature on UK PGR students' experiences of, and recommendations for, support revolves around practical support surrounding academics, finances and communication. This could be because PGR students tend to cope better with adversity so might have not mentioned

wellbeing support as much as other types of support. Most researchers in Byrom's (2020) study agreed their universities had given advice and made arrangements to support students with working from home, and libraries were praised by students for adapting their policies to suit remote studying (Burridge et al., 2020; Goldstone & Zhang, 2021), such as introducing socially distanced click and collect services, extending book loans and cancelling fines for overdue returns. However, many students wanted more online training and assistance with working from home, such as paying for, or allowing students to borrow, office equipment to use at home (Burridge et al., 2020; Goldstone & Zhang, 2021; Lambrechts & Smith, 2020).

Opinions on financial support showed students were, generally, unsatisfied with their university's provision. Only half of the 29% of students in Goldstone et al.'s (2021) study who received financial support found it helpful, and 37% claimed it was unavailable. In Lambrechts and Smith's (2020) research, although a third agreed their universities had introduced measures to assist students financially, 13.5% were, and 44.3% were not, satisfied. Regarding communications, some students liked that universities swiftly introduced online platforms to encourage communication and received regular and clear information about wellbeing support, extensions and policy updates (Burridge et al., 2020; Byrom, 2020), while others found university communication confusing or not specific to PGR students (Burridge et al., 2020; Goldstone & Zhang, 2021; Lambrechts & Smith, 2020).

PGR students have expressed mixed feelings about the wellbeing, academic and financial support and communications they received from universities during the pandemic. Some believed their universities had neglected them and prioritised undergraduates in terms of COVID-19 policy changes, wellbeing support and communications (Burridge et al., 2020; Goldstone & Zhang, 2021). This persistent issue highlighted in pre-pandemic literature (Priestley et al., 2021; Waight & Giordano, 2018) calls for universities to review their policies, facilities and resources to improve the PGR experience.

Overall, the COVID-19 pandemic has caused major disruption to daily life, particularly for PGR students. Transitioning to working from home and living in isolation, interference with research, remotely connecting with others and other concerns related to their studies has contributed to a decline in mental health and

increase in loneliness. Spending time at home enabled them to use their time for personal activities to maintain their wellbeing, however the wellbeing, academic and financial support offered by universities meant students had mixed experiences. However, most of the existing UK PGR literature does not specify students' country of study, a factor that could influence their experiences due to varying restrictions in each devolved nation. The current study will contribute to the small body of literature that looks at how the COVID-19 pandemic has impacted UK PGR students' mental health and daily life and explore their views of the wellbeing support offered to them, specifically focusing on students studying in Wales.

2.9. Theoretical perspective

I have drawn upon several theories to create a framework that I believe best explains the relationships between university challenges, depression, anxiety, stress and loneliness in PGR students during the COVID-19 pandemic. It should be noted that this framework is my interpretation of how the pandemic may link to student mental health and loneliness, and that the aim of this study is not to test this framework. The following paragraphs briefly discuss each of these theories and includes a step-by-step description of my theoretical framework (Figure 2.1). A thorough examination of these and other theories are beyond the scope of this study, but are found in Appendix B.

The hopelessness theory of depression (HD) by Abramson et al. (1989) proposes that in an individual who makes stable and global attributions about the cause, consequence and the importance of an event, feelings of hopelessness will ensue, resulting in a hopelessness depression. Additionally, the stress-generation model (SG) by Hammen (1991) suggests that an individual's depressogenic cognitions and behaviours increase their own likelihood of experiencing negative dependent events, or stressors that occur as a result of their own negative thoughts and actions.

Beck's (1985) cognitive theory for anxiety (BCA) comprises three stages to explain anxiety development. A negative bias towards negative stimuli in the orienting mode means environmental threats are quickly identified. This activates primal mode, where evolutionary-driven physiological, behavioural and cognitive changes occur to maximise survival. Following this, distorted thinking during the meta-cognition mode

means the coping abilities and resources needed to deal with the threat are underestimated by the individual, resulting in increased anxiety symptoms.

In relation to stress, Selye's (1950) general adaptation syndrome (GAS) theory suggests the body enters: an alarm stage, otherwise known as 'fight or flight' mode when first presented with a stressor; the resistance stage where homeostasis is restored if the stressor is no longer perceived as a threat, then, if the stressor remains; the exhaustion stage, where the person becomes susceptible to mental and physical illness. Selye (1950) failed to explain how a stressor is perceived as irrelevant, which can be resolved by incorporating a cognitive theory.

The transactional model of stress (TMS) by Lazarus and Folkman (1984) involves a cyclical two-stage appraisal model. Primary appraisals determine if the stressor is a threat or benign, then, if it is deemed the former, secondary appraisals assess the demands of the stressor against the available coping mechanisms. Negative stress is felt if the coping resources available are not perceived as adequate at dealing with the stressor. Emotion-focused coping strategies are employed to change our emotions if the stressor is uncontrollable and problem-focused coping aimed at changing the situation is used if it is controllable (Kohn et al., 1994; Lazarus & Folkman, 1984). The stressor is then reappraised once coping strategies have been implemented to determine if there is still a threat. In relation to GAS, primary appraisals may occur when an individual is first presented with the stressor. Secondary appraisals of demands and resources during the resistance stage would then determine whether the body enters the exhaustion stage.

To understand loneliness, Cacioppo et al.'s (2006) evolutionary theory (ET) suggests that humans feel vulnerable when isolated from others, which increases the desire to seek others but, in turn, heightens their sensitivity to social threats. Negative social cognitions elicit negative behaviours from others that reinforce the individual's negative perceptions, which deters individuals from forming or maintaining connections, leading to transient loneliness. Michela et al.'s (1982) attributional model of loneliness (AM) proposes there are thirteen causes of loneliness that are assessed on internal-external and stable-unstable scales. Individuals attributing their loneliness to internal-stable causes, such as having an unpleasant personality, are likely to feel

more lonely than those who make external-unstable attributions, such as being in an impersonal situation (Moore & Schultz, 1983).

These theories were appropriate to explain the mental health and loneliness of PGR students during the pandemic. PGR students may have made stable and global attributions about how the pandemic will affect their lives and acknowledge that its impact will be significant, so may have developed (hopelessness) depression. These depressive thoughts and behaviours may have brought about dependent events, such as procrastinating their studying. The negative impact of the pandemic may also have enhanced PGR students' awareness of other threats and, because the pandemic's impact has been prolonged and uncontrollable, led students to believe they cannot effectively cope with the associated stressors, thus predisposing them to anxiety and stress. Furthermore, social restrictions that were in place for a large majority of the pandemic may have discouraged students from connecting to their friends and family, while attributing their loneliness to internal and stable causes. Symptoms indicative of depression and loneliness then may have developed and led to a decline in mental health.

Below describes the stages of how the challenges PGR students faced during the pandemic may relate to depression, anxiety, stress and loneliness. Links between stressors, stress, depression, anxiety and loneliness are described using characteristics from Horowitz et al.'s (1982) depression and loneliness prototypes (DP, LP; A-M in Figure 2.1 caption).

1. The presence of a stressor initiates three similar pathways to depression, anxiety and stress. In the presence of a stimulus, an immediate assessment is made of the situation (BCA; TMS). If the stimulus is deemed threatening (BCA; TMS), physiological changes ensue (BCA; GAS), such as increased heartrate, and the mind fixates on potential threats (BCA).

2. The demands of the stressor and the ability to cope are then assessed (BCA; TMS). If demands outweigh resources available, negative stress ensues and becomes prolonged if the stressor is unmanageable and reappraised as still a threat (TMS). This causes fatigue and heightens the risk for anxiety (GAS).

3. On the depression pathway, attributions for the cause, consequence and significance of the stressor that are stable, global and indicate importance leads to feelings of depression (HD).

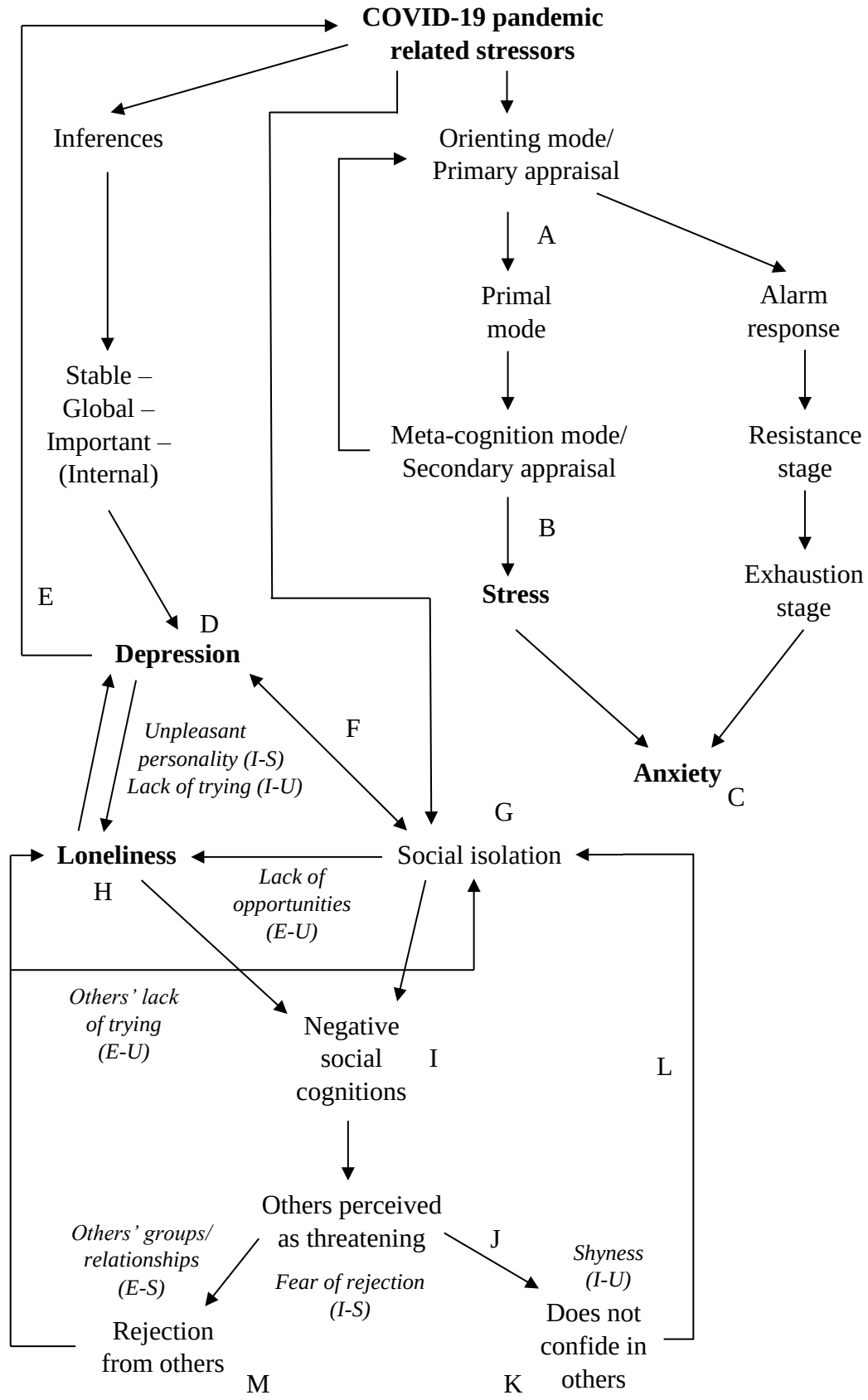
4. Depressed people may make themselves more vulnerable to experiencing dependent stressors via their thoughts, feelings and behaviours (SG), thus creating a stress-depression cycle.

5. Presence of depression symptoms increases the likelihood of loneliness and social isolation based on shared traits of lonely and depressed individuals (LP; DP) and attributions of loneliness (AM). This forms an (almost) bidirectional relationship between the three concepts.

6. Feelings of loneliness and social isolation result in negative cognitive biases of others that reinforce feelings of loneliness and socially isolating behaviours (ET).

Figure 2.1

A synthesis of models to describe the relationship between challenges, depression, anxiety, stress and loneliness



Note. A = Feels overwhelmed, cannot cope. B = Feels hopeless, pessimistic; has a pessimistic attitude. C = Feels nervous, anxious, afraid; irritability. D = Feels unmotivated; feels depressed; feels sad and unhappy; lacks energy. E = Feels unmotivated, lacks initiative; lacks energy, has trouble getting anything done. F = Isolates self from others; avoids social contact. G = Isolates from others. H = Feels isolated; feels separate from others; feels lonely. I = Feels inferior, worthless, inadequate; thinks "I am different". J = Feels paranoid. K = Thinks "no one understands me". L = Avoids social contact. M = Feels excluded from activities, not part of a group; thinks "I don't fit in"; thinks "something is wrong with me"; doesn't laugh, smile, have fun.
Attribution labels: I-S = internal-stable. I-U = internal-unstable. E-S = external-stable. E-U = external-unstable.

2.10. Rationale

The COVID-19 pandemic has seen a rise in mental health difficulties and loneliness in university students across the UK. Most literature has focused on undergraduate students or combined data from undergraduates and postgraduates, with little research on PGR students. Those that do focus on postgraduate students, often do not differentiate between Masters and doctoral students, only study doctoral students or combine data with research staff. Furthermore, there is no research to date that examines the impact of the pandemic on PGR students studying in Wales.

The aim of this mixed methods study, therefore, is to investigate the mental health and loneliness of PGR students in Wales and gain an insight into the experiences and challenges they have faced and their views of university support during the COVID-19 pandemic. More specifically:

1. Examine levels of depression, anxiety, stress and different types of loneliness in PGR students.
2. Explore how the pandemic has affected PGR students' living and study situations and ability to study.
3. Identify activities or strategies PGR students used to maintain their mental wellbeing.
4. Assess PGR students' use and views of different types of University wellbeing support.
5. Identify the factors PGR students perceive as barriers to accessing University wellbeing support.

6. Identify recommendations to improve the wellbeing support and overall University experience for this population.

2.10.1. Hypotheses

1. There will be a significant difference between Masters and doctoral students' depression, anxiety and stress, but doctoral students will have greater overall loneliness levels than Masters students.
2. Male students will have higher depression and overall loneliness, and females will have higher anxiety and stress.
3. Depression, anxiety, stress and overall loneliness will be positively correlated with each other.
4. Mental health and overall loneliness will be positively correlated with academic challenges and barriers to support services.
5. Students who experienced thoughts about quitting will have worse mental health and be more lonely than those who did not have thoughts about quitting.
6. Female students will access a greater number of sources of support, and male students will report a greater number of barriers to university support services.

2.10.2. Exploratory questions

Identified below are some factors and relationships that do not have substantial enough evidence in the literature to propose robust hypotheses, but whose associations are plausible and are relevant to the research topic.

1. Doctoral and female students will report more academic challenges than Masters and male students.
2. Masters students will access a greater number of sources of support, and doctoral students will report a greater number of barriers to University support services.
3. There will be a significant correlation between mental health and loneliness and the number of sources of support accessed.

3. Methods

3.1. Research design

3.1.1. Philosophical approach

My chosen philosophical approach for this study was pragmatism. Pragmatism in research is centred around the principle of how the research question can be best addressed by using all methods available to deliver practical answers to everyday issues (Morgan, 2007; Tashakkori & Teddlie, 1998). Pragmatism also proposes that the world is not one unity and that everybody perceives the world differently, so no two individuals have the same experiences, but they may have shared experiences so view the world in similar, but not identical, ways (Kaushik & Walsh, 2019). As such, it commonly underpins mixed method designs that consider both quantitative and qualitative knowledge (Creswell & Plano Clark, 2011; Morgan, 2007). Pragmatism often underpins mental health research that focuses on using individual experiences to guide positive change (Deering et al., 2021; Glasgow, 2013). In terms of this study, employing a pragmatic approach to a mixed methods design enabled an examination of the mental health and loneliness of PGR students and exploration of the challenges they have faced in the context of the COVID-19 pandemic, to produce meaningful recommendations to the University to benefit these students in the future.

3.1.2. Research methodology

Mixed methods research involves intentionally integrating qualitative and quantitative data during the research process to provide a thorough understanding of the research question (Creswell, 2009; Creswell & Plano Clark, 2011; Tashakkori & Teddlie, 2010). This provides an opportunity for qualitative results to explain relationships in the quantitative data or, conversely, enables comparisons between the quantitative and qualitative data (Creswell & Plano Clark, 2011). For this study, I employed a sequential explanatory approach which involved the collection and analysis of quantitative data in the first phase of the research and the collection and analysis of qualitative data in the second phase (Creswell, 2009), followed by the integration of both sets of data. The research process involved ‘building’, meaning the first data collection phase informs the second data collection phase (Fetters et al., 2013), and

'connecting', where the first dataset influences the sampling of the subsequent data collection and analysis (Fetters et al., 2013). Building was used when I modified my pre-planned interview schedule for each interviewee to ask them about specific points mentioned in their questionnaire answers, while connecting was used when selecting which interviews to analyse based on participant demographics collected in questionnaires (see *Data analysis)*.

Online surveys were used to produce reliable quantitative data because they are cheap, easily accessible to a wider audience and social restrictions at the time of data collection meant PGR students could not fill out a paper questionnaire on campus. The survey also contained a text box for participants to provide qualitative data that was transformed into quantitative frequency counts and several open-ended follow-up questions that allowed participants to expand on their 'Other' answer, if this was selected. However, surveys including multiple-choice questions provide a limited descriptive account of students' mental health and experiences during the pandemic. Semi-structured interviews were used to obtain more in-depth qualitative data to fill in the gaps and provide an interpretative explanation for students' feelings and to expand on their experiences and challenges during the pandemic. It also meant participants could give more detail about specific information provided in their questionnaire, for example why some students thought about quitting their degree.

A sequential explanatory mixed methods design is appropriate for this study because the interviews were designed to expand on questionnaire answers (Fetters et al., 2013), enabling me to apply qualitative analysis of PGR students' experiences during the COVID-19 pandemic to understand the quantitative analysis of mental health and loneliness levels, further elaborate on students' experiences reported in the questionnaires and explore their views about university support services.

3.2. University context

Swansea University is a public research university located in Wales, UK. Swansea University is spread over three campuses and recently condensed their eight academic colleges into three faculties. In the 2021/22 academic year, there are 16,622 undergraduate, 3,439 PGT and 825 PGR students enrolled. 57.5% of PGR students are male and 41.1% are female. 81.1% are home domicile students and 17.6% are

international students. 53.3% are based in the Faculty of Science and Engineering, 27.8% in the Faculty of Humanities and Social Sciences and 17.6% in the Faculty of Medicine, Health and Life Science.

3.3. Participants

Seventy-nine participants completed all pages of the online questionnaire. Seven participants were excluded from the analysis because they were PGT students, therefore the final number of participants was 72. The sample consisted of 16 Masters and 56 doctoral students. The average age of participants was 31.2 ± 9.9 years (range 21.8-60.8 years). 58.3% were female. 83.3% were home domicile students and 88.9% studied full-time. See Table 3.1 for participant demographics. 8.7% of the total PGR student population completed the survey. Females and science and engineering students were overrepresented in the study population. A response rate could not be calculated because the exact number of students who were sent an email or saw an advertisement was not available (see *Procedure*).

The majority of participants had never tested positive for COVID-19 before the time of data collection (80.6%; Table 3.2). Of those who had contracted COVID-19, most experienced symptoms that prevented them from studying (85.7%). At the time of data collection, 15.3% had received a first dose of a COVID-19 vaccination and 4.2% had received both doses.

Thirty-five participants expressed an interest in taking part in interviews. Three participants were PGT students, so the number of participants invited for interviews was 32. 11 participants were not interviewed because they did not respond to the email invitation, therefore 21 participants completed interviews. Analysis of the interview transcripts was stopped when data saturation was reached, making the final number of participants included in the interview analysis 14.

Five Masters and 9 doctoral students were included in the interview analysis, with an average age of 34.4 ± 13.6 years, ranging from 22.0-60.6 years. Six interview participants were female. Five participants were in their 1st year, 2 in their 2nd year, 2 in their 3rd year and 5 in their 4th year of study. Five participants studied Science, 3 Health Science, 3 Sport Science, 2 Engineering and 1 studied Management. There was only 1 international student and 2 students studied part-time. Mental health and

Table 3.1

Demographic characteristics for the total sample (n = 72)

Demographic variable	%		%
Gender		Sexual orientation	
Male	41.7	Heterosexual	86.1
Female	58.3	Bisexual	6.9
Age (years)[a]		Asexual	1.4
21-25	28.2	Relationship status	
26-30	42.3	Single	44.4
31-35	11.3	In a relationship	37.5
36-40	1.4	Married	13.9
41-45	1.4	Divorced	2.8
46+	14.1	Prefer not to say	1.4
Nationality		PGR type	
British[b]	81.9	Masters	22.2
Other[c]	18.1	Doctoral	77.8
Home/International student		Year of study	
Home/UK	83.3	1st	26.4
International	16.7	2nd	22.2
Ethnicity		3rd	18.1
White	94.4	4th	23.6
Mixed/Multiple ethnic group	2.8	5th +	9.7
		Discipline[f]	
Prefer not to say	1.4	Arts and Humanities	8.3
Other[d]	1.4	Engineering	6.9
Religion		Health Science	9.7
Christianity	12.5	Law	8.3
Catholicism	5.6	Management	1.4
Islam	1.4	Medicine	6.9
Sikhism	1.4	Science	36.1
Atheism/No religion	75.0	Sport Science	22.2
Prefer not to say	2.8	Study mode	
Other[e]	1.4	Full-time	88.9
Considered to have a disability?		Part-time	11.1
		Pre-pandemic living situation	
Yes	6.9	Uni residence/halls alone	1.4
No	90.3	Uni residence/halls with others	1.4
Prefer not to say	2.8		
Health condition		Off campus, in flat/house alone	22.2
At least 1 condition	29.2		
No health conditions	70.8	Off campus, in shared flat/house	37.5
		Off campus, with parents/ guardians	12.5
		Off campus, with partner/ children	25.0

[a]*n* = 71. [b]Includes *British, English, Scottish, UK, Welsh*. [c]Includes *American, Bahraini, Belgian, Colombian, Dutch, Estonian, French, Italian, Polish, Spanish*. [d]Includes *Arab*. [e]Includes *Celtic Shamanism*. [f]There were 8 academic colleges at the time of data collection.

Table 3.2

Coronavirus infection status of those who did and did not contract COVID-19, and symptom severity

Coronavirus infection status					
	n	%[a]		*n*	%[b]
Tested positive	5	6.9	Did not have symptoms	1	7.1
Potential COVID-19 case but not tested	9	12.5	Had symptoms not preventing study	1	7.1
			Had symptoms that prevented study but not serious enough to visit hospital	12	85.7
Tested negative	58	80.6		-	-

[a]% of total sample (*n* = 72); [b]% of COVID-19 cases (*n* = 14).

loneliness scores for interviewees were not significantly different from those who did not take part in interviews ($p > .05$).

3.4. Measures

Questionnaires were used to assess PGR students' depression, anxiety, stress and loneliness levels and to explore how the pandemic affected their daily lives. They were created using the online survey company JISC (https://www.onlinesurveys.ac.uk/) and were performed online by students in their own time (see Appendix C).

3.4.1. Demographics

The demographics questionnaire obtained information about participants' age, gender, nationality, student status (home or international), ethnicity, religion, disability, underlying health conditions, sexuality, relationship status, course type, discipline and study mode (full- or part-time). Only one participant was studying in their sixth year so was merged into the *5th year* category to form *5th year and above.*

3.4.2. Mental health

The Depression, Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995) was used to measure participants' mental health, specifically depression, anxiety and

stress. The DASS-21 was chosen because it provides three separate scores in one instrument. The original Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995) consists of 42 items measuring the same components, but the shortened version was used for this study. The DASS-21 contains 21 items: 7 depression items, 7 anxiety items and 7 stress items, presented in a mixed scale order. The survey uses a 4-point Likert scale to measure how much each statement applies to participants over the past week (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 the time* and; 3 = *Applied to me very much or most of the time*). Scores for depression, anxiety and stress are calculated by adding together the relevant items. Higher scores indicate stronger feelings of depression, anxiety and stress. DASS-21 scores are multiplied by two so that thresholds determining the severity of mental distress can be applied (see Appendix D for scoring guide). It should be noted that this instrument is not designed for diagnostic purposes.

High internal consistency for each subscale of the DASS-21 has been recorded in a Spanish student sample during the COVID-19 pandemic (Odriozola-González et al., 2020), specifically α = .89 for depression, .82 for anxiety and .85 for stress. With Cronbach's alpha cut-offs of α = .70 (Nunnally, 1978), reliability was relatively high in the current study: depression = .83, anxiety = .68 and stress = .72.

3.4.3. Loneliness

The Social and Emotional Loneliness Scale for Adults Short Form (SELSA-S; DiTommaso et al., 2004) was used to measure participants' feelings of loneliness. The SELSA-S was chosen because it is a short instrument that assesses the severity of different types of loneliness. Fifteen items from the original 37-item SELSA (DiTommaso & Spinner, 1993) were used to create the SELSA-S. The SELSA-S consists of 5 items for family loneliness, 5 for social loneliness and 5 for romantic loneliness. Answers used a 7-point Likert scale to measure how much participants agreed with each statement (1 = *Strongly disagree*; 7 = *Strongly agree*). The nine positively worded items were then reverse scored. Scores for family loneliness, social loneliness and romantic loneliness were calculated by adding together the relevant items, and overall loneliness score was the sum of all items. Overall loneliness scores

can range from to 15 to 105. Higher scores indicate higher feelings of each type of loneliness.

Each SELSA-S subscale has shown high internal consistency in a recent study with university students in Brazil (Amorim et al., 2019): Cronbach's alpha for family = .89, social = .90 and romantic = .87. Cronbach's alpha was also high in the current study for family (.87), social (.90) and romantic (.92) subscales.

3.4.4. Additional questions

Following the validated questionnaires, participants answered a series of questions that were created to assess experiences during the COVID-19 pandemic. There were 13 single answer multiple-choice questions, 4 multiple answer multiple-choice questions and 8 Likert scale questions. The topics covered by the questions included: how their mental health and loneliness changed over the year; pre-pandemic and current living and study situations and impact on their productivity and work-life balance; motivation, academic-related challenges, changes to thesis topic and duration, thoughts about quitting and experiences of home-schooling; their opinions on the sources of support they accessed and barriers to accessing University support services, and, COVID-19 infection and vaccination status and diagnosis of long-term health conditions. There were three questions with a free-text box for participants to type their answer: deadline extension duration, activities they did during lockdown to help their mental wellbeing and any other support they accessed. Students were also given the opportunity to write down anything else they thought might be relevant to the study in a free-text box at the end of the questionnaire. However, this data was not included in the final analysis because it did not add anything new to the interview findings. Several multiple-choice questions included an *Other* option for participants to type in an alternative answer.

As part of a wider project, four questions asked participants about their opinions on the CONNECT project at Swansea University. The CONNECT project is a wellbeing initiative funded by the Higher Education Funding Council for Wales (HEFCW) in partnership with another Welsh university that aims to reduce social isolation in students (see https://connect-wellbeing.wales/ for more details).

3.5. Semi-structured interviews

Semi-structured interviews were used to gain further insight into the experiences of participants during the COVID-19 pandemic to expand on quantitative findings from questionnaires. They were also used to explore students' opinions of the support provided by the University during the pandemic and propose recommendations to improve the PGR experience (see Appendix E).

Interviews were conducted via the online conferencing program Zoom. The mean duration of interviews was 00:55:21 minutes. The shortest interview lasted 00:22:47 minutes and the longest lasted 01:38:46 minutes. The wide time range for interview duration was because the interviewer did not want to limit participants' responses, unless they were due to clash with an interview scheduled to begin in the next timeslot.

At the beginning of the interview, participants were reminded that it would be audio and video recorded for transcription purposes, the interview was confidential, and their answers would remain anonymous upon transcription and publication. The interviewer engaged in small talk with participants before the recording began to create a relaxed atmosphere, which is beneficial when discussing sensitive topics (Liamputtong & Ezzy, 2005). Participants were given the opportunity to ask the interviewer any questions both before the interview began and once it had ended.

Questions were designed to 'build' on questionnaire questions (Fetters et al., 2013), and explored participants' academic-, health- and lifestyle-related challenges faced during the pandemic, the perceived benefits of the pandemic and the support they received from University support services, their supervisor and the academic community. Interviewees were asked if there was anything the University should change or introduce to better support PGR students and improve their experience. They were also asked about their motivations and expectations of postgraduate study, their outlook for the future now that social restrictions were easing, if there was anything they had learned about themselves during the pandemic, and their thoughts on mental health culture at universities and in society, however these questions were not covered in this study.

Once the interview recording had started, but before the main body of questions, the interviewer also asked participants about their degree areas, such as their thesis title, to ease them into the questions and to understand any challenges specific to their discipline, such as limited laboratory access. During the interview, follow-up questions

were asked about certain points that the interviewer thought needed further clarification. Before the recording finished, participants were invited to mention anything else about their experiences they thought may be relevant to the discussion.

3.6. Procedure

Following ethical approval from the College of Engineering Research Ethics Committee, Swansea University, emails were sent to administration staff from each academic college at Swansea University requesting they circulate an email invitation to all PGR students in their academic college. The email gave a brief overview of the research, included a hyperlink to the online questionnaire and emphasised study participation was voluntary and confidential. The study was also promoted in student email newsletters, on academic social media accounts and through word-of-mouth. No representatives from arts and humanities responded to the email request, so participants in arts and humanities must have been recruited through another mode. It was predicted there may be an overrepresentation of respondents from Sport Science disciplines as this was the same field as the researcher's own discipline. Participant recruitment strategies were implemented between 24th March and 6th May 2021.

In order to participate, students had to: 1. Be at least 18 years of age, 2. be fluent in written and spoken English, 3. be currently enrolled as a postgraduate research student at Swansea University.

Questionnaire and interview data collection took place between 24th March and 16th May 2021. At the beginning of data collection, the UK was in a national lockdown, but some restrictions gradually lifted during the period, including the 'rule of six' for outdoor meetings being implemented and reopening of non-essential retail and outdoor hospitality (Institute for Government, 2021). The same rules applied in Wales as the rest of the UK during this period.

Once students had clicked the survey hyperlink, they were taken to the online survey company JISC. Participants were given the opportunity to read the participant information sheet (Appendix F) and were asked to give informed consent before proceeding with the questionnaire. The following pages consisted of the demographic questionnaire, DASS-21, SELSA-S and questions asking about their experiences during the COVID-19 pandemic.

The last page of the survey asked participants if they wished to be contacted with information about taking part in an interview to further discuss their experiences of the COVID-19 pandemic. They were instructed to enter their student email address if they wanted more information. It was emphasised in the participant information sheet that their student email address would only be used by the researcher to contact them with details about the interview. Due to sufficient numbers (35) expressing an interest in taking part in interviews after four weeks of the online questionnaire being live, the questionnaire was re-routed to block access to the interview information page so no more participants could sign up.

Once the participants had submitted their answers, a page was shown thanking them for their participation. It listed four organisations that could provide support and advice to participants if they felt affected by anything mentioned in the questionnaire. There were also instructions on how to contact the principal researcher if participants wished to withdraw their answers from the study.

Participants who had expressed an interest in follow-up interviews were sent an email invitation that included information about the interviews and the topics that would be discussed (Appendix G), as well as the participant information sheet if they wished to revisit it. The terms for informed consent were also included in the email. If participants wished to take part, they were instructed to click on the hyperlink for the meeting scheduling online platform Calendly (https://calendly.com/) to book an interview timeslot. Participants were able to choose one one-hour timeslot on any working weekday between 12th April and 7th May 2021. It was emphasised that by booking a timeslot, participants were agreeing to the informed consent terms stated in the interview email invitation. Upon booking, they were sent a confirmation email of their interview time, a link to the Zoom meeting and instructions about how to reschedule or cancel their interview, if they so needed.

All interviews were audio and video recorded on Zoom software and were audio recorded by the principal researcher using a Philips VoiceTracer DVT3400 dictaphone as a replacement if issues arose with the Zoom recording.

3.7. Data analysis

3.7.1. Quantitative data

Quantitative data from questionnaires was analysed using SPSS 27 for Windows (IBM Corp, 2019). Descriptive statistics were calculated for all variables. Normality tests revealed the data was not normally distributed as skewness and kurtosis values fell outside the -2 to +2 range. Mann-Whitney *U* tests were conducted to compare course type and gender differences for mental health and loneliness variables and the number of academic challenges, types of support accessed and barriers to support ($p \leq .05$).

Spearman's correlations estimated associations between mental health and loneliness scores and other continuous data at the $p \leq .05$ level. Only overall loneliness scores were used for correlations with academic challenges, number of support sources and number of barriers to support.

Mann-Whitney *U* tests compared mental health and loneliness variables of students who had and had not thought about quitting their degree ($p \leq .05$).

Following interview analysis, Mann-Whitney *U* tests were carried out to identify any significant differences in mental health and overall loneliness scores between interviewees who had their interview included in the analysis and participants who did not have their interview analysed or participate in an interview *(*$p \leq .05$).

3.7.2. Qualitative data

Qualitative analysis of free-text questionnaire answers and interviews was conducted using NVivo 12 software (QSR International, 2018).

Conceptual content analysis was used for *Other* follow-up answers and free-text answers for deadline duration and activities during lockdown in the questionnaire. This was deemed the most appropriate qualitative analytical method due to the need to extract and quantify the most themes frequently mentioned by participants (Weber, 1990). Activities were coded and categorised into overarching activity groups to create a frequency distribution.

Inductive thematic analysis was used to analyse interviews (Braun & Clarke, 2006) in order to create key themes to provide a rich understanding of PGR students' experiences during the COVID-19 pandemic. Braun and Clarke (2006) outlined six steps to thematic analysis: 1. *familiarisation with the data*; 2. *generating initial codes*; 3. *searching for themes*; 4. *reviewing themes*; 5. *defining and naming themes*; 6.

producing the report. The inductive thematic procedure used for NVivo software broadly follows Braun and Clarke's (2006) process, as detailed below in the following paragraphs.

Qualitative interviews were transcribed verbatim by an external company and online copies of the transcripts were emailed to the researcher. Familiarisation with the data involved 'repeated reading' through all the online transcripts (n = 21) in Microsoft Word while listening to corresponding audio recordings to ensure accuracy and to begin looking for ideas and noting down arising thoughts (Step 1).

Once familiarised with all transcripts, purposive sampling was used to select which interviews to analyse so that participants from a range of demographic groups were represented (Marshall, 1996), particularly characteristics that were only represented by one or two participants, for example international, part-time and disabled students. The researcher's interview notes were also consulted to consider participants who talked about specific instances (critical case sample) or had opinions that were different from the majority (disconfirming sample) so that a range of views could be included in analysis (Marshall, 1996), rather than painting a biased portrayal of PGR's experiences. From this, 11 interviews were imported to NVivo for analysis.

Initial codes were generated by highlighting featured data and giving it a code (known as a 'node' in NVivo; Step 2). As transcripts were coded, similar nodes were combined to create sub-themes, which were then sorted into overarching themes once all 11 interviews had been initially coded (Step 3).

Once interviews from participants who represented a range of demographic characteristics were coded, transcripts from the remaining selection were randomly chosen, imported to NVivo and coded to determine whether data saturation had been reached. Data saturation is defined as the point at which "additional data do not lead to any new emergent themes" (Given, 2008, p. 135). After three more interviews, no significant changes to nodes or new themes were made, at which point no more interviews were analysed.

Themes were then reviewed in two stages to create a thematic data map: 1. reading all coded data in each theme to ensure they accurately reflect the theme's story and, if not,

removing offending data; and 2. re-reading all analysed interviews to code additional data that may have gone unnoticed in the initial coding stage (Step 4).

Before themes and sub-themes were finalised, quotes from each theme and sub-theme were extracted onto a Microsoft Excel sheet and sorted into themes and sub-themes by a critical friend. The critical friend was not given the named themes so that they could independently analyse and triangulate themes. The main researcher and critical friend discussed their agreements and disagreements about emergent themes to ensure trustworthiness in the qualitative analysis.

Following this, each theme was defined and named to capture the theme's overall meaning and content (Step 5). For this step, all data was exported to another Microsoft Excel sheet where the codes and subthemes could be more easily viewed as a whole than in the narrow panel on NVivo in which they were listed.

Finally, each theme was integrated into the report (Step 6) by 'weaving' the qualitative data into the quantitative data so that each theme and its corresponding questionnaire data was presented together (Fetters et al., 2013).

3.8. Trustworthiness of the methodology

Trustworthiness of the data was considered using Tracy's (2010) eight 'big-tent' criteria. This study: was on a *worthy topic,* in that COVID-19 will have an ongoing impact on universities and university students for the foreseeable future; it has *rich rigour* as the data collection period was of satisfactory length to include a sufficient number of interviews that represented different demographic groups, each interviewee gave in-depth answers to each question asked and the analytic process involved re-reading and triangulation with a critical friend; is *sincere* as the researcher acknowledges her potential bias as a PGR student herself (see *Researcher positioning*), and was transparent with participants and readers about data collection and analysis procedures; the data is *credible* as the context of the study was thoroughly described, such as the University population and current lockdown restrictions, there is a wide range of participants included in the sample that have similar opinions to each other and the use of a critical friend to conduct secondary independent data analysis lent support for the researcher's data analysis; has *resonance* as the writing presents PGR students' experiences in a way that evokes readers' emotions about similar hardships

they may have endured during the pandemic; provides a *significant contribution* to our understanding of postgraduate research and how to improve students' university experience; was conducted in an *ethical* fashion as interviews were deemed more suitable than focus groups to protect participants, anonymity was prioritised throughout and students were signposted to organisations if they required support following discussion of sensitive topics; and has *meaningful coherence* as using a pragmatic approach to undertake a mixed methods study using questionnaires and interviews generates a holistic understanding of PGR students' experiences during the pandemic as the interview data explains the questionnaire data, it fills a gap in the literature as it focuses on Masters and doctoral students studying in Wales and it strengthens the findings from previous research that PGR students have encountered unique challenges to the rest of the student population and that the University should endeavour to improve their support for PGR students.

3.8.1. Researcher positioning

I am a 23-year-old research Masters student at Swansea University. In October 2019, I enrolled onto a Masters degree that was funded as part of the CONNECT project, and the original thesis focus was on evaluating the effectiveness of this project for improving student wellbeing. Due to various delays in the project set-up, I had not begun data collection for my thesis by the time the COVID-19 pandemic began. In March 2020, I moved back to my parents' home situated 2 hours away from Swansea and have continued with remote study. Due to the pandemic and issues with participant recruitment for CONNECT, I was forced to change my thesis focus in March 2021. In those 17 months, I was creating my literature review and evaluating the CONNECT project.

3.8.2. Self-reflexivity

Self-reflexivity, a self-awareness of the influence the researcher has on the research (Probst, 2015), was a significant feature during the data collection and analysis phases of my study (Tracy, 2010) because I, as the researcher, am a PGR student and have shared experience of studying during the pandemic. First and foremost, I have described my position as an insider researcher to reduce any criticism I may receive

for bringing a potential bias to my research and to let readers interpret my position as they see fit.

During the research design stage for my questionnaire and interview schedule, with an altruistic attitude, I drew on different topics covered by the literature that I personally had not encountered as a PGR student, such as home-schooling or financial worries, to ensure that participants could share their views on a variety of issues.

During data collection, I was able to build an immediate rapport with participants due to my shared experience, which fostered a safe environment for them to comfortably voice their experiences and opinions. Being an 'insider' also enabled me to dig deeper into topics and ask more suitable probing questions compared to a researcher with no lived experience. Additionally, during the interviews themselves, I felt my position of power as a researcher was equal to that of the participants', rather than being in a traditionally superior position (Råheim et al., 2016), because we were living similar realities.

During the data analysis stage, I asked a critical friend who was not a PGR student to independently analyse a portion of my interview data and challenge my interpretations of the data and any preconceived ideas I may have formulated during my analysis.

Away from the research and the study's data, self-reflection was practised through discussions with my academic supervisor about my personal situation as a PGR student living in the pandemic, and through documenting my progress on an online academic monitoring system that records PGR students' engagement with their studies. Discussing my experiences made me realise that part of my motivation for conducting this research may have been a way of validating my own situation and could be achieved via the questions I asked. The range of options for each multiple-choice questionnaire question and open-ended interview questions meant participants were able to easily convey their own experiences and were not bound to questions tied to my personal circumstances.

4. Results

4.1. Mental health and loneliness

The average mental health scores indicate PGR students were experiencing moderate depression (7.3 ± 5.45), mild anxiety (4.1 ± 3.77) and 'normal' levels of stress (7.6 ± 4.88). The average overall loneliness score was 45.1 ± 15.56, 12.0 ± 6.00 for family loneliness, 14.7 ± 7.28 for social loneliness and 18.4 ± 10.18 for romantic loneliness.

Table 4.1 shows the mental health and overall loneliness scores for different demographic groups. There were no significant differences in depression, anxiety, stress and overall loneliness scores between Masters and doctoral students and male and female students ($p > .05$), meaning Hypotheses 1 and 2 were not supported. Full descriptive statistics for these variables are provided in Appendix H.

Table 4.1

Depression, anxiety, stress and overall loneliness scores for each demographic group

Demographic variable		Depression		Anxiety		Stress		Overall loneliness	
	n	M	SD	M	SD	M	SD	M	SD
Gender									
Male	30	7.9	6.74	3.3	3.46	7.0	5.14	46.1	16.90
Female	42	6.8	4.33	4.6	3.92	8.1	4.69	44.3	14.70
Age (years)[a]									
21-25	20	6.5	5.22	4.2	3.53	6.8	4.28	48.7	16.57
26-30	31	7.3	5.11	4.0	4.32	7.6	5.13	41.4	13.48
31-40	9	9.7	4.58	5.3	3.43	10.8	3.77	46.2	16.02
41-50	5	7.8	8.17	2.4	2.61	7.2	5.97	46.2	22.22
51-60	6	5.8	7.60	3.7	3.56	5.8	5.78	50.2	18.08
Nationality									
British[b]	59	7.2	5.62	3.9	3.70	7.5	4.80	43.6	15.42
Other[c]	13	7.8	4.75	5.0	4.10	8.2	5.41	51.9	14.90
Home/ International student									
Home/UK	60	7.3	5.63	4.0	3.78	7.6	4.83	43.8	15.42
International	12	7.3	4.68	4.5	3.85	7.7	5.35	51.3	15.41
Ethnicity[d]									
White	68	7.3	5.49	4.0	3.69	7.7	4.91	44.4	15.67
Mixed/ Multiple ethnic	2	11.0	4.24	8.5	6.36	10.5	3.54	59.0	2.83
Other[e]	1	7.0	0.0	3.0	0.0	4.0	0.0	63.0	0.0
Religion[f]									
Christianity	9	5.7	2.60	3.8	3.83	6.9	4.70	42.8	16.06

Catholicism	4	7.3	4.50	4.5	5.92	8.0	4.90	46.0	20.02
Islam	1	7.0	0.0	3.0	0.0	4.0	0.0	63.0	0.0
Sikhism	1	14.0	0.0	13.0	0.0	13.0	0.0	57.0	0.0
Atheism/No religion	54	7.7	5.83	4.1	3.60	7.8	5.01	44.8	15.35
Other[g]	1	2.0	0.0	3.0	0.0	4.0	0.0	69.0	0.0
Disability[h]									
Yes	5	11.0	9.59	7.2	4.15	11.2	6.76	54.2	18.17
No	65	6.8	4.97	3.9	3.72	7.3	4.72	44.1	15.40
Sexual orientation[i]									
Heterosexual	62	7.7	5.51	4.2	3.76	7.8	5.01	45.7	16.01
Bisexual	5	5.8	5.17	5.4	4.93	9.4	3.78	38.0	13.13
Asexual	1	5.0	0.0	2.0	0.0	5.0	0.0	48.0	0.0
Relationship status[j]									
Single	32	6.9	5.26	3.7	4.02	6.6	5.18	52.5	12.34
In a relationship	27	7.4	5.17	4.5	3.75	8.5	4.44	34.7	11.44
Married	10	8.2	6.39	4.6	3.50	8.9	4.43	46.0	16.98
Divorced	2	9.5	10.61	4.5	2.12	9.5	7.78	72.0	4.24
PGR type									
Masters	16	7.8	5.91	5.2	3.64	8.6	5.56	46.1	12.98
Doctoral	56	7.1	5.36	3.8	3.78	7.4	4.69	44.8	16.32
Year of study									
1st	19	7.0	4.94	4.5	2.61	8.1	4.55	46.9	15.11
2nd	16	7.1	6.60	3.7	4.30	6.6	5.09	44.4	17.12
3rd	13	7.9	5.41	3.8	3.53	9.3	4.73	57.3	12.20
4th	17	7.8	5.64	4.2	4.38	7.2	5.29	38.5	13.42
5th +	7	5.9	4.63	4.0	4.97	7.0	4.97	35.0	9.64
Discipline[k]									
Arts and humanities	6	4.2	2.48	2.2	1.47	5.6	2.73	42.3	18.81
Engineering	5	7.6	2.97	3.6	3.29	8.8	3.83	53.2	12.09
Health science	7	9.0	7.30	4.7	3.15	8.3	5.53	50.3	17.81
Law	6	8.3	6.83	3.2	4.12	7.7	5.68	49.2	21.61
Management	1	5.0	0.0	2.0	0.0	5.0	0.0	48.0	0.0
Medicine	5	5.0	3.74	4.6	4.34	8.2	6.10	47.6	11.97
Science	26	7.7	5.73	4.2	3.68	7.5	4.54	41.6	15.65
Sport science	16	7.3	5.72	4.7	4.87	7.9	6.02	44.5	13.85
Study mode									
Full-time	64	7.4	5.24	4.3	3.83	7.9	4.63	44.7	15.78
Part-time	8	6.5	7.33	2.4	2.92	5.8	6.63	48.5	14.16

Note. Family, social and romantic loneliness were not included in this table because, individually, they were not key variables (see Appendix I for scores).
[a]*n* = 71. [b]Includes *British, English, Scottish, UK, Welsh*. [c]Includes *American, Bahraini, Belgian, Colombian, Dutch, Estonian, French, Italian, Polish, Spanish*. [d]*n* = 71. [e]Includes *Arab*. [f]*n* = 70. [g]Includes *Celtic Shamanism*. [h]*n* = 70. [i]*n* = 68. [j]*n* = 71. [k]There were 8 academic colleges at the time of data collection.

Although there were no hypotheses set or inferential statistical tests completed, the data in the above table shows that certain groups potentially have poorer mental health and are lonelier than others. Groups who tended to show worse mental health were students aged 31-40 years, mixed or multiple ethnicities, those with a disability, studying health science and full-time students. Groups who tended to have higher loneliness scores were students with an *Other* nationality, international students, ethnic minority, those with a disability and third year students.

Figure 4.1 shows the percentage of participants in each severity category for depression, anxiety and stress. Almost two thirds of participants reported some level of depression (65.3%), with 40.3% reporting mild to moderate and 25.0% reporting severe or extremely severe depression. 43.1% of participants reported some level of anxiety, including 26.4% mild to moderate anxiety symptoms and 16.7% severe or extremely severe anxiety. Just over half of participants reported some level of stress (51.4%), with 30.6% reporting mild to moderate stress symptoms and 20.9% reporting severe or extremely severe stress symptoms.

Figure 4.2 displays the percentages of Masters and doctoral students in each DASS-21 severity category. 68.7% of Masters students showed symptoms of depression, 56.2% of anxiety and 62.5% of stress. For doctoral students, 64.3% showed signs of depression, 39.3% of anxiety and 48.2% of stress. Most students in each category are doctoral students, apart from extremely severe stress, with the only two participants in this category being Masters students.

See Figure 4.3 for the percentages of male and female students in each DASS-21 severity category. 60% of males showed symptoms of depression, 43.3% of anxiety and 50% of stress. For females, 69% showed signs of depression, 42.9% of anxiety and 52.4% of stress. Most students in each category were female, but of particular note is the considerably greater percentage of males categorised as reporting extremely severe depression compared to females. 36.7% of male students were in this category, compared to just 4.8% of females, meaning 84.6% of participants in this category were male.

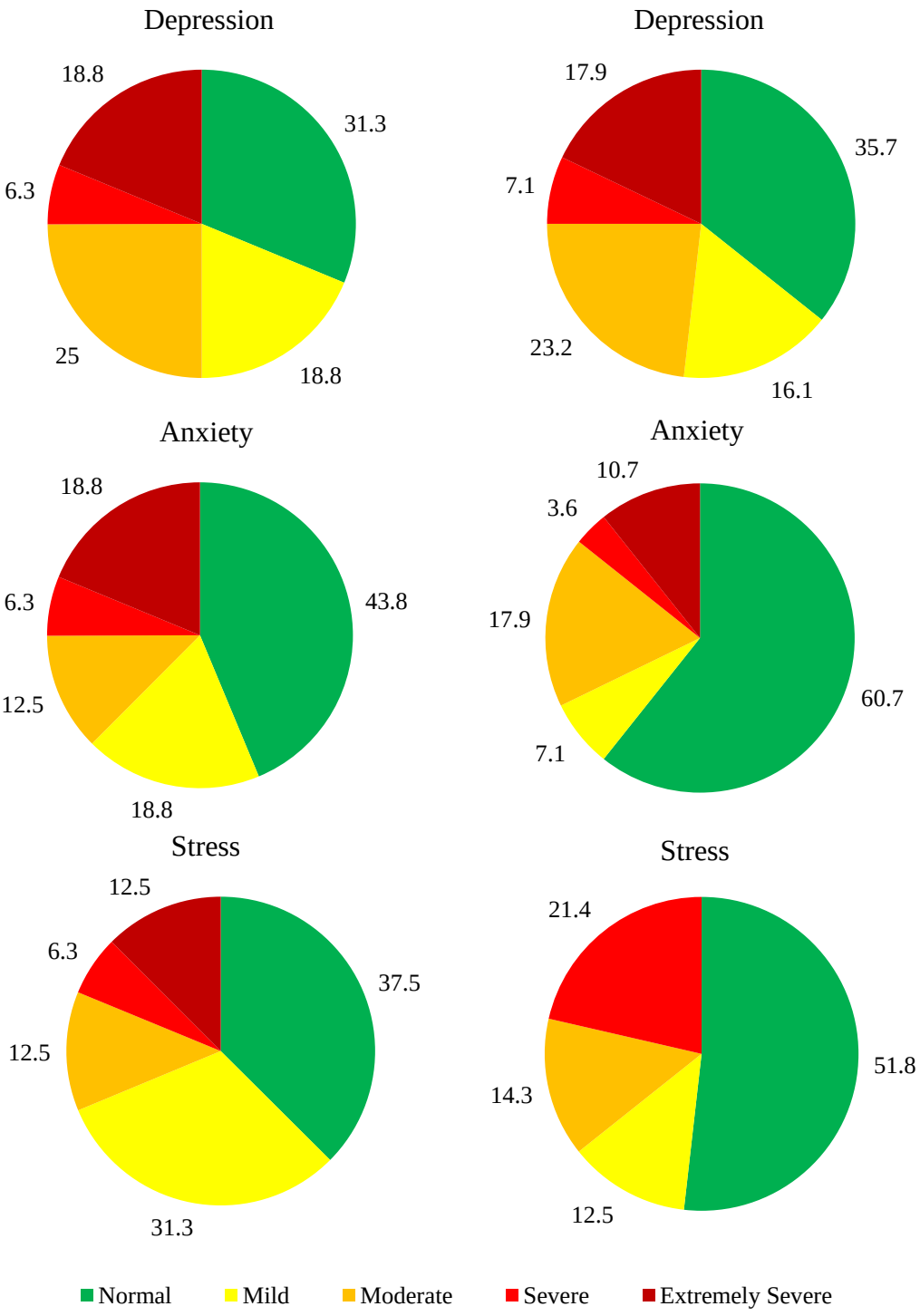
Figure 4.1

Percentage of total sample in each DASS-21 severity category.

Note. $n = 72$

Figure 4.2

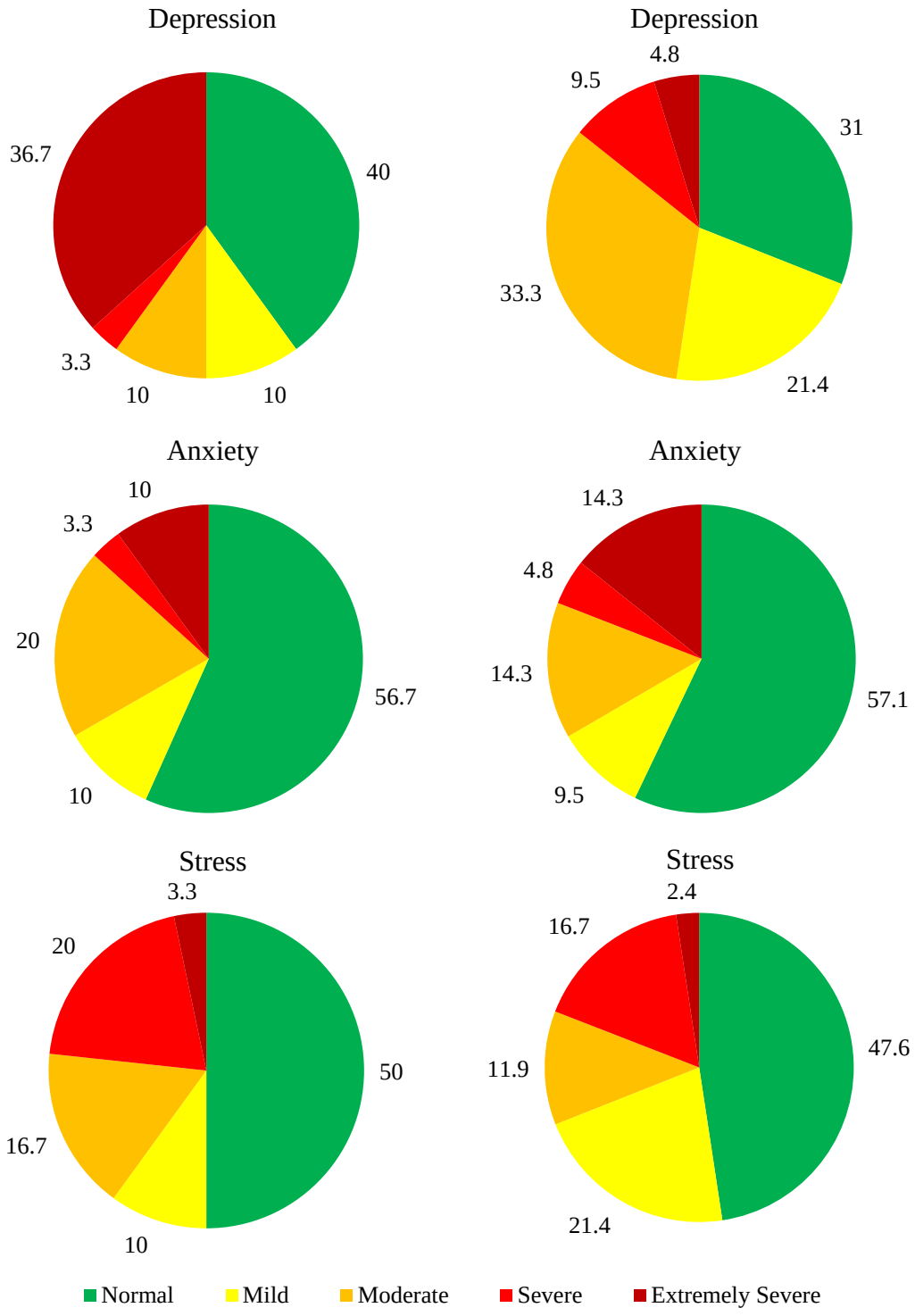
Percentage of Masters (left) and doctoral (right) students in DASS-21 severity categories



Note. Masters n = 16; doctoral n = 56.

Figure 4.3

Percentage of male (left) and female (right) students in DASS-21 severity categories



Note. Male *n* = 30; female *n* = 42.

Table 4.2 displays correlations between mental health and loneliness variables. Hypothesis 3 suggesting all mental health and loneliness variables would be correlated was partially supported. Depression was significantly positively associated with all variables except for romantic loneliness. The strongest correlations reported were between stress with anxiety $r = .77$ and depression $r = .76$ and between depression and anxiety $r = .65$, which were all significant at the .01 level.

Table 4.2

Correlations between mental health and loneliness variables

	Dep	Anx	Stress	Lon	Fam lon	Soc lon	Rom lon
Dep							
Anx	.645**						
Stress	.756**	.766**					
Lon	.338**	.113	.156				
Fam lon	.431**	.193	.290*	.659**			
Soc lon	.358**	.225	.274*	.588**	.516**		
Rom lon	.028	-.081	-.068	.721**	.165	-.014	

Note. $n = 72$; Dep = depression; Anx = anxiety; Lon = overall loneliness; Fam lon = family loneliness; Soc lon = social loneliness; Rom lon = romantic loneliness.
* $p < .05$. ** $p < .01$.

There tended to be stronger correlations between mental health and loneliness variables in doctoral students compared to Masters students (Table 4.3). The strongest correlations seen in Masters students were between depression with stress $r = .73$, overall loneliness $r = .52$ and anxiety $r = .52$, and stress and family loneliness $r = .60$. The association between stress and anxiety was not significant in Masters students. The strongest correlations seen in doctoral students were between stress with anxiety $r = .82$ and depression $r = .76$, and between depression and anxiety $r = .68$.

For gender, males typically showed stronger associations between variables than females (Table 4.4). The strongest correlations were between stress and anxiety $r = .85$ and depression $r = .78$, and between depression and anxiety $r = .67$. The strongest correlations for females were between stress and depression $r = .71$ and anxiety $r = .69$, and between depression and anxiety $r = .64$.

Table 4.3

Correlations between mental health and loneliness variables by course type

	Dep	Anx	Stress	Lon	Fam lon	Soc lon	Rom lon
Dep		**.677****	**.757****	.316*	**.407****	**.352****	-.010
Anx	.518*		**.824****	.070	.153	**.270***	-.182
Stress	.725**	.468		.120	.191	.239	-.095
Lon	**.521***	.332	.356		**.696****	**.651****	.725**
Fam lon	.406	.335	**.603***	.589*		**.536****	.210
Soc lon	.387	.315	.412	.293	.486		.077
Rom lon	.211	.127	.065	**.756****	.133	-.286	

Note. Below line = Masters (n = 16); Above line = doctoral (n = 56); Dep = depression; Anx = anxiety; Lon = overall loneliness; Fam lon = family loneliness; Soc lon = social loneliness; Rom lon = romantic loneliness; Figures in **bold** show a stronger correlation than the other group.
* $p < .05$. ** $p < .01$.

Table 4.4

Correlations between mental health and loneliness variables by gender.

	Dep	Anx	Stress	Lon	Fam lon	Soc lon	Rom lon
Dep		.642**	.707**	.285	.367*	**.437****	-.066
Anx	**.667****		.692**	.186	.224	.227	.030
Stress	**.780****	**.850****		.100	.304	.234	-.078
Lon	.343	.058	.233		.518**	**.643****	.683**
Fam lon	**.489****	.243	.330	**.834****		.509**	-.037
Soc lon	.268	.244	.301	.547**	**.556****		-.013
Rom lon	.050	-.228	-.037	**.752****	**.432***	-.007	

Note. Below line = male (n = 30); Above line = female (n = 42); Dep = depression; Anx = anxiety; Lon = overall loneliness; Fam lon = family loneliness; Soc lon = social loneliness; Rom lon = romantic loneliness; Figures in **bold** show a stronger correlation than the other group.
* $p < .05$. ** $p < .01$.

4.1.1. Perceived change in mental health and loneliness

The majority of students reported an increase in their feelings of sadness, anxiety or worry, stress and loneliness compared to perceived levels before the pandemic (58.3%, 76.4%, 72.2% and 63.9%, respectively). A massive increase was reported by 8.3% of students for sadness, 16.7% for anxiety, 16.7% for stress and 13.9% for loneliness. Seven students reported their feelings of sadness had decreased (9.7%), 6 reported decreased anxiety (8.4%), 11 decreased stress (15.2%) and 6 reported decreased loneliness (8.4%). It should be noted that changes in different variables were not

necessarily the same for each student, for instance, students reporting increased anxiety did not necessarily report increased depression.

4.2. Impact on living and study situation

4.2.1. Living situation

Before the pandemic, most students were living off campus in shared accommodation (37.5%). 25.0% were living off campus with a partner and/or children, 22.2% were living alone off campus and 12.5% were living with parents/guardians or family (see Table 3.1 in *Methods*).

Over half said their living situation had not changed since before the pandemic (54.2%), 30.6% moved in with their parents/guardians or family and 4.2% moved in with friends. 11.1% of participants selected *Other* – situations included moving in with a partner, moving house due to financial hardship and postponing moving house due to pandemic restrictions and mental health difficulties. Students' current living situation, therefore, consisted of 37.5% living with parents/guardians or family, 25.0% living with partner and/or children, 15.3% living off campus in shared accommodation, 12.5% living alone off campus and 9.7% in a different living situation.

Issues with moving back home to live with parents were mentioned in the interviews, particularly as students typically live away from home during term time. One participant felt a loss of independence at the beginning of the pandemic while he was revising for his final year undergraduate exams:

"Suddenly, even though I was 21 and living at home, I felt like I was in Year 10 again… my mum would make tea and it felt just really strange. I felt like that independence had kind of been ripped from me and I felt like I'd regressed a couple of years".

As a result, he questioned whether life was really worth living:

"The worst days were the ones where I was basically like, 'Well if I am not doing anything, like, do I need to be here?"

A PhD student struggled at the beginning of the pandemic when she moved back in with her family, stating, *"I've lived away from them for so long and so there were*

definitely some teething problems in the beginning, kind of setting up boundaries and stuff".

As an international student, there were clear difficulties she found when returning to her family home in a different country, however she was reminded that the lockdown meant she could see her family more than usual, adding *"We're lucky in the family to have spent quite a lot of time together, which, on the one hand, can drive you a bit insane but, on the other hand, you're not alone."*

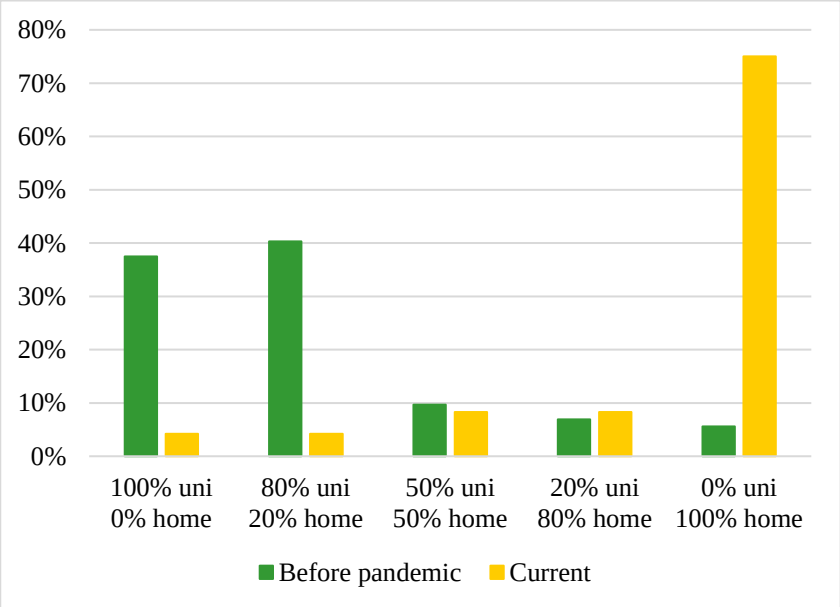
This highlights that, despite the initial strains of living under her family's roof, there were benefits to being reunited with her loved ones, such as providing emotional support.

4.2.2. Study situation

Prior to the pandemic, 77.8% of students would have spent more time studying on the University campus than at home (Figure 4.4). 12.5% would have spent more time studying at home and 9.7% would have divided their study time equally between university and home. During the pandemic, three quarters of students were spending their entire time studying at home. At the time of questionnaire completion, 8.4% were spending more time studying on campus than at home. Of the students who spent 100%

Figure 4.4

Percentage of students studying at university and at home before and during the pandemic



of their time studying on campus before the pandemic, 66.7% were spending 100% of their time working from home and 11.1% were spending 100% of their time working on campus.

At the beginning of the pandemic, participants were in disbelief that they had to work entirely from home, *"The first week or two, I was like, 'What am I doing? I'm never going to be able to work from home'."* However, the *"novelty"* soon wore off and participants quickly became acclimatised to working from home, with one student describing it as being like, *"groundhog day."*

Working from home often meant sharing a workspace with other household members:

"My mum is working from home as well… it's nuts just trying to work alongside each other. [As part of her job] she is constantly talking, and I am just there going 'Please… I have got to get some work done'."

At the other end of the spectrum, other participants spoke about working in a solitary environment, the impact of which is discussed in later sections.

4.2.3. Productivity

Regarding productivity levels, students perceived that the change in their study situation had a negative impact on their productivity (61.1%), with 25.0% reporting a moderately negative impact and 20.8% a hugely negative impact. For those spending 100% of their time working from home, 58.4% perceived this had a negative impact on their productivity. 23.6% reported their new study situation had a positive impact on their productivity, with eight participants saying it had a moderately or hugely positive impact. 32.1% of people always working from home thought their new study situation had a positive impact on their productivity.

For the most part, the reasons for students' lower levels of productivity are explained in the *Academic challenges* section, however one student described how working from home impacted his productivity:

"I've ended up going down far more rabbit holes that have been a complete waste of time… If I'd been in a normal work environment… somebody would have gone, 'Nah, you don't really want to do that.'… I've put an awful lot more effort in and, effectively, got a lot less out."

Without the influence of others, this student tended to immerse himself in topics that were irrelevant to his thesis focus and resulted in work time being wasted in the long run.

However, there was a minority of students who found the first national lockdown beneficial to their work productivity because it created an environment conducive for writing:

"I was fortunate in the sense that the stage that I had reached was in the final analysis and writing stage, so you generally need peace and quiet to work on that."

"I was quite productive through the lockdown… I got a paper out of the lockdown start to finish. I was pretty chuffed with that."

4.2.4. Preference of study situation

75.0% of students preferred their pre-pandemic study situation, while 15.3% preferred their study situation at the time of questionnaire completion (9.7% said their study situation had not changed). Of those who preferred their previous study situation, 66.7% worked mainly at university/office prior to the pandemic but were currently 100% working from home.

These findings were echoed in the qualitative data. Most students preferred to work anywhere but at home, usually in a work-oriented environment:

"I like to go into a space where I feel like I need to be required to work to be there, otherwise I am just like, 'I can just use my internet to just watch Netflix'."

"There's all these polls on either LinkedIn or Facebook, you know, 'Would you rather work at home or work in the office or have a mixture?'. I would always just choose the office. Like anywhere else just completely separated from home."

Two interviewees preferred working from home. One student preferred working from home because he could sleep in, stating *"[I] don't get up so early so I don't feel so tired, which again makes me fresher and more equipped to actually deal with research"*. He added, however, that he feels *"guilty"* for *"only seeing the benefits"* of working from home, showing that he knows he is in the minority of people who prefer working from home.

Another participant who spent most of her time working from home before the pandemic explicitly said she preferred working from home because she struggles to focus when surrounded by others. She also said that being forced to work from home *"[gave her] more of an ability to make [her]self work from home".* The realisation that she is more capable of working from home than she originally thought created a sense of empowerment.

4.2.5. Work-life balance

Most students perceived their work-life balance was imbalanced towards work (36.1%). Almost a fifth of students perceived a better balance and were satisfied with their time distribution between studying, home life and other commitments (19.4%). 15.3% perceived an imbalance towards personal life responsibilities, for example, caring for others, while 13.9% perceived an imbalance towards engaging in personal activities, such as hobbies. 12.5% of participants reported no change in their work-life balance compared to before the pandemic. Two individuals selected *Other*, with one person mentioning she was *not getting enough work done*, suggesting she believes there are not enough hours in the day to work, and the other stating *the boundary between work and play is vague and ill-defined*, rather than specifying whether the *balance has shifted*. He instead defined his home and work spaces as very *intertwined*.

Qualitative data showed that students found it *"alien"* that their work life and home life had merged now that they were both situated in one location because *"normally the two never collide".* This meant many found it difficult to relax when they were not working:

"When I think I'm having downtime, maybe watching a bit of TV while I'm eating and things, my mind is ticking over with other things instead. It is difficult. There's very much the case of not being able to fully turn off."

Participants remained, mentally, in work-mode long after they had physically stopped studying, which created feelings of anxiety about *"not being able to switch off"*. This feeling of unease was particularly pronounced in the evening:

"Come 10 or 11 o'clock at night, you're lying there and thinking 'Did I do that? Did I put this variable in?'. And at 1 o'clock in the morning you're still wide awake."

The struggle to divide work and home life was exacerbated during the strict lockdowns:

"There's no let up when you have finished a day of uni work… because you can't go anywhere. It almost feels like a punishment."

Being unable to visit friends and family or participate in leisure activities outside the house during strict stay at home orders except for essential journeys, meant students could not escape the place they spend the majority of the day.

Not having to commute to university was a frequently mentioned reason for the blurred lines between home and work, however there were mixed views about its effect on their work-life balance. Some participants missed the commute as it was utilised to psychologically *"clock on and clock off"* work, but, without it, they slipped into a habit of working much longer than their normal hours. In contrast, one participant perceived he had a *better balance* because he did not need to commute, despite spending more time studying:

"Ordinarily, I would have to travel in a car probably about an hour and a half each day driving. That is an hour and a half that I can devote to research."

The health benefits he has seen with not commuting may explain his reasoning, adding:

"In terms of sleep patterns… I think I have actually benefited, actually feel a better sense of wellbeing. I feel less tired than I would ordinarily."

By being able to sleep longer, he felt he could better concentrate on his work and study more efficiently, as well as have more energy for non-work activities, which may lead to a better perceived work-life balance.

An increase in personal responsibilities was also indicated in interviews:

"All of [my family] are vulnerable apart from me and so I was doing all of the outside stuff that needed to be done, so that was a bit stressful… I was doing the prescription runs, I was organising the doctors' appointments, driving them and I was doing all that lot, and I was then like 'Can I just nap please?' or 'I haven't done any work today.'"

Caring for her family took priority during the pandemic and meant this participant spent less time studying. However, in her questionnaire, she had a work-life imbalance towards personal activities. In her interview, when asked whether looking after her animals on her family's farm was *"an escape from [her] work and responsibilities"*, she answered:

"Yes… If I was just chilling in the garden reading a book, I would constantly be being called in saying 'I need you to do this and I need you to do that'… But if I was out with the horses I would be like, 'I can't I am like three fields over!' [laughter]"

4.3. Academic challenges

4.3.1. Motivation

Over half of students thought their motivation had decreased due to the pandemic (59.8%), including 25.0% who thought it had massively reduced. 18.1% perceived their motivation had increased to some degree as a result of the pandemic, but only two individuals reported a moderate or massive increase.

Participants interviewed talked about their lack of motivation. Working in a solitary environment and not being surrounded by others meant students struggled to muster up enthusiasm to study:

"I don't have people breathing down my neck. It's all on me to do all my stuff, do you know what I mean? No one is telling me, 'Okay, you've got to go and do this now'. So my motivation has been affected by COVID."

"I am on my own a lot of the time so it can be difficult to motivate myself especially."

4.3.2. Challenges faced

The average number of academic challenges students experienced was 5.3 ± 2.44. In relation to exploratory question 1, there was no significant difference between the average number of challenges experienced by Masters (6.3 ± 2.55) and doctoral (5.0 ± 2.35) students ($p > .05$), or between male (5.1 ± 2.39) and female (5.4 ± 2.49) students ($p > .05$). Hypothesis 4 was partially supported, as Spearman's correlations indicated that academic challenges were significantly positively associated with depression r =

.43, anxiety r = .44 and stress r = .51, p = < .01. The relationship between academic challenges and overall loneliness was not significant (p > .05).

Table 4.5 displays the frequency that each factor was identified as an academic challenge. An overwhelming majority cited lack of informal interactions with colleagues and peers as an academic challenge they have faced during the pandemic (81.9%). Other frequently cited challenges were students' own expectations to maintain the same productivity as before the pandemic (65.3%), disruption to routine (61.1%) and loss of focus due to stress (58.3%). Less frequently reported challenges were difficulties accessing journal databases (15.3%) and reduced access to online software (12.5%). Only three students stated they did not experience any academic challenges during the pandemic. Two students identified other academic challenges: working from home and not having access to laboratories led to depression symptoms and sick leave, and, one female said she was caring for her clinically vulnerable husband who contracted COVID-19.

Table 4.5

Academic challenges faced by PGR students during the COVID-19 pandemic

Academic challenge	*n*	%
Lack of informal interactions with colleagues/peers	59	81.9
Own expectations for you to maintain pre-pandemic work productivity	47	65.3
Disruption to normal routine	44	61.1
Loss of focus due to worry or stress	42	58.3
Unsuitable working environment	33	45.8
Others' expectations of you to maintain pre-pandemic work productivity	31	43.1
Overwhelming or unwanted increased independence	25	34.7
Not having access to library books and resources	20	27.8
Limited access to specialist laboratories and equipment	19	26.4
Too many online meetings	18	25.0
Increased personal responsibilities that have affected my work	17	23.6
Difficulty remotely accessing journal databases	11	15.3
Limited access to online software	9	12.5
I have not found anything more challenging	3	4.2
Other	2	2.8

Several topics discussed in the interviews that related to academic challenges are cited in other sections, such as increased personal responsibilities and disruption to normal routine.

PGR students talked about multiple academic challenges they had faced during the COVID-19 pandemic. Supporting the quantitative data, a frequent talking point by nearly all interview participants centred around not having informal interactions with colleagues, peers and supervisors and the switch to online communication:

"The casual chat has been the real casualty of all this. You can't just mention something in passing to a colleague. You [are] more likely have to email them. You have to ping them on Teams."

Despite having the software available to easily communicate with others, it was difficult to collaborate together on projects:

"It's the lack of being able to ask questions face-to-face. Not so much sharing a screen because you can do it like that, but sharing a computer with someone actually showing you… Instead, it's taken three or four times longer to resolve whatever the issue is."

The general consensus is that people have to make a deliberate effort to interact with others rather than talking across the office or walking next door to see their supervisor:

"It's a bit more inconvenient for them [supervisor] to respond to my email or set up a Zoom meeting instead of just kind of that 30 second conversation we could have had in person."

This participant felt like she was a bit of a nuisance to her supervisor as he had to go out of his way to answer her questions. She added:

"The little questions that you might ask someone in your team sat next to you or just pop into your supervisor's office… Maybe those questions don't get answered because you don't feel like it's enough to kind of organise a meeting on Zoom or something. Just like that little question. Something that might hold up progress a bit when you can't just get that quick, easy response as you would in person."

Being unable to collect data due to lab closures and unavailable equipment was another issue highlighted, with some students suggesting that certain disciplines were disproportionately affected by the pandemic:

"I think without lab access for several months, you know, that's a big blow for an experimentalist more so than a theorist who only needs to see their computer… An experimentalist or anyone like a biologist, anyone doing experimental stuff, you know, if you have not got the lab, you have got no output probably."

Other students that may have been more greatly affected with the switch to remote working were those who did not already have a suitable work-at-home environment:

"I've got a laptop which was provided through my PhD funding… I've always had neck problems, so I put my laptop on a couple of boxes, found an old monitor in the attic, sent away for a keyboard and a mouse. Basically, I've got what I need. It's not as good as what I had in the office because I had two large monitors there and an ergonomic keyboard as well and a tidy chair."

The closure of campus facilities meant there was a lack of demonstrator roles for undergraduate courses: *"I had all my training and stuff but obviously there haven't been any practicals, so I haven't actually done any demonstrating."* Another student critiqued video calls as a method of delivery for seminars when she was a module teaching assistant,

"I find it intimidating to do public speaking anyway but, in this format, it feels even more like, 'Woah, what are they thinking? Are they enjoying it? Are they bored? Are they listening?', it's harder to gauge."

Students being able to turn their cameras off during video calls means teaching is less personal and may create additional anxiety for those delivering the module. Another academic challenge a couple of students mentioned was struggling to meet their supervisors' expectations:

"I kind of felt like I had to keep [my work] to quite a high standard all the time, which has been kind of quite hard sometimes, I guess… It's all the same for everyone isn't it. You're having a hard week and then trying to keep on top of your work. Sometimes it's not ideal."

4.3.3. Changes to thesis

13.9% of students reported they had to change the topic, title or another aspect of their thesis due to restrictions brought about by the pandemic, of whom 70.0% were doctoral students.

In interviews, students reported experiencing *"massive stress"* when they realised they had to change their thesis focus in order to produce high quality work:

"Now it's all theoretical and I am really not comfortable doing that because I am very good at putting nuts and bolts together in the lab and doing all that side of things… The level of modelling I have to do to make up for the lack of content is such a complex model, that it's super difficult for me to get to grips with."

"I couldn't go and recruit the way I thought I could. I couldn't go into hospitals or make use of the hospital staff, there was none of that."

As well as having to rethink their research design, students often had to resubmit ethics applications, which delayed their progress further.

4.3.4. Deadline extensions

One third of the sample had requested an extension to their thesis deadline since the beginning of the pandemic (33.3%), of whom 8.3% were Masters and 91.7% were doctoral students. A quarter of the sample had received an extension to their thesis deadline (25.0%), 44.4% of whom had also been granted additional funding for this candidature period. Extension requests for those who had their funding application confirmed ranged from 3 months to 6 months, with an average of 4 months. For those who were granted an extension but whose funding application was denied, extension durations were between 3 months and 1 year, with an average of 6.2 months. 8.3% had requested an extension to their deadline but were waiting for confirmation. Most of these students had asked for additional funding (83.3%), with durations lasting between 1 to 5 months, with an average of 3.2 months. One person who was awaiting confirmation of their 1-year extension had not requested funding. No students had their extension request denied.

Two PhD students from the same department expressed frustration during their interviews about how students in later years of study were given priority for extensions

and funding by their research council and that students in earlier years of study were forgotten:

"A bit of unfairness as well… [Final year students] got paid fully paid six-month extensions… Why would they need an extension, they should have done it all!... They're saying to us we have got to make do with three months on a cut salary."

"Our year [who were 1st years in 2019/20] is going to be impacted the worst because they are least likely to give us extensions. We are only going to get a maximum of three months but it's like we have missed six months."

Slow communication about the progress for their extension applications left students to continue working on their research without knowing whether they would receive an extension, and, if so, how long it would be for and whether it would be funded, which heightened participants' stress levels:

"I applied for an extension back in, gosh, July last year [2020]. The first communication that I had from the University was an email saying that people who were not in their final year were going to be considered in December. We got that email in December… The next official email I got was saying that it had been approved, which was in February [2021]."

"'Oh my God, what's going to happen?' You're trying to plan your time out… I was writing on the weekend… It's a lot of work. I'd been doing that when I might not have had to. It makes me much more liable to burnout if I'm not taking any time for myself."

4.3.5. Quitting

41.7% of PGR students admitted they had thought about quitting their degree during the COVID-19 pandemic and 56.9% had not admitted having these thoughts. One student selected *Prefer not to say*. There was a greater percentage of Masters and male students who thought about quitting compared to doctoral and female students (56.3% vs 38.2% and 50.0% vs 36.6%, respectively).

Hypothesis 5 was partially supported. Students who had thought about quitting their degree had significantly higher depression, anxiety, stress and overall and family loneliness scores than those who did not have these thoughts (Table 4.6; Appendix J).

Table 4.6

Mental health and loneliness scores of those who did and did not think about quitting their degree

	Thought about quitting during the pandemic				
	Yes (n = 30)		No (n = 41)		
Variable	Mean	SD	Mean	SD	p
Depression	10.0	5.74	5.1	4.18	<.001
Anxiety	5.5	3.75	2.8	3.27	<.001
Stress	10.0	4.80	5.8	4.11	<.001
Overall loneliness	50.1	16.86	41.0	13.53	.022
Family loneliness	14.5	7.16	10.0	4.21	.009
Social loneliness	15.9	6.99	13.4	7.03	.126
Romantic loneliness	19.7	10.21	17.6	10.27	.405

Note. 1 participant who did not specify was excluded from inferential analysis.

In the interviews, students who had indicated they had experienced thoughts about quitting their degree were asked why they had had those thoughts. One student simply admitted,

"I just kind of fell out of love with it. I was no longer enjoying it. It was more of a task than actually something I wanted to do. It was like a chore."

Despite wanting to quit, she continued due to contractual obligations, saying, *"I had to do it because I had a scholarship. I didn't want to pay them [research council] back so I had to keep doing it."*

Students cited the slow nature of PGR study as another contributing factor to having thoughts about quitting:

"With research, it's quite like, obviously quite a long process. You sometimes feel as though you're not really achieving anything… The week goes on and you're like 'Okay, I've read so many papers. I've done so many words', but the end goal is so far away. It can be quite demotivating."

Thinking about quitting due to a perceived lack of progress is a *"normal"* occurrence with being a PhD student, as one doctoral student recalled the time he approached his supervisor:

"The first thing he did on the computer was he pulled up his calendar and he counted the months, and he went 'Yes, you're about on schedule' because it just happens. Every student he has taught… Always at that point wanted to go 'No, I'm out'."

The COVID-19 pandemic exacerbated this, which left students feeling like they were the only person who was struggling:

"I couldn't kind of say 'Oh like do you struggle with this?' or 'how do you cope when this happens?'. I felt like I was quite isolated and didn't have those discussions… Someone else might feel 'Oh I feel exactly the same, but I do this to help', and then that problem might have just been solved straight away rather than it leading to kind of that feeling that maybe quitting was the answer."

4.3.6. Home-schooling

Three females and one male student helped with home-schooling children at some point during the pandemic (5.6%). The male and one female student agreed it had a massively negative impact on their ability to study, one female experienced a slightly negative impact and the other female reported no impact to their studying.

One male interviewee, who did not specify in the questionnaire that he had to home-school, spoke about how his two young children made it *"difficult"* to work from home because *"they liked to press the keys on the keyboard".* He spoke about how he *"will be lucky if I get two hours work throughout the working day"*,

"I sort of did 9[am] until 12[pm]… and then took a break and then try to do some more in the evening when they go to bed. It was difficult. I mean especially looking after the kids all day and then going back to work, so tired."

4.4. Activities during lockdown

A total of 79 different activities were identified by 70 participants as being done during lockdowns to improve their mental wellbeing. Table 4.7 presents the different activities PGR students did during the lockdowns with some examples. The overwhelming majority of participants exercised or were physically active during lockdowns (75.0%). Frequently mentioned types of exercise and physical activity were walking (26), exercise in general (23) and running (16). The next most common activities were keeping in touch with family and friends (27.8%), including video and phone (12) calls, and relaxation activities (27.8%), such as reading (12) and yoga (10). One of the three participants who did not state any activities added he was *just working*.

Table 4.7

Activities PGR students did during lockdowns to maintain their mental wellbeing

Activity	*n*	%	Examples
Exercise	54	75.0	Walking, running, doing workouts at home and outside, cycling, swimming
Keeping in touch with loved ones	20	27.8	Video calls, phone calls, using Zoom, online quizzes, making an effort to contact others
Relaxation activities	20	27.8	Reading for pleasure, yoga, meditation, manifesting the future
Entertainment activities	17	23.6	Watching television and movies, bingeing Netflix, gaming, listening to music, audiobooks
Lifestyle-related activities	17	23.6	Maintaining a routine, drinking more/less alcohol, reducing screen time, eating healthier, comfort eating, smoking, drug use, sleeping more
Creative pursuits	16	22.2	Arts and crafts (drawing, needlework, painting, origami), baking, journaling, writing poetry, playing musical instruments
Outdoor activities	13	18.1	Spending more time outdoors, gardening, visiting the beach
Sought wellbeing support	7	9.7	Receiving counselling, being prescribed medication, seeking advice from a charity
Spending time with others	6	8.3	Spending quality time with family, friends, partner
Spending time with pets	6	8.3	Walking the dog, playing with pets
Other hobbies	4	5.6	Trying new hobbies, doing things unrelated to field of study
Shopping	4	5.6	Online shopping, buying themself expensive gifts
Skill development	3	4.2	Learning languages, completing online courses, improving computer skills

Several students elaborated further in their answers. Referring to exercise, three participants specified they had to *find the time* for it, two participants were doing more now than before the pandemic and two others stopped in winter due to low motivation and unsuitable spaces to exercise but became more active again in spring. Some students were trying harder to stay in contact with loved ones more often. One self-proclaimed introvert revealed that she *enjoyed not having to meet others* and her wellbeing improved because *the expectations to 'take part' in socialising [were] less during the pandemic*.

4.5. Support during the pandemic

4.5.1. Support accessed

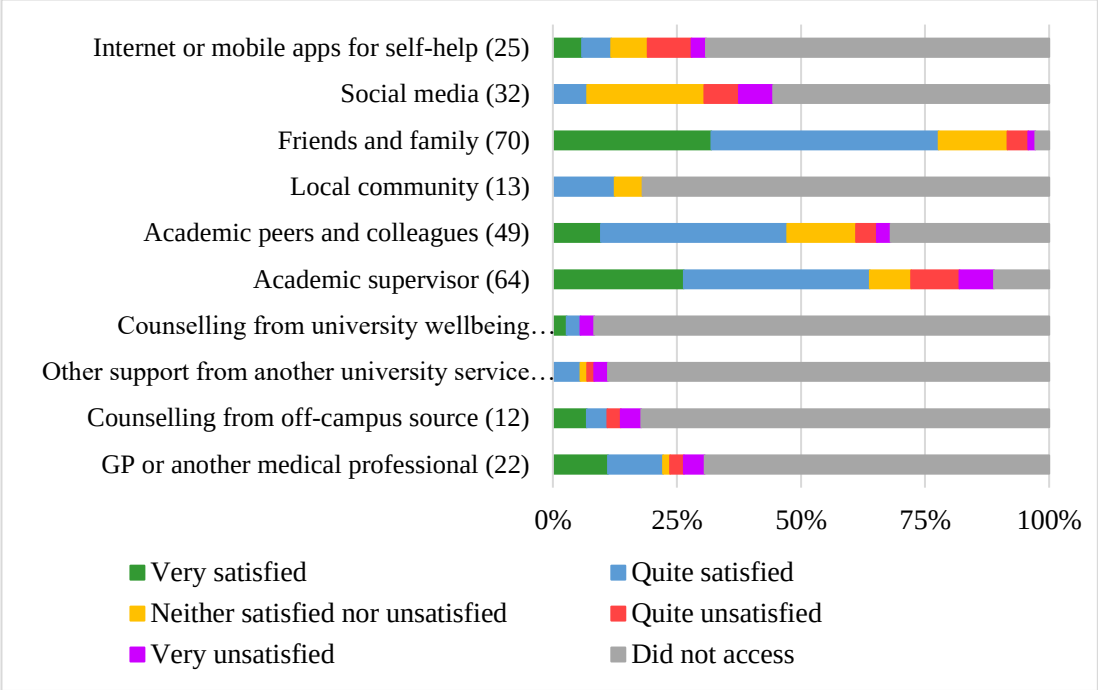
The average number of sources of support PGR students accessed was 4.2 ± 1.59, with no significant difference between course type or gender ($p > .05$), which rejects exploratory question 2 and Hypothesis 6. The number of sources of support accessed was not significantly correlated with mental health and overall loneliness variables ($p > .05$), so exploratory question 3 is rejected.

Figure 4.5 shows the sources of support accessed by PGR students during the pandemic and their satisfaction with this support. Almost all participants sought support from friends and family (97.2%), and this was the source students were most satisfied with (31.9% were very satisfied and 45.8% were quite satisfied). The next most frequently identified sources of support for students were from their academic supervisor (88.9%) and academic peers or colleagues (68.1%), with 63.9% and 47.4%, respectively, feeling satisfied with the support received. Counselling (8.3%) and other support (11.1%) from the University were the least frequently reported sources of support. Despite being the second most accessed and satisfying support, support received by academic supervisors was the most frequently reported support as unsatisfying, with 9.7% revealing they were quite unsatisfied and 6.9% being very unsatisfied, suggesting PGR students had a range of experiences with their supervisors. Support from social media (13.9%) and self-help resources on the internet or mobile apps (11.1%) were also frequently reported as unsatisfying. Only one student reported not accessing any type of support during the pandemic.

Three students mentioned other support they received during the pandemic that was not listed in the multiple-choice answer list or support they felt needed explaining. One student had reached out to the University's wellbeing service but was sent self-help resources that were neither free to use nor accessible in Wales. Another student stopped attending weekly forums in her department because staff *"seemed a bit sensitive to criticism"* so she felt uncomfortable speaking her mind. Finally, one student attended a restorative yoga course and then began counselling which improved her anxiety.

Figure 4.5

PGR students' satisfaction with support accessed during the COVID-19 pandemic



Note. Support type (number of students who accessed this support).

In most interviews, students reported regularly staying in touch with their friends and family during the first lockdown, mainly in the form of video calling and Zoom quizzes. However, they unanimously agreed that they were now *"fed up with Zoom quizzes"* and socialising online, and were experiencing online burnout:

"If you were working on your PC at home for, you know, several hours… the last thing you would want to do is stay on that PC just to socialise with people."

Despite this, students realised that connecting with others could only be beneficial, such as improving their mental health:

"I found that I've communicated and been in touch more with old friends more often. I've made an effort to be in touch with them… I've made a point of doing this because I feel that's important now."

The majority of PGR students were happy with the wellbeing support they received from their academic supervisors during the pandemic, such as checking in about mental health and encouraging students to take time off to recover from COVID-19 or to reduce burnout:

"Obviously she was quite busy but always supportive when I needed to talk to her about anything and she was also at the end of the phone. Even if I couldn't have a meeting with her straight away, she'd talk to me over messages."

However, students acknowledged that it might be difficult for supervisors to provide wellbeing support while maintaining professional boundaries:

"He gave me some advice, but it was very cautious advice because he knows if he says the wrong thing, you know, it could backfire on him. I would never make it backfire on him but obviously he has to protect himself as well. And that's probably quite stressful for him to have to deal with. But no, he was fine when I explained everything… He pointed me towards like, 'Go see the GP if you feel like you need to.' The normal advice I guess."

Students had a mixed amount of contact with their supervisors, with some enjoying the fact that they could meet their supervisors more often, while others reporting a drop in communication:

"We'll have a Zoom meeting every Wednesday evening… I think we're probably having more meetings than we would have had ordinarily because I certainly wouldn't have gone into the University every single week."

"There were quite long periods of time where we didn't have any contact. I feel like if I had heard from her more, then I might have felt more motivated."

Some students reported not being satisfied with their supervision because they felt their relationship with their supervisor was too professional, with one student revealing, *"I wouldn't feel that comfortable maybe going to him if I was struggling with something other than work,"* which she later confirmed when discussing her thoughts about quitting her degree, saying, *"I've never brought that up with my supervisor just to kind of keep that professional relationship."*

A negative relationship dynamic between students and their supervisors can destroy confidence and exacerbate feelings of stress, as expressed by one participant:

"She's a very formidable woman, you see, and I find it difficult to string two words together when I'm talking to her… When I'm talking to other people, I can explain what my ideas are… But with her, I can't do it and I think the worse the pandemic has

become and the more isolated we have become, the worse that's got. When I have supervision [meetings], I absolutely dread it… Even if I feel really prepared and I've done everything she's asked, everything's on course, I can't think on my feet when she asks me something, whereas if someone else asks me, I'm okay."

She suspected that her feelings of intimidation from her supervisor were down to *"imposter syndrome,"* because she *"had more confidence in her abilities before [COVID]"* which had since worsened.

Students also commented on the academic support their supervisors provided during the pandemic. They appreciated how quickly supervisors recognised the scale of the impact on PGR students' ability to conduct research, which was shown by recording COVID-19 related issues on the online research engagement platform for *"even the [students] who are on course just because it gives a bit of leverage for having extensions."*

Most participants agreed that the PGR community during the pandemic was *"dead"*. First year PGR students reported having *"no contact with anybody else"* except for their supervisors, which heightened their feelings of isolation and loneliness. However, it did not appear like students wanted to stay, or be more, connected to their peers:

"There has been attempts from the College, from PGR reps here. The departments are always trying to force people to keep in contact with each other but it's very difficult."

As a result of students not engaging, *"there is a lot less effort that goes into [creating a community]."*

Others, however, have strived to continue facilitating social connection within their departments to improve productivity and mental health:

"We meet [on Zoom] on a Tuesday and Thursday for 2 to 2 and a half hours… We all sort of boost each other up… We set a pomodoro timer and for 30 minutes, we don't talk. We're disciplined now. We weren't disciplined before. We would ramble on in the break but now we have 10 minutes where we talk and then, 'Right. Stop. Back to pomodoro for 30 minutes." Sometimes we do five of those. It's 2 and a half hours of writing that we wouldn't do if we were left to our own devices."

One interviewee reported being prescribed antidepressants from his GP at the University's onsite surgery. His mental health improved, and he weaned himself off his medication, however he was not impressed with the care he received:

"The GP actually never came back to have a chat with me. She never checked up on me once during that entire session [of medication]. I imagine she was super busy probably dealing with everyone else in the Uni."

No participants discussed their use of the University's counselling or other support services during the pandemic, however many reported that the presence of the Wellbeing service and other initiatives within the University was *"prominent"* and that they had a *"level of reassurance"* that help was available to them if they needed it in the future:

"I did notice they were pushing a lot more of their wellbeing services on the newsletters and things like that. They talk about that quite a lot anyway, don't they… Swansea are pretty good with their student support I would say."

Two students discussed their individual experiences of using the University's Wellbeing support service prior to the pandemic, with mixed reviews. One student had *"nothing but good things to say about it,"*, while the other was incredibly disappointed:

"It was like a wellbeing health event or something, but I guess the Wellbeing services would have definitely been aware of it if they didn't organise it… It was advertised as a 'Come along if you've got anxiety. We have got a few things to help you cope!'… She was talking absolute bollocks during the entire thing… Really like hippy-ish… Like one of the suggestions, that apparently worked for other students, was she had told someone with anxiety to go down to the beach, go to the waterfront and shout as loud as they can, 'Everything here is mine!'… Putting my legs behind my head was a suggestion. Sniffing salts was a suggestion… it was all really obscure stuff."

He stated there was, *"nothing in it that's practically useful,"* suggesting that PGR students want clear strategies that are designed to reduce depressive or anxious thoughts in the long-term, rather than temporary solutions to ease symptoms.

4.5.2. Barriers to support

The average number of factors reported by PGR students as barriers to accessing University wellbeing support services was 2.1 ± 1.68. Doctoral and female students reported slightly more barriers to support than Masters and male students, but the differences were not significant ($p > .05$), rejecting Hypothesis 6 and exploratory question 2. Hypothesis 4 was partially supported as the number of barriers to support services reported was significantly positively correlated with depression ($r = .29$, $p = .01$) and stress ($r = .30$, $p = .01$) scores.

Over half of PGR students identified that thinking their issue was not serious enough to need support was a barrier (52.8%; Table 4.8). Lack of information about resources (37.5%), lack of service efficacy (22.2%) and waiting times (22.2%) were also frequently identified. Cultural insensitivity was the least identified barrier to support (5.6%). 19.4% of students stated there were no barriers to them accessing wellbeing support.

Table 4.8

Barriers preventing students from accessing University support services

Barrier	*n*	%
Thinking your issue is not serious enough to need support	38	52.8
Lack of information about available resources	27	37.5
Lack of efficacy of services	16	22.2
Waiting times	16	22.2
No services that meet your preferences	13	18.1
Appointment times clash with study/other commitments	9	12.5
Financial concerns	9	12.5
Social stigma	9	12.5
Cultural insensitivity	4	5.6
There are no barriers	14	19.4
Prefer not to say	3	4.2
Other	8	11.1

Eight students identified different barriers to support. Two students did not identify barriers because they had not felt the need to access the wellbeing service before. One international student said she would have used the wellbeing service had she stayed in Swansea and not moved back to her home country. One student identified that, although he had used mental health services in the past for a previous issue, he now would be unsure about where to get help for difficulties pertaining to this previous problem. One student mentioned, not so much a barrier but, that he just increased his existing counselling sessions with a service external to the University. The remaining

three students mentioned that they had previously found remote support unhelpful; they did not *want to be making a fuss out of nothing or seem to waste someone else's time*; lost contact with the University's onsite GP about medication so did not bother to contact them again; had a negative experience with the University's wellbeing service in the past.

Several interview participants voiced their annoyance that *"the vast majority of [support during the pandemic] seemed to be aimed at undergrads,"* and that *"postgraduates were never given any specific help,"* implying that the wellbeing needs of PGR students were not being adequately met. A few students also mentioned not being aware of the support available, with one student admitting,

"It's not in my orbit but I can't say it's not been brought to my attention because it may have been, and I've just not noticed it or disregarded it."

Linked to this, several students said that they have never accessed support because they *"haven't really felt the need for it"*, and,

"I kind of feel like I would only ever go to them if it was quite severe… if I just have a little worry or kind of something that I don't think's too severe, I probably wouldn't go to something like Wellbeing."

Furthermore, students reported feeling adequately supported by loved ones, suggesting that any difficulties they were having were manageable for untrained individuals.

Students may be deterred from accessing support because of the stigma of accessing professional mental health services:

"If you go to a welfare service and you start talking to them, they might suddenly go, 'Okay, this person needs help. I have to refer them to someone else.' And I think that's potentially what freaks people out because they don't want to necessarily suddenly think, 'Oh my God, I'm depressed!'"

One PhD student recalled feeling *"really embarrassed"* and thinking, *"Nobody ask where I'm going"* when he would leave the office to access the University's Wellbeing support a few years ago. He also spoke about how the accessibility of the University's support services may influence students' decisions about seeking help:

"PGR students especially are really susceptible to overworking themselves and burning out, and if you've got a student that is like, 'I'm overworked. I can't cope with this. I need to talk to someone. I can't manage my workload.' And the solution to both is, 'Take 2 hours out of your workday to go to a different campus.' They're going to go, 'I can't do that, I haven't got the time.'"

It was recognised, however, that the sheer number of students enrolled means that the University cannot cater to everyone's needs, which could be a barrier to those who prefer the types of support that are not being delivered:

"I actually think that is down to the postgraduate students themselves. So it's all well and good that we want these provisions but all of us are doing such different things that it would be impossible to provide all the things that someone personally wanted."

4.6. Miscellaneous interview themes

4.6.1. Communication

College-level and institution-level communications from the University were received by PGR students with mixed opinions. Students who spoke about their College's communication reported the administrative staff as *"pretty approachable"*:

"They constantly send out information… wellbeing advice and things like that… so that's been a positive aspect. In terms of the COVID situation, it's been sort of giving advice about how to take care of yourself."

Communications on an institution-wide scale were welcomed by a handful of students, from the first response to the lockdown announcement to regular updates about restrictions:

"I don't think there is anything they could have done. It was sort of out of their hands. They sprung a lockdown on us with a few days' notice. I think they handled it really well."

"Even if an email didn't really tell you anything you didn't already know… Even if it was just kind of those repeat ones, it was nice to know that they weren't sort of saying 'The Uni is going into lockdown, see you in September!'"

However, others strongly opposed the need for a *"small army of staff"* to send out daily or weekly COVID-19 updates because it was clogging their email inbox:

"Do you want an email every week that says exactly the same thing as it did the previous week? It's this horrible situation where you're only ever getting, 'Nothing's happening' emails."

"I don't think the University needs to be communicating [the COVID-19 restrictions] to students because that should be obvious, it's in the news! You don't need to be told there's a lockdown by the University on email. You'd have to be pretty daft not to know!"

Additionally, some students felt that *"in the early days, the postgraduate-specific information was non-existent"*. This concerned information about office space, data collection and funding availability that is, on the whole, not applicable to undergraduate students. This is related to an opinion shared by nearly all interviewees that emails from their College, the University, Student Union and Wellbeing tend to be written about and sent to an *"umbrella"* student population without consideration for the relevance to certain student groups, both before and during the pandemic:

"I feel like quite a lot of the time, [the regular emails about restrictions] are quite specific to undergrads or taught Masters students and I feel like research [students] kind of gets a bit left out sometimes."

"A lot of students I know put mailing list emails straight in the bin because they keep getting copied in on things that they shouldn't be or it's irrelevant to them."

Applying this to the Wellbeing department, this tendency to send emails to the entire student body means that important information is likely to be missed as students are not interested in reading emails not pertaining to them.

Two students shared their experiences of the administrative process for changes to their candidature. One student who had to extend her deadline mentioned,

"The only person I spoke to about [my extension] was my supervisor and beyond that, like, no one chased me up on it. No one seemed to be worried that I'd extended it."

She perceived the lack of follow-up communication as the University not caring that she was delaying her thesis hand-in deadline. Another student revealed that when he

suspended his studies due to a family grievance, he received a *"cold block"* and simply received, *"the email that 'You are going to suspend. You need evidence to do it.' That's it,"* with no personal enquiries into why he decided to suspend.

4.6.2. Health concerns

In interviews, students expressed worries about their own and others' mental and physical health and reported, often negative, lifestyle changes as a result of the pandemic.

There were different magnitudes to the effect on participants' mental health by the pandemic. Some students reported they, *"haven't really felt a massive strain,"* whereas others experienced a severe decline, with one student revealing that, *"It was the case of feeling like I was surviving day to day, of just trying to make it to the end of the day really,"* which negatively impacted their studying:

"I was finding it easier and easier to come up with an excuse to not turn on the computer or, even worse, turning on the computer and just sitting there looking at a white screen. Well, not necessarily a blank screen, but just a screen and looking up an hour later and thinking, 'I've done nothing,' and that gets you into that horrible sort of exercise wheel where that's making you feel even worse so you're less likely to get into it again."

Students felt that their negative feelings were, *"maybe quite similar for everybody else,"* such as anxiety about COVID-19. Feelings of anxiety were also expressed towards the health of loved ones, especially vulnerable family members, for example:

"I was really, really anxious about my family and I still am. Even though they've all been jabbed now. A lot of sleepless nights worrying. Especially in the case of my sister. The chance of her surviving an infection is not good, it's really not good. So the mental toll of constantly fearing… It was a really, really difficult, very anxiety-filled time."

Concerns about physical health, particularly in terms of catching and spreading COVID-19, were also expressed by participants:

"I think it was the unknown that freaked me out the most, like being in Sainsbury's and seeing all the people who had masks on and things like that and you're just like, 'Am I going to get COVID? Am I not going to get COVID?'"

"I was going into the labs and being in contact with obviously other people and my team and with the [vulnerable] patients as well. From then, I really had a bit of concern of like, 'God, I really need to be careful like what I'm doing, where I'm going.'"

Another physical health concern several participants discussed was how much more sedentary they were because they spent most of their day in their homes working:

"My back is definitely worse with all the sitting I've been doing… There's only so much stretching I can do when you spend the rest of the day moving from the sofa to the table to do work."

As well as body pain, weight gain was another result from sitting for large portions of the day, combined with not having the opportunities to exercise and eating more junk food, which led to a drop in *"self-confidence"*. The lack of opportunities for usual exercise also impacted participants' mental health, for example, one student stated, *"It's not just the loss of exercise. It's the loss of my stress relief."* Another student explained how not exercising impacted her ability to work efficiently:

"I tend to find that when I go to the gym, I get like a buzz afterwards and I feel more energised so then I'll get on with work because I feel like I'm full of beans… Not going to the gym almost made me feel more tired and then like I don't want to work because I'm tired."

A couple of participants also mentioned they drank less or gave up drinking alcohol, showing that the health implications of the pandemic were not all negative.

4.6.3. Financial concerns

Students reported having to *"tighten the purse strings"* in order to afford rent and bills:

"We're on a pay-as-you-go meter. I would say in the winter, we were topping up loads, being inside… It gets dark really early so the lights go on, whereas if I was at uni doing work at 5pm, I'd be using their electricity."

This is despite paying normal price tuition fees, which was criticised by participants when asked whether tuition fees were *"value for money"* during the pandemic:

"Probably not. I think obviously we haven't had like anywhere near as much kind of like contact time as we would in normal times."

4.7. Students' own suggestions to improve the PGR student experience

Students were asked in interviews what they would introduce, change or improve to enhance the PGR student experience at the University. The following paragraphs summarise their suggestions. An overall set of recommendations is found at the end of the *Discussion* section (p. 128).

4.7.1. University support

Participants wished to see more informal support that is a "*bridge in between"* chatting to friends and seeking professional counselling, acknowledging the fact that the Wellbeing department "*has been absolutely inundated with people"* during the pandemic and having a drop-in service "*would take the pressure off [the Wellbeing service]".* PGR students want a place to go to whenever they feel like they may be struggling so they can "*offload their feelings"*, "*talk about [their problems] quite casually"* or to seek advice without necessarily needing to book appointments or slots. A handful of students said informal support should be provided by PGR students as they "*will talk to a student much quicker"* than to staff or family members as they are *"in the same boat."* Basic training would be beneficial to equip students with skills and knowledge to handle conversations with peers about mental health:

"Ultimately that is who people disclose to. In a research community, it's going to be peers, it's not going to be your supervisor because, especially if it's something like burnout. Nobody wants to tell their boss that they think they're working too hard."

One student proposed an idea of having a university-wide *"mental health day"* every few months where students are actively encouraged to reflect and focus on their mental health. *"Taking time out of my work time"* is something she feels guilty doing. By implementing these days, it would 'give' PGR students permission to take care of their wellbeing.

Several participants thought the University "*should be monitoring how you are"* and gave suggestions as to how this could be achieved. One participant proposed integrating wellbeing check-ins to the monthly e:Vision [online research student

engagement monitoring portal] engagement updates where students themselves can submit a response to how they are feeling, then will be contacted by staff if determined necessary. Others suggested that College administration staff, whether that be someone in a new, dedicated role or in an existing team, could send personalised emails to students:

"If they approached you individually, emailed you using your name, showing you that they knew a bit about what you were doing and asking you to respond to them."

By reaching out to PGR students themselves, the University would show students that it *"might actually give a damn"* about their mental health.

It was also suggested that, alongside in-person appointments, the Wellbeing service should continue offering online Zoom appointments because, *"that's reachable at the click of a button,"* and *"it can be in your own home if you're not comfortable."*

An improvement specific to the support provided during the COVID-19 pandemic was more outreach from the University to vulnerable students. One shielding student said,

"I don't know how much they know about our health status but I'm sure there was a way, as they could have found out how many students have got a health condition that might actually require a bit more support."

He suggested students who were already recorded on the University system as having a disability or pre-existing health condition should be contacted with specific advice or offered assistance related to their isolation status, for example collecting prescriptions or shopping.

4.7.2. Communications

A suggestion to improve communication from the very beginning of PGR students' enrolment was to have a *"meet and greet"* within the first few weeks with Heads of Department and administrative staff so students feel more comfortable contacting them *"if things are starting to get tricky"* and staff *"are much better placed to deal with [students] because they know them personally,"* rather than feeling disconnected from the research community.

It was also suggested that the University's online platforms should be simplified so that all resources and frequently asked questions are located on one site because, *"if the students only have to remember a webpage, they might use it… Things like all the different intranets and all that, it's terrible fragmented."*

4.7.3. Facilitating a PGR community

Several students wanted more opportunities to find out about wider research across the University:

"There's just no communications between different research teams and, like, personally I think it'd be quite interesting to hear what other people felt about their research and what they're up to."

"Hear what other people were doing, what stage they were at with their projects, even if they didn't talk anything technical. Just like a little summary."

Students would like any such events to be informal and, *"more of a discussion… chatting… sharing ideas,"* rather than formal presentations.

4.7.4. University infrastructure

One student felt strongly about the inadequacy of current provisions on Bay campus, admitting *"There's nothing to do here. I don't hang about here after work."* He criticised the University for being *"reluctant to build anything that isn't a lecture theatre or a set of student flats,"* and for *"trying to get the maximum undergraduate students in paying the 9 grand."* As a result of campus expansion, he perceived the hospitality, retail and leisure facilities are now struggling to meet the demand of the vast numbers of students and staff based there. He suggested that senior management should invest more in making the campus a more enjoyable place for students and creating more social spaces:

"Just some development here that's not just accommodation. Personally, I think that the ground floor flats, knock through at least a couple of them, then lease it as a retail or cafes, that kind of thing, to outside businesses."

"We designed active buildings on this campus… A self-sufficient solar-powered building. Why could we not get one of those down near the beach and have a beach

bar that is green? An eco[-friendly] beach bar. It would be a really good advert for the university!"

In addition to recreational facilities, he argued there should be a Wellbeing department that is in a *"fixed location"* on the campus that is a *"space for this and nothing else,"* which he reckoned could only be beneficial to students:

"I think that you'd have better completion from students that know there's someone they can speak to that's near where they are."

5. Discussion

The purpose of this mixed methods study was to compare the mental health and loneliness levels of Masters and doctoral students in Wales, explore their experiences of the COVID-19 pandemic and their views of University wellbeing support. The overall findings present the multifaceted impact the COVID-19 pandemic has had on the lives of PGR students. They reported symptoms of depression, anxiety, stress and loneliness but this was not different between Masters and doctoral or male and female students (aim 1). With regards to aim 2, students experienced positive and negative changes to their living and study situations, work productivity and motivation and work-life balance, and were impacted by numerous academic challenges, but particularly missed seeing their academic peers and supervisors. To overcome their negative feelings, students mostly exercised, received remote social support and used relaxation activities (aim 3), and sought informal support from family and friends and their academic peers and supervisor (aim 4). Few participants accessed University wellbeing support, which was attributed to a number of barriers (aim 5), such as not feeling like their issues are serious enough for formal support or not having support tailored to PGR needs. Further interpretation of the results, along with their implications for University policy and research, are discussed below.

5.1. Depression, anxiety, stress and loneliness in PGR students

The current study found most PGR students were experiencing symptoms of moderate depression, mild anxiety, low stress and moderate overall loneliness. This supports other studies finding a large prevalence in this population (Byrom, 2020; Chirikov et al., 2020; Wang et al., 2020). This partially supports Odriozola-González et al. (2020) who reported low levels of depression, anxiety and stress. However, scores may have been noticeably different if data collection was completed during the first months of the pandemic or during stricter restrictions, as suggested by longitudinal studies (NUS, 2020a, 2020b, 2020c). This means caution should be taken when interpreting these cross-sectional findings.

The hypothesis that there would be a difference between Masters and doctoral students' depression, anxiety and stress, and that doctoral students would have higher

overall loneliness scores was not supported, adding to the uncertainty of whether there are differences (cf. Chirikov et al., 2020; Hyun et al., 2006; Patel, 2015) or none (cf. Alageel et al., 2021; Wang et al., 2020). Previous research has suggested that doctoral degrees are "qualitatively different" from other university degrees with students experiencing a rollercoaster of emotions (McPherson, 2018, p. 8), as they are longer and the dissertation is multi-study and expected to be completely original, which some students may find difficult to cope with. Further quantitative research with a larger and more diverse sample is required to determine whether these two types of PGR students do have similar mental health and loneliness levels. Although not significant, Masters students' scores were higher than doctoral students' for all four variables. Wyatt and Oswalt's (2013) speculation that undergraduates may be less likely to continue to postgraduate level was based on their findings that undergraduates had worse mental health than postgraduate students. The results in the current study suggest the same trend could be present for the Masters to PhD transition. However, the current study is cross-sectional, so future longitudinal research could compare the mental health of PGR Masters students who do and do not choose to progress to a PhD to investigate if it is a potential contributor to Masters students' continuation of their postgraduate education.

The observed gender differences tended to follow the direction of Hypothesis 2, with males having higher depression and overall loneliness scores and females having higher anxiety and stress scores. With a greater sample size, more conclusive results may be produced in line with larger postgraduate studies conducted before (Byrom et al., 2020; Zirpoli, 1986) and during (Chirikov et al., 2020; Wang et al., 2020) the pandemic.

Unsurprisingly, depression, anxiety and stress were all strongly significantly correlated with each other, and depression was significantly correlated with overall loneliness, which partially supports Hypothesis 3, and confirms past findings of their co-morbidity (Copeland, 2017; Diehl et al., 2018; The Insight Network, 2019; Jenkins et al., 2020; Makhubela, 2021; Nann, 2018; Richardson et al., 2017; Vasugi & Hassan, 2019). Overall loneliness was not correlated with anxiety and stress, which is contrary to the evolutionary theory that proposes loneliness and social isolation create feelings of heightened anxiety and stress towards others (Cacioppo et al., 2006). Anxiety and

stress may also have stemmed from other sources, such as anxiety about catching COVID-19 and stress about disrupted data collection.

The associations between depression, anxiety and stress can be applied to Horowitz et al.'s (1982) depression prototype. *Feels nervous, anxious* and *feels overwhelmed, can't cope*, which are symptoms of anxiety and stress, were listed in the prototype, showing their comorbid tendency. The relationship between anxiety and stress can be explained via the shared stages of Beck's (1985) cognitive model of anxiety, the transactional model of stress (Lazarus & Folkman, 1984) and the general adaptation syndrome (Selye, 1950). Stress symptoms are triggered in stressful situations, and negative stress occurs when the stressor is perceived as unmanageable. This heightens the risk for anxiety due to the prolonged symptoms of stress. Horowitz et al.'s (1982) prototypes can also explain the relationship between depression and loneliness as several characteristics of loneliness are nestled within the depression prototype. Michela et al.'s (1982) attributions explain how social isolation during the pandemic means there are fewer opportunities for PGR students to socialise, which would increase the likelihood of loneliness and depression due to shared symptoms.

5.2. PGR students' living and study situations and ability to study during the pandemic

Contrary to exploratory question 1 suggesting that doctoral and female students would report more academic challenges than Masters and male students, there were no differences. It was thought doctoral students might experience more challenges and disruption due to the greater length and independence of a PhD compared to a Masters degree (McPherson et al., 2018), while females might report more challenges because they are more open about mental health difficulties than males (Johnson & Crenna-Jennings, 2018) and are thought to have been disproportionately affected by the pandemic (Camerlink et al., 2021). The multiple pandemic studies focusing solely on doctoral students (Brinkert et al., 2020; Burridge et al., 2020; Lambrechts & Smith, 2020) or combining their data with research staff (Byrom, 2020; Camerlink et al., 2021; Kappel et al., 2021), and the overrepresentation of females in the current study warrant further investigation into how the pandemic has affected Masters students and comparisons in the challenges experienced between course type and gender.

As predicted in Hypothesis 4, students who reported more academic challenges had significantly higher depression, anxiety and stress levels (Bitsika, Sharpley & Holmes, 2010). The correlation data cannot demonstrate a causal relationship between academic challenges and mental health variables, nor vice versa. With a larger sample, multi-level modelling could help to establish if there are influences of one factor on another. Contrary to the hypothesis, overall loneliness was not related to academic challenges. A potential reason for this could be that nearly all students were feeling lonely, regardless of how many academic challenges they were facing, due to the unique pandemic situation isolating them from others.

The associations between academic challenges and mental health variables can be explained by Abramson et al.'s (1989) hopelessness depression model, the stress-generation model (Hammen, 1991), Beck's (1985) cognitive model for anxiety and the general adaptation syndrome (Selye, 1950). In the presence of a challenge, for example, reduced laboratory capacity or closures, PGR students were uncertain about how long the social restrictions would remain for laboratory access (cause) but it would mean they would not be able to collect data (consequence) which caused a considerable delay to their progress (significance), resulting in hopelessness. PGR students who were feeling depressed may then increase the likelihood they experience other negative events, for example, missing an extension request deadline, that would exacerbate depressive symptoms. Using the same example, students may have exhibited initial signs of stress when they realised they were unable to collect data. If they were unable to progress with writing because they had no data, feelings of stress would remain, eventually resulting in anxiety.

Being at home for long periods of time appears to be the root of participants' negative experiences. Many students returned to their family home during the pandemic. In interviews, students felt stressed about living with their family again, so may have emotionally isolated themselves from other household members to reduce conflict (Camerlink et al., 2021). This could be a possible explanation for the correlation between stress and family loneliness. Additionally, students not living with their family were unable to visit to relieve feelings of stress, so may have felt lonely as a result. Students living alone may be at greater risk of mental health difficulties and loneliness, as reported in UK adult general population data (Bu et al., 2020; Fancourt,

2021; ONS, 2021). Future research focusing on PGR students could shed light on this topic, particularly as UK PhD students had higher levels of depression and anxiety than the general population (Brinkert et al., 2020).

As PGR students studying in Wales, participants in the current study might have experienced different challenges at different times compared to students studying in other countries due to country-specific COVID-19 restrictions being imposed. Although restrictions were the same in Wales and England during the data collection period, they varied at certain times over the 12 months prior (Institute for Government, 2021). Having stricter or more relaxed rules will have affected PGR students' ability to collect data and visit campus, along with visiting family and friends or moving accommodation. Subsequently, their mental health and loneliness levels may have been affected differently. The current results show PGR students studying in Wales had similar experiences to PGR students studying in the rest of the UK and across the world, demonstrating the almost universal impact the pandemic has had on this population.

It was unsurprising that most participants reported spending most of the time working from home, but this was not the preferred study situation for most respondents. Interviews revealed the reasons for this include a lack of informal interactions, disruption to research and a poor work-life balance. The main difference from previous studies (Álvarez et al., 2021; Bogosavljevic et al., 2021; Goldstone & Zhang, 2021; Kee, 2021; Lambrechts & Smith, 2020) is that having few in-person interactions was the most dominant topic for expressing desire to return to campus working (Kappel et al., 2021), and contributed to increased feelings of depression and loneliness. The above studies were conducted between April and August 2020 when students were mostly worried about the disruption to their research and its long-term impact. A year on, their research plans will likely have been adapted and their concerns drifted towards other issues, such as isolation from their peers. Students may have realised the value of the PGR community at protecting them from mental health difficulties and loneliness, therefore departments should provide more opportunities for socialisation upon PGR students' return to the office as students may engage more with activities.

Disruption to data collection and analysis was frequently reported in the current study, however most participants were 'bench scientists', so were not able to conduct

research due to campus closures. This may have painted an overly negative picture of the academic challenges and productivity impact experienced compared to non-science students (Goldstone & Zhang, 2021). It would be useful to understand whether students not requiring access to laboratories experienced the same types of challenges and reductions in productivity, particularly as those in the writing stage of their projects reported an increase in productivity due to having fewer distractions (Byrom, 2020).

The current study showed most students had a perceived work-life imbalance towards working. The physical, temporal and psychological boundaries that usually separate work and home life domains were weakened as a result of living and working in the same environment (Basile & Beauregard, 2021). This unwanted integration could be attributed to no longer having to commute, as this period is an opportunity for people to psychologically prepare for different roles (Ashforth et al., 2000). Without commuting, students may not have had sufficient opportunity to transition between their home and work mindsets, thus leading them to work longer hours and struggle to switch off (Aristovnik et al., 2020; Burridge et al., 2020). On the other hand, the time saved by not commuting was a reason for preferring to study at home, better work-life balance and increased productivity (Aristovnik et al., 2020; Burridge et al., 2020; Camerlink et al., 2021), demonstrating the different perceptions students had about enforced working from home.

A work-life imbalance towards personal responsibilities was another negative feature of working from home and a contributor to lower productivity. There was a lower proportion of students in the current study who had childcare or home-schooling responsibilities compared to other studies (Byrom, 2020; Camerlink et al., 2021; Lambrechts & Smith, 2020; Suart et al., 2020), however questionnaire and interview data agreed with past research that these students faced additional work challenges to those without children. Clearly, there are multiple advantages and disadvantages to working from home (Beňo, 2021), so universities must enhance provisions to support individuals who remain working from home, such as continuing to offer online meetings and conferences rather than reverting back to in-person only activities.

An issue relating to the work-life balance question in the present study is that, except for those who reported a better balance, there is no indication of whether PGR students

who reported a work-life imbalance were satisfied or not with their situation. For example, the interviewee who reported an imbalance towards personal activities may have felt like she was spending too little time working because she was taking time for herself. Conversely, she could be satisfied that she was spending more time than usual taking part in other activities. If this were the case, however, she may have been more likely to perceive a better work-life balance. To resolve this, questions about the number of, and students' satisfaction with, hours per week spent on different activities may enable a clearer understanding of how PGR students feel about how they spend their time.

Despite the multiple challenges students reported, questionnaire data showed only a third of PGR students requested and received approval for extensions to their thesis hand-in deadline, but interviews indicated the extension period was not proportionate to the disruption students experienced (Advance HE, 2021), and most had not received an extension to their funding. Deadline and funding extensions are essential for students who faced severe disruption, such as student parents (Goldstone et al., 2021), or those who saw a considerable drop in income, such as part-time students (Bogosavljevic et al., 2021). Financial concerns negatively impact PGR students' mental health (Brinkert et al., 2020; Camerlink et al., 2021) and are a recognised contributor to PhD attrition (Sverdlik et al., 2018). Universities should acknowledge all students have been disadvantaged during the pandemic, but more so certain student groups, and provide the necessary academic and financial support to ensure they successfully complete their PGR degrees. For self-funded students, research funding could have been obtained by utilising university funds that were not spent during the strict lockdown periods if they were available (Burridge et al., 2020), such as building running costs or fieldwork travel bursaries. For funded students, more communication between the University and stakeholders is needed to ensure students who are not in immediate need of an extension, for example, first year doctoral students, will still be compensated for COVID-19 disruption.

The proportion of students who self-reported thoughts about quitting was greater than figures seen in other pandemic studies (Advance HE, 2020, 2021; Goldstone et al., 2021). As predicted in Hypothesis 5, students who thought about quitting had worse mental health and were lonelier than those who did not experience these thoughts. This

is supported by Pyhältö et al. (2012) who also reported higher anxiety and stress levels in students who considered quitting. The significantly higher family loneliness in students who thought about quitting may be unique to the current climate. Social restriction measures meant students living away from home could not visit family, which is a key source of support for doctoral students (Waight & Giordano, 2018).

Interviews revealed that a lack of enjoyment, perceived lack of progress and isolation from others were reasons for considering quitting. These factors were also reported in pre-pandemic studies to influence PGR students' decisions to quit their degree (Devos et al., 2017; Pyhältö et al., 2012; van Rooij et al., 2021), while research conducted during the pandemic reported mental health difficulties as the most common reason (Advance HE, 2021). The current study's results also contradict other pre-pandemic findings that suggest, among various other factors, low internal motivation (Spronken-Smith et al., 2018; Sverdlik et al., 2018), unsupportive supervisor relationship (Sverdlik et al., 2018; van Rooij et al., 2021) and financial difficulties (Rigler et al., 2017; Sverdlik et al., 2018) were the main reasons for PGR students dropping out of university. Future research should seek to understand how different factors influence each other, as well as investigating Masters students due to a heavy focus on PhD students (Devos et al., 2017; Goldstone et al., 2021; Pyhältö et al., 2012; Rigler et al., 2017; Spronken-Smith et al., 2018; Sverdlik et al., 2018; van Rooij et al., 2021).

Students were not asked how often or how seriously they had considered quitting. As mentioned in interviews, it is normal for PGR students to experience these thoughts, so it is likely that most only had fleeting thoughts about this. More in-depth investigation would uncover the extent of the problem.

5.3. Activities or strategies PGR students used to maintain their mental wellbeing

PGR students used exercise, remote social support and relaxation activities to improve their mental wellbeing during pandemic lockdowns, with similarly high prevalence in previous studies (Kappel et al., 2021; Misca & Thornton, 2021; NUS 2020a, 2020b; Son et al., 2020; Suart et al., 2021; Wang et al., 2020). Students may have perceived a large improvement to their mental wellbeing because they changed their motivations for exercising. A study by Pietsch et al. (2021) found German university students were

more likely to select *fitness*, *relaxation* and *health* as reasons for being active during the COVID-19 pandemic whereas *enjoyment*, *socialising* and *competition* were the main reasons beforehand. However, the current study's quantitative findings contrast with the experiences of several interviewees who spoke about the negative influence not being able to exercise as usual had on their mental health, supported by Kaur et al. (2020) who found regular gym users reported a negative psychological impact of not going to the gym during lockdowns. The students in the current study may have faced a *disruption to normal routine* and a *work-life imbalance towards working* because they could not exercise as normal, which may have increased their depression or stress levels. Furthermore, socialisation may also have been a key feature of these students' pre-pandemic exercise participation (Pietsch et al., 2021), which may have led to an increase in loneliness. This demonstrates how the COVID-19 pandemic can impact mental health and loneliness from multiple angles. In addition, returning to gyms or normal activities may be challenging as students will have developed new routines and some might still be scared of COVID-19 infection. This should be qualitatively investigated in future study.

The current study also identified that a handful of participants used activities that could be classed as negative strategies, such as drinking alcohol, comfort eating and smoking cannabis, although this was reported by fewer students compared with other studies (Misca & Thornton, 2021; NUS, 2020c; Son et al., 2020; Staser et al., 2020; Wang et al., 2020). Whilst it was beyond the scope of the study to code responses as 'positive' and 'negative' activities, or different types of coping strategy, postgraduates are known to use more positive coping strategies, such as exercise and social support, while undergraduates are more likely to use negative strategies, like smoking and taking drugs (Ickes et al., 2015). This could be investigated further in future research to separately analyse and compare the type of strategies Masters and doctoral students use to manage their wellbeing and why any differences might occur.

Following categorisation into different types of coping, the activities PGR students did could be interpreted by the transactional model of stress (Lazarus & Folkman, 1984). Following the secondary appraisal of the stressor, those who could not conduct laboratory data collection may have used relaxation techniques, such as mindfulness, to manage the emotional demands of the stressor. If the stress remains following the

reappraisal process, students may perceive that mindfulness could not deal with the stressor, leading to an increase in negative stress.

5.4. PGR students' use and views of different types of wellbeing support

Contrary to exploratory question 2 and hypothesis 6, that suggests Masters and female students would access a greater number of sources of support, there was no difference found between course type and gender. Hyun et al. (2006) also reported no differences between course type, however significant gender differences are reported elsewhere (Garcia-Williams et al., 2014; Hyun et al., 2006). There was also no difference in the number of barriers reported. It was thought that doctoral and male students might perceive more barriers than Masters and female students. Doctoral students often have more academic and personal responsibilities than Masters students through the complexity of their degree and typically being older (Compton & Tran, 2017; McPherson et al., 2018), so may not feel able to access support. Males may perceive more barriers because they possess more negative attitudes about mental health support compared to females (Eisenberg et al., 2009a). To the author's knowledge, there is no research examining PGR course differences and little research examining gender differences in the number of barriers students perceive (Vidourek et al., 2014). This warrants future research so universities can understand how to make their wellbeing support services more appropriate for PGR students.

Exploratory question 3 did not state a correlational direction because there are mixed pre-pandemic findings about the relationship between different mental health and overall loneliness variables and students accessing wellbeing support. For example, Hyun et al. (2006) found PGR students with higher depression and stress scores were more likely to use campus wellbeing support, whereas Cage et al. (2020) reported higher stress levels were associated with only seeking informal support and higher depression levels were associated with not seeking any support. The same study also found no association with anxiety. Further quantitative research into the number of sources of support PGR students seek in relation to mental health and loneliness levels is required as no relationships were found in the current study.

There was partial support for the hypothesis that mental health and overall loneliness variables would be positively correlated with the number of barriers reported, as

depression and stress were significantly correlated to barriers to accessing support. It is possible that students with higher levels of depression and stress may perceive there are more barriers to accessing support because of their symptoms. Students may feel hopeless that no support will help them or so overwhelmed with different stressors, such as a demanding work schedule, relationship conflict or care responsibilities, that they cannot take the time for a wellbeing appointment, so will report more barriers to accessing support than students with lower depression or stress levels.

PGR students experiencing mental health difficulties may be less likely to seek wellbeing support because of the research culture that normalises overworking and burnout symptoms (Horwitz et al., 2020; Patel, 2015). Departments and universities should emphasise that regular feelings of emotional exhaustion are not supportive of physical and mental health (Hyun et al., 2006; Salvagioni et al., 2017), and signpost PGR students to a variety of formal and informal support services based online and on- and off-campus. As suggested by one participant, 'mental health days' could mitigate burnout symptoms and allow PGR students to take a day off from their studies knowing that others are doing the same, as some PGR students are afraid of falling behind others' progress (Suart et al., 2020).

Most students accessed, and were satisfied with, informal sources of support from their family and friends, academic peers and supervisor (Advance HE, 2021; Burridge et al., 2020; Byrom, 2020; Goldstone, 2020; Goldstone et al., 2021; Lambrechts & Smith, 2020). Online communication replaced face-to-face interactions, which some participants linked to online burnout (Day et al., 2012; Mheidly et al., 2020), and the subsequent disintegration of the PGR community. Since some participants felt like student representatives and departments were pushing students to remotely connect with each other, the PGR community themselves should be given the opportunity to share how they want to remotely connect with their peers. This would enable students who decide to continue (mainly) working from home to integrate themselves into the PGR community.

Online communication was also linked to less satisfying supervisor support (Kumar et al., 2021; Lambrechts & Smith, 2020). Having an unsupportive or unsatisfying supervisor relationship is associated with mental health symptoms and feelings of loneliness (Byrom, 2020; Evans et al., 2018; Milicev et al., 2021; Zirpoli, 1986), while

having a healthy supervisor relationship lowers the likelihood of students needing support from university wellbeing services (Hyun et al., 2006). Basic mental health awareness training should be offered to all academic supervisors to equip them with skills about how to spot initial signs that their students may be struggling, how to easily start those conversations and educate them about on-campus services and projects (Bogosavljevic et al., 2021; Chirikov et al., 2020; Evans et al., 2018). As suggested by one interviewee, it should be emphasised to supervisors that they, themselves, are not counsellors, but can confidently give basic advice and signpost to other services (Storrie et al., 2010; Waight & Giordano, 2018). In addition, supervisors themselves may benefit from wellbeing support as they will be in a better place to provide academic and pastoral support to their students (Brewster et al., 2021). Pandemic studies generally find that research staff have better mental health than PGR students (Byrom, 2020; Camerlink et al., 2021; Kumar et al., 2021; Odriozola-González et al., 2020), but faced increased time commitments from administrative processes and transitioning their supervision and teaching online, and experienced feelings of burnout and anxiety about staff redundancies (Kumar et al., 2021; Leal Filho et al., 2021; Wray & Kinman, 2021). As academic staff who have research and teaching roles are found to have greater stress and poorer wellbeing than other university employees before the pandemic (Kinman & Wray, 2020), qualitative insight into the type of support desired might be helpful for academic supervisors.

Notably, many participants in the current study did not access formal support such as counselling and other services offered by the University. This is confirmed by quantitative and qualitative data showing students would only approach university wellbeing services if they had a serious issue. Other frequently mentioned barriers may have influenced students to seek more informal support (Horwitz et al., 2020; Hyun et al., 2006; Waight & Giordano, 2018). Not knowing what is available or doubting service efficacy at meeting PGR students' needs may lead them to seek support from people they trust rather than exploring other options. The University could look at ways to better advertise the services on offer and be more transparent about what students should expect from different services.

5.5. Identify recommendations to improve the wellbeing support and overall University experience for this population

Changes to University policy to improve the PGR experience should begin during students' degree enrolment period. The induction process for PGR students should not just centre around academics and the responsibilities of a PGR student. It should cover life at the University, such as the academic, financial and wellbeing support available to them and the different facilities and opportunities offered on both campuses. This would be particularly useful for PGR students who have not transitioned straightaway from a Swansea University undergraduate degree or those who are re-entering higher education.

Support within the research community should also be introduced to facilitate connection between faculties, departments and students. Encouraging peer-to-peer support or implementing a mentoring initiative within each department would foster communication between different fields and researcher hierarchies within an, often, isolating research environment, as endorsed by students in the current study. During the induction process, new students should be introduced to each other so they can form friendships and support each other as they progress through their degrees. A mentoring system that pairs first year PGRs with trained students in later years of study would provide new students with another source of support to their supervisors and make them feel less intimidated (Waight & Giordano, 2018), and upskill older students with mentoring experience that will benefit their future academic careers (McLaughlin & Sillence, 2018). University-wide PGR peer support groups with trained group facilitators would enable students to talk about shared issues and develop friendships with PGRs who may not necessarily be from the same department (Batchelor et al., 2019; Panayidou & Priest, 2020; Waight & Giordano, 2018).

Another method to facilitate inter-researcher connection could be an academic-focused group chat or forum delivered via Microsoft Teams. Students can ask questions and receive answers from other PGR students in their department, rather than brooding over whether to ask their supervisor or hunting for an answer on the internet. This form of communication would be particularly beneficial for students who continue to (mainly) work from home to reduce their feelings of isolation or for students who are not part of a research team. This should be tested in this context to assess whether it is an effective mode of informal academic support for PGR students.

To foster connection between academic departments across the university, interviewees would like casual seminars where PGR students can informally discuss their research projects. The location of these sessions should alternate between campuses to make them more accessible to students from all departments and backgrounds. Streaming these sessions via Zoom to other PGR students would enable students to attend remotely, as conferences held during the pandemic were seen by some as more accessible (Camerlink et al., 2021).

Emphasised by most students interviewed in the current study, PGR students are distinct from undergraduate and PGT students. Their studies are highly independent, with considerably lower contact time with academic staff and peers and a vastly different degree structure consisting of an independent research project and oral exam, rather than multiple assignments and written examinations (McPherson et al., 2018). More University support tailored to the needs of PGR students is required for this population to feel like their needs are being adequately met (Lambrechts & Smith, 2020). As one participant recommended, having a permanent student wellbeing service department on each campus would make formal service more accessible for PGR students who have significant demands on their time. Appointments should be delivered at a variety of times and in different modes, for example, after traditional working hours on one day per week and offering online consultations. The wellbeing support PGR students receive could be enhanced if existing counsellors were educated about the specific challenges PGR students face, or through recruiting a new counsellor who is dedicated to supporting PGR students.

Less well-known University support, services and activities should be better advertised to inform PGR students about what is available and promote early help-seeking through more informal sources of support. This could be achieved by listing information on what the University and individual faculties offer all on one webpage so students can choose the type of support they think is most suitable for them and their needs.

Communication protocols for general information, wellbeing support and COVID-19 information should be reviewed. Streamlining communication would ensure PGR students only receive information pertaining to them, rather than receiving emails about examinations and other information only relevant to undergraduate and PGT

students. This point was advocated by many interviewees, suggesting this could be a wider concern for students in the University's PGR population.

Colleges should also ensure there is clear and frequent communication about extension application progress to reassure students that their requests have been received and are progressing through the system. This includes more coordination between supervisors and academic and Wellbeing services to provide holistic student support through the extensions process and regarding their reason for extending. Coordination could include: supervisors and academic services signposting students to Wellbeing services, or alerting the service themselves if they have serious concerns; with the student's permission, the Wellbeing service could reassure supervisors and academic services if the student does seek help so they are aware the student is being supported; supervisors could contact academic services if extension applications are overdue to explore reasons why this is the case.

This can also be applied to the University's procedures for alterations to students' candidature status. Department student information teams should personally reach out to students wishing to withdraw from or suspend their studies to provide support, as well as signposting them to the Wellbeing service. Suggested by several interviewees, student information teams could also be used to contact students in need if a wellbeing section was introduced to the eVision academic engagement monitoring program.

Although the participants in this study provided some valuable suggestions to improve the PGR experience, PGR students have been found to complain about wellbeing services currently available but show little interest in helping to improve the support (Knowlson, 2020). Co-production with contributions from both PGR students and universities may inspire ideas from each side (Chirikov et al., 2020; Priestley et al., 2021) and enable a collective understanding of what PGR students desire. As it would be unfeasible to implement all of the recommendations that were detailed in the preceding paragraphs, viable options should be proposed to Swansea University's PGR student community, with the most popular option being delivered first. Additionally, reviewing and discussing successful PGR student wellbeing initiatives implemented by other UK universities with the students would help the University deliver a suitable initiative for this PGR student body. Projects funded by the PGR Catalyst Fund in 2018 (Metcalfe et al., 2020) that are relevant to the current findings

include several peer-support and peer-mentoring initiatives, such as the University of Bradford's 'PGR Connect', 'Mental Health First Aid' training offered to supervisors at University of Portsmouth, University of Manchester's PGR student and supervisor 'Decision Trees' that contain practical advice, resources and signposts to services, and enhanced induction processes at the University of Liverpool that include information about campus wellbeing services and activities.

5.6. Strengths

Using a mixed methods methodology provided a robust and holistic analysis of PGR students' mental health and loneliness and the challenges they faced during the COVID-19 pandemic (Tashakkori & Teddlie, 2010), where the qualitative interview data explained and expanded on the quantitative questionnaire data (Creswell & Plano Clark, 2011). Employing an explanatory sequential design (Fetters et al., 2013) enabled interviews to 'build' on certain participants' questionnaire answers for further clarification, for example, why they experienced thoughts about quitting, and 'connect' the two datasets when selecting which interviews to analyse. This rich and comprehensive data produced well-informed recommendations for policy and future research.

The use of semi-structured interviews meant the interviewer followed a basic question schedule but was allowed to probe with follow-up questions to gain a more detailed insight (Adams, 2015). Additionally, more participants may have taken part in online interviews because they are more accessible than face-to-face interviews, such as overcoming geographical limitations and increased timeslot flexibility. Participants may have been more willing to share their negative experiences of the pandemic due to the physical distance from the interviewer.

Another strength to the current study is that data saturation was reached, which increases the validity of the qualitative research (Fusch & Ness, 2015). By carrying out 22 interviews, data saturation was realised when 3 randomly chosen interviews delivered no new codes to the 11 interviews that were initially coded based on the range of demographic factors represented by participants (Given, 2008).

5.7. Limitations

There are several limitations to the current study. First, data collection took place one year after the UK entered its first lockdown. Apart from the validated measures of mental health and loneliness, students had to recall their experiences from the previous 12-13 months, so there is a risk students may have forgotten certain experiences or challenges they faced.

Second, the study contained a small sample from one institution that produced limited demographic variability. Female, science and sport science students were over-represented compared to the University's PGR population. Although the data did highlight some potential differences in mental health and loneliness scores for certain sociodemographic groups, group sizes were too small to carry out inferential statistical tests. Future research with a larger and more diverse sample is necessary to examine the demographic factors that may influence PGR students' mental health and loneliness levels, their experiences at university and opinions on university wellbeing support.

Third, a self-selecting sample meant students who had mental health difficulties or faced many challenges over the pandemic may have been more inclined to participate, particularly in interviews, as a way of seeking help. Alternatively, students with mental health difficulties may have felt unable to participate due to the time and effort needed to complete the questionnaire and interview. Therefore, the results of this study may not be entirely representative of the University's PGR student population.

Fourth, some students may have been deterred from participating due to confidentiality or anonymity concerns about their identities. Using a different method of virtual qualitative data collection in future research, for example telephone interviewing, could encourage these students to participate.

5.8. Conclusion

The current mixed methods study aimed to examine the mental health and loneliness of PGR students, explore their challenges and experiences during the COVID-19 pandemic and analyse their use and views of University wellbeing support. Through quantitative and qualitative analysis, this study has contributed to the small body of literature comparing Masters and doctoral students' mental health and loneliness levels. It has confirmed previous findings that PGR students' experiences during the

pandemic were mainly negative, but that some students found small benefits regarding certain aspects of the pandemic. This study also confirms that PGR students tend to use informal support and perceive existing University wellbeing support as unsuitable for PGR students' needs. Finally, this study highlighted the importance of peer interaction for PGR students' wellbeing during the COVID-19 pandemic.

From a theoretical perspective, this study has attempted to explain how the COVID-19 pandemic and its stressors have influenced depression, anxiety, stress and loneliness symptoms to develop and how these variables are interlinked. It was not intended to test the theoretical framework proposed in this study, however the results suggest that these theories are applicable to PGR students' experiences during the pandemic. With future research using larger samples, these theories could be tested.

Despite there being limitations to this research, this study investigated the pandemic experiences of PGR students studying in Wales, providing a novel contribution to the literature that predominantly focuses on English universities. It has also filled a gap in the literature where there are few studies comparing the mental health and loneliness between students enrolled on different types of PGR course, or that only focus on doctoral students. Future research using a larger sample should undertake further quantitative examination of the mental health and loneliness levels between Masters and doctoral students. A gap in the literature for further study is qualitative insight to explore differences in the experiences and challenges of Masters and doctoral students. This could help determine whether tailored support is required for each student group. Also, more investigation should be done into different sociodemographic groups and how these factors may impact PGR students' mental health and university experiences. Finally, a review of existing PGR-focused wellbeing interventions would enable University policymakers to determine which types of initiative are most suitable for their PGR students.

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Appendices

A. Loneliness and depression prototypes

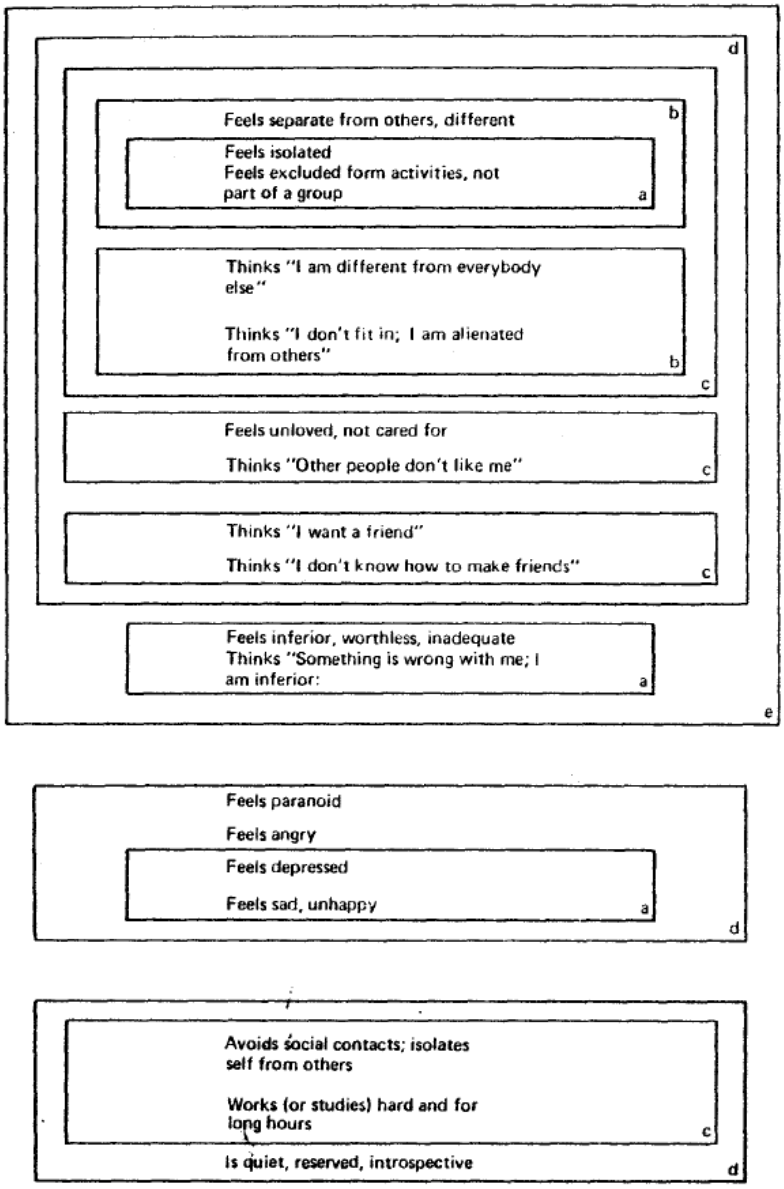

Figure 12.1. Prototype of a lonely person. Strength of cluster: (a) .71–.90; (b) .51–.70; (c) .31–.50; (d) .11–.30; (e) .01–.10.

Horowitz et al. (1982)

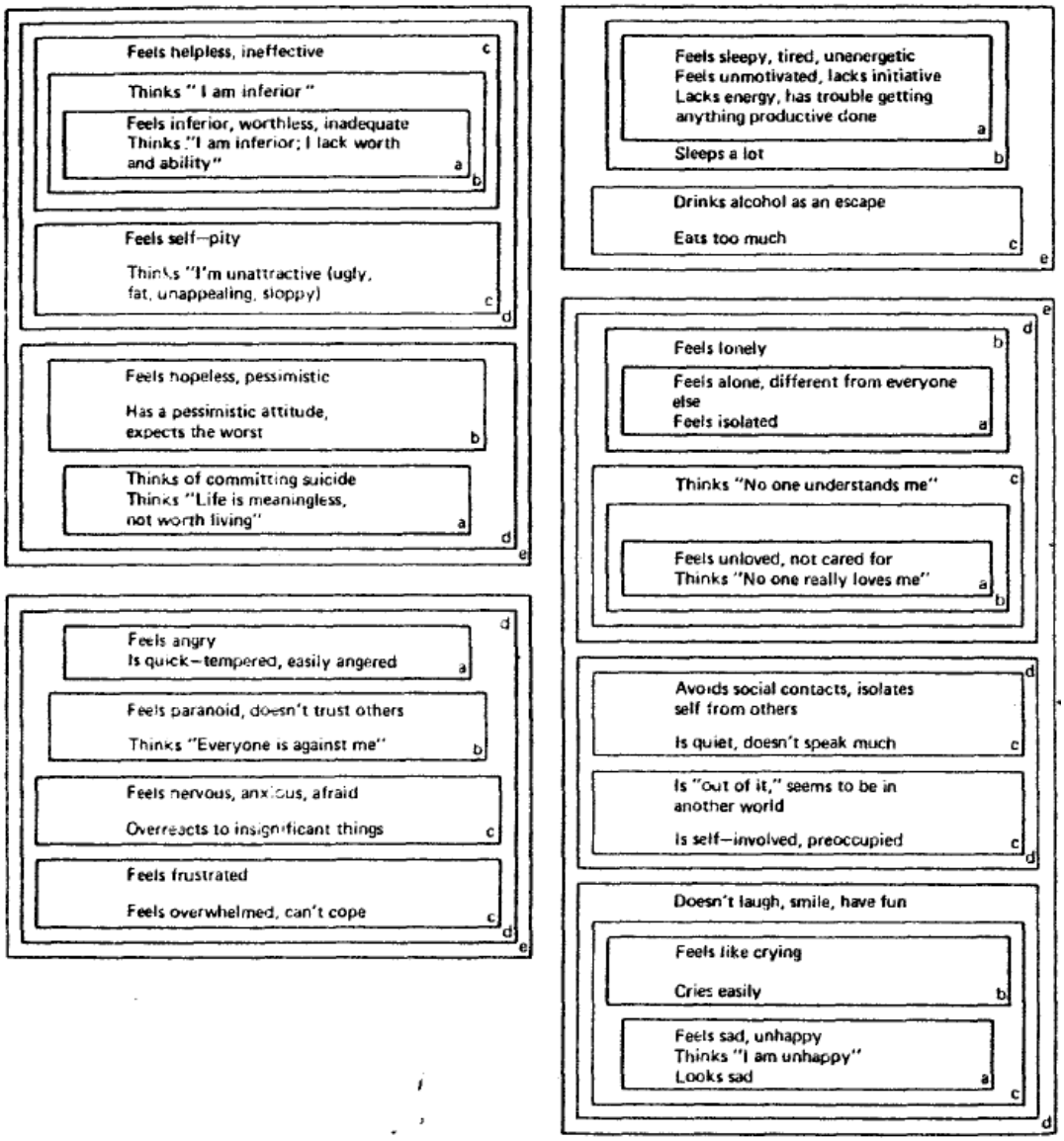

Figure 12.2. Prototype of a depressed person. Strength of cluster: (a) .71–.90; (b) .51–.70; (c) .31–.50; (d) .11–.30; (e) .01–.10.

Horowitz et al. (1982)

B. Theories and models of depression, anxiety and stress discussion

Depression

There are numerous theories that have been proposed to explain the onset of depression. Several biological explanations have been suggested, such as the catecholamine hypothesis (Schildkraut, 1965), whereby certain areas of the brain responsible for normal functioning are deficient of the norepinephrine hormone, as well as individuals having defective serotonin pathways (Cowen & Browning, 2015) and reduced dopamine concentrations (Dunlop & Nemeroff, 2007). As expected, biological theories do not factor in cognitions and emotions, which seems illogical when theorising a mental health condition. Psychodynamic theories attribute depression to unfulfilled childhood needs for affection (Freud, 1917), while humanist approaches suggest depression occurs when our basic human needs are not fulfilled, namely situations preventing humans from achieving their potential (Maslow, 1962).

Other psychological theories that have dominated research focus on cognitions (see Henkel et al., 2002 for a review). One pronounced model is Beck's cognitive theory (1967), consisting of three intertwining concepts. First is the cognitive triad, which involves having negative views of the self, the world and the future. These negative thoughts disturb normal cognitive functioning and eventually become automatic, where almost all views are negative. The second concept is that depressed individuals possess a negative schema. Individuals hold negative and dysfunctional attitudes of themselves that developed from negative experiences during childhood, such as unrealistic and demanding parental expectations. The third concept of Beck's theory is that depressed people experience errors in logic, where they fixate their attention on certain, often negative, aspects of a situation as a result of their negative self-schema. The types of logical errors Beck (1967) identified were making irrational negative conclusions, focusing on the negatives, exaggerating problems and ignoring solutions, self-blame and perceiving everything as either good or bad.

Although Beck's cognitive theory is seen as a widely accepted theory of depression and is the foundation of widely used cognitive therapies, it does not explain the cause of depression. Instead, Beck (1967) integrated the three concepts to create a diathesis-stress model of depression. A diathesis is a biological or psychological predisposition or vulnerability to a disorder, and a diathesis-stress model proposes that a diathesis is activated by the presence of a stressful event and leads to disease (APA, 2020). Beck (1967) suggested stressful events activate the negative schema which leads to distorted thinking through errors in logic. This increases the likelihood that a person will develop a negative cognitive triad which influences the onset of physiological, behavioural and emotional manifestations of depression.

Other cognitive theories that have gained a lot of support are based on attributions, namely the learned helplessness model (Abramson et al., 1978) and the hopelessness theory (Abramson et al., 1989). Originally conceived by Seligman's (1972) animal

research, the learned helplessness model was revised by Abramson et al. (1978), who introduced attributions to explain why some people show depressive symptoms following an uncontrollable event and others do not. Attributions are the cognitive processes that enable individuals to explain the causes of their own or others' behaviours, and the causes of daily occurrences (Ikhlef, 1982), and are typically based on situational cues from the environment. If someone attributes a negative event as internal (to do with themselves), stable (permanent and unchanging) and global (affecting all aspects of life), they are more likely to develop depression, compared to someone who attributes the event to external (to do with the situation), unstable (changing) and specific (affecting only the current situation) causes. For example, one student may attribute an exam failure due to their perceived lack of overall knowledge (internal, stable and global) while another may attribute it to the question topic not being well-taught in lectures (external, unstable and specific).

Eleven years later, Abramson et al. (1989) built on the learned helplessness model to create the hopelessness theory of depression. Unlike the earlier model, the hopelessness theory proposes there are a sequential chain of aetiological factors that occur, culminating in the manifestation of hopelessness depression, a sub-type of generalised depression. The chain begins when a negative life event is presented. Three types of inferences are made about the negative life event: causes and consequences of the event and negative views of the self. If stable and global attributions are made about the cause and consequence of the event, and if the event and its consequences are considered important, feelings of hopelessness are likely to ensue. Additionally, if attributions are internal, Abramson et al. (1978) also suggests that self-esteem will decline. Stable and global negative inferences about the self that prevent an important outcome will likely result in hopelessness. If attributions about the event's cause, consequence and importance were specific, a sense of hopelessness will only arise in that specific aspect of their life (Abramson et al., 1989). The final stage of the aetiological chain to (hopelessness) depression symptoms is the feeling of hopelessness.

This theory also serves as a diathesis-stress model. Abramson et al. (1989) suggested some people possess a depressogenic attributional style, so when presented with the same negative stressor, they are more likely than those without this cognitive vulnerability to make stable and global attributions and perceive the event as important and, subsequently, develop hopelessness depression. This model also suggests there is an inverse relationship between the cognitive vulnerability to make depressogenic attributions and the significance of the negative events (Abramson et al., 1989). Someone with a strong cognitive vulnerability would require less significant or fewer events for depression symptoms to manifest, whereas someone with a weak cognitive vulnerability would need more serious, or a higher frequency of, negative events for the attributional chain to begin. This relationship suggests that negative events do not have to be significantly life-changing for the diathesis to be triggered, meaning this theory can be used to explain depression onset following daily stressors. Furthermore,

support for the diathesis-stress model of hopelessness theory has been found in postgraduate students (Mongrain & Blackburn, 2005; Sturman et al., 2006). Unfortunately, there are no studies testing the hopelessness theory of depression in students within the last five years, so more research should be undertaken to investigate whether earlier findings can be applied to present day students.

The stress generation model is a relatively new transactional model explaining the relationship between stressors and depression. Created by Hammen (1991), the stress generation model proposes that individuals who possess a cognitive vulnerability to depression have depressogenic cognitions and behaviours that increase the probability of negative dependent events occurring. Dependent events are controllable and, somewhat, dictated by an individual's own behaviour, for example falling out with a flatmate, whereas independent events are uncontrollable, such as the death of a loved one. The model suggests that a higher frequency of negative dependent events occurring as a result of a depressogenic cognitive vulnerability means that these individuals may experience more stress and, ultimately, depression symptoms than people without this vulnerability. Studies testing the stress generation theory have shown mixed results (see Liu & Alloy, 2010 for a review), however other research with university student participants provide support for the model (Joiner et al., 2005; Safford et al., 2007).

Overall, there are a variety of approaches that attempt to explain the development of depression, but it is clear there are many factors that interact and influence each other to produce depressive symptoms.

Anxiety

Several biological, psychological and behavioural theories have been put forward to explain anxiety onset. Genetics and hormonal and neurotransmitter imbalances comprise the biological explanations of anxiety onset. Genetic heritability has been confirmed by many studies (Otowa et al., 2016; Purves et al., 2020), with family and twin studies estimating a 23-42% genetic variance for GAD (Davies et al., 2015; Hettema et al., 2001). A review of 1519 meta-analyses by Gatt et al. (2015) found a minority of studies looked at GAD hereditability, of which only a third recognised 3 anxiety genes, whereas 199 studies in 966 meta-analyses recognised 50 genes for schizophrenia. This means that genetics may not play as significant a role in general anxiety development as it does in other anxiety disorders.

Another biological explanation for anxiety is centred around the stress response and its associated hormones and neurotransmitters. The 'fight or flight' response, first coined by (Cannon, 1915), is the body's first response to an acute stimulus or stressor. Epinephrine is released into the bloodstream, producing a number of physiological symptoms to facilitate alertness to environmental stimuli, such as increased heartrate, sweating and nausea. The hypothalamic-pituitary-adrenal (HPA) axis is then activated, resulting in cortisol release into the blood. During chronic stress, the HPA axis negatively adapts to maintain elevated cortisol levels, enabling the body to stay on

high alert for threats. Elevated levels of cortisol have been found in people with a current anxiety diagnosis compared to controls (Vreeburg et al., 2010), particularly for comorbid depression cases (Vreeburg et al., 2010), suggesting increased vigilance for stressors may be linked to anxiety onset, although other research has not found any associations (Kische et al., 2021).

Serotonin (Kaur & Singh, 2017) and gamma-aminobutyric acid (GABA, Kaur & Singh, 2017; Lydiard, 2003) deficiency have also been linked to anxiety. These neurotransmitters are responsible for regulating the bodily systems and inhibiting brain excitability, respectively, and medications commonly used to treat anxiety disorders are designed to increase serotonin and GABA concentrations (Bandelow et al., 2017). However, these biological explanations do not factor in psychological influences, such as cognitions.

Following his successful depression theory, Beck (1985) shifted his focus to anxiety development. Beck's cognitive theory comprises three stages of information processing: orienting mode, primal mode and meta-cognition mode. When assessing the situation in the orienting mode, autonomic information processing that is biased towards negative stimuli identifies environmental cues that may pose a threat. The primal mode is activated when a perceived threat is detected, causing evolutionary-driven physiological, behavioural and cognitive changes to maximise survival. Cognitive adaptations include narrowing the attention to focus on the threat and distortions that lead to unrealistic exaggeration of the threat severity and likelihood of occurring. The meta-cognition mode is similar to the stress appraisal process (see *Stress*) in that individuals' coping abilities and resources are evaluated. People with anxiety tend to underestimate their coping abilities and resources and overestimate threat severity due to their distorted thinking and maladaptive behaviours increasing their awareness of negative stimuli. Although it is generally thought of as a psychological explanation of anxiety, Beck's (1985) cognitive theory pulls on physiological and environmental factors that influence cognitions, making it a well-rounded approach to anxiety development. Other cognitive theories of GAD and general worry are analysed in a review by Behar et al. (2009).

A behavioural theory for anxiety onset is Bandura's (1977) social learning theory. People shape their own behaviours to mimic the behaviours they have observed from influential role models. A child who has a parent with an anxiety disorder or who exhibits GAD behaviours will likely learn and copy their parents' behaviours and develop anxiety. Social learning theory, therefore, questions the genetic hereditability of anxiety disorders as it may be the influence of parental verbal and non-verbal behaviours that predispose anxiety development rather than a sole biological vulnerability (Aktar et al., 2017).

Stress

It has been suggested that stress is not always a negative feeling. Selye (1976) defined stress as "the nonspecific response of the body to any demand" (p. 137). He developed

the general adaptation syndrome (Selye, 1950), dividing the physiological response of the body to stressors into three stages: alarm, resistance and exhaustion. As mentioned in above paragraphs describing the biological explanation of anxiety, the body enters 'fight or flight' mode, or the alarm stage. Selye (1950) then suggests the body enters the resistance stage where cortisol release slows and the body returns to normal homeostasis if the stressor is removed or no longer perceived as threatening. If the stressor remains, and becomes prolonged, the body enters the exhaustion stage where maladaptive change to HPA axis functioning increases the person's vulnerability to psychological and physical illness. Selye (1950) failed to explain how a person in the resistance stage decides the stressor is no longer relevant, suggesting that cognition plays a role in determining physiological responses.

The transactional model of stress created by Lazarus and Folkman (1984) is a well-known psychological explanation for stress. They defined psychological stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19), and developed a two-stage model involving primary and secondary appraisals. When presented with a stressor, the primary appraisal determines whether the stressor is benign, threatening, harmful or challenging. The stressor is disregarded if it is appraised as benign. If the individual appraises the stressor as harmful, threatening or challenging, a secondary appraisal is made to assess the demands of the stressor and the ability to cope with the stressor, which, ultimately, determines their behaviours. If demands outweigh resources, negative stress ensues. In this situation, where the stressor is perceived as uncontrollable, emotion-focused coping strategies are often used to regulate the emotional response to the stressor and is often associated with maladaptation (Kohn et al., 1994). If the situation is controllable with the resources available, problem-focused coping is used to actively change the environment, and is associated with beneficial adaptation (Kohn et al., 1994). A third coping response, avoidance-focused coping, has also been proposed as being both positive, for example distraction to relieve stress, and negative, for example denial, for dealing with stressors (Kohn et al., 1994). It should be noted that coping strategies are not a main focus in the current study, but it was deemed necessary to mention them while introducing the transactional model of stress, therefore Kohn et al.'s (1994) paper should be referred to for more information about coping.

Overall, the transactional model of stress by Lazarus and Folkman (1984), therefore, proposes that stress manifestation is determined by individuals' judgements of their own capabilities to manage the stressor. This is a cyclical model as a reappraisal process begins once coping mechanisms have been implemented and the situation or emotions have changed to enable individuals to decide if the stressor is still negative.

C. Online questionnaire

Swansea University

Experiences of postgraduate research students during the Covid-19 pandemic

Page 1: Study participation

Below is a link to the Participant Information Sheet. Please read through this and click 'Yes' if you approve and would like to participate in this study.

https://drive.google.com/file/d/1fmlb3FT27gGPnyH6oBky15DXY9vuHLz4/view?usp=sharing

I confirm that I have read and understood the information sheet dated 28/02/2021 (version number 1.1), and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.

I understand that sections of any data obtained may be looked at by responsible individuals from the Swansea University or from regulatory authorities where it is relevant to my taking part in research. I give permission for these individuals to have access to these records.

I understand that data I provide may be used in reports and academic publications in anonymous fashion.

Do you consent to taking part in the named study? * *Required*

- ○ Yes
- ○ No

Please create your participant password. This will **only** be used if you wish to withdraw from the study once you have submitted your answers. Your password **must be at least 6 characters** long and **should not** include your name or student number.

Page 2: Demographics

What is your date of birth?

Dates need to be in the format 'DD/MM/YYYY', for example 27/03/1980.

(dd/mm/yyyy)

Which gender do you identify as?

- Male
- Female
- Non-binary
- Transgender male
- Transgender female
- Other
- Prefer not to say

Please specify:

What is your nationality?

Are you a Home (UK) or International student?

- Home/UK
- International

What is the first half of your home postcode (eg. NW1 or PO33)?

More info

Which city/country do you live in when you're not at university, for example during the summer holidays?

More info

What is your ethnicity?

- White
- Asian/Asian British
- Black/African/Caribbean/Black British
- Mixed/Multiple ethnic groups
- Prefer not to say
- Other

Please specify:

What is your religion?

- Christianity
- Catholicism
- Islam
- Judaism
- Hinduism
- Sikhism
- Buddhism
- Atheism/No religion
- Prefer not to say
- Other

Please specify:

Do you consider yourself to have a disability?

- Yes
- No
- Prefer not to say

What is your sexual orientation?

- Heterosexual
- Homosexual
- Bisexual
- Asexual
- Prefer not to say

- Other

Please specify:

What is your current relationship status?

- Single
- In a relationship
- Married
- Divorced
- Widower/Widowed
- Prefer not to say
- Other

Please specify:

Main campus of study

More info

- Singleton
- Bay
- St. David's Park

Postgraduate course type

- MA
- MEng
- MSc
- MPhil
- PhD
- Other

Please specify:

Year of postgraduate study

- 1st year

- 2nd year
- 3rd year
- 4th year
- 5th year
- Over 5 years

If longer than 5 years, please specify:

Subject/Course

Mode of study

- Full-time
- Part-time

Page 3: Your mental wellbeing

Please read each statement and select a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week.

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 a considerable degree or a good part of the time
3 Applied to me very much or most of the time

In the past week...

Please don't select more than 1 answer(s) per row.

Please select at least 21 answer(s).

	Did not apply to me at all (0)	Applied to me to some degree or some of the time (1)	Applied to me to a considerable degree or a good part of the time (2)	Applied to me very much or most of the time (3)
I found it hard to wind down	☐	☐	☐	☐
I was aware of dryness of my mouth	☐	☐	☐	☐
I couldn't seem to experience any positive feeling at all	☐	☐	☐	☐
I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	☐	☐	☐	☐
I found it difficult to work up the initiative to do things	☐	☐	☐	☐
I tended to over-react to situations	☐	☐	☐	☐
I experienced trembling (e.g. in the hands)	☐	☐	☐	☐
I felt that I was using a lot of nervous energy	☐	☐	☐	☐
I was worried about the situations in which I might panic and make a fool of myself	☐	☐	☐	☐
I felt that I had nothing to look forward to	☐	☐	☐	☐
I found myself getting agitated	☐	☐	☐	☐
I found it difficult to relax	☐	☐	☐	☐
I felt down-hearted and blue	☐	☐	☐	☐
I was intolerant of anything that kept me from getting on with what	☐	☐	☐	☐
I felt close to panic	☐	☐	☐	☐

I was unable to become enthusiastic about anything	☐	☐	☐	☐
I felt I wasn't worth much as a person	☐	☐	☐	☐
I felt that I was rather touchy	☐	☐	☐	☐
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)	☐	☐	☐	☐
I felt scared without any good reason	☐	☐	☐	☐
I felt that life was meaningless	☐	☐	☐	☐

Please think back to February 2020, a month before the first UK national lockdown was imposed.

How have your feelings of sadness, anxiety and stress changed over the past year?

Please don't select more than 1 answer(s) per row.

Please select at least 3 answer(s).

	1 - Massively decreased	2	3	4 - Neither increased nor decreased	5	6	7 - Massively increased
Sadness	☐	☐	☐	☐	☐	☐	☐
Anxiety or worry	☐	☐	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐	☐	☐

Page 4: Your feelings of isolation

Below are fifteen (15) statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by indicating that response for each statement.

7. Strongly agree
6. Agree
5. Slightly agree
4. Mixed or neither agree nor disagree
3. Slightly disagree
2. Disagree
1. Strongly disagree

In the past 2 weeks...

Please don't select more than 1 answer(s) per row.

Please select at least 15 answer(s).

	Strongly disagree (1)	Disagree (2)	Slightly disagree (3)	Mixed or neither agree nor disagree (4)	Slightly agree (5)	Agree (6)	Strongly agree (7)
I feel alone when I am with my family	☐	☐	☐	☐	☐	☐	☐
I feel part of a group of friends	☐	☐	☐	☐	☐	☐	☐
I have a romantic partner with whom I share my most intimate thoughts and feelings	☐	☐	☐	☐	☐	☐	☐
There is no one in my family I can depend on for support and encouragement, but I wish there was	☐	☐	☐	☐	☐	☐	☐
My friends understand my motives and reasoning	☐	☐	☐	☐	☐	☐	☐

I have a romantic or marital partner who gives me the support and encouragement I need	☐	☐	☐	☐	☐	☐	☐
I don't have any friends who share my views, but I wish I did	☐	☐	☐	☐	☐	☐	☐
I feel close to my family	☐	☐	☐	☐	☐	☐	☐
I am able to depend on my friends for help	☐	☐	☐	☐	☐	☐	☐
I wish I had a more satisfying romantic relationship	☐	☐	☐	☐	☐	☐	☐
I feel part of my family	☐	☐	☐	☐	☐	☐	☐
My family really cares about me	☐	☐	☐	☐	☐	☐	☐
I do not have any friends who understand me, but I wish I did	☐	☐	☐	☐	☐	☐	☐
I have a romantic partner to whose happiness I contribute	☐	☐	☐	☐	☐	☐	☐
I have an unmet need for a close romantic relationship	☐	☐	☐	☐	☐	☐	☐

Please think back to February 2020, a month before the first UK national lockdown was imposed.

How have your feelings of loneliness changed over the past year?

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	1 - Massively decreased	2	3	4 - Neither increased nor decreased	5	6	7 - Massively increased
Loneliness	☐	☐	☐	☐	☐	☐	☐

Page 5: Impact of the Covid-19 pandemic on your living and studying situation

What was your living situation in February 2020?

More info

- ○ University residence/halls by myself
- ○ University residence/halls with others
- ○ Off campus, in flat/house by myself
- ○ Off campus, in a shared flat/house
- ○ Off campus, with parents/guardians
- ○ Off campus, with partner/children
- ○ Prefer not to say
- ○ Other

Please specify:

What impact did the pandemic have on your living situation? Please select all that apply.

- ☐ I moved in with my parents/family
- ☐ I moved in with friends
- ☐ I moved in to a different type of accommodation (not with family or friends)
- ☐ I was made homeless/had to seek a homeless shelter
- ☐ My living situation has not changed
- ☐ Prefer not to say
- ☐ Other

Please specify:

Which option best reflects your study/work situation before the pandemic?

- ○ 100% at university/office
- ○ 80% at university/office and 20% at home
- ○ 50% at university/office and 50% at home
- ○ 20% at university/office and 80% at home
- ○ 100% at home

Which option best reflects your current studying/working situation?

- 100% in university/office
- 80% in university/office and 20% from home
- 50% in university/office and 50% from home
- 20% in university/office and 80% from home
- 100% from home

What impact has your new study/work situation had on your productivity?

- It has had a hugely positive impact
- It has had a moderately positive impact
- It has had a slightly positive impact
- It has not made an impact
- It has had a slightly negative impact
- It has had a moderately negative impact
- It has had a hugely negative impact
- My study/work situation has not changed

If applicable, do you prefer your study/work situation before the pandemic or your current one?

- I prefer my study/work situation before the pandemic
- I prefer my current study/work situation
- My study/work situation before the pandemic is the same as it is now

How has your perceived work-life balance changed over the pandemic?

- Yes, better balance (greater satisfaction with the time distribution between both work and personal life since the lockdown)
- Yes, imbalance towards more responsibilities related to personal life (e.g. more time spent looking after children, chores, etc)
- Yes, imbalance towards more time engaging in personal activities (e.g. hobbies)
- Yes, imbalance towards work
- No changes
- Other

If you selected Other, please specify:

Page 6: Impact of the Covid-19 pandemic on your ability to study

How has your motivation to study/work changed due to the pandemic?

Please don't select more than 1 answer(s) per row.

	1 - massively decreased	2	3	4 - stayed the same	5	6	7 - massively increased
My motivation has...	☐	☐	☐	☐	☐	☐	☐

What aspects have you found more challenging while working/studying during the pandemic?

- ☐ Lack of informal interactions with colleagues/peers
- ☐ Too many online meetings
- ☐ Overwhelmed by having to make more decisions independently, or having unwanted increased independence
- ☐ Difficulties remotely accessing journal databases
- ☐ Not having access to library books and resources
- ☐ Loss of focus due to worry or stress
- ☐ Disruption to normal routine
- ☐ Limited access to specialist laboratories and equipment
- ☐ Limited access to online software
- ☐ Increased personal responsibilities that have affected my work
- ☐ Unsuitable working environment
- ☐ Others' expectations of you to maintain pre-pandemic work productivity
- ☐ Your own expectations for you to maintain pre-pandemic work productivity
- ☐ I have not found anything more challenging
- ☐ Other

Please specify:

Have you had to change your thesis title or topic due to issues related to the pandemic?

- ○ Yes
- ○ No

Have you had to ask for an extension for your thesis hand-in deadline due to issues related to the pandemic?

- Yes, my extension has been confirmed
- Yes, but I am waiting for confirmation of the extension
- Yes, but my request was declined
- No

By how many extra weeks/months/years has your deadline been extended by?

Have you been granted additional funding to cover this extension period?

- Yes
- No

How many extra weeks/months/years have you requested your deadline be extended by?

Have you requested additional funding to cover this extension period?

- Yes
- No

How many extra weeks/months/years did you request your deadline be extended by?

Have you ever thought about quitting your degree due to the pandemic?

- Yes
- No
- Prefer not to say

Have you had to help with home-schooling any children during the pandemic?

- Yes
- No
- Prefer not to say

How much of an impact has this had on your ability to study/work?

Please don't select more than 1 answer(s) per row.

	1 - massively negative impact	2	3	4	5 - massively positive impact

Homeschooling has had a...	☐	☐	☐	☐	☐

Page 7: Activities you have been doing during the pandemic/lockdown

What have you been doing during the pandemic to take care of your mental wellbeing?

More info

Page 8: Support during the pandemic

Please select the sources of support you have accessed during the pandemic and how you satisfied you were with the support you received.

Please don't select more than 1 answer(s) per row.

Please select at least 10 answer(s).

	I did not access this support	I was very unsatisfied	I was quite unsatisfied	I was neither satisfied nor unsatisfied	I was quite satisfied	I was very satisfied
Using the internet or mobile apps for self-help resources	☐	☐	☐	☐	☐	☐
Social media	☐	☐	☐	☐	☐	☐
Your friends and family	☐	☐	☐	☐	☐	☐
Your local community	☐	☐	☐	☐	☐	☐
Your academic peers or colleagues	☐	☐	☐	☐	☐	☐
Your academic supervisor	☐	☐	☐	☐	☐	☐
Counselling from Swansea University Wellbeing department	☐	☐	☐	☐	☐	☐
Other support from Swansea University services	☐	☐	☐	☐	☐	☐
Counselling from services external to Swansea University	☐	☐	☐	☐	☐	☐
Your GP or another medical professional	☐	☐	☐	☐	☐	☐

Did you receive any other support that was not mentioned above? If not, please leave blank. If you used Swansea University services other than counselling, please give details here.
Optional

Please select all the factors you perceive to be barriers for accessing mental health support from different services at Swansea University?

- [ ] Appointment times clash with study/other commitments
- [ ] Cultural insensitivity
- [ ] Financial concerns
- [ ] Lack of efficacy of services
- [ ] Lack of information about available resources
- [ ] No services that meet your preferences
- [ ] Social stigma
- [ ] Thinking your issue is not serious enough to need support
- [ ] Waiting times
- [ ] Other
- [ ] There are no barriers
- [ ] Prefer not to say

Please specify:

CONNECT is a wellbeing project being co-run by Swansea University and UWTSD, and aims to promote healthy behaviours as well as help students feel less isolated.

Student volunteers are trained as Connectors to offer online peer support through messaging where you can ask them for advice or simply just have a chat!

Have you heard about the CONNECT project at Swansea University?

- ( ) Yes
- ( ) No
- ( ) Not sure

Please select all the places you have seen information about CONNECT.

- [ ] Social media
- [ ] Emails
- [ ] Swansea University website
- [ ] Student Union website
- [ ] Word-of-mouth from your friends or academic peers
- [ ] Your supervisor
- [ ] The University's Wellbeing department
- [ ] Other

Please specify:

From reading the description above, how beneficial do you think a project like CONNECT would be to PGR students?

Why do you think this?

Page 9: Covid-19 symptoms

This is the last page of questions!

Have you ever tested positive for Covid-19?

- ○ Yes
- ○ No
- ○ I think I have had Covid-19 but I didn't have a test
- ○ Prefer not to say

How serious were your symptoms?

- ○ I did not have any symptoms
- ○ I had symptoms but they did not prevent me from studying
- ○ I had symptoms that prevented me from studying, but were not serious enough for me to go to hospital
- ○ I had symptoms that were serious enough for me to go to hospital
- ○ Prefer not to say

Please select any underlying health conditions you have that make you clinically vulnerable and put you at higher risk of becoming seriously ill with Covid-19? *Optional*

- ☐ Asthma
- ☐ Cancer
- ☐ Cerebrovascular disease
- ☐ Chronic kidney disease
- ☐ COPD (Chronic obstructive pulmonary disease)
- ☐ Cystic fibrosis
- ☐ Down Syndrome
- ☐ Heart conditions
- ☐ Hypertension or high blood pressure
- ☐ Immunocompromised state
- ☐ Liver disease
- ☐ Neurological conditions
- ☐ Pregnancy
- ☐ Pulmonary fibrosis
- ☐ Severely overweight or obese
- ☐ Sickle cell disease
- ☐ Smoking
- ☐ Thalassemia (a blood disorder)
- ☐ Type 1 diabetes
- ☐ Type 2 diabetes
- ☐ Other
- ☐ I do not have any health conditions that put me at greater risk of becoming seriously ill with Covid-19

- [ ] Prefer not to say

Have you received a vaccine for Covid-19?

- ( ) Yes, I have received my first dose but not my second
- ( ) Yes, I have received both doses of the vaccine
- ( ) No, I have not received a vaccine yet
- ( ) Prefer not to say

Is there anything else you wish to add about your experiences as a PGR student during the pandemic? Please skip if not. *Optional*

Page 10: Interview participation

I'd also like to conduct an **optional** interview with you to find out more about your experiences during the pandemic and your opinions on the support available to PGR students.

Would you like to be **contacted in the future** with more information about these interviews?

- ○ Yes please, I'd like to find out more about the interviews
- ○ No thanks, I don't want to hear about the interviews

Please enter your student email address so we can send you the details:

Please press 'Finish' to complete the survey.

Page 11: Thank you for taking part in this study

Thank you for taking part in this study and filling out this questionnaire!

The research you are contributing to will improve our knowledge of the wellbeing of the postgraduate student community and assist in our bid to enhance postgraduate student wellbeing at Swansea University, both during the pandemic and in the future.

If you are concerned about anything that was raised in the questionnaires you have just answered, there are organisations that can provide support and advice. Below are details on just some of these organisations:

CONNECT
Website: https://connect-wellbeing.wales/

Student Minds
Website: https://www.studentminds.org.uk/

Samaritans
Website: https://www.samaritans.org/
Phone number: 116 123 (Open 24 hours a day, 365 days a year)

Papyrus
Website: https://papyrus-uk.org/
Phone number (HOPELINK): 0800 068 4141

Please note that this page is displayed for every participant, no matter what they scored in each questionnaire. This page does not reflect the answers you gave in the questionnaires.

If you have any further questions or would like to discuss your responses to the questionnaires, or if you would like to withdraw from the study, please contact the principal researcher Isobel King (905166@swansea.ac.uk) and include your Participant Password in your email.

D. DASS-21 scoring guide

	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+

(Lovibond & Lovibond, 1995)

E. Semi-structured interview schedule

Postgraduate Research Students During the Pandemic Interview Questions

Short chat about their degree etc.

1. First of all, what were your motivations or reasons for going into postgraduate study?

2. Was it what you were expecting?

3. How were you before all of this, before university closing, before the pandemic?

   Follow-up questions (mental health, thesis progress, ability to work, goals, habits, social life, routine).

4. What have been the academic-related challenges you have faced during the pandemic?

   Follow-up questions (motivation, thesis extension, change of topic, supervisor-relationship, academic community, ability to study at home, thoughts of dropping out).

5. IF RELEVANT - How significant of a change was your thesis title/topic change? What impact did this have on you?

6. IF RELEVANT – You said in the questionnaire that you had considered quitting your degree. Why is this? How do you feel about your thoughts of quitting?

7. How have you found working from home?

8. How have these challenges/issues affected you? Negatively? Have any academic changes due to the pandemic positively affected you? Are you coping more now than you were at the beginning?

9. Now I'd like to talk about health-related concerns. What have been the health-related challenges you have faced during the pandemic?

   Follow-up questions (worried about your own or others' mental and physical health, sleep changes, diet changes, chronic health problems becoming worse).

10. How have these challenges/issues affected you? Negatively? Have any health concerns due to the pandemic positively affected you? Are you coping more now than you were at the beginning?

11. I'd now like to ask you about lifestyle changes because of the pandemic. What have these been like?

    Follow-up questions (ability to seek medical care, not seeing family and friends, not being able to go on days out, restricted access to certain places, moving back home, relationship breakdowns).

12. How have these challenges/issues affected you? Negatively? Have any of these positively affected you? Are you coping more now than you were at the beginning?

13. Were there any financial concerns you had over the pandemic?

14. Now I'd like to ask you some questions about any support you've got through the pandemic. Have you been getting any support during lockdown, either informal or professional?

    If no, ask why not.
    Follow-up questions (when, effectiveness, hearing about it).

15. Have you reached out or received any support from services in Swansea University? This doesn't have to be the professional counselling service with Wellbeing.

    Follow-up questions (the experience, feelings afterwards, would you go there again, accessibility).

16. How has the communication been from the university in terms of Covid-19, so like restrictions, funding arrangements, extensions, travel?

17. Is there anything that needs to be changed or improved on, particularly to make them more suitable for postgraduate research students?

18. What's your outlook on the future now that restrictions are slowly easing up?

19. Have there been any positives that the pandemic, and everything that has happened with it, has brought?

20. Do you think there's anything you've learnt about yourself over the pandemic?

21. Opinions on mental health culture of students in general.

22. Is there anything else you'd like to add that you think may be relevant to the discussion? Anything you think we have missed?

23. Do you have any questions for me before we leave it there?

F. Participant information sheet

PARTICIPANT INFORMATION SHEET

(Version 1.1, Date: 28/02/2021)

Project Title:

Mental health, loneliness and challenges faced by UK postgraduate research students during the Covid-19 pandemic.

Contact Details:

Isobel King (Principal Researcher) – [redacted]

1. Invitation Paragraph

You have been chosen to participate in this study because you are a postgraduate research student who is currently enrolled at Swansea University. This study intends to investigate postgraduate research student mental health and loneliness and gain an insight into students' university experiences and perceptions of the support currently being provided by Swansea University during the Covid-19 pandemic. This study received full ethical approval from Swansea University's College of Engineering Research Ethics Committee. If you wish to discuss any ethical concerns, please contact the College of Engineering Research Ethics Committee (coe-researchethics@swansea.ac.uk). You are not obliged to participate if you do not wish to do so.

2. What is the purpose of the study?

The main purpose of this research is to assess your mental health (specifically depression, anxiety and loneliness) and feelings of loneliness, as well as the challenges you have faced/are facing, while being a postgraduate research student at Swansea University during the Covid-19 pandemic. The secondary purpose of this study is find out about your knowledge of Swansea University's support for mental health and wellbeing.

3. Why have I been chosen?

You have been chosen to participate in the study because you are a postgraduate research student who is currently enrolled at Swansea University. Also, you are able to speak and write in fluent English. Participation in the study is voluntary and you have the right to withdraw at any time, please contact the principal researcher if you wish to do so.

4. What will happen to me if I take part?

You will be asked to complete three online questionnaires which look at your demographics, mental health and loneliness. You will also be asked about the challenges you have faced while studying during the Covid-19 pandemic and your knowledge of Swansea University's support services. You will then be invited to take part in an optional interview where you will be asked about your student experience during the pandemic. The interview will take place on the online video conferencing website Zoom and will last approximately 30-50 minutes.

All interviews will be audio- and video-recorded, then transcribed.

The themes that will be discussed in the interview will include your motivations to study at postgraduate level, your expectations of being a postgraduate student, your academic-, health- and lifestyle-related concerns with the Covid-19 pandemic, the types of support you received during lockdown (if relevant) and your opinions of the support that the Wellbeing service and other departments in Swansea University have provided.

5. What are the possible disadvantages of taking part?

You will encounter no physical risks as a result of taking part in the study.

You may feel uncomfortable sharing information about your own experiences. The questionnaires focusing on your mental health may make you aware of any feelings you are having, which may cause you some distress. If there are any concerns, you will be identified to relevant support services for your own wellbeing or, if you'd like to seek help yourself, there is information about organisations and services at the bottom of the questionnaires.

6. What are the possible benefits of taking part?

By completing these questionnaires, we can evaluate the wellbeing of current postgraduate students at Swansea University and look at what this population is currently facing in their university experience. By sharing your knowledge of available support services at Swansea University, we can gain an insight into students' perceptions of these services and share concerns raised with the university to make positive changes to these services. The information you provide will also help us identify the services and initiatives that *are* working.

By taking part in this research, you are adding evidence to the research specifically focusing on postgraduate students and, thus, finding out more about their needs and challenges, highlighting the need for more investigation into this community.

7. Will my taking part in the study be kept confidential?

You will not be referred to by name at any point in the study and any identifying information will be removed from reports of data. Any direct quotes will be anonymised.

All information collected will be stored on a password-secured computer with your identification code rather than your name. Identification codes will be stored on a separate spreadsheet.

Data will be held for a maximum period of 5 years after the completion of the research project, after which anonymous electronic data files will be deleted and destroyed. Audio and video recordings of interviews/focus groups will be deleted from any recording equipment following final analysis.

Data Protection and Confidentiality

Your data will be processed in accordance with the Data Protection Act 2018 and the General Data Protection Regulation 2016 (GDPR). All information collected about you will be kept strictly confidential. Your data will only be viewed by the researcher/research team.

All electronic data will be stored on a password-protected computer file on the principal researcher's laptop. All paper records will be stored in a locked filing cabinet in a locked academic offie. Your consent information will be kept separately from your responses to minimise risk in the event of a data breach.

Please note that the data we will collect for our study will be made anonymous. You will be asked to create your own unique participant password, which will be used to identify you. If you wish to withdraw from the study, you will need to quote your participant number in your email to the principal researcher.

Data Protection Privacy Notice

The data controller for this project will be Swansea University. The University Data Protection Officer provides oversight of university activities involving the processing of personal data, and can be contacted at the Vice Chancellors Office.

Your personal data will be processed for the purposes outlined in this information sheet.

Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you.

The legal basis that we will rely on to process your personal data will be processing is necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the College of Engineering Research Ethics Committee, Swansea University.

The legal basis that we will rely on to process special categories of data will be processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will your information be held?

We will hold any personal data and special categories of data for 5 years.

What are your rights?

You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights.

Any requests or objections should be made in writing to the University Data Protection Officer:-

University Compliance Officer (FOI/DP)

Vice-Chancellor's Office

Swansea University

Singleton Park

Swansea

SA2 8PP

Email: dataprotection@swansea.ac.uk

How to make a complaint

If you are unhappy with the way in which your personal data has been processed you may in the first instance contact the University Data Protection Officer using the contact details above.

If you remain dissatisfied then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at: -

Information Commissioner's Office,

Wycliffe House,

Water Lane,

Wilmslow,

Cheshire,

SK9 5AF

www.ico.org.uk

8. What if I have any questions?

If you would like further information, please contact the Principal Researcher Isobel King [redacted]This project has been approved by the College of Engineering Research Ethics Committee at Swansea University. If you have any questions regarding this, any complaint, or concerns about the ethics and governance of this research please contact the College of Engineering Research Ethics Committee, Swansea University: coe-researchethics@swansea.ac.uk. Further details are available at the Swansea University webpages for Research Integrity. http://www.swansea.ac.uk/research/researchintegrity/."

G. Interview email invitation

Dear student

Firstly, I would like to thank you for choosing to take part in this study. 😊

You are receiving this email because you expressed an interest in taking part in an interview to discuss your experiences as a postgraduate research student in the Covid-19 pandemic. The interviews will be held via Zoom and will typically last between 30-60 minutes.

Topics that will be discussed include:

- Your motivations to study at postgraduate level.
- Your expectations of postgraduate study.
- Academic-, health- and lifestyle-related concerns around the Covid-19 pandemic.
- Types of support, if any, you received during lockdown.
- Your opinions of the support that different Swansea University departments and projects have provided.

Please be aware that <u>your expression of interest to this part of the study does not mean you are obligated to take part in an interview</u> and participating or not participating will not affect your status at the University. Your comments will be anonymised once the interviews are transcribed and any quotes will remain anonymous in the published paper.

Please read the following points about informed consent and, if you wish, the attached Participant Information Sheet which is the same as the one included at the start of the questionnaire.

- *I confirm that I have read and understood the information sheet dated 28/02/2021 (version number 1.1) for the above study and have had the opportunity to ask questions.*
- *I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.*
- *I understand that sections of any of data obtained may be looked at by responsible individuals from the Swansea University or from regulatory authorities where it is relevant to my taking part in research. I give permission for these individuals to have access these records.*
- *I understand that data I provide may be used in reports and academic publications in anonymous fashion.*
- *I agree to take part in the interview part of the study.*

If you would like to participate in this part of the study, please click on the link below which will take you to a calendar for you to book an interview timeslot. You will then receive an email confirmation with your timeslot. If you are not available for any of the timeslots listed, please email me and we can arrange a different time. **Please note, by booking a timeslot, you are confirming you have read, and agree with, the above points about informed consent.**

interview calendar link

If you have any questions, please contact Isobel King [redacted]

Kind regards
Izzy

H. Mean rank and Mann-Whitney *U* scores for continuous variables for gender and course type ($p \leq .05$)

Variable	Depression			Anxiety			Stress			Overall loneliness		
	MR	*U*	Z	MR	*U*	Z	MR	*U*	Z	MR	*U*	Z
Gender												
Male	36.6	627	-.04	31.7	776	-1.67	33.3	727	-1.11	37.6	597	-.38
Female	36.4			40.0			38.8			35.7		
Course type												
Masters	38.8	412	-.49	44.5	320	-1.75	39.2	406	-.58	38.6	415	-.45
Doctoral	35.9			34.2			35.7			35.9		

Variable	Academic challenges			Sources of support			Barriers to support		
	MR	*U*	Z	MR	*U*	Z	MR	*U*	Z
Gender									
Male	35.3	593	-.43	35.4	596	-.40	34.8	578	-.61
Female	37.4			37.3			37.8		
Course type									
Masters	43.6	335	-1.54	35.9	439	-.12	32.6	386	-.86
Doctoral	34.5			36.7			37.6		

I. Family, social and romantic loneliness scores by demographic group

Demographic variables		Family loneliness		Social loneliness		Romantic loneliness	
	n	M	SD	M	SD	M	SD
Gender							
Male	30	13.0	6.83	14.2	6.59	19.0	10.18
Female	42	11.3	5.31	15.1	7.80	18.0	10.29
Age[a]							
21-25	20	12.7	6.19	14.6	7.13	21.4	10.46
26-30	31	10.8	5.10	13.0	6.19	17.5	10.18
31-40	9	13.7	7.63	16.7	8.47	15.9	9.12
41-50	5	11.6	9.02	16.6	11.32	18.0	11.90
51-60	6	13.2	5.60	19.2	7.81	17.8	11.30
Nationality							
British[b]	59	12.1	6.20	13.9	6.71	17.5	10.27
Other[c]	13	11.6	5.20	18.1	9.00	22.2	9.17
Home/International student							
Home/UK	60	12.2	6.17	14.23	7.01	17.5	10.21
International	12	11.3	5.26	17.0	8.47	23.1	9.02
Ethnicity[d]							
White	68	12.1	6.10	14.5	7.08	17.8	10.15
Mixed/Multiple ethnic group	2	13.0	2.83	17.5	9.19	28.5	3.54
Other[e]	1	8.0	0.0	31.0	0.0	24.0	0.0
Religion[f]							
Christianity	9	10.6	5.96	12.8	5.65	19.4	11.26
Catholicism	4	7.5	2.38	15.0	10.23	23.5	8.10
Islam	1	8.0	0.0	31.0	0.0	24.0	0.0
Sikhism	1	15.0	0.0	11.0	0.0	31.0	0.0
Atheism/No religion	54	12.7	6.19	14.7	7.17	17.4	10.15
Other[g]	1	9.0	0.0	25.0	0.0	35.0	0.0
Disability[h]							
Yes	5	15.0	5.96	19.6	8.88	19.6	11.26
No	65	11.7	6.02	14.5	7.16	18.0	10.17
Sexual orientation[i]							
Heterosexual	62	12.5	6.14	15.3	7.35	17.9	10.37
Bisexual	5	9.6	4.93	8.8	3.63	19.6	10.48
Asexual	1	15.0	0.0	18.0	0.0	15.0	0.0
Relationship status[j]							
Single	32	11.9	6.07	13.4	7.26	27.2	5.59
In a relationship	27	11.2	5.44	13.7	5.39	9.8	5.50
Married	10	14.1	6.06	20.8	9.05	11.1	4.79
Divorced	2	17.5	12.02	22.5	3.54	32.0	4.24
PGR type							
Masters	16	12.6	4.86	13.3	6.34	20.2	10.73
Doctoral	56	11.8	6.32	15.1	7.53	17.9	10.06

Year of study							
1st	19	13.5	5.17	15.0	7.66	18.4	9.92
2nd	16	10.9	6.06	12.4	5.55	21.1	10.24
3rd	13	15.2	7.78	20.2	6.35	21.9	8.54
4th	17	10.3	5.12	12.6	7.08	15.6	10.54
5th +	7	8.57	3.15	14.0	8.12	12.4	10.83
Discipline[k]							
Arts and humanities	6	9.5	3.39	15.2	8.33	17.7	12.55
Engineering	5	13.4	6.02	20.8	7.63	19.0	7.31
Health science	7	15.7	6.42	18.7	8.88	15.9	9.25
Law	6	13.5	9.73	18.8	11.70	16.8	10.65
Management	1	15.0	0.0	18.0	0.0	15.0	0.0
Medicine	5	11.6	5.27	12.4	5.27	23.6	10.21
Science	26	11.9	5.78	12.3	5.48	17.4	10.71
Sport science	16	10.4	5.67	13.69	6.11	20.4	10.64
Study mode							
Full-time	64	12.0	6.23	14.6	7.53	18.1	9.98
Part-time	8	12.4	4.00	15.6	5.15	20.5	12.22

Note. [a]*n* = 71. [b]Includes *British, English, Scottish, UK, Welsh*. [c]Includes *American, Bahraini, Belgian, Colombian, Dutch, Estonian, French, Italian, Polish, Spanish*. [d]*n* = 71. [e]Includes *Arab*. [f]*n* = 70. [g]Includes *Celtic Shamanism*. [h]*n* = 70. [i]*n* = 68. [j]*n* = 71. [k]There were 8 academic colleges at the time of data collection.

J. Mean rank and Mann-Whitney *U* scores for mental health and loneliness variables for students who did and did not think about quitting ($p \leq .05$)

Variable	Depression			Anxiety			Stress			Overall loneliness		
	MR	*U*	Z	MR	*U*	Z	MR	*U*	Z	MR	*U*	Z
Thoughts about quitting												
Yes	47.0	285	-3.89	45.5	330	-3.34	46.0	316	-3.49	42.6	418	-1.53
No	27.9			29.1			28.7			31.2		

Variable	Family loneliness			Social loneliness			Romantic loneliness		
	MR	*U*	Z	MR	*U*	Z	MR	*U*	Z
Thoughts about quitting									
Yes	43.5	392	-2.61	40.4	484	-1.53	38.4	544	-.83
No	30.6			32.8			34.3		