The mental health of higher education students and the role of finances and debt

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Declaration:

I, Tayla McCloud, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

There have been many reports of high levels of common mental disorders (CMD) among higher education (HE) students in the United Kingdom (UK). However, it is not yet understood whether the mental health of students is worse than those who do not attend higher education. If this were the case, potential stressors particular to the HE experience, such as students' financial situation and student loan debt, would be important avenues for further research.

In Chapter 3, I investigated whether attending HE is associated with increased CMD symptoms in young people in England. I used two nationally representative datasets to compare those who attended HE with those who did not, before, during and after attendance. I found that those who attend HE have worse mental health than those who do not attend, during HE but not afterwards at age 25.

In Chapter 4, I rapidly reviewed the peer-reviewed evidence on the association between financial situation and mental health among HE students in the UK. This highlighted the need for up-to-date longitudinal evidence using a range of financial situation measures. In Chapter 5, I investigated the association between four domains of financial situation and symptoms of depression in students, cross-sectionally and longitudinally. To do this, I conducted a prospective cohort study of students' mental health (SENSE). I found that less income, more loan income, more total expected debt and experiencing more financial difficulties were all associated with more symptoms of depression in students.

My findings suggest that attending HE is a potential risk factor for experiencing CMD. My findings point to financial situation as a possible stressor that may partially explain the increased mental health problems seen among students compared to their peers. This is a promising area for research, interventions, and government and institutional policies to address mental health problems among students.

Impact statement

It has been widely reported by academics, institutions and the media that higher education students are struggling with their mental health. Many have referred to this as a 'crisis'. However, it has not been established whether the mental health of students is worse than that of their peers who are not attending higher education, and if it is, why this might be. In this thesis I have addressed this knowledge gap. This has broad-reaching implications, with the potential to impact higher education policy at an institutional and governmental level.

I have found new evidence to answer the question of whether there is a difference between the mental health of students and their peers, during and after higher education. By analysing longitudinal data from two contemporary, nationally representative cohorts, I found that higher education students experience worse mental health than their peers during higher education, but not afterwards at age 25. Based on this, I proposed that temporary stressors experienced as part of student life are promising avenues for future research aiming to improve student mental health. I conducted a longitudinal cohort study (SENSE) investigating this topic. I focused on students' financial situation and adapted existing measures of financial situation for use in students. These measures can be incorporated into future studies. I demonstrated that less income, more total expected debt, more loan income, and experiencing more financial difficulties are all associated with experiencing more symptoms of depression.

I have identified a promising area that may partially explain the increased mental health problems seen among students compared to their peers: financial situation. This has clear policy implications for the government and higher education institutions regarding tuition fees, maintenance loans and financial support. It is also a promising target for efforts to improve students' mental health through prevention and intervention. This has the potential to improve students' lives, to prevent them dropping out or underperforming academically, and to reduce the overall burden of mental health problems in society. This is particularly important given the large proportion of people who attend higher education. Furthermore, the SENSE study contributes data that

facilitates the investigation of other aspects of the higher education experience that may be harmful for students' mental health.

I have published versions of two of my thesis chapters: one peer-reviewed journal article and one report for the Department for Education. Two additional papers are in preparation for publication. I have presented my research to fellow academics of various disciplines at the Alan Turing Institute and the SMaRTeN student mental health network. I was also part of two panels discussing student mental health aimed at the public; UCL Mind the Brain Conference and Mental Elf Question Time. I have been interviewed by The Guardian about student mental health, demonstrating wider interest in my work. I have also engaged with students via interviews with UCL News, student societies and student magazines. This demonstrates the relevance and importance of my findings to the wider academic community, the government, the public and to students themselves.

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Abbreviations

ACQ: Author Constructed Question

APMS: Adult Psychiatric Morbidity Survey

CI: Confidence Intervals

CIDI: Composite International Diagnostic Interview

CMD: Common Mental Disorders

EAT-26: 26-item Eating Attitudes Test

GAD: Generalised Anxiety Disorder

GAD-7: Generalised Anxiety Disorder 7-item scale

GHQ/GHQ-12: 12-item General Health Questionnaire

GP: General practitioner

HADS: Hospital Anxiety and Depression Scale

HE: Higher education

HESA: Higher Education Statistics Agency

IFS: Index of Financial Stress

LSYPE: Longitudinal Surveys of Young People in England

MANOVA: Multivariate Analysis of Variance

MCID: Minimum Clinically Important Difference

MD: Mean Difference

N: Number (of participants)

NHS: National Health Service

NS-SEC: National Statistics Socio-Economic Classification

NVQ: National Vocational Qualification

ONS: Office for National Statistics

OR: Odds Ratio

PHQ-9/PHQ: Patient Health Questionnaire

PQB: Prodromal Questionnaire-Brief Version

RPI: Retail Price Index

SD: Standard Deviation

SENSE: Student mENtal health SurvEy

SMaRTeN: Student Mental Health Research Network

UK: United Kingdom

UKHLS: UK Household Longitudinal Study

UKRI: United Kingdom Research and Innovation

UNIQoLL: UNIversity Quality of Life and Learning study

US: United States (of America)

UCL: University College London

WHO: World Health Organisation

WMH-ICS: World Mental Health International College Student project

Chapter 1 Thesis remit and hypotheses

1.1 Thesis remit

The mental health of higher education students has received a lot of attention in recent years among researchers, universities and the general public. There have been numerous reports of an alarmingly high prevalence of mental health problems among students, in particular the common mental disorders (CMD) of depression and anxiety. Many reports refer to the present situation as a "crisis"[1,2]. However, there is a lack of high-quality research in this area, with a reliance on small samples and cross-sectional data. Amidst increases in mental health problems among young people generally in the United Kingdom (UK), it is yet to be established whether students' mental health is worse than those who do not attend higher education. If it is, it also remains to be seen whether this is due to differences before students enter higher education and whether it persists beyond higher education. If higher education is a risk factor for developing mental health problems, it follows that to understand and improve students' mental health, we must investigate possible stressors that contribute to the unique experience of higher education. One such stressor is financial situation and debt, a key area in which students' lives differ from that of those who do not attend higher education. In the UK, higher education costs and funding have undergone major changes in recent years, leading many to posit that they could be responsible for observed increases in CMD among students. Additionally, as students' financial situation is influenced heavily by governmental and HE institutional policy, it represents a potential avenue for prevention. Up-to-date, longitudinal research addressing this topic is sparse.

With my thesis I aim to address these gaps in the literature. In Chapter 1, I review my thesis remit and objectives, and set out my hypotheses. In Chapter 2, I broadly overview the background, context and literature regarding student mental health. I then explore, in Chapter 3, whether the mental health of higher education students differs from those who do not attend higher education; before, during and after attending. I present findings from two nationally representative cohorts in England. Regardless of whether attending higher education is a risk factor for mental health problems in young people,

there are certain stressors within the student population that are likely to be modifiable, with avenues for intervention. I will focus on students' financial situation. Chapter 4 reviews the literature on students' financial situation and mental health, identifying gaps and limitations using a rapid review method. Chapter 5 describes the SENSE study I conducted to address these gaps and limitations, and uses this dataset to investigate how different domains of students' financial situation are associated with symptoms of depression. Finally, in Chapter 6, I summarise and contextualise my findings, explore possible threats to the validity of my findings, and discuss possible implications and future directions.

1.2 Objectives and hypotheses

The following are my objectives and hypotheses for each study in my thesis. The rationale, context and background for each will be justified throughout. Terms will be defined in the relevant chapters.

Objective 1 (presented in Chapter 3): To investigate whether attending higher education is associated with increased symptoms of CMD in young people in England, during and after attendance.

Hypothesis 1: I hypothesised that higher education attendance would be associated with CMD, such that those who attend would experience more symptoms of CMD than those who do not.

Objective 2 (presented in Chapter 3): To investigate whether young people in England who go on to attend higher education have more symptoms of CMD during secondary school compared to those who do not.

Hypothesis 2: I hypothesised that there would be no difference in symptoms of CMD between those who attend higher education and those who do not during secondary school.

Objective 3 (presented in Chapter 4): To rapidly review the peer-reviewed evidence on the association between financial situation and mental health among higher education students in the UK.

Objective 4 (presented in Chapter 5): To investigate the association between different domains of financial situation and symptoms of depression in a sample of higher education students at a University in England, both cross-sectionally and longitudinally.

Hypothesis 3: I hypothesised that income would be inversely associated with depression, such that those with less income would experience more symptoms of depression.

Hypothesis 4: I hypothesised that loan income would be positively associated with depression, such that those with more loan income would experience more symptoms of depression.

Hypothesis 5: I hypothesised that total expected debt would not be associated with symptoms of depression.

Hypothesis 6: I hypothesised that financial difficulties would be positively associated with depression, such that those who had experienced more financial difficulties would experience more symptoms of depression.

Chapter 2 Introduction

2.1 Summary

This chapter sets out the context for my thesis. I provide an overview of common mental disorders in young people and, in particular, higher education students. I review the current research on the mental health of students and the limitations of this, as well as the broader context of increased attention around this topic. Finally, I critically appraise the existing literature on the association between attending higher education and CMD in the UK.

2.2 Common mental disorders (CMD)

Depression is the leading cause of disability worldwide and is estimated to affect approximately 280 million people globally, equivalent to 3.8% of the world's population[3]. It is characterised by the key symptoms of low mood and a loss of interest and pleasure in things usually enjoyed (anhedonia)[4,5]. Symptoms used in clinical diagnostic criteria also include feelings of hopelessness, lack of motivation, difficulty concentrating and thoughts of suicide or self-harm[4,5]. Anxiety disorders affect 4.1% of the global population[3], and commonly co-occur with depression[6]. Generalised anxiety disorder (GAD; anxiety) is characterised by restlessness, excessive worry, irritability and feeling nervous or on edge[4,5]. Diagnoses of depression and anxiety both require some clinically significant distress or impairment of functioning[4,5].

Depression and anxiety are sometimes referred to as common mental disorders (CMD) owing to their high prevalence in the general population and their overlap[6]. Population-based studies often use measures of common mental disorders, which in effect measure symptoms of depression and anxiety but are not diagnostic tools. There is a high correlation between measures of CMD (such as the General Health Questionnaire; GHQ) and measures of depression (such as the 9-item Patient Health Questionnaire; PHQ-9)[7,8]. CMD can therefore be said to refer to the continuum of depression and anxiety symptoms present in the general population. When talking about mental health in this thesis, I am

usually referring to symptoms of CMD. For example, poor or worse mental health would indicate more symptoms, and improving mental health would mean reducing symptoms.

2.3 The mental health of young people

It has been well established that the mental health of young people under 24 years old is an important avenue for research and a policy concern[9], in the United Kingdom (UK) and worldwide. Three quarters of people who experience mental health problems at any time in their life experience their first onset by the age of 24[10]. Additionally, mental health problems that begin early in life are often chronic and can lead to a range of adverse outcomes such as poor academic attainment and self-harm[11,12]. In my thesis, I will focus primarily on young people in the UK.

There is evidence that the mental health of young people has worsened in recent decades, particularly depression and anxiety[13–16]. In the UK, the Adult Psychiatric Morbidity Survey (APMS) found that the prevalence of CMD symptoms among those aged 16-24 increased from 14.2% in 2000 to 16.4% in 2007 and then to 17.3% in 2014, driven largely by an increase in symptoms among young women[13]. This is also reflected in data from the two Longitudinal Study of Young People in England (LSYPE) cohorts, consisting of young people aged 14/15 in 2005 (LSYPE1) and 2014 (LSYPE2)[15]. Teenagers in 2014 had more symptoms of CMD on average (and a larger proportion over the threshold indicating possible cases) than those in 2005, due to an increase among girls[15]. These trends have continued in the years since, and the UK Household Longitudinal Study (UKHLS) found that the proportion of women aged 16-24 scoring over the threshold for CMD (according to the GHQ-12) had increased from 25% in 2014/15 to 32% in 2018/19, the largest increase of any group[17]. There has also been a corresponding rise in the prevalence of self-harm among 16-24s in APMS, from 5.3% in 2000 to 8.9% in 2007 and 13.7% in 2014[13]. In terms of clinical diagnoses, Pitchforth et al.[18] analysed trends among those aged 16-24 in England using national datasets and found that the prevalence of those reporting mental health conditions had increased sixfold between 1995 and 2014. Evidence of this can also be seen in mental health services, which have reported increased referrals among young people and high levels of unmet need[18]. The COVID-19

pandemic may have worsened this, as studies have found that there were particularly steep increases in symptoms of CMD among young people in 2020. For example, data from UKHLS showed that whilst 32% of women and 18% of men aged 16-24 scored over the threshold for CMD in 2018-19, 44% and 27% respectively did so in April 2020[17].

Understanding why young people's mental health appears to be worsening, and which young people are at risk, is important to improve outcomes. Preventing and treating CMD in young people would help to reduce the rising prevalence of depression and anxiety, improve community health and alleviate the burden on clinical services. One group of young people that has drawn particular attention over recent years is higher education students.

2.4 Higher education and student life

Higher education is commonly undertaken by young people across the world. Nevertheless, there are vast differences between countries regarding the setup of higher education and what student life is like. The work in my thesis focuses on young people in the UK (and particularly those in England), so I will first outline the higher education context in the UK.

In the UK, higher education (HE) refers to formal education that results in a qualification above A Levels[19]. This includes undergraduate first degrees, sub-degrees (e.g. foundation degrees), Higher National Certificates (HNCs) and some other qualifications. The majority of HE students in the UK are studying for these qualifications at one of over 140 universities (93%[20]), but others are doing so at further education colleges or other institutions in both the private and public sector. Among young people in England, it was estimated in 2019 that the likelihood of attending university by the age of 30 is over 50%[21]. In England, 29% of 18-year-olds and 12% of 19-year-olds entered higher education in the 2018/19 academic year[22]. The number and proportion of students in UK higher education has increased substantially in recent decades, up to approximately 2.5 million[20]. This is in part due to the "widening participation" government policy agenda, which began in around 2004 and has led to increases in the proportion of young people

who attend higher education each year. As a result, there are now many more higher education students from lower socioeconomic or low-income backgrounds[23,24].

While experiences vary widely, attending higher education can expose young people to many stressors that they may not otherwise encounter[25,26]. It can represent the beginning of an independent adult life, and often requires students to adjust to a new environment, a lifestyle of increased alcohol use and irregular sleep patterns, and managing their own financial situation for the first time[27–35]. Higher education means continuing to experience stressors such as exams and assignments, alongside the need to adapt to higher academic standards, different teaching methods and a more independent way of studying[28,30]. Some have reported changes in the higher education environment in recent years, in particular increases in academic pressure and, perhaps relatedly, increases in financial difficulties among students[29,36]. Additionally, there can be social pressures involved in higher education, including a larger social pool and the need to form new friendships. Most undergraduates are leaving their family home for the first time, perhaps to go to a new city or country without their loved ones, and may be at risk of experiencing loneliness[35,37]. This typically comes at an age when young people are still undergoing important psychological, social and brain development and may be vulnerable to stressors[28,32]. Some 69% of HE students in the UK are 18-24 years old[38], which is also an age where the onset of mental health problems is very common[10]. Consideration of these stressors has led to the hypothesis that attending higher education may be a risk factor for mental health problems among young people, during their degree and potentially in the long term[39,40].

As well as those developing new mental health problems, the higher education environment may be detrimental for those who already struggle with their mental health. Navigating new stressors away from their usual support system, as well as potential discontinuity of care, may be particularly difficult for those already experiencing anxiety and depression[30,33,41]. The increasing proportion of young people entering higher education in recent years also means that there are likely to be more students with pre-existing mental health problems than before, particularly against the background of an overall deterioration in the mental health of young people (see Section 2.3).

There are also many potential benefits of higher education. Meeting a large number of people in the same age group can be a positive social opportunity, and many students form meaningful friendships while in HE. McIntyre et al.[35] found loneliness to be the strongest predictor of poor mental health among students, but also concluded that this could be alleviated by identifying with university friends. Many young people also benefit from the increased independence and freedom gained from moving away from home and attending higher education. Those who attend HE may even be expected to have better mental health than those who do not, upon entry and beyond. As Duffy et al. point out, students are on average likely to be of a higher socioeconomic status, with less functional impairment (to have been academically successful), and will have increased access to mental health services during their higher education (within their institution)[42,43]. Those with a degree are more likely to experience the benefits of economic security, increased earning potential and higher socioeconomic status, though these are not usually experienced until after higher education. Higher socioeconomic status (from having obtained more qualifications or a higher status occupation), for example, has consistently been found to be associated with better mental health[44–46]. It has been suggested that students "expect and/or accept significant psychological distress as part of being a student" (Stallman et al.[47], page 255), positioning poor mental health as a temporary 'necessary evil' students must endure to access the later benefits of higher education.

2.5 Student mental health

There have been many reports of poor mental health among students globally[48]. Research has found that depression and anxiety are the most common disorders in this population (as in the general population), and thus they have been the focus of research[49]. In 2014, the World Health Organisation (WHO) launched the World Mental Health International College Student (WMH-ICS) project, which aims to address the knowledge gap in student mental health and interventions[50]. They found an international prevalence among students of 18.5% and 16.7% for depression and anxiety respectively[49]. However, estimates vary widely; a 2013 systematic review of international studies estimated the prevalence of depression to be 30.6% in undergraduate students,

with included studies reporting estimates ranging from 10% to 85%[51]. The may partly reflect geographical differences – estimates varied widely across countries such as South Korea (10.3% in one study and 26.8% in another) and Egypt (71%)[51]. One particularly large national survey of students in the United States (including both undergraduates and postgraduates) reported that 17.3% of students screened positively for depression and 8.3% for GAD[27].

In the UK, there have been many reports of high levels of CMD among HE students, though prevalence estimates differ. Moreover, where there is no comparison group it is difficult to put these prevalence estimates into context. In 1996, Webb et al. reported that out of over 3,000 second-year undergraduates from ten UK universities, 54.2% scored above the threshold for anxiety on the Hospital Anxiety and Depression Scale (HADS), and 13.4% for depression[52]. In 2004, a study at one University found that out of 676 undergraduates halfway through their degree, 66% scored above the HADS threshold for anxiety, and 17% for depression[41]. In 2008, Bewick et al.[53] reported that, from a sample of 1,129 students who signed up for an alcohol use intervention study, 29% had scores on the CORE-10 indicating psychological distress or symptoms of CMD. In 2013, though, a study of 1,197 undergraduates at a University in England found that just 17.3% scored over the threshold for CMD according to the GHQ-28[43]. A study conducted in Northern Ireland in 2015 as part of the WMH-ICS project[50] reported a 12-month prevalence of 21.9% for anxiety and 21.4% for depression, measured using questions adapted from the Composite International Diagnostic Interview (CIDI) in a sample of 739 first-year undergraduates[54]. One 2021 online study of postgraduate researchers (PhD students and research Master's students) in the UK reported that 41% of students reported moderate or severe symptoms of depression on the PHQ-9, and the same amount reported moderate or severe symptoms of anxiety on the GAD-7[55]. Finally, in 2020 research looking at undergraduate and postgraduate psychology students at a University in England, 42% screened positive for anxiety and 35% for depression according to the GAD-2 and PHQ-2 respectively[56].

It is clear from this that prevalence estimates for anxiety, depression and CMD vary widely. Differing measures, thresholds and samples mean that comparing between studies is problematic. Even minor differences between assessments can have a large

effect on prevalence estimates[57]. Furthermore, it is important to note that measures differ in their psychometric properties. Whilst the measures reported above are all widely validated and commonly used in general population studies, it has been shown in student samples that there are some differences between the GAD-2 and GAD-7, for example - more people scored above the cutoff point when using the GAD-2[58].

It is also likely that students' mental health fluctuates throughout their time in HE, which could mean that findings differ depending on when measures are taken. A large study (UNIQoLL[59]) involving 16,000 undergraduate students at a UK University found that CMD worsened over time throughout students' degree course[39]. A smaller UK study[41] also found that among undergraduate students who did not report symptoms of anxiety or depression one month before beginning university (time 1), 20% reported clinical levels of anxiety by halfway through their degree (time 2), and 9% reported depression. However, this study also found that 36% of those reporting symptoms of anxiety or depression at time 1 had recovered by time 2[41].

Regardless of whether attending HE can be considered a risk factor for mental health problems, there is evidence that a number of students are struggling with their mental health, and it is important that they get the support they need. Help-seeking and treatment rates are low among young people with mental health problems generally[57,60,61], though service use does appear to be rising among students[30,62]. Nevertheless, this would be expected if students' (and young people's) mental health were worsening, and does not necessarily reflect increased help-seeking as much as increased need. There is still a large treatment gap between the proportion of students reporting symptoms and those accessing treatment[32]. For example, one study of medical practices in England found that in 2016, only 7-8% of student patients were recorded as experiencing depression and/or anxiety[63], a much lower percentage than the prevalence estimates would suggest. This suggests a need to expand and potentially rethink the current support options. Universities typically hold influence over various aspects of students' lives: clubs and societies, accommodation and social spaces, as well as teaching and learning environments and academic pressures. If aspects of the higher education experience, for example students' financial situation, were found to be associated with students' mental health, institutions and government policymakers would be in a good

position to intervene beyond the current support services, potentially leading to prevention and intervention on a much wider scale.

The consequences of poor mental health in students can include underachieving academically and dropping out of higher education[64,65]. Stewart-Brown et al.[66] found evidence that suggests that a large proportion of students are underperforming due to poor mental health, not necessarily owing to symptom severity but to the impact (known as 'role limitation') that their mental health has on their studies. Verger et al.[57] found that, in France, 52% of students with any mental health disorder had experienced marked impairment in their work or studies, with the mean duration of impairment 24 days for depression. Considering that a university term in the UK is typically around 12 weeks, students experiencing impairment for 3.5 of those weeks could have a severe impact on their academic attainment. Perhaps as a result, the UK Office for Students report that among full-time students, those with a mental health condition have lower attainment and higher dropout rates than average[30]. The Guardian reported in 2017 that the number of students withdrawing from university due to their mental health more than tripled between the 2009/10 and 2014/15 academic years[67].

2.6 Attention on student mental health

Reports of students struggling with their mental health have led to increased attention and concern from researchers, institutions, the UK government, the media and the general public.

In 2011, the Royal College of Psychiatrists[26] described concern over students' mental health amidst increasing demand for student mental health services, and there have since been several reports that these services are struggling to meet this demand[25,26,63,68]. In 2017, 94% of higher education providers reported that the demand for student counselling services had increased in recent years, and 61% of respondents reported that this was by over 25%[63]. Alongside this, 86% of providers also reported that the demand for student disability services had increased[63]. Indeed, the proportion of higher education students in England disclosing mental health conditions has risen sixfold over the last nine

years, with 4.2% reporting a mental health condition in the 2019/20 academic year compared with 0.7% in 2010/11[69].

As well as demand for university support services, there have also been reports of increases in suicides among students. Between 2007 and 2015, the number of student suicides in England and Wales increased by 79%[63], and more recently several student deaths by suicide were reported on widely in the media[70,71]. Reports in national newspapers in the UK have increased the public attention on this topic, and put pressure on institutions to act. For example, The Guardian's ongoing series 'Mental health: a university crisis' that began in 2012[1]. In 2017, various higher education officials in Universities UK put together the #stepchange framework calling for leadership to make student mental health a strategic priority and employ a whole-university approach to improving it[72], but this initiative is still in its infancy.

Attention from the UK government and related funding bodies has led to promising steps towards supporting research in this area, in recognition of the need for establishing a high quality evidence base[40]. In 2018, the UK government initiated the University Mental Health Charter scheme[73], which aims to encourage and support universities to make students' mental health a priority. In 2018, the national funding agency UK Research and Innovation (UKRI) invested funding specifically to support student mental health research, setting up the student mental health research network SMaRteN[74]. The same year, the UK Office for Students announced six million pounds of funding to support a step-change in mental health outcomes for students[75], and directed 1.5 million pounds towards research specifically supporting the mental health and wellbeing of postgraduate research students (the Catalyst fund[76]).

2.7 Do higher education students have worse mental health than those who do not attend higher education?

It is clear that students' mental health is an issue for higher education institutions and policymakers to contend with as they have a duty of care to their students. However, it is not yet understood whether there is a causal link between the student experience and poor mental health, and therefore whether higher education is a risk factor for

experiencing mental health problems. First, it needs to be established whether the mental health of students is worse than those who do not attend higher education.

Several cross-sectional studies have reported that students have worse mental health than those who do not attend higher education, but these studies have compared data collected from students with existing national survey data. For example, one study[66] compared data on 1,208 students from three higher education institutions in England with data from the equivalent age group in local population surveys. The student sample scored worse on eight indicators of general health (including mental health) and quality of life. Another similar study of 482 students across two London Universities reported students scoring worse on seven of these indicators and in terms of CMD symptoms than established norms for those of comparable age and sex in the general population[77]. In Australia, a much larger cross-sectional study with 6,479 students estimated a much higher prevalence of CMD among university students than in Australian general population surveys; 84% of students reported elevated distress compared with 29% found in the general population overall[47]. Other similar studies, in the UK but also elsewhere, have drawn varying conclusions using this method[43,78–81]. However, this study design is likely to lead to bias. Comparing prevalence estimates from two different datasets with different recruitment processes is flawed, as sampling biases could inflate estimates among the student sample compared to general population surveys, which are more representative.

There are some international studies directly comparing those who attend HE with those who do not within the same sample, typically using larger and more representative surveys. However, while cross-sectional studies comparing data from single universities with general population data may seem to show that students have worse mental health than their peers who are not students, these studies have not confirmed this. The recent World Mental Health survey series included data on young people aged 18-22 from Australia, Germany, Northern Ireland and the United States among others, but not England, Scotland or Wales[61]. The 1,572 current university students had a lower 12-month prevalence than those who had never attended university of both GAD (0.4% vs 0.8%) and depression (4.5% vs 5.1%), differences that were significant when controlling for age and sex. However, as well as adjusting for only two confounders, this study

observed differences between groups in terms of the proportion of these disorders that had an onset before age 18 but did not adjust for this in analyses. This makes it difficult to conclude whether there is a causal link between university attendance and mental health, or whether those with mental health problems are less likely to attend university. This is the case for the majority of other similar studies. For example, Blanco et al.[60] used a large, nationally representative US dataset to compare the 12-month prevalence of mental health disorders among those aged 19-25 years who had and had not attended HE in the past 12 months. There was no difference between groups in the odds of having a disorder or the odds of having a mood or anxiety disorder, measured by structured interviews and adjusted for various sociodemographic variables[60]. However, again the researchers did not adjust for any prior mental health mental health problems. Furthermore, the confidence intervals in these comparisons were relatively wide, so it is not possible to exclude the possibility of an important difference. One Australian study used data from three nationally representative household surveys, including over 3,000 students[34]. In two of the surveys, the study found a higher prevalence of moderate CMD symptoms among those currently in higher education compared with those who were not, but this effect attenuated when accounting for age and gender and the prevalence of high CMD symptoms was similar between groups[34]. Again, this study did not adjust for prior mental health symptoms despite some of the surveys being longitudinal. A follow-up study then looked at differences between groups at different ages, and found that after adjusting for a range of sociodemographic confounders higher education students had significantly better mental health than their peers before higher education at age 15 and during their studies at age 18[82]. In line with this, Gunnell et al.[83] recently used UK Office for National Statistics (ONS) mortality records to show that rates of deaths by suicide are considerably lower amongst undergraduate students than their non-student counterparts. However, without adjusting for prior mental health it is not clear whether any differences seen during higher education are merely a continuation of the differences seen beforehand.

As well as inconsistent findings and lack of adjustment for confounders, particularly for prior mental health symptoms, it is unlikely that many of these studies are generalisable to the UK. There are large cross-national differences in education systems that are likely

to affect mental health, including how studying is funded and the proportion of students who move away from home. To answer the question of whether attending HE may be a risk factor for mental health problems in the UK specifically, there is a need for research comparing the mental health of those who attend HE with those who do not, using longitudinal, representative UK data. I am only aware of two studies that have done this; the UK Adult Psychiatric Morbidity Surveys (APMS; 2000-2014)[84] and the UK Household Longitudinal Study (UKHLS; 2010-2019)[85]. The former found no evidence in APMS that symptoms of depression or anxiety, suicide attempts, or non-suicidal self-harm differed between higher education students and the general population. The latter found that although mental health worsened over time in both groups in the UKHLS, those who were attending or had attended higher education had fewer depression and anxiety symptoms than those who had not.

These two studies have important limitations. Both were focused on prevalence, and so used data from a series of cross-sectional surveys rather than following the trajectory of the same sample. This also meant that there was no exploration of symptom changes with age, or adjustment for prior mental health symptoms. This is an issue in the wider literature; the nature of cross-sectional research and recruitment strategies means that most studies measure students' mental health while they are in higher education, and the trajectory of young people's symptoms before higher education has not been taken into account. It may be that young people with mental health problems are less likely to attend higher education (due to the impact of their symptoms), or that young people who later attend higher education experience more mental health problems than their peers during school (for example due to academic pressures). The World Mental Health survey series indicated that 83% of those experiencing mental health problems at university had experienced them beforehand[61]. This has implications for the prevention of mental health problems, and for understanding when best to intervene. There has also been no investigation of the longer-term mental health outcomes of higher education students compared with the general population once they have transitioned to adulthood. Longitudinal studies are therefore needed.

Secondly, student status was not robustly measured in either study. In APMS[84], student status was only recorded for those not in any paid work in the past week, potentially

miscategorising many students who are in employment (approximately 74% of students[86]) as the comparison group. The UKHLS study[85] did not distinguish between current students and graduates, grouping them together, so it is not possible to rule out that students' mental health is worse than or the same as their peers at some stages of higher education. Moreover, the former may have been under-powered to detect an effect (the confidence intervals are wide and do not exclude the possibility of an important difference). Additionally, both studies adjusted for a limited range of confounders, not including health or behavioural variables such as disability status and drug use. This limits our ability to conclude whether any observed differences in outcomes are a result of differences between those who attend HE and those who do not.

It is important to understand whether students' mental health is worse than that of their peers who do not attend higher education, and whether any increase in symptoms of CMD represents the development or exacerbation of chronic mental health problems or a temporary situational distress[32]. Once we know this, we can then consider the factors that may influence this and how best to tackle it. For this reason, my first objective for Chapter 3 (**Objective 1**) is to investigate whether attending higher education is associated with increased symptoms of CMD in young people in England, during and after attendance. Based on the literature outlined here, I hypothesised (**Hypothesis 1**) that higher education attendance would be associated with CMD, such that those who attend would experience more symptoms of CMD than those who do not.

Furthermore, the existing literature has not explored the idea that students may have worse mental health during secondary school than those who do not attend higher education; the differences may pre-date the experience of higher education. Many studies (as above in Section 2.5) focus on first-year undergraduate students, but poor mental health at this time could be indicative of the number of students who already have poor mental health when they arrive[32]. In the WMH-ICS surveys, 25% of those who entered higher education had a pre-existing mental health disorder, and 83% of students who had experienced a mental health disorder in the past 12 months had experienced symptoms before attending HE[61]. Similarly, a large Canadian study found that at entry to university, 28% of undergraduate students screened positively for depression and 33%

for anxiety[33]. Research is needed that investigates whether there are differences during secondary school between the mental health of young people who later attend higher education and those who do not. For this reason, my second objective for Chapter 3 (**Objective 2**) is to investigate whether young people in England who go on to attend higher education have more symptoms of CMD during secondary school compared to those who do not. I hypothesised (**Hypothesis 2**) that there would be no difference in symptoms of CMD between those who attend higher education and those who do not during secondary school.

Chapter 3 The association between higher education attendance and symptoms of common mental disorders among young people

3.1 Summary

In this chapter, I investigate whether attending higher education is associated with increased symptoms of CMD in young people in England, during and after attendance (**Objective 1**). I also investigate whether young people in England who go on to attend higher education have more symptoms of CMD during secondary school compared to those who do not (**Objective 2**). I present an analysis of data from the Longitudinal Surveys of Young People in England (LSYPE), with the main analysis using a sample size of 6,128 in LSYPE2 and 4,832 in LSYPE1. In LSYPE2, 50.7% attended higher education (n = 3,104), and in LSYPE1, 55.8% attended higher education (n = 2,696). CMD symptoms were measured using the 12-item General Health Questionnaire (GHQ-12). I used linear regression models to examine the association between higher education attendance and CMD symptoms at several time points in each cohort, using weights to address missing data. I found evidence that young people who attend higher education have worse mental health while they are in higher education (in line with **Hypothesis 1**), but that by age 25 their mental health is similar to that of their peers who did not attend higher education (in contrast to **Hypothesis 1**). I found mixed evidence of a difference in mental health between groups before higher education, with findings differing between cohorts (partially in line with **Hypothesis 2**). These findings point to the need for more effective prevention and treatment of mental health problems within higher education institutions in the UK. They also suggest the need for more research exploring those aspects of the higher education experience that may be detrimental for young people's mental health.

3.2 Background

3.2.1 Rationale

In Chapter 2, I reviewed the current research on the mental health of students and the limitations of this. I demonstrated that although there has been a lot of attention on student mental health in recent years, it has not yet been established whether those who attend higher education experience worse mental health than those who do not, or whether the reports suggesting a crisis in student mental health are a result of worsening mental health among young people overall. If there were a difference at age 18 between those attending higher education and those not attending, it is not clear whether this would represent a temporary worsening or a lasting mental health impact. It could also be that those who attend higher education had worse mental health before attending higher education.

The existing research on this topic has been limited by a lack of longitudinal, representative data. Previous research has used small sample sizes and often compared data collected from students with existing general population data susceptible to different sampling biases. Research is particularly lacking in the UK. There is a need for research on this topic that follows the trajectory of CMD symptoms in a representative sample of young people in the UK from secondary school, through typical higher education age and beyond. This would allow us to investigate the differences between those who do and do not attend higher education in terms of mental health, in particular common mental disorders (CMD). To address this, I used data from the Longitudinal Surveys of Young People in England (LSYPE), two recent cohorts that are designed to be nationally representative and contain detailed information on young people's education, mental health and lives. Using these datasets, I was able to improve upon the limitations of the existing literature by comparing CMD symptoms among young people in England who attended HE with those who did not, using data from age 13 to 25.

This work was conducted in collaboration with and funded by the Department for Education, and the findings have been published as a report[87] (see Appendix 1). This chapter has been written independently of the funders.

3.2.2 Objectives and hypotheses

As outlined in Chapter 2, my first objective for this chapter (**Objective 1**) is to investigate whether attending higher education is associated with increased symptoms of CMD in young people in England, during and after attendance. I hypothesised that that higher education attendance would be associated with CMD, such that those who attend would experience more symptoms of CMD than those who do not (**Hypothesis 1**).

My second objective for Chapter 3 (**Objective 2**) is to investigate whether young people in England who go on to attend higher education have more symptoms of CMD during secondary school compared to those who do not. I hypothesised (**Hypothesis 2**) that there would be no difference in symptoms of CMD between those who attend higher education and those who do not during secondary school.

3.3 Methods

3.3.1 Design

I used data from the Longitudinal Surveys of Young People in England; LSYPE1 (also called "Next Steps") and LSYPE2 (also called "Our Future"). LSYPE1 began in 2004, recruiting 13–14-year-olds who were born in 1989-1990. Participants were surveyed annually until the age of 19/20 and again at the age of 25 in 2015 (wave 8; see Table 3-1). LSYPE2 began in 2013, with participants born in 1998-1999. LSYPE2 participants were also surveyed annually, with the latest available data at the time of analysis from age 18/19 in 2018 (wave 6; see Table 3-1).

Further information about LSYPE1 and LSYPE2 is available on the CLS and CLOSER websites respectively (https://cls.ucl.ac.uk/cls-studies/next-steps/; https://www.closer.ac.uk/study/lsype-2/).

3.3.2 Participants

Both of the LSYPE cohorts used a two-stage sampling process. Schools were the primary sampling unit, separated into deprived and non-deprived based on free school meal receipt and achieved grades, with over-sampling from deprived schools. Pupils within schools were then sampled, with pupils from ethnic minority groups over-sampled. The initial LSYPE1 sample contained 15,770 young people (74% response rate). An additional 352 participants were recruited at age 16/17 (wave 4) as an ethnic boost, giving a final sample of 16,122 young people. The LSYPE2 sample contained 13,100 young people (72% response rate; no ethnic boost). In both cohorts, the participants' parents were also interviewed in waves 1-4.

3.3.3 Measures

Table 3-1. LSYPE time points and availability of outcome and exposure variables.

Data collection					Variable			
					Higher education		Common Mental Disorders (GHQ-12[d])	
Wave	Age	School year	Calendar year		LSYPE1	LSYPE2	LSYPE1	LSYPE2
			LSYPE1	LSYPE2				
1	13/14	9	2004	2013	No	No	No	No
2	14/15	10	2005	2014	No	No	Yes	Yes
3	15/16	11	2006	2015	No	No	No	No
4	16/17	12	2007	2016	No	No	Yes	Yes
5	17/18	13	2008	2017	Yes[a]	Yes[a]	No	Yes
6	18/19	-	2009	2018	Yes[b]	Yes[b]	No	Yes
7	19/20	-	2010	2019	Yes	N/A[c]	No	N/A[c]
8	25	-	2015	-	Yes	N/A[c]	Yes	N/A[c]

a. Note that the young person has probably not yet attended higher education.
b. Data on whether the young person is currently studying for a higher education degree.
c. Wave 7 and 8 data from LSYPE2 not available at the time of analysis.
d. GHQ-12 = General Health Questionnaire.
e. Yellow highlight = LSYPE1 and LSYPE2 have the same data at the same age and are well-matched for comparative analyses across the cohorts.
f. Green highlight = variable is available but not matched according to time point in LSYPE1 and LSYPE2.

3.3.3.1 Outcome: Symptoms of common mental disorders (CMD)

The outcome was CMD symptoms (see Section 2.2). CMD symptoms were measured in the LSYPE cohorts using the self-administered 12-item General Health Questionnaire (GHQ-12)[88]. Factor analyses of the GHQ-12 show that it measures symptoms of depression, anxiety, and social dysfunction, with the overall score reflecting symptoms of common mental disorders (CMD)[89,90]. Items include thinking of self as worthless, being able to concentrate, losing sleep over worry, and enjoying normal day-to-day activities. Respondents indicate how often they have experienced each item over the past few weeks from the following options, scored on a scale of 0-3 as indicated: less than usual (0), no more than usual (1), rather more than usual (2), or much more than usual (3). I

summed these items to get a continuous total score of 0-36[88]. A higher score indicates worse mental health.

I also conducted sensitivity analyses with a binary outcome. For this, I used a bimodal scoring method (0,0,1,1) of the GHQ-12[91,92]. Each individual item is coded as 0 or 1 (where selecting 'rather more' or 'much more than usual' gives a score of 1, or else 0) and then a threshold of three or more is used to identify possible cases of CMD[88].

My primary outcome for LSYPE2 was age 18/19 (wave 6), during higher education. My primary outcome for LSYPE1 was age 25 (wave 8), after higher education. Symptoms of CMD were also measured at age 14/15 (wave 2) and 16/17 (wave 4) in both cohorts and at age 17/18 (wave 5) in LSYPE2, so I used these to measure differences between groups before higher education (see Table 3-1).

3.3.3.2 Exposure: Higher Education attendance

For the exposure, I used a binary variable to indicate whether young people were attending higher education or not. In both datasets, I categorised participants as higher education students if they were studying at a university, higher education college, university college or private college, for a degree or any other undergraduate higher education qualification, including teacher training (BEd or BA/BSc with Qualified Teacher Status), Higher Education Diploma (DipHE), and qualifications at an equivalent level, e.g. National Vocational Qualification (NVQ) at level four or five. This is in line with the usual definition of HE in the UK[93].

In LSYPE2, HE was measured at age 18/19 (wave 6) only (see Table 3-1). In LSYPE1, HE was measured at ages 18/19 and 19/20 (waves 6 and 7), which I combined to form one binary variable indicating whether young people had been attending higher education at either of these time points. I conducted a sensitivity analysis using exposure data from age 18/19 (wave 6) only in both cohorts, to check that this had not altered the findings.

3.3.3.3 Confounders

I adjusted for various confounders in my analyses. These are variables that represent alternative explanations for the association between two variables. If they are not

controlled for, they can lead to a spurious association being observed. I therefore selected potential confounders that were likely to be associated with exposure and outcome, but not on the causal pathway between them (i.e. a mediator). This was based on existing evidence and theoretical assumptions around how young people who attend higher education will differ socially, demographically and individually to those who do not. If these differences are also associated with CMD, they could be potential confounders.

The confounders included sociodemographic variables such as sex and parents' socioeconomic status, because mental health problems and higher education attendance differ between some demographic groups. For example, young women and girls are more at risk of experiencing mental health problems than young men and boys, and are also more likely to attend higher education[13,94]. I also included variables related to health, due to the common comorbidity of physical and mental health problems, and the likelihood that physical health problems may make an individual less likely to attend higher education[95,96]. The remaining confounders are behavioural variables such as antisocial behaviour, alcohol use and cannabis use. These variables are likely to be associated with poorer mental health and reduced likelihood of attending higher education (due to lower academic performance)[97].

I took variables from the same time point as the exposure or as close as possible to it. I included the following confounders in all analyses:

- Sex
- Ethnicity
- Parents' socioeconomic status (based on parent with highest employment category)
- Parents' highest qualification
- Family composition.

I included the following additional confounders in the main analysis of mental health during and after HE:

- Antisocial behaviour in past 12 months (including vandalism, shoplifting or fighting; at age 15/16)
- Whether experienced bullying in past 12 months (at age 15/16)
- Frequency of alcohol use (at age 16/17)
- Whether ever used cannabis (at age 16/17)
- Carer status (whether young person had been a carer; at age 16/17 in LSYPE2 and at age 16/17 or age 17/18 in LSYPE1)
- General quality of health (at age 16/17)
- Disability status (at age 16/17).

These variables were not included in the secondary analysis, of mental health before HE, as they measure behaviour that occurred after some of the outcome time points and therefore could be on the causal pathway.

The following states how each included confounding variable was measured and when.

3.3.3.3.1 Sex

In LSYPE2, young person was judged by interviewer to be of male or female sex. In LSYPE1, young person was asked 'are you male or female', indicated as sex. This was measured at age 13/14 (wave 1) in LSYPE2 and age 18/19 (wave 6) in LSYPE1.

3.3.3.3.2 Ethnicity

In LSYPE2, young people were asked 'What is your ethnic group?' with 18 categories as response options. In LSYPE1, young people were asked 'To which of the groups on this card would you say you belong?' with 16 categories as response options. The two options missing from this version were "White – Gypsy or Irish Traveller" and "Arab", instead categorised within "Any other White background" and "Other ethnic group", respectively. The "Chinese" ethnic group was categorised within "Asian or Asian British" in LSYPE2 but within "Other ethnic group" in LSYPE1.

I used derived variables available in the datasets that grouped participants into eight ethnicity categories:

- White
- Mixed
- Indian
- Pakistani
- Bangladeshi
- Black African
- Black Caribbean
- Other

This was measured at age 13/14 (wave 1) in LSYPE2 (with missing data supplemented with age 14/15 data) and age 16/17 (wave 4) in LSYPE1.

3.3.3.3.3 Parents' Socioeconomic Status

I used derived variables available in the datasets that indicated which category each parent's employment activity fell into from the following eight:

- Higher Managerial and professional occupations
- Lower managerial and professional occupations
- Intermediate occupations
- Small employers and own account workers
- Lower supervisory and technical occupations
- Semi-routine occupations
- Routine occupations
- Not currently working

These categories are based on the NS-SEC operational category tool for socioeconomic class, which has 41 categories. I collapsed the categories due to small numbers in some groups, resulting in the following three categories:

- Managerial and professional occupations
- Intermediate occupations

- Lower supervisory, routine occupations and not currently working.

I then combined the two parents' variables into one variable that indicated the employment category of whichever parent had the highest value. This was measured at age 13/14 (wave 1) in LSYPE2 and age 16/17 (wave 4) in LSYPE1.

3.3.3.3.4 Parents' Highest Qualification

This indicates the qualification held by whichever parent has the highest qualification. In LSYPE2, this is either the mother or father, and in LSYPE1, this is either the main or second parent. I used derived variables available in the datasets that indicated the highest qualification held out of seven categories:

- Degree or equivalent
- Higher education below degree level
- GCE A Level or equivalent
- GCSE grades A-C or equivalent
- Qualifications at level one and below
- Other qualifications
- No qualifications

These categories are based on a detailed list of 50 qualifications. In LSYPE1, interviewers collected data pertaining to the 50 categories. In LSYPE2, only the seven-category answer was recorded. I collapsed the categories due to small numbers in some groups, resulting in the following five categories:

- Degree or equivalent
- Higher education below degree level
- GCE, A Level or equivalent
- GCSE grades A-C or equivalent
- Below GCSE or no qualification

This was measured at age 13/14 (wave 1) in LSYPE2 and age 16/17 (wave 4) in LSYPE1.

3.3.3.3.5 Family Composition

This indicates the family level composition based on the (natural, step, adoptive or foster) parents of the young person. I used derived variables available in the datasets that were based on questions asked to parents, indicating one of the following five situations:

- Married couple
- Cohabiting couple
- Lone father
- Lone mother
- No parents in the household

In the derived variables, if there is only one parent (mother or father) in the household, the family is coded as a lone father/mother. If there is one mother and one father in the household, then relationship variables are used to determine whether the couple are married or cohabiting. If there are two mothers or fathers in the household, these are assumed to be same sex couples coded as cohabiting. I collapsed the categories due to small numbers in some groups, resulting in two categories: Married/cohabiting or Lone parent or no parents in the household. This was measured at age 13/14 (wave 1) in LSYPE2 and age 16/17 (wave 4) in LSYPE1.

3.3.3.3.6 Antisocial Behaviour

This indicates whether the young person has taken part in antisocial behaviour in the previous 12 months. In LSYPE2, antisocial behaviour includes the following:

- Damaging anything in a public place on purpose that does not belong to them
- Shoplifting
- Graffitiing anywhere
- Hitting or attacking someone on purpose with or without using an object or weapon.

In LSYPE1, it includes the following:

- Vandalising public property
- Shoplifting

- Graffitiing on walls
- Fighting or public disturbance.

This was measured at age 15/16 (wave 3) in both LSYPE2 and LSYPE1.

3.3.3.3.7 Experienced Bullying

This indicates whether the young person has been bullied in any way in the previous 12 months. In LSYPE2, this includes being upset by name-calling (including by text or email), being excluded from a group of friends, being made to hand over money or possessions, being threatened with violence by other students, experiencing violence from other students, and being bothered, harassed or having hurtful words, pictures or videos spread about them via internet or mobile phone. In LSYPE1, this includes all of the above except the latter item about cyber-bullying. This was measured at age 15/16 (wave 3) in LSYPE2 and LSYPE1.

3.3.3.3.8 Frequency of Alcohol Use

This was measured at age 16/17 (wave 4) in LSYPE2 and LSYPE1. There were two questions used to create this variable. Young people were asked:

1. Have you ever had a proper alcoholic drink? That is a whole drink, not just a sip. Please do not count drinks labelled low alcohol.

If they answered yes, they were then asked the second question:

2. Thinking about the last 12 months, about how often did you usually have an alcoholic drink?

I combined the two questions so that those who answered no to the first question were coded as 'Never' in response to the second question. The response options given for the second question were slightly different in each cohort, so I recoded them to be more comparable. In LSYPE2, the categories for the second question were as follows:

- 4+ times a week
- 2-3 times a week
- 2-3 times a month

- Once a month or less
- Never (given as an option for the second question, as well as containing those who answered no to the first question)

I collapsed the former two categories. In LSYPE1, the categories for the second question were as follows:

- Most days
- Once or twice a week
- 2 or 3 times a month
- Once a month
- Once every couple of months
- Less often
- Never (not given as an option for the second question, so only contains those who answered no to the first question)

I collapsed the former two categories, then the following two, then the following two. The final combined categories were therefore as follows:

- Never
- Less than monthly
- A few times a month
- Weekly or more.

3.3.3.3.9 Cannabis Use

Young people were asked whether they had ever tried cannabis, even if only once. This was measured at age 16/17 (wave 4) in LSYPE2 and LSYPE1.

3.3.3.3.10 General Quality of Health

Young people were asked 'In the last 12 months, would you say your health has been very good, fairly good, not very good, or not good at all?' I combined the latter two categories. This was measured at age 16/17 (wave 4) in LSYPE2 and LSYPE1.

3.3.3.3.11 Disability Status

Indicates whether the young person has any longstanding illness, disability or infirmity. This was a question of opinion, asked to young people with the added instruction 'By 'longstanding' I mean anything that has troubled you over a period of at least 12 months or that is likely to affect you over a period of at least 12 months?'. This was measured at age 16/17 (wave 4) in LSYPE2 and LSYPE1.

3.3.3.3.12 Carer Status

In LSYPE2, this indicates whether young person has been a carer at age 16/17 (wave 4) only. In LSYPE1, indicates whether young person has been a carer at age 16/17 (wave 4) or age 17/18 (wave 5). Young people were asked 'Do you regularly look after any ill, disabled or elderly relatives or friends aged 15 or more and in need of care, without being paid? This includes both people who live here with you and those who live elsewhere.' This was clarified as not including any professional obligations such as volunteering.

3.3.3.4 Auxiliary variables used in multiple imputation analyses

I selected auxiliary variables to help improve estimates in the multiple imputation analyses. Below I describe how each auxiliary variable in the multiple imputation model was measured and when.

3.3.3.4.1 Parent General Health

In LSYPE1, the young person's main parent was asked 'Do you have any longstanding illness, disability, or infirmity?' The response options were yes or no. In LSYPE2, the young person's mother was asked 'In the last 12 months, would you say your health has been very good, fairly good, not very good, or not good at all?' I combined the latter two categories. This was measured at age 13/14 (wave 1) in LSYPE2 and LSYPE1.

3.3.3.4.2 Truancy

This indicates whether young people have missed school without permission in the last 12 months. Young people were asked 'In the last 12 months, have you ever played truant, that is missed school without permission, even if it was only for a half day or a single lesson?' This was measured at age 13/14 (wave 1) in LSYPE2 and LSYPE1.

3.3.3.4.3 Smoking

Young people were asked whether they ever smoke cigarettes at all. Those who indicated that they did were then asked to indicate the statement that best describes them out of the following:

- I have never smoked
- I have only ever tried smoking once
- I used to smoke sometimes but I never smoke a cigarette now
- I sometimes smoke cigarettes now but I don't smoke as many as one a week
- I usually smoke between one and six cigarettes a week
- I usually smoke more than six cigarettes a week

I combined these two questions so that those who answered no to the first question were coded as 'Never smoked' in response to the second question. I then collapsed the categories to the following:

- Never smoked
- Sometimes or less often
- One or more per week

This was measured at age 13/14 (wave 1) in LSYPE2 and LSYPE1.

3.3.4 Statistical analyses

3.3.4.1 Main analysis

I conducted all analyses for LSYPE2 and LSYPE1 separately, using Stata 16[98]. For the main analysis, I used linear regressions to investigate whether attending higher education is associated with increased symptoms of CMD in young people, during (in LSYPE2) and after (in LSYPE1) HE attendance. Linear regression models the effect of one or more explanatory variables (in this case, the exposure) on a continuous outcome variable[99]. It is then possible to obtain adjusted effect estimates by adding potential confounders to the model and applying weights. Linear regression also has the advantage of being relatively robust to violations of assumptions, particularly when a large sample is used[100].

First, I tested a univariable association with higher education attendance as the exposure and subsequent CMD symptoms (GHQ-12 total score at age 18/19 or age 25) as the outcome. Then I incrementally added potential confounders to the model in groups based on theoretical assumptions.

I included participants in the main analysis if they had complete data on all variables (exposure, outcome and all study confounders). I addressed missing data using weights available in the datasets. These weights were generated using variables including sex, ethnicity, birth month, region, and school size, and account for initial non-response to the survey (sample weights) and attrition at each time point (attrition weights). In line with LSYPE guidance, I selected weights from the same time point as the outcome in each model[101].

3.3.4.2 Secondary analysis

I used multilevel linear regression models with growth curves to investigate whether young people who later attend higher education have more symptoms of CMD during secondary school compared to those who do not. Multilevel models combine data from all time points, allowing those who are missing data at some time points to contribute to estimates at other time points[102]. This means that all of the available data is used, increasing statistical power and improving the precision of estimates. Multilevel models use random effects to take into account data that is in clusters, as is the case when data is taken from the same individual at multiple time points[102]. This means that differences between participants in terms of change in symptoms over time can be modelled.

First, I ran a univariable model. Next, I tested for a non-linear association with time using a quadratic time variable. If there was evidence of non-linearity, I retained the quadratic time variable. I then tested whether the association between higher education attendance and GHQ-12 scores differed by time, using interactions between higher education and linear and quadratic time variables. Next, I ran the multilevel models after adjusting for sex, ethnicity, parents' socioeconomic status, parents' highest qualification and family composition. Where there was evidence that the association differed by time, associations were presented separately by time point. I did not report p values for this because p values from sub-group analyses can be unreliable[103].

For the secondary analysis, participants were eligible to be included if they had complete data on the exposure, sex, ethnicity and socioeconomic confounders as well as at least one GHQ-12, from any time point. The number of participants included in the analysis differed by wave, as participants were only included for waves in which they provided GHQ-12 data. I accounted for missing data using weights from the same time point as the outcome in each model, as in the main analysis.

3.3.4.3 Sensitivity analyses

I conducted sensitivity analyses on the main analyses. The first treated the GHQ-12 as a binary outcome, to investigate the association between attending HE and the likelihood of experiencing CMD.

Second, I conducted a sensitivity analysis of LSYPE1 categorising the higher education variable using only data from age 18/19 (wave 6), comparable with the data available in LSYPE2. People who took a gap year after secondary school and attended higher education at age 19/20 were included in the higher education group in LSYPE1 but not in LSYPE2. This sensitivity analysis checked for any impact of this difference on my findings.

I also conducted sensitivity analyses to check for any impact of missing data on my findings. I used multiple imputation with chained equations (MICE) to replace missing data, imputing 50 values and when analysing, combining them using Rubin's rules[104]. To predict missing values, I used all of the variables from the main analysis plus the auxiliary variables parent general health, truancy and smoking. I conducted two imputed analyses, applying the sample weight from the first time point (wave 1) to account for the study design and non-response. First, I replaced missing data in the outcome and confounders for all participants who provided exposure data. I also required participants to have provided at least one GHQ-12, to improve prediction of missing outcome data. Second, I replaced missing data in the exposure, as well as the outcome and confounders. This increased the sample size to all participants originally recruited to each cohort at wave 1, thus increasing statistical power and improving the precision of estimates.

3.4 Results

3.4.1 Sample characteristics

The flow of participants through each cohort is shown in Figure 3-1 and Figure 3-2. In LSYPE2, 6,922 (52.8%) participants had complete data on higher education attendance. Of these, 6,128 (46.8% of the full sample) had complete data on the primary outcome (GHQ-12 at age 18/19) and all confounders, and are included in the main analysis. In LSYPE1, 9,794 participants (60.7%) had complete exposure data. Of these, 4,832 (30.0% of the full sample) had complete data on the primary outcome (GHQ-12 at age 25) and all confounders, and are included in the main analysis.

Characteristics of the main analysis sample for each cohort, overall and according to higher education attendance, are shown in Table 3-2. In LSYPE2, 50.7% were HE students (n = 3,104), and in LSYPE1, 55.8% were HE students (n = 2,696). In both cohorts, there were differences between those who did and did not attend higher education on most variables. A higher proportion of higher education students were female; from an ethnic minority background; lived in two-parent homes; had university-educated parents; and came from higher socioeconomic backgrounds. Higher education students were less likely to have consumed alcohol regularly, ever used cannabis, been bullied or have a history of antisocial behaviour. They were also less likely to have had poor general health, a disability, or caring responsibilities. The proportion of young people who had a disability, consumed alcohol weekly or more, had participated in antisocial behaviour and had experienced bullying was lower in those who did attend higher education compared with those who did not.

Participants who had complete data on sex, ethnicity and socioeconomic confounders and had complete GHQ-12 data from at least one time point were eligible to be included in the secondary analysis; this was 6,835 (52.2%) participants in LSYPE2 and 9,113 (56.5%) participants in LSYPE1. The secondary analysis sample size differs by time point based on when participants had provided GHQ-12 data.

Figure 3-1 Flowchart for LSYPE2 sample.

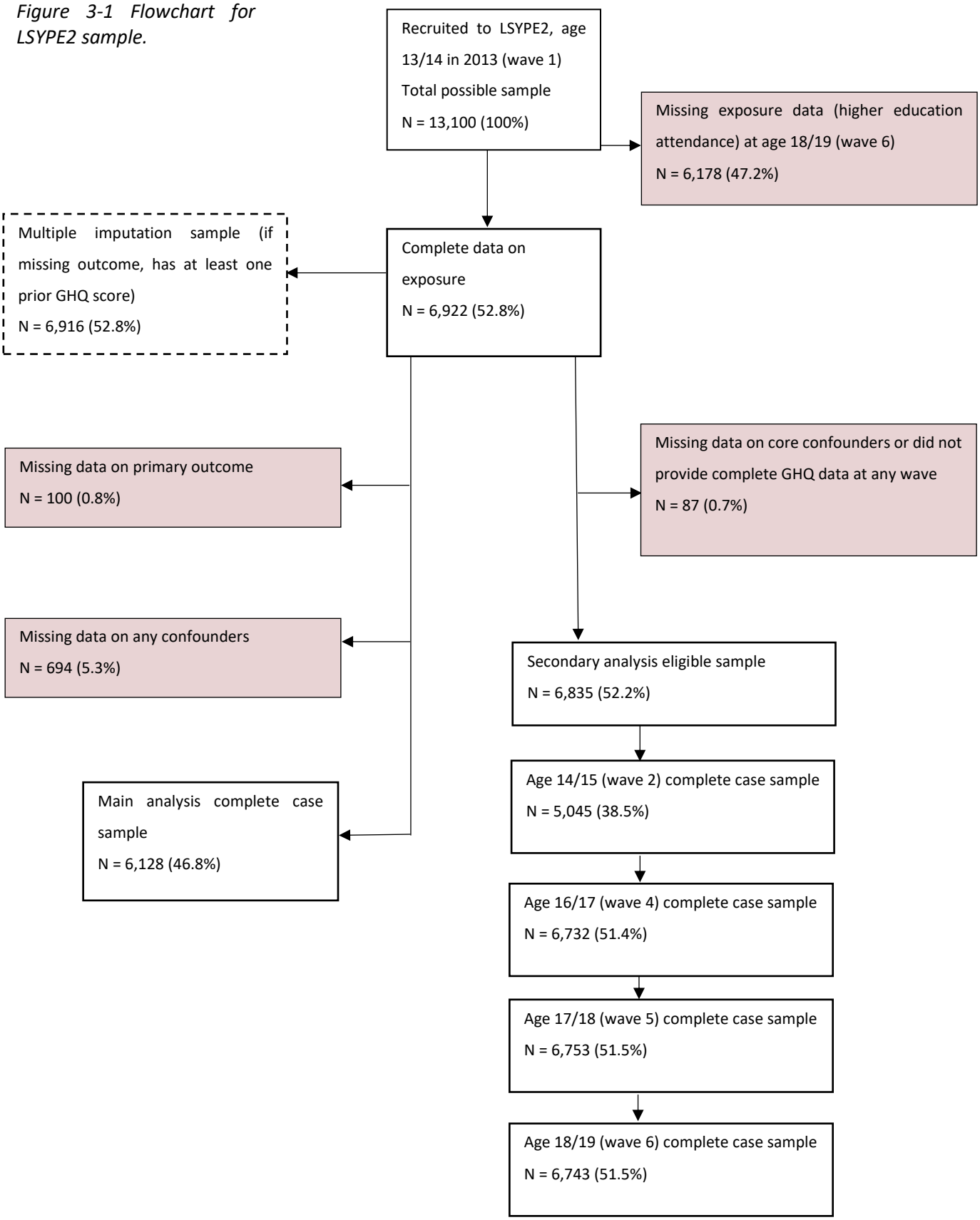


Figure 3-2 Flowchart for LSYPE1 sample.

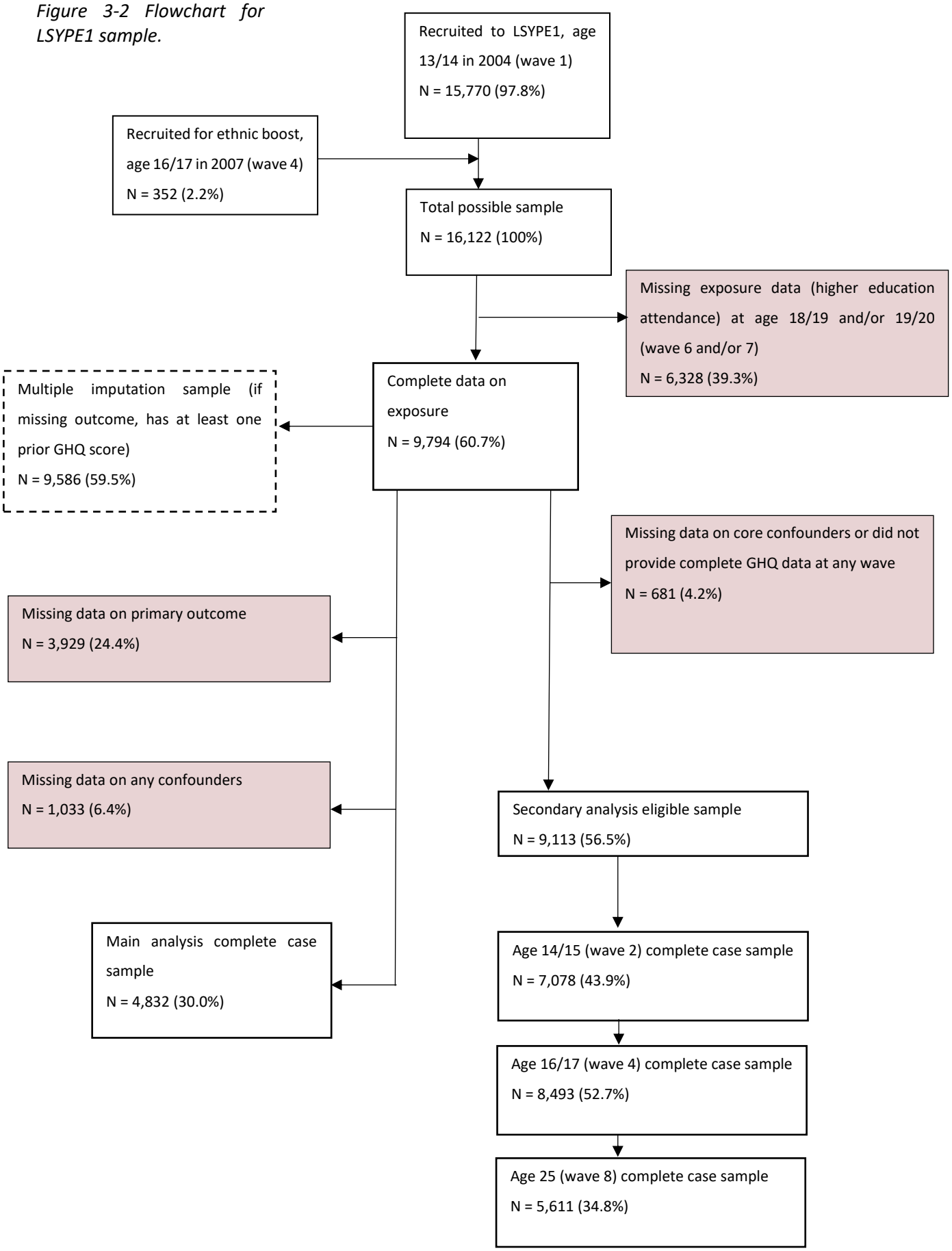


Table 3-2. Demographic characteristics of the main analysis samples, overall and those who did and did not attend higher education.

Variable – N (%)	**LSYPE2**			**LSYPE1**		
	Attended higher education[a]	**Did not attend higher education[a]**	**Total**	**Attended higher education[a]**	**Did not attend higher education[a]**	**Total**
Sex[b]						
Female	1,731 (55.8%)	1,509 (49.9%)	3,240 (52.9%)	1,530 (56.8%)	1,084 (50.7%)	2,614 (54.1%)
Male	1,373 (44.2%)	1,515 (50.1%)	2,888 (47.1%)	1,166 (43.2%)	1,052 (49.3%)	2,218 (45.9%)
Ethnicity[c]						
White	2,255 (72.7%)	2,497 (82.6%)	4,752 (77.6%)	1,830 (67.9%)	1,724 (80.7%)	3,554 (73.6%)
Mixed	135 (4.4%)	125 (4.1%)	260 (4.2%)	105 (3.9%)	102 (4.8%)	207 (4.3%)
Indian	103 (3.3%)	56 (1.9%)	159 (2.6%)	275 (10.2%)	57 (2.7%)	332 (6.9%)
Pakistani	136 (4.4%)	85 (2.8%)	221 (3.6%)	151 (5.6%)	95 (4.4%)	246 (5.1%)
Bangladeshi	112 (3.6%)	48 (1.6%)	160 (2.6%)	123 (4.6%)	65 (3.0%)	188 (3.9%)
Black African	170 (5.5%)	81 (2.7%)	251 (4.1%)	77 (2.9%)	20 (0.9%)	97 (2.0%)
Black Caribbean	80 (2.6%)	86 (2.8%)	166 (2.7%)	57 (2.1%)	46 (2.2%)	103 (2.1%)
Other	113 (3.6%)	46 (1.5%)	159 (2.6%)	78 (2.9%)	27 (1.3%)	105 (2.2%)
Parents' Socioeconomic Status[d,e]						
Managerial and professional occupations	1,694 (54.6%)	1,239 (41.0%)	2,933 (47.9%)	1,557 (57.8%)	783 (36.7%)	2,340 (48.4%)

Intermediate occupations	686 (22.1%)	728 (24.1%)	1,414 (23.1%)	456 (16.9%)	471 (22.1%)	927 (19.2%)
Lower supervisory, routine occupations and not currently working	724 (23.3%)	1,057 (35.0%)	1,781 (29.1%)	683 (25.3%)	882 (41.3%)	1,565 (32.4%)
Parents' Highest Qualification[e, f]						
Degree or equivalent	670 (21.6%)	335 (11.1%)	1,005 (16.4%)	815 (30.2%)	224 (10.5%)	1,039 (21.5%)
Higher education below degree level	440 (14.2%)	278 (9.2%)	718 (11.7%)	536 (19.9%)	319 (14.9%)	855 (17.7%)
GCE, A Level or equivalent	421 (13.6%)	345 (11.4%)	766 (12.5%)	445 (16.5%)	419 (19.6%)	864 (17.9%)
GCSE grades A-C or equivalent	1,126 (36.3%)	1,429 (47.3%)	2,555 (41.7%)	485 (18.0%)	646 (30.2%)	1,131 (23.4%)
Below GCSE or no qualification	447 (14.4%)	637 (21.1%)	1,084 (17.7%)	415 (15.4%)	528 (24.7%)	943 (19.5%)
Family Composition[e]						
Married/cohabiting	2,456 (79.1%)	2,169 (71.7%)	4,625 (75.5%)	2,252 (83.5%)	1,530 (71.6%)	3,782 (78.3%)
Lone parent or no parents in the household	648 (20.9%)	855 (28.3%)	1,503 (24.5%)	444 (16.5%)	606 (28.4%)	1,050 (21.7%)
Antisocial Behaviour (in past 12 months)[g, h]	170 (5.5%)	299 (9.9%)	469 (7.7%)	299 (11.1%)	465 (21.8%)	764 (15.8%)
Experienced Bullying (in past 12 months)[h]	839 (27.0%)	970 (32.1%)	1,809 (29.5%)	642 (23.8%)	645 (30.2%)	1,287 (26.6%)

Frequency of Alcohol Use[i, j]						
Never	1,094 (35.2%)	893 (29.3%)	1,987 (32.4%)	653 (24.2%)	380 (17.8%)	1,033 (21.4%)
Less than monthly	1,189 (38.3%)	1,297 (42.9%)	2,486 (40.6%)	486 (18.0%)	379 (17.7%)	865 (17.9%)
A few times a month	718 (23.1%)	682 (22.6%)	1,400 (22.9%)	893 (33.1%)	636 (29.8%)	1,529 (31.6%)
Weekly or more	103 (3.3%)	152 (5.0%)	255 (4.2%)	664 (24.6%)	741 (34.7%)	1,405 (29.1%)
Cannabis Use[j] (ever)	554 (17.9%)	771 (25.5%)	1,325 (21.6%)	673 (25.0%)	785 (36.8%)	1,458 (30.2%)
General Quality of Health[j]						
Very good	1,363 (43.9%)	1,127 (37.3%)	2,490 (40.6%)	1,488 (55.2%)	1,031 (48.3%)	2,519 (52.1%)
Fairly good	1,543 (49.7%)	1,560 (51.6%)	3,103 (50.6%)	1,064 (39.5%)	928 (43.4%)	1,992 (41.2%)
Not very good or not good at all	198 (6.4%)	337 (11.1%)	535 (8.7%)	144 (5.3%)	177 (8.3%)	321 (6.6%)
Disability Status[j]	286 (9.2%)	412 (13.6%)	698 (11.4%)	163 (6.0%)	177 (8.3%)	340 (7.0%)
Carer Status[k]	125 (4.0%)	180 (6.0%)	305 (5.0%)	203 (7.5%)	165 (7.7%)	368 (7.6%)

a. Indicates whether young person was attending higher education at age 18/19 (wave 6) in LSYPE2, or at age 18/19 or 19/20 (wave 6 or 7) in LSYPE1.

b. Measured at age 13/14 (wave 1) in LSYPE2 and age 18/19 (wave 6) in LSYPE1.

c. Measured at age 13/14 (wave 1) in LSYPE2 (missing data supplemented with age 14/15 data) and age 16/17 (wave 4) in LSYPE1.

d. Parents' socioeconomic status is based on the socioeconomic status of whichever parent (mother or father) has the highest employment category.

e. Measured at age 13/14 (wave 1) in LSYPE2 and age 16/17 (wave 4) in LSYPE1.

f. Indicates the qualification held by whichever parent has the highest qualification. In LSYPE2, the mother or father, and in LSYPE1, the main or second parent.

g. In LSYPE2, antisocial behaviour includes taking part in any of the following: damaging anything in a public place on purpose that does not belong to them; shoplifting; graffitiing anywhere; hitting or attacking someone on purpose with or without using an object or weapon. In LSYPE1, it includes any of the following: vandalising public property; shoplifting; graffitiing on walls; fighting or public disturbance.

h. Measured at age 15/16 (wave 3) in LSYPE2 and LSYPE1.

i. Categories differed slightly from stated at LSYPE2, as follows: Never; Once a month or less; 2-3 times a month; 2 or more times a week.

j. Measured at age 16/17 (wave 4) in LSYPE2 and LSYPE1.

k. In LSYPE2, indicates whether young person has been a carer at age 16/17 (wave 4) only. In LSYPE1, indicates whether young person has been a carer at age 16/17 (wave 4) or age 17/18 (wave 5).

Notes:

1. Data from main analysis complete case sample - N = 6,128 for LSYPE2 and N = 4,832 for LSYPE1.
2. Data are unweighted.

3.4.2 Main analysis: The association between attending higher education and symptoms of CMD, during and after higher education

Results from the main analysis are shown in Table 3-3. In LSYPE2, in the unadjusted model there was evidence that during higher education (at age 18/19), GHQ-12 scores were 0.43 (Model 1; 95% confidence interval [CI] 0.07 to 0.79, p = .020) points higher in young people who were attending higher education compared with those who were not. This attenuated after adjusting for sex, ethnicity, parents' socioeconomic status, parents' highest qualification and family composition (Model 3; mean difference [MD] 0.19, 95% CI -0.16 to 0.55, p = .290). However, evidence of the association strengthened after further adjusting for antisocial behaviour, bullying, alcohol use, cannabis use, carer status, quality of health and disability status (Model 6; MD 0.60, 95% CI 0.26 to 0.94, p = .001). After additionally adjusting for GHQ-12 score at age 16/17, a difference in symptoms of CMD between the two groups remained (Model 7; MD 0.36, 95% CI 0.05 to 0.68, p = .024).

In LSYPE1, in the unadjusted model there was evidence that at age 25 GHQ-12 scores were 0.46 (Model 1; 95% CI -0.88 to -0.05, p = .030) points lower in young people who had attended higher education compared with those who had not. Evidence of this association attenuated after adjusting for confounders (Model 6; MD 0.02, 95% CI -0.40 to 0.44, p = .921). In the fully adjusted model, there was no evidence of a difference in symptoms of CMD between the two groups (Model 7; MD -0.25, 95% CI -0.66 to 0.16, p = .229).

Table 3-3. Mean difference in symptoms of common mental disorders between young people who did and did not attend higher education from linear regression models.

Model	**Mean Difference (95% Confidence Interval), p value**	
	Age 18/19 (LSYPE2) N = 6,128	**Age 25 (LSYPE1) N = 4,832**
Did not attend higher education	*Reference category*	*Reference category*
Model 1[a]	0.43 (0.07 to 0.79), p = .020	-0.46 (-0.88 to -0.05), p = .030
Model 2[b]	0.28 (-0.07 to 0.63), p = .116	-0.51 (-0.93 to -0.09), p = .018
Model 3[c]	0.19 (-0.16 to 0.55), p = .290	-0.31 (-0.73 to 0.12), p = .153
Model 4[d]	0.32 (-0.03 to 0.67), p = .074	-0.14 (-0.55 to 0.28), p = .521
Model 5[e]	0.39 (0.04 to 0.74), p = .028	-0.08 (-0.50 to 0.34), p = .722
Model 6[f]	0.60 (0.26 to 0.94), p = .001	0.02 (-0.40 to 0.44), p = .921
Model 7[g]	0.36 (0.05 to 0.68), p = .024	-0.25 (-0.66 to 0.16), p = .229

a. Unadjusted model.
b. Adjusted for sex and ethnicity.
c. Model 2 plus parents' socioeconomic status, parents' highest qualification and family composition.
d. Model 3 plus antisocial behaviour and experienced bullying.
e. Model 4 plus alcohol use and cannabis use.
f. Model 5 plus carer status, general quality of health and disability status.
g. Model 6 plus GHQ-12 scores at previous time point - for LSYPE2, this is age 16/17 (wave 4) and for LSYPE1, this is age 17/18 (wave 5).

Notes:
1. Data from main analysis complete case sample. Participants were included if they had complete data on all variables (exposure, outcome and all study confounders).
2. Analyses weighted using weight from primary outcome time point – age 18/19 (wave 6) for LSYPE2 and age 25 (wave 8) for LSYPE1.

3.4.3 Secondary analysis: Symptoms of CMD during secondary school in young people who go on to attend higher education compared to those who do not.

Mean (standard deviation [SD]) symptoms of common mental disorders at each time point are shown in Table 3-4. When I tested for a non-linear association with time, there was strong evidence that the association between higher education attendance and CMD symptoms differed across time points (p = .001 in LSYPE2 and p = .002 in LSYPE1). I therefore present associations between higher education attendance and CMD

symptoms separately at each time point, before and after adjustment, in Table 3-5. Adjusted models are presented graphically in Figure 3-3 and Figure 3-4.

In LSYPE2, at age 14/15, GHQ-12 scores were 0.38 (Model 1; 95% CI -0.74 to -0.01) points lower in young people who would later attend higher education compared with those who would not. This association became larger and stronger after adjustment for confounders (Model 2; MD -0.74, 95% CI -1.09 to -0.39). At every other time point, ages 16/17, 17/18 and 18/19, there was some evidence of a difference between the two groups in unadjusted but not adjusted models.

In LSYPE1, there was some evidence in the unadjusted model that, at age 14/15, young people who would later attend higher education had higher mean GHQ-12 scores than those who would not (Model 1; MD 0.55, 95% CI 0.25 to 0.85). Evidence of this association attenuated after adjustments (Model 2; MD 0.08, 95% CI -0.23 to 0.39). There was strong evidence in the unadjusted model, at age 16/17, that those who would later attend higher education had mean GHQ-12 scores 0.96 points higher (Model 1; 95% CI 0.53 to 1.39) than young people who would not. This association attenuated but remained after adjustment (Model 2; MD 0.54; 95% CI 0.10 to 0.98). By age 25, there was no evidence in this sample of a difference in symptoms of CMD between the two groups (Model 2; MD -0.21, 95% CI -0.64 to 0.23).

Table 3-4. Mean (SD) symptoms of common mental disorders at each time point, in the secondary analysis samples overall and those who did and did not attend higher education.

	Mean (95% confidence interval); standard deviation							
Time point	**LSYPE2**				**LSYPE1**			
	Attended higher education	**Did not attend higher education**	**Total**	**N**	**Attended higher education**	**Did not attend higher education**	**Total**	**N**
Age 14/15 (wave 2)	10.31 (10.08 to 10.54); 6.69	10.74 (10.48 to 11.01); 6.07	10.52 (10.34 to 10.69); 6.38	5,045	10.09 (9.92 to 10.27); 5.36	9.65 (9.45 to 9.85); 5.88	9.89 (9.76 to 10.02); 5.61	7,078
Age 16/17 (wave 4)	12.01 (11.80 to 12.22); 6.12	11.70 (11.48 to 11.92); 6.52	11.85 (11.70 to 12.01); 6.33	6,732	10.85 (10.68 to 11.03); 5.81	9.77 (9.59 to 9.95); 5.92	10.32 (10.19 to 10.44); 5.89	8,493
Age 17/18 (wave 5)	12.49 (12.28 to 12.70); 6.15	11.99 (11.77 to 12.21); 6.69	12.24 (12.08 to 12.39); 6.43	6,753				

Age 18/19 (wave 6)	12.07 (11.85 to 12.29); 6.41	11.73 (11.50 to 11.96); 6.84	11.90 (11.74 to 12.06); 6.63	6,743				
Age 25 (wave 8)					11.51 (11.31 to 11.71); 5.64	11.81 (11.56 to 12.06); 6.42	11.65 (11.49 to 11.80); 6.00	5,611

Notes:

1. Data from secondary analysis sample. Participants were eligible to be included if they had complete data on exposure, core confounders, and at least one GHQ-12 at any time point. Sample size differs by time point (as indicated) based on when participants had provided GHQ-12 data.
2. Data are unweighted.
3. Grey cells indicate time points where data was not available for that cohort.

Table 3-5. Mean difference in symptoms of common mental disorders between young people who did and did not attend higher education from linear regression models.

Mean Difference (95% Confidence Interval)				
LSYPE2				
Model	**Age 14/15 (wave 2) N = 5,045**	**Age 16/17 (wave 4) N = 6,732**	**Age 17/18 (wave 5) N = 6,753**	**Age 18/19 (wave 6) N = 6,743**
Did not attend higher education	*Reference category*	*Reference category*	*Reference category*	*Reference category*
Model 1[a]	-0.38 (-0.74 to -0.01)	0.41 (0.09 to 0.72)	0.52 (0.20 to 0.85)	0.42 (0.07 to 0.77)
Model 2[b]	-0.74 (-1.09 to -0.39)	-0.06 (-0.38 to 0.25)	0.08 (-0.25 to 0.40)	0.16 (-0.18 to 0.50)
LSYPE1				
Model	**Age 14/15 (wave 2) N = 7,078**	**Age 16/17 (wave 4) N = 8,493**	**Age 25 (wave 8) N = 5,611**	
Did not attend higher education	*Reference category*	*Reference category*	*Reference category*	
Model 1[a]	0.55 (0.25 to 0.85)	1.11 (0.82 to 1.40)	-0.34 (-0.75 to 0.07)	
Model 2[b]	0.08 (-0.23 to 0.39)	0.60 (0.30 to 0.90)	-0.21 (-0.64 to 0.23)	

a. Model 1 is unadjusted.
b. Model 2 is adjusted for sex, ethnicity, parents' socioeconomic status, parents' highest qualification and family composition.

Notes:
1. Data from secondary analysis sample. Participants were eligible to be included if they had complete data on exposure, core confounders, and at least one GHQ-12 at any time point. Sample size differs by time point (as indicated) based on when participants had provided GHQ-12 data.
2. Each analysis is weighted using the weight from that time point.
3. Analyses are not adjusted for any confounders measured after age 14/15 (wave 2).

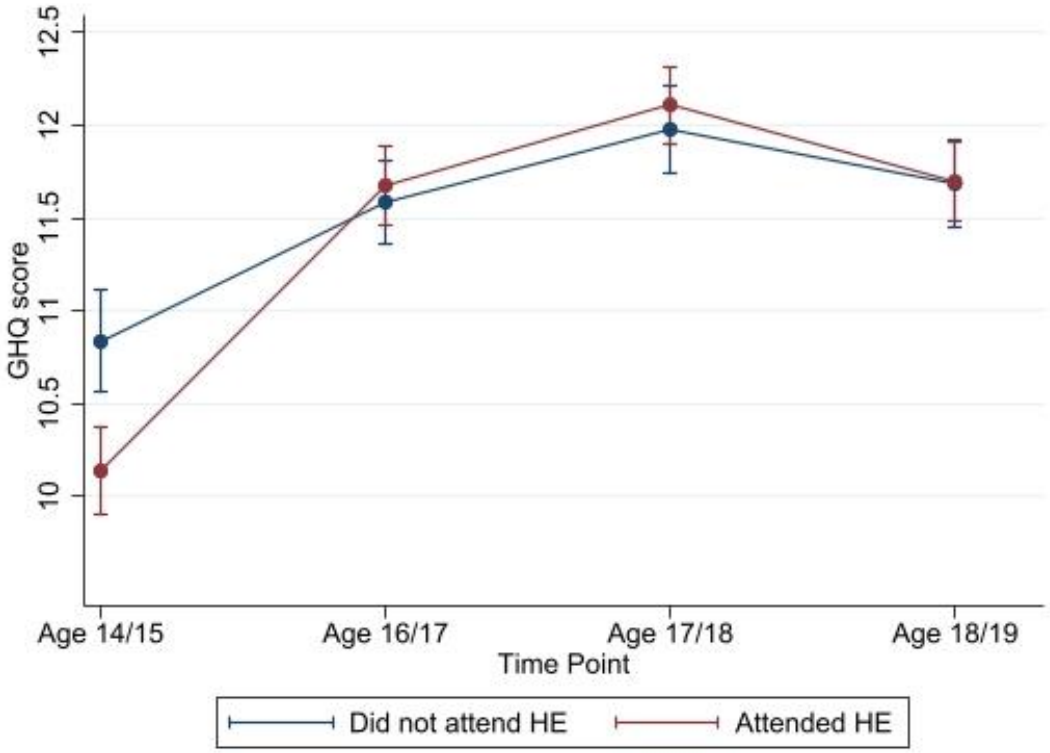


Figure 3-3. Change in symptoms of common mental disorders over time in young people who attended higher education compared with those who did not, in LSYPE2.

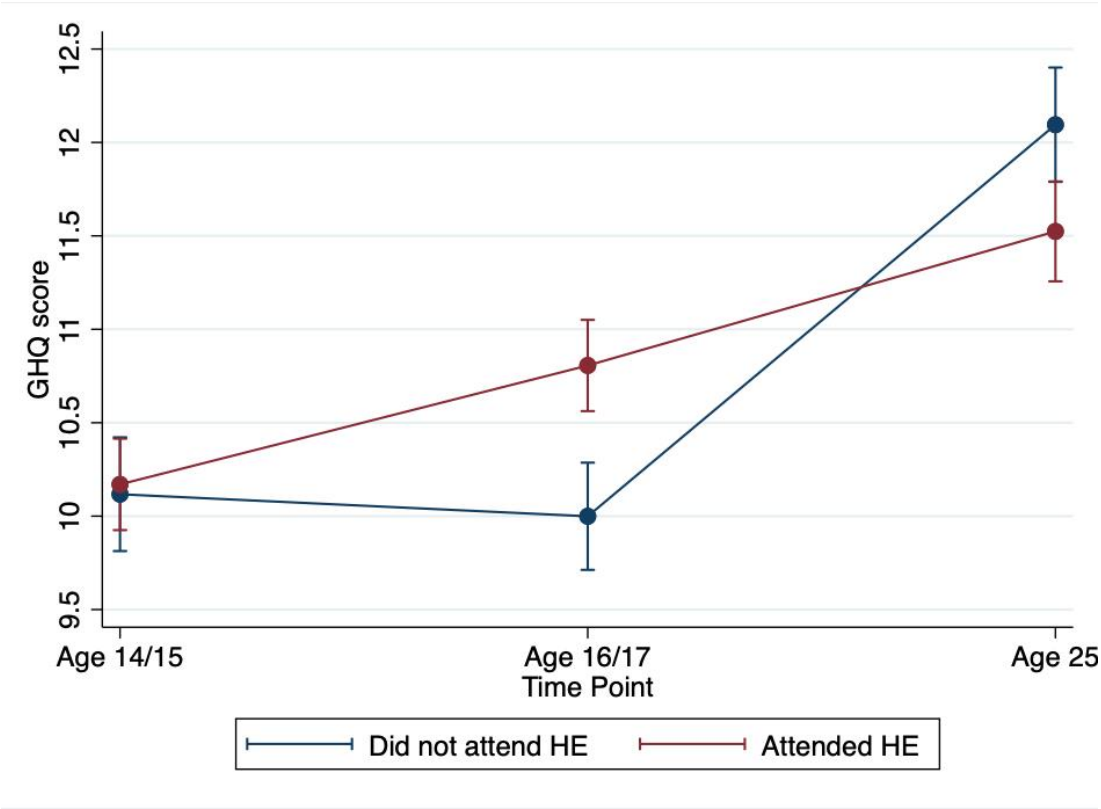


Figure 3-4. Change in symptoms of common mental disorders over time in young people who attended higher education compared with those who did not, in LSYPE1.

3.4.4 Sensitivity analyses

3.4.4.1 Binary outcome

A sensitivity analysis using the GHQ-12 as a binary outcome variable was conducted for the main analysis. The findings were largely unchanged from the main analysis with the GHQ-12 as a continuous outcome (see Table 3-6).

In LSYPE2, in the unadjusted model there was evidence that during higher education (at age 18/19), those who were attending higher education were 17% more likely to experience CMD (Model 1; 95% CI 1.03 to 1.32, p = .013) compared with those who were not. This estimate was largely unchanged after adjusting for all confounders and GHQ-12 score at age 16/17 (Model 7; odds ratio [OR] 1.17, 95% CI 1.02 to 1.34, p = .024). In LSYPE1, there was no evidence in any of the models of a difference in the likelihood of experiencing CMD between the two groups at age 25 (Model 7; OR 1.03, 95% CI 0.87 to 1.22, p = .743).

Table 3-6. Sensitivity analysis with common mental disorders outcome as a binary variable.

Model	Odds Ratio (95% Confidence Interval), p value	
	Age 18/19 (LSYPE2) N = 6,128	**Age 25 (LSYPE1) N = 4,832**
Did not attend higher education	*Reference category*	*Reference category*
Model 1[a]	1.17 (1.03 to 1.32), p = .013	0.95 (0.82 to 1.11), p = .509
Model 2[b]	1.11 (0.98 to 1.26), p = .105	0.93 (0.80 to 1.08), p = .323
Model 3[c]	1.08 (0.95 to 1.22), p = .247	1.00 (0.85 to 1.17), p = .959
Model 4[d]	1.13 (0.99 to 1.28), p = .064	1.06 (0.90 to 1.25), p = .492
Model 5[e]	1.15 (1.02 to 1.31), p = .027	1.08 (0.92 to 1.28), p = .358
Model 6[f]	1.22 (1.08 to 1.39), p = .002	1.11 (0.94 to 1.31), p = .222
Model 7[g]	1.17 (1.02 to 1.34), p = .024	1.03 (0.87 to 1.22), p = .743

a. Unadjusted model.
b. Adjusted for sex and ethnicity.
c. Model 2 plus parents' socioeconomic status, parents' highest qualification and family composition.
d. Model 3 plus antisocial behaviour and experienced bullying.
e. Model 4 plus alcohol use and cannabis use.
f. Model 5 plus carer status, general quality of health and disability status.
g. Model 6 plus GHQ-12 scores at previous wave - for LSYPE2, this is age 16/17 (wave 4) and for LSYPE1, this is age 17/18 (wave 5).

Notes:
1. Data from Analysis 1 complete case sample - N = 6,128 for LSYPE2 and N = 4,832 for LSYPE1.
2. Analyses weighted using weight from primary outcome wave – age 18/19 (wave 6) for LSYPE2 and age 25 (wave 8) for LSYPE1.
3. GHQ scores made binary by coding each item 0 or 1 - a score of 1 or 2 would be coded 0 and a score of 3 or 4 would be coded 1. The score across the 12 items is then totalled. Finally, any participant with a total score above 2 would be coded as 1, and scores of 2 and below would be coded as 0.

3.4.4.2 Gap year students

A sensitivity analysis was conducted for the main analysis categorising those in LSYPE1 who took a gap year before attending HE as not attending higher education, comparable with the data available in LSYPE2 (see Table 3-7). The findings were largely unchanged from the main analysis, in which these participants are included.

In the unadjusted model, there was evidence that at age 25 GHQ-12 scores were 0.44 (Model 1; 95% CI -0.84 to -0.03, p = .033) points lower in young people who had attended higher education compared with those who had not. Evidence of this association attenuated after adjusting for confounders (Model 6; MD 0.04, 95% CI -0.36 to 0.44, p = .836). In the fully adjusted model, there was no evidence of a difference in symptoms of CMD between the two groups (Model 7; MD -0.14, 95% CI -0.54 to 0.25, p = .480).

Table 3-7. Sensitivity analysis excluding those who took a gap year.

Model	**Mean Difference (95% Confidence Interval), p value**
	Age 25 (LSYPE1) **N = 4,824**
Did not attend higher education	*Reference category*
Model 1[a]	-0.44 (-0.84 to -0.03), p = .033
Model 2[b]	-0.49 (-0.89 to -0.09), p = .017
Model 3[c]	-0.30 (-0.70 to 0.09), p = .131
Model 4[d]	-0.16 (-0.56 to 0.24), p = .444
Model 5[e]	-0.08 (-0.48 to 0.33), p = .710
Model 6[f]	0.04 (-0.36 to 0.44), p = .836
Model 7[g]	-0.14 (-0.54 to 0.25), p = .480

a. Unadjusted model.
b. Adjusted for sex and ethnicity.
c. Model 2 plus parents' socioeconomic status, parents' highest qualification and family composition.
d. Model 3 plus antisocial behaviour and experienced bullying.
e. Model 4 plus alcohol use and cannabis use.
f. Model 5 plus carer status, general quality of health and disability status.
g. Model 6 plus GHQ-12 scores at previous wave - for LSYPE1, this is age 17/18 (wave 5).

Notes:

1. Categorises higher education variable using only data from age 18/19 (wave 6), comparable with the data available in LSYPE2.
2. Uses alternate Analysis 1 complete case sample – those with complete data on primary outcome, all confounders and exposure (now only coded using data from wave 6). N = 4,824.
3. Analyses weighted using weight from primary outcome wave – age 25 (wave 8) for LSYPE1.

3.4.4.3 Multiple imputation

Finally, sensitivity analyses were conducted using multiple imputation to address missing data (see Table 3-8 and

Table 3-9). The findings were largely unchanged from the main analysis, in which this data is missing for some participants.

In the first, I imputed missing data on outcome and confounders for all participants who provided exposure data and the outcome for at least one time point. The findings are presented in Table 3-8. In LSYPE2, in the unadjusted model there was evidence that during higher education (at age 18/19), GHQ-12 scores were 0.46 (Model 1; 95% CI 0.19 to 0.82, p = .011) points higher in young people who were attending higher education compared with those who were not. This estimate was largely unchanged after adjusting for all confounders and GHQ-12 score at age 16/17 (Model 7; MD 0.39, 95% CI 0.09 to 0.70, p = .011). In LSYPE1, there was no evidence in any of the models of a difference in symptoms of CMD between the two groups at age 25 (Model 7; MD -0.15, 95% CI -0.51 to 0.22, p = .432).

In the second, I imputed missing data on exposure, outcome and confounders for all participants. The findings are presented in

Table 3-9. In LSYPE2, in the unadjusted model there was evidence that during higher education (at age 18/19), GHQ-12 scores were 0.41 (Model 1; 95% CI 0.06 to 0.75, p = .020) points higher in young people who were attending higher education compared with those who were not. This estimate was only slightly attenuated after adjusting for all confounders and GHQ-12 score at age 16/17 (Model 7; MD 0.35, 95% CI 0.05 to 0.65, p = .024). In LSYPE1, there was no evidence in the adjusted or fully adjusted models of a difference in symptoms of CMD between the two groups at age 25 (Model 7; MD -0.17, 95% CI -0.54 to 0.20, p = .356).

Table 3-8. Mean difference in symptoms of common mental disorders between young people who did and did not attend higher education, in sample with complete exposure data (missing data on outcome and confounders imputed).

Model	**Mean Difference (95% Confidence Interval), p value**	
	Age 18/19 (LSYPE2) N = 6,916	**Age 25 (LSYPE1) N = 9,586**
Did not attend higher education	*Reference category*	*Reference category*
Model 1[a]	0.46 (0.19 to 0.82) p = .011	-0.25 (-0.59 to 0.09) p = .142
Model 2[b]	0.29 (-0.05 to 0.63) p = .096	-0.31 (-0.65 to 0.03) p = .071
Model 3[c]	0.22 (-0.13 to 0.57) p = .216	-0.13 (-0.50 to 0.24) p = .501
Model 4[d]	0.33 (-0.01 to 0.67) p = .058	0.02 (-0.35 to 0.39) p = .914
Model 5[e]	0.39 (0.05 to 0.73) p = .026	0.07 (-0.03 to 0.44) p = .722
Model 6[f]	0.62 (0.29 to 0.95) p < .001	0.17 (-0.20 to 0.54) p = .360
Model 7[g]	0.39 (0.09 to 0.70) p = .011	-0.15 (-0.51 to 0.22) p = .432

a. Unadjusted model.
b. Adjusted for sex and ethnicity.
c. Model 2 plus parents' socioeconomic status, parents' highest qualification and family composition.
d. Model 3 plus antisocial behaviour and experienced bullying.
e. Model 4 plus alcohol use and cannabis use.
f. Model 5 plus carer status, general quality of health and disability status.
g. Model 6 plus GHQ-12 scores at previous wave - for LSYPE2, this is age 16/17 (wave 4) and for LSYPE1, this is age 17/18 (wave 5).

Notes:

1. N = 6,916 for LSYPE2 and N = 9,586 for LSYPE1.
2. Analyses weighted to represent the target population using the sample weight from wave 1.

Table 3-9. Mean difference in symptoms of common mental disorders between young people who did and did not attend higher education, in total possible sample (missing data on exposure, outcome and confounders imputed).

Model	**Mean Difference (95% Confidence Interval), p value**	
	Age 18/19 (LSYPE2) N = 13,100	Age 25 (LSYPE1) N = 15,770
Did not attend higher education	*Reference category*	*Reference category*
Model 1[a]	0.41 (0.06 to 0.75) p = .020	-0.31 (-0.64 to 0.03) p = .073
Model 2[b]	0.24 (-0.10 to 0.58) p = .171	-0.36 (-0.69 to -0.02) p = .037
Model 3[c]	0.17 (-0.18 to 0.53) p = .343	-0.15 (-0.52 to 0.22) p = .411
Model 4[d]	0.29 (-0.06 to 0.64) p = .104	0.00 (-0.37 to 0.38) p = .991
Model 5[e]	0.35 (0.00 to 0.61) p = .049	.056 (-0.33 to 0.44) p = .772
Model 6[f]	0.59 (0.25 to 0.93) p = .001	0.16 (-0.22 to 0.55) p = .396
Model 7[g]	0.35 (0.05 to 0.65) p = .024	-0.17 (-0.54 to 0.20) p = .356

a. Unadjusted model.
b. Adjusted for sex and ethnicity.
c. Model 2 plus parents' socioeconomic status, parents' highest qualification and family composition.
d. Model 3 plus antisocial behaviour and experienced bullying.
e. Model 4 plus alcohol use and cannabis use.
f. Model 5 plus carer status, general quality of health and disability status.
g. Model 6 plus GHQ-12 scores at previous wave - for LSYPE2, this is age 16/17 (wave 4), for LSYPE1, this is age 17/18 (wave 5).

Notes:

1. N = 13,100 for LSYPE2 and N = 15,770 for LSYPE1.
2. Analyses weighted to represent the target population using the sample weight from wave 1.

3.5 Discussion

In this study, I investigated whether attending higher education is associated with increased symptoms of CMD in young people in England, during and after attendance (**Objective 1**). I also investigated whether young people in England who go on to attend higher education have more symptoms of CMD during secondary school compared to those who do not (**Objective 2**). To do this, I used data from two cohort studies in England, LSYPE1 and LSYPE2, to compare CMD symptoms among young people who attended HE with those who did not, from ages 13 to 25.

3.5.1 Summary of findings

In my main analyses, I found evidence that young people who attend higher education have worse mental health while they are in higher education, but that by the age of 25 their mental health is similar to their peers who did not attend higher education. I had hypothesised that higher education attendance would be associated with CMD, such that those who attend would experience more symptoms of CMD than those who do not (**Hypothesis 1**). The finding for during higher education is in line with this, but the finding that there was no difference after higher education at age 25 is contrary to my hypothesis.

In my secondary analysis of LSYPE1, young people who would later attend higher education had more symptoms of CMD than those who did not, at age 16/17 but not at age 14/15. In LSYPE2, I found evidence that young people who would later attend higher education had better mental health than their peers, at age 14/15 but not at any other time point during secondary school. I had hypothesised that there would be no difference (**Hypothesis 2**).

3.5.2 Strengths and limitations

3.5.2.1 Strengths

This is the first study that I am aware of to investigate the trajectory of CMD symptoms among those who attend higher education and those who do not, in a representative sample of young people in England. The LSYPE cohorts enabled longitudinal

measurement of young people's mental health before, during and after higher education, building a fuller picture of when differences between the groups may be present. This has not been done in previous research (see Chapter 2). Longer-term follow-up of the young people at age 25, after the transition out of higher education and into adulthood, is another strength. This has not been done before, and has implications for understanding the longer term outcomes of those who attend higher education (see Section 3.5.3.1). Similarly, previous research has not explored whether differences between those who attend HE and those who do not pre-dates higher education attendance. Providing some evidence towards understanding whether, and when, there may be differences during secondary school between these groups is valuable and has implications for the timing and focus of interventions (see Section 3.5.3.2).

This study also addresses several of the limitations present in the existing literature. Using prospective cohort studies allowed me to compare HE students with their age-matched peers from within the same sample, whereas prior studies often combined samples from different surveys[47,66,77] (see Chapter 2). My approach is less susceptible to bias and allows more valid conclusions to be drawn. The existing research also typically does not measure student status robustly. As the LSYPE cohorts were designed as sources of data on young people's education, HE student status was measured in detail. This ensures that my exposure categorisation is valid, including those studying qualifications such as level four NVQs and teacher training as well as university degrees. Many existing studies, such as those by Tabor et al.[85] and McManus et al.[84] (see Chapter 2), focus on those who are attending a university. This could result in categorising some of those who are attending other forms of higher education in the unexposed group and underestimating the difference between groups. Additionally, the LSYPE cohorts are rich datasets with a large number of variables, which means that I was able to adjust for a range of possible confounders, something that the existing literature has typically failed to do[84,85] (see Chapter 2). This is important to ensure that any observed differences in outcomes between the groups are not a result of differences in who attends HE and who does not.

The LSYPE cohorts were designed to be nationally representative, used extensive and robust recruitment and sampling procedures, and contain a large number of participants. The researchers also over-sampled from certain groups that are typically

underrepresented in research, such as those eligible for free school meals. The response rate (at the individual level) for LSYPE2 was 71% and for LSYPE1 was 74%[105]. The datasets also contained both sample and attrition weights that allowed me to effectively account for missing data. Overall, this strengthens my findings in terms of their representativeness and generalisability to the population of young people in England. Furthermore, the LSYPE cohorts are two of the most contemporary sources of data on young people's education and health in England – many young people in LSYPE2 will have entered higher education in 2018 or 2019 and so some may still be attending. This makes my study the most up to date on this topic, and means that the conclusions drawn from my analyses are relevant to current policy.

Finally, a strength of this study is the use of the GHQ-12. The GHQ-12 is a brief instrument measuring CMD symptoms, shown to work as well as the longer version of the GHQ while being more practical[91]. It has been widely used and well-validated in both community and primary care settings, and among young people in the UK and worldwide[92,106]. It has also been found to have good reliability and validity in student samples[107,108]. Gender, age and educational level have not been found to impact the validity of the GHQ[91].

3.5.2.2 Limitations of the sample

Although there are many advantages of the LSYPE cohorts, they only cover young people who attended secondary school in England. This ensures that all participants are subject to the same educational policies but means that my findings are not necessarily generalisable beyond England. For example, young people in Scotland are typically slightly younger when they attend higher education (age 17/18) due to differences in the educational system. Additionally, higher education students who are from Scotland and studying in Scotland do not pay tuition fees, so have much less student loan debt than those in England (approximately one third, on average)[109]. Both of these factors could mean that the association between higher education and mental health differs in Scottish samples. Nevertheless, studies in this area typically group all UK participants together, and the reports of increases in mental health problems among students have come from across the UK including Scotland specifically[110]. However, I cannot rule out that findings may be different among young people in other parts of the UK.

Student status was measured at age 18/19 in both cohorts and additionally at age 19/20 in LSYPE1. This means that my findings are not necessarily generalisable to postgraduates and mature students who attend higher education at a later age. These groups are often in different situations to those attending HE at 18 years old, for example they are more likely to be studying part-time (28% vs 18% in 2019/20[20]) and due to their age may already be established in a career or have caring responsibilities. It has been reported that mature students experience greater changes to their lifestyle in the transition to higher education[31], but also that they may be less vulnerable to experiencing poor mental health during HE than younger students[34]. This could mean that the association between higher education and mental health differs for these students as well.

There was a large amount of missing data on the exposure in both cohorts, which meant that a large proportion of participants could not be included (47% in LSYPE2 and 39% in LSYPE1). This is largely due to the fact that the exposure was measured at waves 6 and 7, so attrition had occurred since wave 1. Similarly, there was a large amount of missing data on the outcome at age 25 in LSYPE1 as a result of attrition. This is likely due to the large gap in time between wave 7, when participants were age 19/20, and wave 8 when participants were age 25. I cannot rule out that a different pattern of findings may have been present in those who dropped out of the study; attrition may have lead to selection bias. For example, it could be that students with mental health problems were more likely to drop out than non-students with mental health problems, as they had moved away from home and were busy with their higher education. This may have led to an underestimation of the difference between the two groups during HE. Also, the smaller sample size may have meant that my analyses were underpowered to detect an effect at age 25. However, my findings were unchanged when using multiple imputation to estimate the possible influence of both of these instances of missing data, indicating that this is unlikely to be the case.

3.5.2.3 Limitations of the measures

Using secondary data meant that I was constrained by the time points at which my outcome was measured, and this differed across cohorts. For example, CMD symptoms were only measured during HE in LSYPE2 and after HE in LSYPE1. It is therefore not

possible to conclude whether the different findings observed (a difference between groups during HE and no difference after HE) are due to the different measurement time points or to differences between the cohorts. LSYPE2 was conducted nine years after LSYPE1, and there may have been changes in young people's mental health and the higher education environment over the last decade. It could be that higher education had a negative impact on young people's mental health in the more recent LSYPE2 cohort, but not in LSYPE1. There have been reports of increases in academic pressure (e.g. workload and exam stress) and an overall deterioration in the mental health of young people in the time between cohorts[13–16,18], which would support this argument. Where CMD symptoms were measured at the same time in both cohorts, scores are higher in LSYPE2 overall and in both groups separately (see Table 3-4). Once there are data available for the LSYPE2 cohort at later ages it will be possible to investigate whether the LSYPE2 data at age 25 correspond with my findings from LSYPE1. This would provide support for my conclusion that the difference in findings for the main analysis are due to the different time points (during and after HE), and not the different cohorts.

I was also constrained by how the demographics questions were asked in the cohorts. In LSYPE1, participants' sex was determined to be either male or female by the interviewer's judgment. In LSYPE2, participants' sex was assumed by the interviewer and confirmed, with no question text as such ("Respondent is...?"). It would have been more valid to ask this using a standardised question, to avoid any assumptions being made by the interviewer. It would also be preferable to ask for the participant's gender, to more accurately reflect gender diversity in the population and individuals' experience of their gender.

Other threats to the validity of the findings in this thesis will be discussed in detail in Chapter 6.

3.5.3 Meaning of findings

3.5.3.1 Main analysis: During and after higher education

My findings suggest that attending higher education is a risk factor for experiencing mental health problems at age 18/19 (during HE), with young people who attend HE

experiencing more symptoms of CMD than those who do not. There are many stressors associated with student life that those in the general population would be less likely to experience at age 18/19, such as taking on large student loans, moving away from family and friends, and increased academic pressure, which may explain this. These findings provide support for the existing literature, reports and concerns regarding poor mental health among students in the UK and globally (see Chapter 2).

However, I also did not find any evidence of a difference between groups at the age of 25. By this age, the majority of those who attend HE will have completed their qualification(s); only 11% of HE students are aged between 25 and 29 years[20]. In this study, the majority of those in the HE group are full-time undergraduate students who began a three- or four-year degree at age 18. This suggests that the CMD symptoms students experience during higher education might not have a long-term impact on their mental health after they have left.

One explanation for this is that by age 25, when students have left higher education and potentially experienced the financial and employment benefits of their qualifications, they recover from the impact of higher education's stressors and their mental health improves. This would be in line with evidence that those of a higher socioeconomic status have better mental health than those of a lower socioeconomic status during adulthood[44,57,111]. It may be that after higher education, students' mental health improves and continues to do so as a result of the benefits of HE qualifications, while those who did not attend higher education do not experience this. Nevertheless, existing research may be outdated given the modern challenges facing recent graduates, such as a highly competitive job market.

It is also possible that students' mental health suffers in their first year of higher education (at age 18/19), but then improves soon after. Adapting to higher education, a new home, new friendships and more independent living are all difficult transitions that are usually made at this time and could be detrimental to students' mental health[29–32,41] (see Section 2.4). This is likely to improve by students' second year of HE, when they are more settled and have acclimatised to the HE experience. This would not necessarily be the case for those who do not attend higher education, who are less likely to experience

stressors such as moving out of their family home at this time[30,112,113]. In this way, adjusting to higher education would be a risk factor for experiencing a temporary increase in symptoms of CMD in students' first year.

Those who already experience mental health problems may experience a deterioration in their mental health which they may not have if they did not attend higher education. For example, moving home will mean being away from their usual support systems and services. It could then improve later on when they establish new support systems and contact with services in their institution or new location. However, it does not appear that my findings are driven by a large increase in symptoms among a few students or by an increase among students who were already experiencing high levels of symptoms. My sensitivity analysis using a binary outcome variable to indicate the number of participants scoring over a symptom threshold found very similar results to the main analysis, which uses a continuous outcome.

There may also be differences between groups in terms of mental health before higher education. It may be that those who attend HE already have worse mental health beforehand, and this difference is exacerbated or sustained by their experience of higher education[114]. My secondary analysis attempted to address this explanation.

3.5.3.2 Secondary analysis: Before higher education

My secondary findings differed between the two cohorts and the various time points. At age 14/15, I found that future higher education students had better mental health, in LSYPE2 but not LSYPE1. At age 16/17, I found that young people who would later attend higher education had more symptoms of CMD than those who did not, in LSYPE1 but not LSYPE2. I did not find a difference between groups at age 17/18 in LSYPE2.

The findings at age 14/15 differ between cohorts, and the LSYPE2 result is the only finding indicating that HE students have better mental health than their peers. In my sample, I observed that students who later attend HE are generally less disadvantaged in terms of demographic characteristics and early experiences (see Table 3-2). They generally came from higher socioeconomic backgrounds and were less likely to report poor general health or have been bullied, which may explain the difference in CMD symptoms between

groups at this age[115]. This difference could disappear or begin to reverse by the time students reach age 15/16, the school year in which they will complete their General Certificates of Secondary Education (GCSEs). All young people may experience a worsening of CMD symptoms in response to this stressor, but those who are hoping to attend HE may be more affected due to the academic pressure of achieving the necessary grades. This theory is supported by the trajectory of symptoms shown between the age 14/15 and age 16/17 time points in both LSYPE1 and LSYPE2 (see Figure 3-3 and Figure 3-4).

Although my secondary analysis categorises participants by whether they will later attend HE, it is important to note that this is not necessarily pre-determined throughout secondary school. Some participants who do not attend HE may have been expecting to at age 14/15. Some of the explanations for differences between groups, such as academic pressures on those who intend to progress to HE, would apply to these participants at this point. There may be factors outside their control that mean they do not end up attending higher education at age 18/19. This could mean that I have underestimated the differences between groups during secondary school. Furthermore, as the outcome occurs before the exposure of higher education attendance, reverse causation should be considered. It may be that the sociodemographic advantages and good mental health enjoyed by the HE group in childhood and early adolescence are the reason they are later able to attend HE. Research has found an association between mental health in early adolescence and educational attainment at age 16, such that those who experience more mental health difficulties are less likely to gain five or more GCSE qualifications[116]. In line with this, Auerbach et al.[61] found that being diagnosed with a mental health problem as a teenager was associated with reduced odds of going to university and, among those who did go, increased odds of dropping out of university.

One possible explanation for the discrepant findings at age 16/17 is that in the time between the two cohorts the law changed making post-16 education or training compulsory for all students. At age 16/17 in LSYPE1, young people who did not intend to attend higher education could have already left school or college, whereas those who did have this intention would have had to stay in education. This could explain why, at this time, those who intended to attend higher education had worse mental health than

those who did not; they were still in education, struggling with stressors such as academic pressures, A Level study and concerns about getting onto their chosen course. Meanwhile, their peers had left compulsory education and were pursuing an occupation of their choosing without these stressors. Evidence for this can be seen in Figure 3-4; CMD symptoms increase in the HE group between ages 14/15 and 16/17, whereas their peers show little change in symptoms with a trend towards a slight decrease. This is not the case in LSYPE2, as post-16 education or training was compulsory for all students, meaning that all participants were subject to the stressors associated with education and training and there is no difference between groups. This would also explain the lack of a difference between groups at age 17/18 in this cohort.

In contrast to the main analysis, my secondary analysis did not find evidence of a difference between the two groups at age 18/19 in LSYPE2. This is because the longitudinal models used in the secondary analysis only include the confounders that were measured before the earliest time point (age 14/15). The complete case samples for the two analyses also differ as a result. I observed a strong pattern of negative confounding for these additional confounding variables in the main analysis. My main finding of students having worse mental health than their peers during higher education but not afterwards therefore remains the most accurate representation of differences during and after higher education.

3.5.4 Implications of findings

My main findings have implications for higher education institutions, governmental policy, and mental health support for young people. If young people in higher education are more at risk of experiencing common mental disorders than their peers who are not in higher education, this points to the need for preventing mental health problems within HE institutions. Institutions have a duty of care to protect the health and safety of their students, and hold influence over students' lives, including parts of their social and living situations and their workloads. This means that institutions are in a unique position to support students' mental health and wellbeing, but my research highlights that at present not enough is being done. At a government and policy level, it needs to be ensured that

there is enough funding for institutions to support students who are struggling with their mental health and implement wider initiatives focused on prevention.

If it is the case that overall students' mental health improves when they have left higher education (perhaps considered as a 'short term pain for long term gain'), this does not diminish the importance of supporting students while they are studying. Symptoms of CMD can have lasting adverse effects, including academic underperformance, weakened social relationships, poor physical health, and increased risk of suicide and self-harm[11,12,117]. Furthermore, as those who attend higher education are usually a more socially and economically privileged group, both before and after higher education (see Section 3.5.3.2), it would usually be expected that they would have better mental health than their peers[44,57,111]. That their mental health at age 25 is not significantly different from those who do not attend HE could also represent a worsening of mental health on their part from where they may otherwise have been if they had not experienced HE as a stressor. This is something that needs further research. Moreover, higher education among young people is a major determinant of prosperity and development for countries as well as individuals[118]. If educational achievement is limited by students' mental health, it is an issue for everyone to contend with.

While I believe that my findings make an important contribution to the literature in this area, the effect sizes I have observed are small. It remains to be seen whether the increased CMD symptoms seen in those who are attending HE compared with those who are not (a mean difference of 0.36 of a point on the GHQ-12) are of clinical and public health importance. Nevertheless, my sensitivity analysis using the binary threshold to identify possible cases of CMD found that students were 17% more likely to experience CMD than their peers (see Table 3-6). Considering the large number and high proportion of young people who attend HE, this would represent a substantial number of cases.

Most people with common mental disorders never seek or receive treatment[119]. My finding suggests that closing this so-called "treatment gap"[120] is important in higher education settings as well as in the general population of young adults. To do this requires funding to ensure there is a variety of treatment and support options available within HE institutions and the National Health Service (NHS) that can be tailored to young adults[32].

There is also the need for funding for research to understand which treatments are likely to be the most effective. Moreover, continuity of care is an issue for young people who are already in touch with mental health services when they move away to attend HE[30]. Governmental policy, funding and initiatives could address these issues, some of which are already in motion, as highlighted in Section 2.6. One area where progress is needed, is linkage and partnerships between HE institutions and NHS services[32]. It is also important to note that we should not only focus attention and resources on those who attend higher education, as it has been posited that this could lead to the widening of socioeconomic inequalities in mental health symptoms and treatment[121].

My secondary findings suggest that there may be a role for secondary and further education in improving young people's mental health. It may be the case that young people experience a worsening of symptoms during secondary school due to exams if they are hoping to attend HE, or not being able to leave full-time education at 16 if they are not (see Section 3.5.3). It could also be that in the years before attending higher education, the academic pressure of getting into HE and the anticipation of the upcoming transition period affects young peoples' mental health in advance. Further research is needed to better understand the role academic pressure plays in young people's mental health during secondary school.

Regardless of the explanation, research including mine suggests that young people experience increased symptoms of CMD as they progress through secondary school[122], and this could be mitigated with a focus on prevention and early intervention in schools and colleges[115]. Programmes could focus on improving pupils' coping skills for dealing with academic pressure (regardless of whether students are high achievers or struggling academically), enhancing access to social support, and transitioning out of secondary education into higher education or other occupations[28,123].

3.5.5 Future directions

It is unclear what it is about higher education that makes it a risk factor for mental health problems for the young people who attend. Further research is needed to identify aspects of the higher education experience that may make students more vulnerable to mental health problems, and to investigate possible mitigations for these. Changes could

then be implemented by universities and other higher education institutions. My findings suggest a focus on temporary stressors not typically experienced by those who are not attending HE. A prospective cohort study of HE student mental health, measuring mental health symptoms and possible risk factors typically experienced by students but not their peers, would provide valuable insights. Avenues to explore include financial stressors such as student loans, social pressures such as forming new support systems, and academic stressors such as workload and examinations[27,28,124]. These may have a negative impact on students' mental health, and are also areas in which students are likely to differ from their peers who have not transitioned to higher education. This could further our understanding of why students appear to experience worse mental health while in HE but not afterwards, as I found in Chapter 3. As mentioned above (see Section 3.5.4), these are also often areas where higher education institutions have some control or opportunity to intervene - if it were found that social pressures, for example, were contributing to poor mental health among students, they could provide more social spaces and events.

As the LSYPE2 data is contemporary, data from later time points are not yet available, but will be in the future. When the participants reach age 25 (wave 8), it will be important to investigate whether there is a difference in CMD symptoms between those who attended HE and those who did not. If this finds no difference, as in LSYPE1, this would provide further evidence for my conclusions. This would also allow us to confirm that the different findings between the 'during HE' and 'after HE' analyses presented here are due to changes in mental health as participants age, rather than differences between cohorts. Additionally, if GHQ-12 data were available for LSYPE2 at the subsequent waves (ages 19/20 and 20/21; waves 7 and 8), this would allow us build a picture of students' mental health during higher education. Then conclusions could be drawn regarding students' mental health throughout HE, rather than relying on the age 18/19 data from students' first year when they may be struggling with the transition to HE. Additionally, there will be other datasets available in time that will allow for corroboration of my findings and further understanding of this topic. For example, the Millennium Cohort Study (MCS) age 22 wave will be conducted in 2022 and will include questions on education and mental health[125]. This would provide a measure of young people's mental health soon after

higher education, which was not possible in the present study. This could help to understand when any difference between groups in terms of mental health disappears.

3.5.6 Conclusions

In conclusion, I have provided evidence that young people who attend higher education experience more symptoms of CMD than those who do not, during higher education but not after they have left at age 25. These findings suggest that higher education institutions should do more to support students' mental health while they are studying. Additionally, I found mixed evidence of differences during secondary school between young people who eventually attend HE and those who do not, suggesting a role for schools in preventing and identifying CMD symptoms. My findings suggest that examining risk factors within the higher education student experience is a promising avenue for future research, to inform preventative policies and interventions to improve students' mental health.

Chapter 4 Students' financial situation and mental health: a rapid review

4.1 Summary

In this chapter, I rapidly review the peer-reviewed evidence on the association between financial situation and mental health among higher education students in the UK (**Objective 3**). To do this, I conducted a rapid review to provide a detailed understanding of the existing literature and its limitations, as a foundation with which to design and conduct the SENSE study (presented in Chapter 5). This included any peer-reviewed evidence on the association between financial situation and mental health among higher education students in the UK, published before November 2018. There are four main domains of financial situation: income, debt, financial difficulties and financial concern. My review found that only the latter three have been investigated in the literature so far.

Eleven studies were included in the review and narratively synthesised, grouped by domain of financial situation. There was some evidence that financial concern was associated with mental health, in particular depression and anxiety, though this relies mostly on cross-sectional studies. There was little evidence of an association between debt and mental health, though existing evidence was outdated, particularly with respect to recent changes to the higher education funding system in England. It appears that experiencing financial difficulties may be associated with poor mental health in students, but much of the existing evidence relies on single-item measures. Longitudinal findings were mixed, but suggested that financial difficulties may be longitudinally associated with symptoms of depression. I concluded that there is a need for up-to-date longitudinal evidence that adjusts for a range of confounders, particularly socioeconomic variables, and uses a range of financial situation measures to make a fuller assessment of students' financial situation and its potential associations with mental health.

4.2 Background

4.2.1 Rationale

As established in Chapter 2, it is important when seeking to further understand risk factors for mental health problems among students that we explore the ways in which those in higher education may differ from those not in higher education. One such area is their financial situation. Students' main occupation does not generate income, and most students accumulate debt and rely on student loans and part-time employment. Many are managing their finances independently for the first time in their lives. As this financial situation is a temporary stressor for students and changes upon graduation, it could be one reason why students experience worse mental health than their peers during higher education but not afterwards (see Chapter 3). Students' financial situation is also influenced heavily by governmental and HE institutional policy, meaning that it could be addressed at these levels. The possibility that students' financial situation could cause mental health problems is therefore a promising area for research, and has potential for preventing and alleviating mental health problems in students.

Student finances have been a topic of increased attention in the past ten years in the UK. Higher education participation has expanded, with particular interest in encouraging those from underrepresented groups to attend[23,24]. There have also been significant changes to the cost and funding of higher education. This comes alongside widespread focus on the mental health of young people and students, as discussed in Chapter 2. As a result, there is often discussion by HE institutions, policymakers, clinicians, researchers and the general public on the possible impact of students' financial situation on their mental health.

With this in mind, and to inform the design and analyses of Chapter 5, in this chapter I have explored the existing evidence on the association between the different domains of financial situation and mental health. As part of this process, I conducted a rapid review of the peer-reviewed evidence on the association between financial situation and mental health among higher education students in the UK. My objective was to rapidly review

the peer-reviewed evidence on the association between financial situation and mental health among higher education students in the UK (**Objective 3**).

Rapid reviews are a streamlined approach to evidence synthesis, representing an efficient alternative to traditional systematic review methods[126] (see Section 4.4.1). They are particularly helpful when a pragmatic approach is preferable to a gold standard systematic review that could take years to complete. Rapid reviews are increasingly used in evidence synthesis and often yield similar findings to full systematic reviews[127,128], particularly if multiple databases are searched[129], as they were in this study. I chose to conduct a rapid review as a more pragmatic and efficient alternative to a full systematic review within the time I had available. This ensured that I could use the findings to inform the design of the SENSE study (see Chapter 5) within the timeline of my PhD. Rapid reviews yield valid inferences on the research topic addressed, albeit with less certainty than a full systematic review[130].

This rapid review has since been published in the Journal of Epidemiology and Community Health[124] (see Appendix 1), but an adapted version is included as part of this chapter. The rapid review was funded by Blackbullion (www.blackbullion.com). The methods, analyses and write-up were completed independently of the funders.

4.2.2 Context

In 1998, tuition fees were introduced in England alongside governmental student loans with income-contingent repayment terms. Yearly tuition fees increased from £1,000 in 1998 to £3,000 in 2006, and then to £9,000 in 2012. The latter change represents the largest one-year increase in the cost of higher education ever seen worldwide (from 2011 to 2012)[131], which also means there was a substantial increase in student loan debt. Since then, non-repayable governmental grants for living costs were abolished and replaced with loans in 2016, again increasing student loan debt. Brown[132] notes that the growing competition for a static number of jobs in the graduate labour market has also led to more demand for postgraduate qualifications to gain a competitive advantage. This means that, on top of large undergraduate student loans, many students also now take out postgraduate student loans, again increasing their level of debt.

In the UK, the "widening participation" policy agenda that began in around 2004 has seen more young people attending higher education each year since. There are now approximately 2.5 million students in the UK[20]. This has resulted in many more students from lower socioeconomic or low-income backgrounds[23,24]. Students from low-income backgrounds take on the most student loan debt in England, as maintenance loans are means-tested, and are more concerned about taking on debt (debt-averse)[133–135]. Similarly, while most higher education students (66% in 2021[86]) rely on financial support from their parents, this may not be an option for some students from lower-income backgrounds, or may put excessive strain on their families and cause stress[65]. Students from low-income backgrounds are more likely to take on paid employment[65], which may negatively impact their studies and act as an additional stressor[136–138]. Overall, the increased numbers of students from lower-income backgrounds has led to concerns that they are struggling financially, which could negatively affect their academic attainment, mental health and overall higher education experience[41,137].

Economists have noted that individuals borrowing money to fund education is a sensible investment, with good rates of return in the long term[139,140]. The high cost of higher education means that without student loans, many would not be able to attend at all. Human capital theory[141] states that we make economically rational decisions about education, and higher education generally wins in a cost-benefit analysis[142]. The economic benefits include increased earning potential and access to high-earning careers[142]. Nevertheless, before the benefits there is time spent studying with little to no regular income, known by economists as opportunity cost[140,143]. This approach also ignores the potential psychological impact of this lack of income and of student loans. For many students, the transition to higher education is also the first time they have been independently responsible for their finances, which can be difficult to manage[140].

Stewart-Brown et al.[66] found that while money problems were the second most common cause of worry among both students and the general population, the frequency of these worries differed; 52% of students worried about money often or most days, while only 25% of the general population did. Globally, higher education students consistently report that their financial situation affects their mental health, and it is often highlighted as their biggest concern alongside academic work[31,65,144,145]. For example, 65% of UK

university students (from a sample of 2,038) reported in 2021 that their mental health suffers as a result of their financial situation[145], and a US study found that four out of the top five stressors ranked by students were related to finances[146]. An international study by the WHO reported that, globally, 69% of higher education students experienced at least mild stress about their financial situation[147]. Among US students who had attempted suicide, 78% cited their financial situation among their reasons for doing so[148]. It is therefore important to understand more about the association between students' financial situation and their mental health.

4.3 Introduction

4.3.1 Defining financial situation

Financial hardship is an indication of the deprivation experienced as a result of a lack of financial resources, relative to one's own needs[149,150]. These needs can encompass food, shelter, warmth, leisure and social participation[46,149]. An individual's financial situation can be seen as their level or likelihood of experiencing financial hardship.

Defining and measuring financial situation is difficult due to its complexity. There are four main domains commonly used. The most common is income, which can be defined as "a gain or recurrent benefit usually measured in money that derives from capital or labour"[151]. In the UK, this often refers to an individual's annual salary earned through employment, but for students it may be more helpful to think of it as the amount of money coming in (as it could be from parents, for example). The second is debt, defined as "being under obligation to pay or repay someone or something in return for something received; a state of owing"[152]. This usually refers to the amount that an individual owes in loans, which may be of various types or from various sources, including payday loans (short-term borrowing with high interest rates) and student loans (long-term borrowing with lower interest rates). However, Frankham[150] notes that, while important, these two domains are not necessarily a reliable or effective indicator of the financial resources individuals have available or how this relates to their needs.

The third domain is financial difficulties, which has been defined as having insufficient economic resources to meet essential costs[153]. In this way, financial difficulties can be seen as a measure of whether someone is experiencing financial hardship, and its severity[149]. Measuring financial difficulties allows an insight into the impact on a person's life their finances (including income and debt) are having. Financial difficulties measures aim to establish the extent to which individuals can afford to pay for necessities, such as utility bills, rent or mortgage payments and groceries[149]. While this is likely to be influenced by income, it also takes into account costs of living and the day-to-day impact of struggling financially. Nevertheless, some people may be able to financially meet their

basic needs but still be struggling to pay off debts, or be on a high income but unable to pay for necessities due to poor budgeting.

Lastly, financial concern (also sometimes referred to as financial wellbeing) measures the amount of stress or worry individuals feel over their current and future financial situation[154]. This takes into account the individual's perception of their finances. Two people who have different incomes or amounts of debt could have the same level of financial concern, and two people with the same amount of debt could have different levels of concern. The multilevel model of economic stress asserts that financial concern (i.e. subjective financial situation) is a mediator of the relationship between one's objective financial situation (i.e. the ability to meet financial needs) and their mental health[155].

Overall, a broad view of financial situation is preferable, taking into account all of these four domains: an individual's debt and income as well as any financial difficulties experienced and their level of financial concern.

4.3.2 Financial situation and mental health in the general population

Financial hardship could be both a cause and a consequence of poor mental health[156]. Financial hardship is a chronic stressor in itself, but also makes individuals more vulnerable to other chronic stressors such as crime, violence, poor housing, malnourishment and social isolation[46]. This deprivation in turn could lead to the development or exacerbation of mental health problems. This is known as the social causation hypothesis[157], and is supported by evidence such as a higher prevalence of depression and psychosis among those of a lower socioeconomic status[150]. On the other hand, social drift theory[158] and the social selection hypothesis[159] posit that poor mental health could lead to problems obtaining or keeping secure employment and housing, making individuals more likely to experience financial hardship. For example, research has found that those experiencing mental health problems are more likely to struggle to pay for housing or to heat their home[160,161].

Most existing research on the association between financial situation and mental health is in the general adult population, and it is difficult to know whether these findings apply

to HE students. Several studies have reported in the general population that those with a higher income experience fewer mental health problems[162]. One study by Jenkins et al.[163] investigated the impact of income and debt on mental health disorders. While in initial analyses it appeared that those who receive a low income are more likely to have a mental health disorder, there was no longer evidence of this association after adjusting for socioeconomic and demographic variables (such as household size, housing tenure and employment status) and debt. However, they found that debt (number of debts) was associated with the likelihood of having a mental health disorder even after adjustment for socioeconomic and demographic variables and income. This study concluded that the association between income and mental health may be mediated by debt.

An international review and meta-analysis by Richardson et al.[164] found an association between more severe debt and increased risk of any mental health problems and of specific disorders including depression and psychosis. Another study[165] has reported that people in debt are 2.4 times more likely to develop depression and 2.5 times more likely to develop anxiety than those without debt. Studies have also reported a dose-response effect wherein as the number of debts people had increased, so did their likelihood of having a mental health disorder[163,165]. Debt is also associated with poor housing quality, job stress, lower levels of social support, recent stressful life events, domestic violence and caring responsibilities, all of which may increase the risk of mental health problems[166].

Several studies have reported that those who experience financial difficulties are at an increased risk of developing mental health problems[167]. For example, experiencing financial difficulties is more indicative of an individual's risk of depression than other financial measures such as occupation and income[168]. Some research has also found that financial difficulties show a stronger association with mental health problems and the level of impairment resulting from these than socioeconomic status or income do[169]. More specifically, Butterworth et al.[168] report that missing meals and having to pawn or sell possessions are all associated with experiencing depression[168].

It is also unclear how far these general adult population studies generalise to young people, which the majority of students are. One systematic review[44] among young people

under the age of 18 found that those from a lower socioeconomic background were three times more likely to have mental health problems than those from a higher socioeconomic background. However, this also may not be applicable to students; studies of young people measure socioeconomic background using parental indicators, whereas students are usually managing their own financial situation (potentially with help from their parents). One large Australian study[34] of people aged 18 to 59 found that having a lower personal income was associated with an increased likelihood of experiencing moderate or high psychological distress (relative to low distress), but only among those who were not university students. University students' personal income was not associated with their likelihood of experiencing moderate or high distress[34].

Generalising findings from adults or young people in the general population to students ignores important differences in terms of income and debt and how that might impact mental health. Students' financial situation and its potential association with their mental health should therefore be considered separately.

4.3.3 Rapid review objective and scope

As highlighted in Section 4.3.1, it is important to take a broad view of students' financial situation to investigate its possible association with mental health[170]. The existing evidence takes various approaches to measuring financial situation, typically focusing on debt, financial difficulties and financial concern. There has been very little research on students' income and mental health. To synthesise the existing research in this area, I conducted a rapid review. My objective (**Objective 3**) was to rapidly review the peer-reviewed evidence on the association between financial situation and mental health among higher education students in the UK.

I focused on students in the UK only, due to differences in higher education systems and funding internationally. While higher education funding and tuition fees differ across the four nations of the UK, many studies include participants from institutions across the UK. As research is scarce in this area, including studies only conducted in England would limit the review too much and risk missing important findings. Similarly, I included studies looking at any mental health outcome (including stress), though depression and anxiety were of most interest in relation to Chapter 3.

4.4 Methods

4.4.1 Design

I conducted a rapid review of the literature in this area. The rationale for this is explained in Section 4.2.1. Rapid reviews are typically systematic in nature but omit some of the steps taken in a full systematic review to produce findings in a timely manner. For example, in this case only one author screened the identified papers. In terms of quality assessment, instead of using a quality rating scale I critically appraised the quality of the included studies and their limitations narratively in Section 4.5.5.

4.4.2 Search strategy and eligibility criteria

The outcome of interest was mental health. I kept this purposefully broad owing to the paucity of literature in the field. Studies looking at any mental health outcomes, including stress, were eligible for inclusion. However, there are a large number of studies examining debt stress and financial stress as outcomes, but not mental health, so to fit with the time constraints and limit irrelevant papers, I did not include the word 'stress' among the mental health search terms. Instead, my search terms focused on words related to depression, anxiety and mental health in general, as these were my main area of interest in line with Chapter 2.

The exposure of interest was financial situation. Any studies which reported any measure of financial situation were considered to be measuring financial situation, however this was defined, including but not limited to income, financial difficulties, debt and financial concern.

As my population of interest was higher education students, I combined the search term 'student' with keywords related to mental health and finances. I searched three databases (Psychinfo, Pubmed and Embase) for any papers from database inception up to the 29th of November 2018. I chose to focus on databases typically used in mental health research rather than education databases, due to the primary focus of my review and thesis being on mental health and epidemiology. I executed the following search:

(Mental or Depress* or Anxi*) AND (Debt* or Loan* or Financ*) AND Student

I restricted my review to peer-reviewed scientific studies that were written in the English language, and did not include grey literature. While grey literature can be an important resource, Mahood et al.[171] found it was typically longer and of lower quality than studies that have been through the peer-review process. The authors note that it requires considerable time and effort to locate[171], so due to time and resource constraints it was decided not to include it.

Only primary research was included, though reviews and meta-analyses were used for hand-searching. Studies were eligible to be included if they quantitively measured an association between financial situation and mental health in higher education students within the UK, at any time. Qualitative research was not eligible for inclusion.

I identified four key studies in the field that were eligible for inclusion based on my knowledge of the literature, and ensured that my search strategy captured all of them.

4.4.3 Screening and data extraction

I screened titles and abstracts to assess whether they met eligibility criteria, followed by the full texts of any definitely or possibly eligible papers. Additionally, I hand-searched papers from the most recent relevant systematic review[164] (on debt and mental health in the general adult population), and recent work by lead authors on the included studies to ensure that no key papers had been missed.

I then extracted the data into Table 4-1, a table I devised to include the most relevant information. Data are divided into study-level data on year(s) of data collection, sampling method, number of participants and response rate, relevant outcome measures, analytical strategy (including adjustment for confounders) and main findings. Meta-analysis was not judged to be appropriate or possible due to heterogeneity among studies; there are important differences in study designs, exposure and outcome measures, and analysis methods. I narratively summarised the findings, grouped by domain of financial situation. Where the included studies also reported associations in the opposite direction (bidirectionality; with mental health measure as the exposure and financial situation as the outcome), these findings are reported as they have implications for assessing the possibility of reverse causation.

4.5 Results

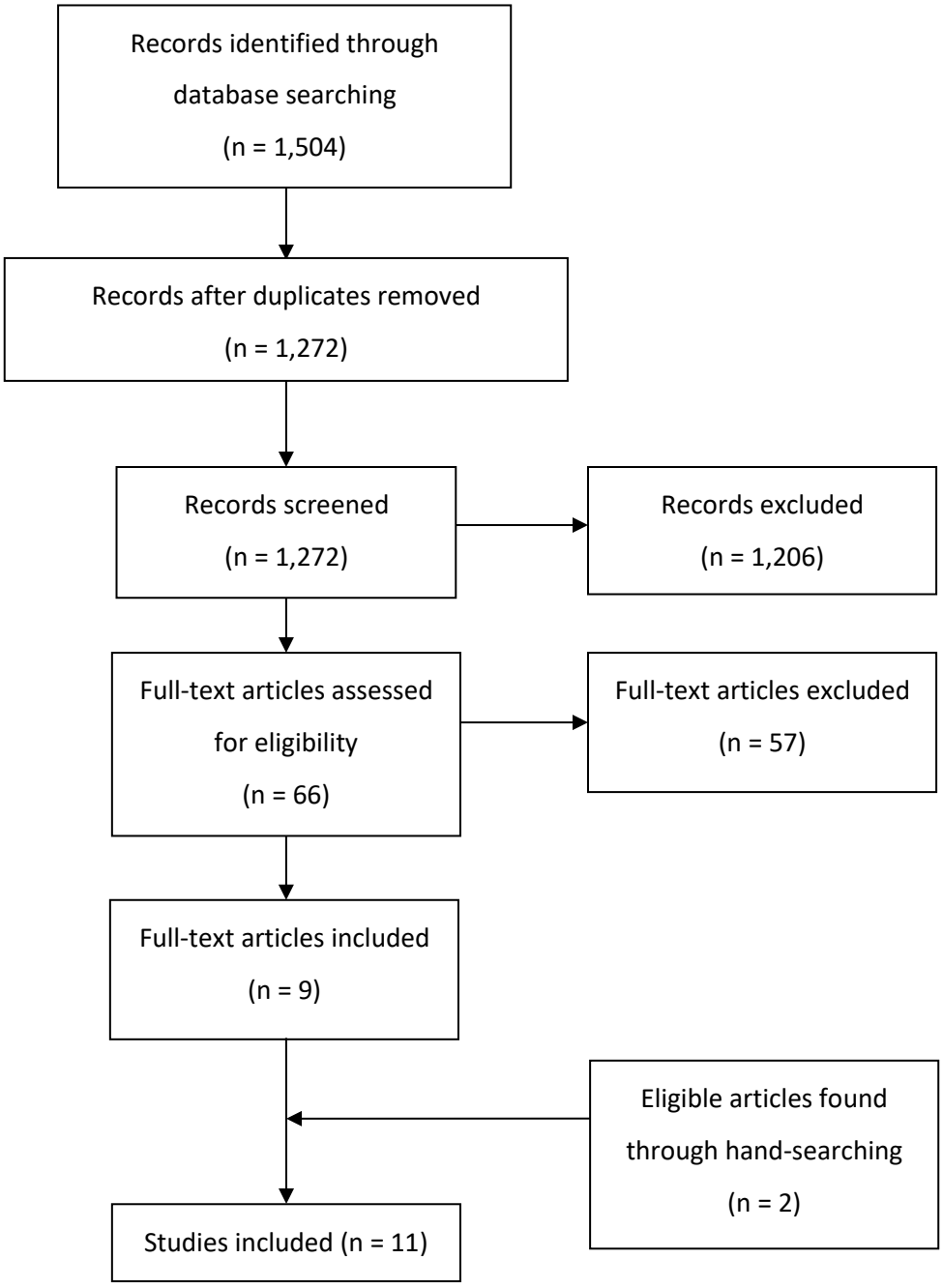


Figure 4-1. Flow diagram.

4.5.1 Study characteristics

I identified 1,504 records through database searching, which yielded 1,272 results once duplicates were excluded. From these, I determined that only nine studies met the inclusion criteria (see Figure 4-1). A further two studies were identified through hand-

searching. Thus, the final number of included studies was 11. The characteristics and key findings of each study can be found in Table 4-1.

The earliest study took place between 1997 and 1998[64], and the most recent between 2012 and 2014[36,172–174]. Seven of the studies only recruited undergraduates[36,41,65,172–175], three had a mixed sample of undergraduates and postgraduates with over 80% undergraduates[64,77,78], and graduate status was unclear for one study[176]. Four of the included papers reported contacting all UK student unions[36,172–174], two recruited participants from two London Universities[77,78], and the five remaining studies were all based at one institution only[41,64,65,175,176]. Reported response rates at baseline ranged from 38%[175] to 95%[176] and were unreported for five studies[36,64,172–174]. Sample sizes ranged from 89 students[176] to 2,146 students[175], with a mean of 536.7 students (SD 558.5).

All of the included studies were survey-based. Five of the included papers reported on cross-sectional surveys[64,65,77,78,176], and the remaining six on data from prospective cohort studies[36,41,172–175]. The longest of the longitudinal studies spanned three years[175], while the remaining five were conducted over the first two years of students' degrees[36,41,172–174]. Four studies reported data from four time points between two and four months apart[36,172–174], one reported data from three time points one year apart[175], and one reported data from two time points approximately 18 months apart[41].

Seven studies used the amount of debt students anticipated leaving university with or their tuition fee amount[64,65,77,78,172,175,176]. In terms of measures of financial situation, five papers reported asking students if they had ever considered abandoning their studies due to financial issues[36,64,77,78,173], which was interpreted as being a measure of financial difficulties (not being able to afford to continue with education). Three studies[36,173,174] reported using the Index of Financial Stress[177] (IFS), a measure of financial difficulties experienced in the past six months. Four studies[41,64,77,78] also asked about other specific financial difficulties the students had experienced, such as difficulty paying bills. In total, seven studies[36,41,64,77,78,173,174] used at least one of these measures of financial difficulties (financial difficulties experienced, considering dropping out due to financial issues, and the IFS). Three studies asked about debt worry (also called debt stress), and two studies

asked about financial concern; these were grouped together as financial concern. No studies measured students' personal income.

In terms of outcomes, the majority of studies (eight of 11) used questionnaires commonly used for measuring symptoms of common mental disorders in the general population, such as the General Health Questionnaire[178] (GHQ; four studies[64,65,77,78]) and the General Population version of the Clinical Outcomes in Routine Evaluation questionnaire[179] (CORE-GP; three studies[36,172,175]). Two of these studies[36,172] used specific validated anxiety and depression measures alongside these measures of symptoms of common mental disorders. The remaining three studies used only measures of anxiety and depression[41] (HADS[180]), psychosis[173] (PQB[181]) and disordered eating behaviours[174] (EAT-26[182]), respectively. Two studies[41,65] also measured academic outcomes (examination results) and one study[77] asked about help-seeking via general practitioner (GP).

Three of the included studies[36,173,174] additionally analysed whether there was an association between financial difficulties and mental health in the opposite direction, such that mental health symptoms at baseline was associated with later financial difficulties. The findings from these analyses are reported as they are informative in relation to the direction of association and the possibility of reverse causation.

Table 4-1. Characteristics of included studies.

Study	Year(s)	Sampling/ Selection	N and response rate	Study design	Financial situation measures (exposures)	Mental health measures (outcomes)	Other outcome measures	Analytical strategy	Main findings
Andrews and Wilding, 2004[41]	2000-2	One pre-1992 University in London, England (Royal Holloway). Undergraduates only (1st years).	676 students at T1, 351 at T2; response rate 76%	Prospective cohort – 2 time points. 1 month before 1st year and halfway through 2nd year.	Financial difficulties: major financial crisis e.g. unable to afford essentials (from modified List of Threatening Experiences[183])	Symptoms of anxiety and depression (HADS)	Examination results (at the end of 2nd year) obtained from University Registrar	Logistic regression to determine association between financial variables and anxiety and depression (separately) mid-course. Adjusted for mental health measure (anxiety or depression) at baseline, other mental health measure (depression or anxiety) mid-course, gender, age & ethnicity.	Found an association between financial difficulties and subsequent depression, but not anxiety. Also found an association between financial difficulties and examination results, but effect disappeared when adjusting for depression symptoms. Concluded that depression mediates relationship between financial difficulties and subsequent exam performance.
Cooke et al., 2004[175]	2000-3	One pre-1992 University in England (University of Leeds). Undergraduates only.	38% at T1 (N = 2,146), 23% (N = 1,360) at T2 and 26% (N = 1,391) at T3.	Prospective cohort – 3 time points at the end of semester 1 each year	Anticipated amount of debt (any source; T3 only); financial concern (one Likert-scale ACQ) and debt worry (one Likert-scale ACQ; T3 only)	General mental health (CORE-GP) – includes questions on functioning, problems & wellbeing		Correlation between financial variables and general mental health. If correlation showed a significant association, compared effect size differences using Z-scores, with 0.4 standard deviation units as threshold indicating an association.	Found an association between financial concern and mental health, and between debt worry and mental health. Found no correlation between amount of debt and mental health.

Jessop et al., 2005[176]	Not known	Middlesex University, London (also conducted in Finland but analyses reported separately). Home students only. Graduate status unclear.	89 students; response rate 95.2% (across London and Finland)	Cross-sectional survey	Amount of debt (any source); financial concern: 6 Likert-scale ACQ items, eg 'I worry about my financial situation'	General health (SF-36) – several dimensions, including mental health and role limitation due to emotional problems		Correlations; multilevel regression model, with nationality (British/Finnish) as level. Amount of debt, age, gender, financial concern, no. of hours worked, units of alcohol and locus of control as exposures (entered into model in this order) and each of the SF-36 dimensions as outcomes. If dimension was predicted by model, multiple regression run on British students only with financial variables as exposures, adjusting for gender and age.	Found more financial concern was associated with worse mental health in British students. Did not find an association between financial concern and role limitation due to emotional problems. No association between amount of debt and mental health or role limitation due to emotional problems.
Richardson et al., 2015a[172]	2012-14	All UK student unions contacted (46 of 114 agreed). Undergraduates only.	390; response rate unclear [very low]	Prospective cohort – 4 time points ~2 months apart over first 2 years at university	Fee amount (amount of student loan debt): £0-2.9k, £3-4k or £8-9k	Anxiety (GAD-7), depression (CES-D), general mental health (CORE-GP), stress (PSS)		MANOVA comparing tuition fee groups separately for each student mental health measure, comparing each time point to the previous time point. No apparent adjustment for confounders. Missing values substituted with mode if less than 50% of measure missing.	Found no association between tuition fee amount and mental health at T1. At T2, the mental health of those with lower fees improved but those with higher fees stayed the same. No differences between groups at T3 and T4.
Richardson et al., 2015b[174]	2012-14	All UK student unions contacted (46 of 114 agreed). Undergraduates only.	444 (completed baseline and at least one other time point); response rate	Prospective cohort – 4 time points 3-4 months apart over first 2 years at university	Financial difficulties over past 6 months (IFS)	Attitudes towards food and eating (EAT-26)		Multilevel regression model with time as level, to test whether IFS at baseline was associated with later EAT-26 scores, after adjusting for socioeconomic status, baseline EAT, gender, ethnicity and age. If an association was found, model repeated for each gender separately. Same analyses repeated with EAT scores at baseline as exposure and IFS scores at follow-up as outcome.	Found financial difficulties associated with more severe eating attitudes at T3 and T4, for women only. Mixed findings for a bidirectional relationship - eating attitudes predicted greater financial difficulties at T2.

			unclear [very low]					Missing data replaced with the mode if less than 50% of measure missing.	
Richardson et al., 2017[36]	2012-14	All UK student unions contacted (46 of 114 agreed). Undergraduates only.	454; response rate unclear [very low]	Prospective cohort – 4 time points ~2 months apart over first 2 years at university	Financial difficulties: over past 6 months (IFS), considering abandoning course for financial reasons; debt stress (ACQ)	Anxiety (GAD-7), depression (CES-D), general mental health (CORE-GP), stress (PSS)		Multilevel regression model with time as level, to test whether financial variables were associated with mental health scores cross-sectionally and longitudinally. Adjusted for age, gender, disability, mature student status, ethnicity and mental health at baseline. Linear regression models with all mental health measures as exposures and IFS at T2 as outcome, adjusted for baseline IFS, socioeconomic status and demographics. Missing data filled in with the mode.	Found an association between IFS and general mental health, anxiety and depression cross-sectionally, but only anxiety at T2. Only general mental health was associated with subsequent IFS, at T3 only. Considering abandoning course was associated with depression at T3 and T4. Greater debt stress was associated with worse mental health, more stress, more depression and more anxiety. Found evidence cross-sectionally for all of these, and at T4 for all except depression.
Richardson et al., 2018[173]	2012-14	All UK student unions contacted (46 of 114 agreed). Undergraduates only.	408; response rate unclear [very low]	Prospective cohort – 4 time points ~2 months apart over first 2 years at university	Financial difficulties: over past 6 months (IFS), considering abandoning course for financial reasons; amount of debt (student loan and non-	Psychosis risk (PQB)		Multilevel regression model with time as level, to test whether financial variables were associated with PQB score. Adjusted for gender, age and ethnicity. A second model with only the financial variables that showed an association in the first model. Same analyses repeated with PQB score as exposure and IFS as outcome.	Found that debt stress and amount of debt are not associated with psychosis risk. Some indicators of financial difficulties are associated with psychosis risk, but not others (IFS scores were but considering abandoning was not). No evidence of bidirectionality.

					student loan); debt stress (ACQ)				
Roberts et al., 1998[64]	"Over the past year" – 1997-8 assumed.	Unknown British university. Undergraduates (83%) and postgraduates.	103; response rate unclear	Cross-sectional survey	Financial difficulties: difficulty paying bills, considering abandoning course for financial reasons; amount of debt (any source)	Symptoms of common mental disorder (GHQ-12)		Not reported	Found there is an association between mental health and financial difficulties. People who had considered abandoning for financial reasons had significantly poorer mental health. In terms of bidirectionality, poorer mental health was significantly related to difficulty paying bills.
Roberts et al., 1999[78]	Not known	Opportunity sample of students from 2 Universities in London – one pre-1992 and one post-1992. Undergraduates (90%) and postgraduates.	360; response rate 65%	Cross-sectional survey	Financial difficulties: difficulty paying bills, considering abandoning for financial reasons; amount of debt (any source)	Symptoms of common mental disorder (GHQ-12) and general health (SF-36)		Regression models with GHQ and SF-36 subscale scores as outcome and hours worked, difficulty paying bills and considering dropping out as exposures. Structural equation modelling of pathways linking financial variables and mental health.	Found that there is an association between mental health and financial difficulties (difficulty paying bills and considering dropping out). Conclude that there are two pathways through which amount of debt is associated with mental health.
Roberts et al., 2000[77]	Not known	Opportunity sample of students from 2 Universities in London – one pre-1992 and one post-1992.	482; response rate 66%	Cross-sectional survey	Financial difficulties: difficulty paying bills, considering abandoning for financial	Symptoms of common mental disorder (GHQ-12) and general health (SF-36)	Help-seeking: whether have consulted a GP in past 2 weeks and satisfaction with most	Linear regression models adjusted for age and sex to assess association between financial difficulties and GHQ scores. Regression models to examine the relationship between debt and help-seeking (adjusted for age and gender). Structural equation	Found that there is an association between financial difficulties (difficulty paying bills and considering dropping out) and mental health. Two pathways confirmed (as above).

		Undergraduates (87%) and postgraduates.			reasons; amount of debt (any source)		recent consultation	modelling of pathways linking financial variables and mental health.	Amount of debt was not associated with help-seeking.
Ross et al., 2006[65]	2004	Undergraduate medical students from one University in Scotland (University of Aberdeen).	352 responses out of 900 students (39% response rate) – 334 included.	Cross-sectional survey	Amount of debt (any source); ACQ on sources of stress and amount of stress due to money	Symptoms of common mental disorder (GHQ-12); caseness (using GHQ threshold)	Examination results (students' rankings relative to the rest of the year group)	Pearson's partial correlations for continuous GHQ scores. Chi-squared for caseness.	Found that indicating that worrying about money affects performance was associated with an increased likelihood of mental health caseness. Lower debts were associated with higher GHQ scores.

Abbreviations: (in order of appearance)
T1/T2/T3/T4 = data collection time points, numbered.
HADS = Hospital Anxiety and Depression Scale.
ACQ = author constructed question(s).
CORE-GP = General Population version of the Clinical Outcomes in Routine Evaluation questionnaire.
SF-12/SF-26 = 12 or 36-item Short Form survey.
UK = United Kingdom.
GAD-7 = Generalised Anxiety Disorder 7-item scale.
CES-D = Center for Epidemiologic Studies Depression Scale.
PSS = Perceived Stress Scale.
MANOVA = Multivariate Analysis of Variance.
IFS = Index of Financial Stress.
EAT-26 = 26-item Eating Attitudes Test.
PQB = Prodromal Questionnaire-Brief Version.
GHQ-12 = 12-item General Health Questionnaire.
GP = General Practitioner.

4.5.2 Financial difficulties and mental health

All seven studies measuring financial difficulties found an association between more financial difficulties and worse mental health, though longitudinal findings were mixed. There was also some evidence that there may be an association between worse general mental health and subsequently experiencing financial difficulties.

All three studies by Roberts et al.[64,77,78] used cross-sectional data from two UK Universities (N=103, N=360, and N=408) and reported that difficulty paying bills was associated with more symptoms of common mental disorders. All three also reported that participants who had considered abandoning their studies due to financial reasons had more symptoms of common mental disorders than those who had not. However, all of these studies used relatively small opportunity samples of mostly psychology students. This means the findings are likely biased and may not be generalisable to the rest of the student population.

Richardson et al.[36], found that experiencing more financial difficulties (measured using the IFS) was associated with more symptoms of anxiety and depression, worse general mental health and more stress cross-sectionally. Longitudinally, financial difficulties at baseline were only associated with symptoms of anxiety two months later, and with no mental health measures four and six months later. Those who indicated at baseline that they had considered abandoning their studies for financial reasons (another measure of financial difficulties) had higher depression scores at baseline and four and six months later. In the opposite direction, none of the mental health measures at baseline were associated with IFS scores two months later. However, worse general mental health at baseline was associated with more financial difficulties four months later, giving some indication that there may be a bidirectional relationship.

Andrews and Wilding[41] used longitudinal data collected across two time points (N=351), and found that experiencing financial difficulties during university was associated with the development of depression mid-course, but not anxiety. This study also reported an association between financial difficulties and worse examination performance at the end of second year, an association that was mediated by the mid-course depression scores.

The only study that looked at psychosis outcomes[173] found that higher IFS scores at baseline were associated with increased positive psychosis symptoms and more distress about symptoms cross-sectionally and after four months, and with more distress after six months. However, this study observed no association between considering abandoning studies for financial reasons and psychosis symptoms. There was no evidence of a relationship in the opposite direction, as higher psychosis symptom scores at baseline were not associated with higher IFS scores at either follow-up points.

Lastly, one study concluded that experiencing more financial difficulties (higher IFS score) at baseline was associated with more severe eating attitudes long-term (at 8 and 12 months), but only in women[174]. In the opposite direction, severe eating attitudes at baseline were associated with higher IFS scores at the four-month follow-up time point only (not at 8 or 12 months).

4.5.3 Debt and mental health

Seven studies investigated the association between amount of debt and mental health (see Table 4-1). Of these, two found an association between more debt and poorer mental health, and one found an association between less debt and poorer mental health. The remaining four studies reported no association.

Cooke et al.[175] found no association between anticipated debt (from any source) and general mental health among final year students from one UK University (N=2,146). One small study[176] (N=89) conducted in England shortly after tuition fees were introduced reported that the mean amount of debt was £4,081. This study did not find evidence of an association between amount of debt and mental health or role limitation due to emotional problems. However, these studies were conducted in England in 2000 and 2005, respectively, when tuition fees (and therefore student loan debt) were much lower than they are now. Addressing this, Richardson et al.[172] found no difference longitudinally in general mental health, depression or anxiety between groups with different tuition fee debt amounts in 2012 (N=390). The only study that looked at psychosis also found in 2012 that there was no evidence that either student loan debt or non-student loan debt was cross-sectionally associated with psychosis risk when gender, age and ethnicity were controlled for[173].

Two cross-sectional studies[77,78] (N=103 and N=360) used structural equation modelling to estimate that larger debt was associated with symptoms of common mental disorders through longer hours worked or a higher likelihood of considering abandoning studies. However, both of these studies were conducted before tuition fees were introduced in the UK, so this only applies to non-student loan debt.

On the other hand, Ross et al.[65] found in one University (N=334) that students with more symptoms of common mental disorders had less debt, though students who reported that worrying about money affects their academic performance had significantly higher debt than those who did not. This study also found that there was no association between debt amount and academic performance (examination results). This study measured debt from various sources including overdrafts, credit card debt and bank loans, and reported that the median student loan debt was £6,000.

4.5.4 Financial concern and mental health

Four out of five studies found an association between an indicator of subjective financial concern and poorer mental health (see Table 4-1).

A longitudinal study[36] demonstrated that greater stress about debt (the author constructed question [ACQ] 'How stressed do you feel about your level of debt?') at baseline was associated with depression cross-sectionally, and with greater anxiety, stress and symptoms of common mental disorders cross-sectionally and at the longest follow-up time point (around six months).

Cooke et al.[175] collected data from undergraduates at one University (N=1,391) every year for three years, and asked participants the ACQ 'Are financial concerns a current issue?', with answers on a 5-point Likert scale. They observed a cross-sectional association between more financial concern and worse general mental health at every time point. However, despite having longitudinal data this study did not analyse whether financial concern was associated with later mental health.

Cooke et al.[175] also asked third year students the ACQ 'To what extent does your debt worry you?', again with answers on a 5-point Likert scale. They found that more debt worry was associated with worse general mental health. When this was made binary, the

authors also report that those in the high debt worry group had on average around £4,000 more anticipated debt (upon leaving university) than those in the low debt worry group.

One small study[176] (N=89) found that those with more financial concern (more agreement with statements such as 'I worry about my financial situation') had worse general mental health, but were not more likely to indicate that their mental health affects their everyday functioning. This study also found a significant correlation between higher debt and more financial concern.

Ross et al.[65] (N=334) identified that students with more symptoms of common mental disorders were more likely to report that worrying about money affects their academic performance. Additionally, students who indicated that they thought that worrying about money affected their academic performance ranked academically lower on average than students who did not.

Finally, Richardson et al.[173] (N=408) found that students' reported stress about debt was not associated with their psychosis risk.

4.5.5 Appraisal of the evidence

In many of the included studies, key information such as survey dates and analytical strategies was not provided, which makes appraisal challenging. Additionally, where multiple papers with the same lead author are included, they appear to be reporting on findings from the same study, but without additional details I cannot be completely certain. I have therefore treated these as separate studies, but this may have introduced bias as findings from these studies will be overrepresented in comparison to others.

Only five of the included studies conducted longitudinal analyses. Cross-sectional studies are limited in being unable to establish temporality or demonstrate the direction of the association. Longitudinal analyses address this, and therefore allow for more confidence when making causal claims. Even in the longitudinal studies, follow-up lengths also differed widely (from two months to 18 months), which makes comparisons problematic.

4.5.5.1 Selection bias (limitations of the samples)

Response rates were frequently not reported in the included studies[36,64,173,174], which means that the possibility of selection bias cannot be fully appraised. However, the studies included were typically small in size, ranging from 89 participants to 2,146 participants with a median of 408 participants. This means that selection bias is a key issue, whereby those who take part differ systematically from those who do not. Those experiencing financial difficulties and mental health problems may be less likely to respond to surveys, potentially leading to an underestimation of the association between these variables. Similarly, many of the studies were conducted at just one UK university, limiting their generalisability further. Small sample sizes also reduce the chance of finding a difference even where there is one, which could explain some of the mixed findings in this field. Furthermore, none of the longitudinal studies reported taking any steps to address or investigate the impact of missing data due to attrition. This is also likely to lead to bias, as those who continue to take part may differ systematically from those who do not, as above.

4.5.5.2 Measurement bias (limitations of the measures)

The measures used and domains investigated vary widely in the included studies. While seven studies measured debt, this was often using one item and did not specify to participants what different types of debt it included. This may have introduced measurement bias where, for example, overdrafts, student loans and loans from friends and family may all be considered differently to students, causing some students to leave out some debts and under-report. It could be that students with mental health problems would be more likely to overestimate their debt in this situation due to negative cognitive biases commonly seen in depression, for example[175,184,185]. It could also result in random measurement error, which would make it more difficult to detect an association if one did exist. This could explain the general lack of evidence for an association between debt and mental health.

Financial difficulties was also measured in several different ways, primarily the IFS or a single-item measure such as whether the participant was struggling to pay their bills or had considered abandoning their course for financial reasons. This makes it problematic

to compare findings between studies. In studies using more than one measure (such as Richardson et al.[36]), there were different findings for each measure. It is therefore preferable for studies not to rely on single-item measures of financial difficulties, and instead seek to gain a fuller picture of whether students are financially able to meet their needs.

4.5.5.3 Publication bias

This field may be particularly vulnerable to publication bias as a result of the small sample sizes often used. Similarly, small studies reporting null findings are less likely to be published.

4.5.5.4 Confounding

The associations reported by the included studies may be confounded by other variables such as socioeconomic factors, which most studies did not account for in their analyses[64,174,175]. Students from a lower socioeconomic background are more vulnerable to mental health problems, and also may be more likely to experience financial difficulties (for example, due to less financial support available from parents), be debt-averse and be concerned about their financial situation[36,140,186]. Even where adjustment has been made, residual confounding or confounding due to other sociodemographic variables such as gender and ethnicity remains a potential explanation for the reported associations.

Additionally, the observed relationships may be confounded by mental health-related variables such as worry, pessimism and negative cognitive biases. These could make an individual more likely to experience financial concern, for example, as well as making them more at risk of experiencing mental health problems. This could also be the case for debt and financial difficulties, as individuals who view their financial situation more negatively may be more likely to feel that they need to go without necessities or take out loans.

4.6 Discussion

4.6.1 Summary of findings

In this review I identified 11 papers (seemingly from six separate studies) examining the associations between three domains of financial situation and mental health among higher education students in the UK. Findings differed by financial situation domain: financial difficulties, debt and financial concern. Experiencing financial difficulties was cross-sectionally associated with worse general mental health and more symptoms of common mental disorders, anxiety, depression and psychosis. Longitudinal findings were mixed and generally differed by follow-up time point and measure, but evidence seems to point towards there being a longitudinal association between financial difficulties and depression. There was also some limited evidence for bidirectional relationships between financial difficulties and CMD and severe eating attitudes, but not anxiety, depression or psychosis symptoms. There has been one further study (to my knowledge) published on this topic in the UK since this review was conducted. This found that number of financial difficulties (measured using the IFS) was not associated with anxiety or depression among a sample of 104 students experiencing financial hardship[187].

In terms of debt, there was little evidence of an association with mental health - the only studies that reported an association suggested that the relationship between debt and mental health was mediated by the experience of financial difficulties. However, only two of the included studies had been conducted since the tuition fee rise came into effect in England in 2012.

Evidence was more consistent for an association between mental health and subjective measures of financial concern. Four studies reported a cross-sectional association between these indicators and mental health outcomes including symptoms of common mental disorders, anxiety and depression. This was the case for general financial concern measures and measures focused on debt. Only one study conducted longitudinal analyses for this domain, reporting that financial concern at baseline was associated with anxiety and symptoms of common mental disorders at six-month follow-up. Since this review was conducted, three further studies (to my knowledge) have been published on

this topic in the UK, finding that financial concern is cross-sectionally associated with general mental health[188], depression and anxiety[187], and wellbeing[23], respectively. One study also looked at the relationship longitudinally, but found that financial concern was only associated with role limitation due to emotional problems, not to mental health itself[189].

4.6.2 Limitations of this review

There are several limitations of this review. Despite the advantages of rapid reviews, there remains more uncertainty in the conclusions drawn in a rapid versus full systematic review, and the extent of this uncertainty is specific to the research question and which aspects of the review process were expedited[127,128]. In this case, my search strategy was only slightly less thorough; I used multiple search engines and additionally manually searched for relevant papers, though my search terms were more limited than in a full systematic review and I was the only person to screen papers. Though it is possible that some relevant papers were missed as a result, this is always the case with systematic reviews as well. Furthermore, there is a scarcity of evidence available on this topic, so the papers that do exist are well-known and cited often. I have done extensive reading before and since conducting this review, as well as discussing this research with colleagues who are also researching the topic, and I have not come across any papers that were missed by my search strategy (including the pre-selected key studies). I also did not search grey literature. While it can be an important resource, Mahood et al.[171] found it was typically longer and of lower quality than studies that have been through the peer-review process. Overall, I am confident that any major studies would have been identified and that the conclusions of my review are justified[190].

This review included studies conducted anywhere in the UK, despite differences in higher education funding across the four nations. This was necessary as much of the relevant literature (five of the included studies) included participants from various parts of the UK within the same sample. However, there may be important differences in the impact of debt on mental health, for example, between England (which has tuition fees of up to £9,250 for full-time undergraduate home students) and Scotland (which has no tuition

fees for undergraduate home students). Future research should ensure that these are investigated separately.

Lastly, due to the lack of evidence identified in this review, including qualitative research on this topic may have provided further insights on the association between students' mental health and their financial situation. Qualitative research typically contributes more detailed data that could have complemented the quantitative data and provided explanations for some of the findings presented here, as well as more recent student perspectives.

4.6.3 Future directions

This review only included studies conducted in the UK. As such, future work could consider a broad range of countries, grouped by key aspects of higher education funding, while examining potential reasons for cross-national similarities and differences in the association between financial situation and mental health. This would allow for a better understanding of how the relationship between financial situation and mental health differs across countries. For example, one study compared undergraduates' attitudes to student debt across the UK, the US and New Zealand[142]. The researchers found that students in the UK were more likely than the other countries to view debt as an expected part of attending university, and were less prone to worrying about the affordability of loan repayments[142]. While it may seem that this is due to differences in students' attitudes, this is likely due to differences in repayment terms and the ubiquity of loans. In this way, an international approach could also help to identify support systems and policies that may be more beneficial for students' mental health.

It is unclear whether findings from the studies included in this review can be generalised to the modern UK higher education student population. Key factors such as available financial help and mental health support differ considerably by institution, and many of the studies were conducted at only one institution, or in small samples (see Section 4.5.5). Moreover, many of the included studies are outdated, approaching around 20 years old. This is an issue as there have been important changes to higher education funding in this time, such as the tuition fee rise in England in 2012. This means that student loan debt is now much higher than when most of these studies were conducted.

The debt reported by participants in the included studies was likely to be mostly made up of non-student loan debt, and so it is unclear whether their findings are applicable to students for whom student loan debt makes up the vast majority of their debt. Future research should measure students' loan 'income' by clearly breaking down different debt sources and the amount students receive from these sources per term. This could be in addition to a total (expected) debt measure taking into account tuition fees, as used in the included studies. It would also allow for further analyses investigating how different types of debt may be associated with mental health.

None of the included studies measured students' income. Students' personal income is unlikely to be easily defined by an annual salary band from employment, as it usually is in the general adult population. Students' income may instead be from several different sources including part-time or flexible work and parental support. Nevertheless, the amount of money students receive is likely to make a large difference to their financial situation and in turn, potentially, their mental health. Future research should therefore include a measure of students' income.

4.6.4 Conclusions

The strength of the identified evidence is weak, such that the possible associations between financial situation and mental health among UK higher education students are unclear. The majority of the existing evidence is cross-sectional, with very little longitudinal evidence, and few studies adjust comprehensively for confounders, particularly socioeconomic confounders. While I tentatively conclude that financial concern may be associated with worse mental health, the evidence base for other domains is still in its infancy with very mixed findings. What does exist suggests that there may be no association between debt and mental health, but much of this is outdated in the context of the current higher education funding system in England. It appears that there may be an association between financial difficulties and mental health, but this relies on single-item measures and it is difficult to conclude whether there is a longitudinal association. Overall, it is clear that more research is needed which addresses the limitations of the studies included in this review, and builds on their findings.

Chapter 5 The association between financial situation and symptoms of depression among higher education students

5.1 Summary

In this chapter, I investigate the association between different domains of financial situation and symptoms of depression in a sample of higher education students at a University in England, both cross-sectionally and longitudinally (**Objective 4**). I designed and conducted an online prospective cohort study, the SENSE study, measuring mental health, lifestyle and demographic variables in students at University College London (UCL). This chapter uses data from the first two survey time points, conducted four months apart; baseline and follow-up. I used linear regression models to examine whether each domain of financial situation (income, loan income, total expected debt and financial difficulties) was associated with scores on the PHQ-9 at baseline and follow-up. I addressed missing data using multiple imputation and sample weights.

A total of 2,725 out of a possible 3,272 participants (83.3%) had complete data on the four exposure variables, and therefore became my sample. Cross-sectionally, after adjustment for confounders there was evidence of an inverse association between income and PHQ scores (mean difference [MD] -0.35, 95% confidence interval [CI] -0.60 to -0.10, p = .006) and a positive association between loan income (MD 0.80, 95% CI 0.53 to 1.07, p < .001), total expected debt (MD 0.50, 95% CI 0.30 to 0.71, p < .001) and financial difficulties (MD 1.63, 95% CI 1.33 to 1.92, p < .001) and PHQ scores. Longitudinally, after adjustment for confounders and baseline PHQ scores, there was weak evidence of a positive association between debt (MD 0.17, 95% CI -0.03 to 0.37, p = .090) and financial difficulties (MD 0.32, 95% CI 0.01 to 0.63, p = .041) and PHQ scores. These findings were largely unchanged in sensitivity analyses treating the outcome variable as binary and using data that was unweighted and not imputed.

Overall, I found that all of the financial domains I investigated were associated with students' mental health (symptoms of depression) cross-sectionally. More financial difficulties and larger total expected debt were also associated with more symptoms of

depression longitudinally. These findings were largely in line with my hypotheses (**Hypotheses 3-6**), though I had hypothesised that there would not be an association between total expected debt and symptoms of depression (**Hypothesis 5**). My findings highlight that changes to government policy, such as offering grants and bursaries to cover students' living costs (instead of maintenance loans), could be beneficial for students' mental health. I also suggest universities could focus on helping students to manage their finances and supporting students who are experiencing financial difficulties.

5.2 Background

5.2.1 Rationale

One key area in which higher education students differ from those not in education is financially. This makes it a promising area for research, representing a temporary stressor for students determined largely by policy. However, as I found in Chapter 4, there has been little research investigating the relationship between students' financial situation and their mental health. What does exist has been limited by small sample sizes, cross-sectional designs and a lack of adjustment for relevant confounding variables. The existing literature has also defined students' financial situation in a variety of different ways, failing to see that there are various domains which together make up the whole picture; income, loan income, financial difficulties, debt and financial concern.

To address this, I conducted the SENSE study, a longitudinal investigation of the mental health of students at a University in England. The survey included detailed financial situation questions designed specifically for and with students to improve upon those used in existing studies.

5.2.2 Context

The financial support and loans available to students differs by the country of the institution and the domicile of the student (the country where they typically reside). As the SENSE study (as well as the research presented in Chapter 3) was conducted in England, I will begin by outlining the context of what the financial situation of many higher education students in England is likely to be. In the SENSE study, 51.9% of participants were considered 'home' students (students from the UK studying in England; see Table 5-2). A further 22.9% of participants were considered 'EU' students (students from the EU studying in England). The remaining participants (25.1%) were considered 'overseas' students (students from neither the UK nor the EU studying in England).

To access higher education, students in England are required to pay tuition fees. For home and EU students, these are up to £9,250 per year for a full-time undergraduate course. Most students take out government-funded student loans which cover their

tuition fees; an estimated 95% of undergraduate home and EU students in England in 2019/20[191]. Overseas students are not eligible for these tuition fee loans from the UK government, and their tuition fees are often much higher. In addition, full-time undergraduate students are eligible for government-funded maintenance loans. It is estimated that 91% of undergraduate home students in England took out maintenance loans in the 2019/20 academic year[191]. These contribute towards students' living costs, but are partially means-tested and their value depends on where students live and study. Previously, a large proportion of these were made up of grants that did not have to be paid back, but in 2016 grants were removed and replaced by loans. A full-time undergraduate student who will be living away from home studying in London would be eligible to receive between £6,166 and £12,382 per year. Undergraduate EU and overseas students are not eligible for these loans from the UK government. The average English undergraduate student who graduated in 2020 became liable in April 2021 to repay debts of around £46,000, with the largest debt taken on by students from the poorest backgrounds[191]. Many will never pay back this debt in full. Of those who started their degree in 1998 with yearly tuition fees of £1,000, 38% had still not repaid their loans in 2021[191].

Since the 2016/17 academic year, students from England and the EU taking postgraduate Master's courses have been eligible for student loans of up to £11,570 per year (as of 2021) to cover their tuition fees and living costs. Tuition fees for postgraduate taught courses for full-time students from England cost on average approximately £10,000 per year for laboratory-based courses and £9,000 for classroom-based courses[192]. Part-time students are typically liable for fees on a pro-rata basis. Students who are not from England or the EU are not eligible for loans from the UK government and, as with undergraduate courses, are charged higher tuition fees. Finally, postgraduate doctoral students often have their tuition fees and living costs covered by a sponsorship or studentship from a Research Council, charitable organisation or other university research funds[193]. However, loans were introduced for students without a studentship living allowance in the 2018/19 academic year[194]. For students from England, non-means-tested Postgraduate Doctoral Loans of up to £27,265 (as of 2021) are available[193,194].

In England, students usually become liable to repay their student loans in the April after they leave higher education, and once their annual income reaches a set threshold. Interest and repayments increase in line with earnings. For undergraduate student loan debt, the threshold is £27,295 in 2021, and individuals pay 9% of their earnings above this threshold. For postgraduate student loan debt, the threshold is £21,000, and individuals pay 6% of their earnings above this threshold. Those who have both types of loan have to pay back both at once. Interest accrues from when students initially take out the loans at the beginning of their degree, at a rate of RPI Retail Price Index (RPI; 1.5% in 2021) plus 3%. This goes on until the debt is paid off or it is written off after 30 years. Student loan debt is not registered on your credit file in the UK, so it does not affect your credit rating or ability to take out any other loans. However, research has found that these favourable repayment terms are not widely understood by students and 52% still report worrying about paying back their student loans[145].

Undergraduate maintenance loans and postgraduate loans may not cover all students' living costs. An analysis of data from the 2014 Student Income and Expenditure Survey[195] reported that, in line with inflation the mean living costs for full-time undergraduate students living away from home in 2018/19 are £15,125 for those studying in London, and £13,725 for students outside of London[196]. In both situations, all students, even those who receive the maximum maintenance loan, are left with a shortfall in their living costs. Similarly, postgraduates with tuition fees of £10,306 (the average amount for a laboratory-based Master's course[192]) would have less than £1,300 left to live on for the year, if they received the maximum postgraduate loan. While a minority of students may be eligible to receive institutional grants or bursaries, there is no statutory requirement for institutions to offer financial support to students to help with living costs[23] (in 2018 approximately 29% of young people expected to receive financial support from their institution[197]). The majority of students (undergraduates in particular) rely on 'income' in the form of financial support from parents and family members. The Student Income and Expenditure Analysis for England and Wales reported that for the 2018/19 academic year, 71% of students living away from home in London and 76% outside London received financial support from their families[196]. For these students, the mean amount received was £3,575 per year in London, or £3,218 outside London[196]. But this still leaves 29% of

students in London without any financial support from their family. Many students undertake part-time employment (approximately 74% in 2020[86]) to earn money, but this can be difficult to balance with studying[138]. Students may have some savings to rely on, and some live at home to save money (estimated to save around £3,000 per year for full-time students[196]). Nevertheless, a sizable fraction of higher education students in the UK worry about making ends meet (76% in 2021[145]). Many also borrow money in more traditional ways, including credit card debt, payday or short-term loans, and borrowing from family members and friends[145]. Banks often appeal to students with 0% interest, high-maximum overdrafts on student bank accounts[198]. These types of debt, while typically in smaller amounts that government student loan debt, may be more of a financial burden on students as they lack the favourable repayment terms.

5.2.3 Objective and hypotheses

In this chapter, my objective (**Objective 4**) was to investigate the association between different domains of financial situation and symptoms of depression in a sample of higher education students at a University in England, both cross-sectionally and longitudinally. Based on the above context (see Section 5.2.2) and my findings in Chapter 4, I chose four measures that capture key domains of students' financial situation: income received from various sources; loan income received from various sources; number of financial difficulties experienced; and total amount of expected debt upon graduation.

The income variable measures the money students are receiving per term that is theirs to keep, comparable to the salary of someone in full-time employment but taking into account financial support from parents and grants. There are no studies that I am aware of that measure students' income when investigating the association between their financial situation and mental health (see Chapter 4). Loan income measures money that students have available to spend but will need to pay back, specifying various sources including maintenance loans, overdrafts and loans from family. The existing research has generally failed to take into account that students borrow money in a variety of ways, such as with student bank account overdrafts, and there are no published studies in the UK that I am aware of that measure students' loan income. Debt gives the total amount of debt students expect to be in when they complete their current degree, including all

of their student debt from tuition fee loans and maintenance loans. There have been very mixed findings for debt amount and mental health, overall suggesting that there is no evidence of an association between the two (see Chapter 4). However, this evidence is outdated, particularly in relation to higher education funding changes in England. Finally, the financial difficulties variable measures how many necessities students have been unable to afford recently. This allows an insight into the impact that students' finances are having on their lives and their ability to pay for essentials. Research so far indicates that experiencing financial difficulties may be associated with poorer mental health both cross-sectionally and longitudinally, in particular with symptoms of depression. However, this research has relied on either single-item measures (such as asking if students have ever considered abandoning their studies due to financial issues), or financial measures designed for the general adult population which do not take into account that students' expenditures and priorities may differ.

Taken together, these variables (income, loan income, financial difficulties and total expected debt) give a fuller picture of students' financial situation, accounting for the complexities that highlight their differences from those not in higher education. The SENSE study also measured students' financial concern, but these variables will be analysed separately in a future piece of work due to these measures being more subjective and subject to reverse causation. I have chosen to focus on symptoms of depression here, though I also collected data on symptoms of anxiety, due to there being slightly more existing evidence for an association between depression and financial situation in students[124] and in the general population[164]. I plan to repeat this study looking at symptoms of anxiety in a future piece of work.

Given the earlier research (detailed further in Chapter 4), I hypothesised that:

- Income would be inversely associated with depression, such that those with less income would experience more symptoms of depression (**Hypothesis 3**)

- Loan income would be positively associated with depression, such that those with more loan income would experience more symptoms of depression (**Hypothesis 4**)

- Total expected debt would not be associated with symptoms of depression (**Hypothesis 5**)

- Financial difficulties would be positively associated with depression, such that those who had experienced more financial difficulties would experience more symptoms of depression (**Hypothesis 6**)

I hypothesised that this would be the case both cross-sectionally and longitudinally.

5.3 Methods

5.3.1 Design

The SENSE study is an online prospective cohort investigating the mental health of current UCL students. I collected data at four time points across a calendar year: October 2019 (Term 1), February 2020 (Term 2), May 2020 (Term 3), and October 2020 (Term 1). I selected these time points to be roughly four months apart, except the May time point which was earlier so that the data collection period was completed before the end of the academic year.

I hosted the survey on the online platform Qualtrics[199], from which participants could be contacted directly via email (see Appendix 2). I chose to conduct an online survey for practical reasons, including the ability to reach a larger number of students using confirmed contact information[200].

5.3.2 Participants and recruitment

I invited all students enrolled at UCL and over the age of 18 to participate in the first time point of the survey (baseline). These inclusion criteria were purposefully broad to try to recruit as many students as possible and maximise the representativeness of the sample. There are very few students enrolled at UCL who are under the age of 18 (n = 202; 0.5% of all students) – these were not eligible as we only received ethical approval for those who were 18 years old and over.

The recruitment period was between 28th October 2019, when the first time point of the survey opened for responses, and 31st December 2019, when it closed. Those who consented to take part at this time point (baseline) were considered part of the SENSE cohort and were followed up at a further three time points (follow-ups).

The UCL Registry provided the University email addresses of all students currently enrolled at UCL, a total of 43,545 students. I sent out recruitment emails in two batches, the first one on 30th October 2019 and the second one on Thursday 21st November 2019. The first batch contained students who were not new to UCL (either because they were not in the first year of their current degree or they had previously completed a degree at

UCL), and the second batch contained the remaining students, who were new to UCL. This was in accordance with an agreement with the Office of the Vice-Provost (Education), so as not to clash with their surveys for new students. All participant emails were sent via Qualtrics from the SENSE email address (SENSEstudy@ucl.ac.uk). Emails contained text inviting the students to participate and a personal unique link to the survey (see Appendix 2). This link identified the participant via their email address. The survey also asked students to enter their email address to verify they were a UCL student, and (optionally) an alternate contact email address. I used this information to check for duplicates and to link data across waves. I sent approximately three reminder emails to those not yet recorded as having responded. I also recruited participants through other methods (detailed below) using generic links or QR codes for the survey, and by encouraging participants to respond to their recruitment email.

There was no payment or incentive for participating, based on evidence that this would not substantially increase the number or representativeness of responses[201,202]. Due to the large number of potential participants, it would not have been financially possible to give an incentive of even £1 per person, and evidence suggests that small incentives do not offer a substantial benefit over no incentive[201,202]. There is also no evidence to suggest that lottery incentives would be effective at improving recruitment[203]. Instead, I focused on key elements likely to motivate survey response in students, based on consultation meetings with students (see Section 5.3.5) and existing evidence[204–208]. These included: study legitimacy and recognisability, demonstrating that the research is important and relevant for students, highlighting the perceived benefits of the research, a short survey length of between 10 and 15 minutes only, invitation emails signed by a fellow student, using a survey progress indicator, limiting technical difficulties and survey errors, and assuring anonymity and confidentiality.

In addition to directly emailing participants, other recruitment techniques I used at the first time point included the following:

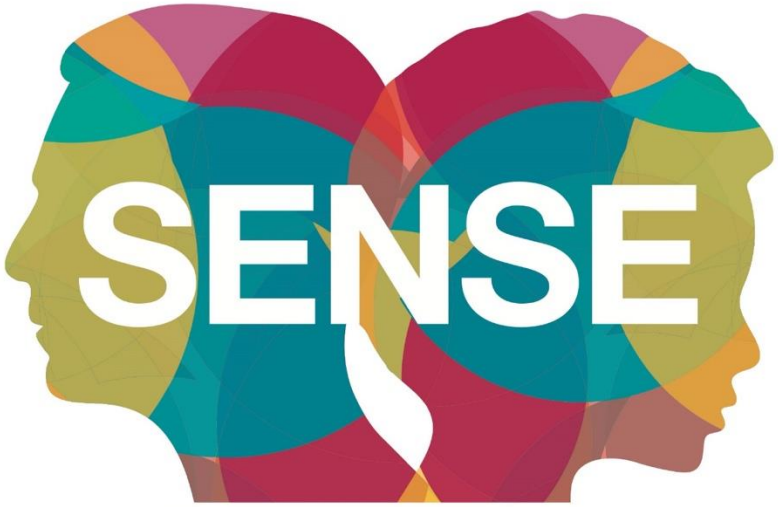
- Poster and digital advertisements around campus and student accommodation
- Advertisement on the University, faculty and online learning environment websites
- Items and interviews in relevant student and Students' Union email newsletters

- Email advertisements circulated via communications teams, Departmental Administrators, student ambassadors and student society officials
- Social media promotion

During the first week, I set up a physical stall with banners and posters in areas of high foot traffic on the University campus. Students and SENSE collaborators promoted and answered questions about the research, giving out chocolate and SENSE branded flyers, stickers and pens. We also gave out flyers (see Appendix 2) and put up posters around campus throughout recruitment. Social media promotion included a SENSE Twitter account (@SENSEstudy) that I used to remind students to participate and encourage University staff to promote the survey. I also set up a SENSE website, www.sensestudy.co.uk, with more detailed information about the survey, study materials (e.g. participant information sheet) and a generic link to participate. These were all intended to raise the profile of the survey and improve response. I also commissioned the UCL Digital Media team to design a logo and branding for SENSE, to increase study recognisability during recruitment and throughout data collection (see

Figure 5-1). This was applied to the survey and all recruitment methods. Overall, 3,272 participants completed the consent form and at least one survey question, and are therefore considered to be the main SENSE sample.

Figure 5-1. SENSE logo.



5.3.3 Follow-up

I invited all students who consented at the first time point (baseline) to participate in three follow-up time points, via direct email (see Appendix 2). The unique links used within Qualtrics meant that individuals' responses were linked back to their email addresses without the need for login details, but students were asked to confirm their email address in case of link-sharing. Once I had removed duplicates and completed the data linkage process across all follow-up waves, participants were identified only using pseudonymised study IDs.

Each survey time point took approximately 10-15 minutes in total to complete, and each survey was open for responses for six weeks. I sent email reminders every 1-2 weeks to those who had not yet completed the survey. I contacted participants primarily via their University email address, but used the alternate email addresses where emails bounced (for example, if a student's course had ended).

In March 2020, COVID-19 was declared a pandemic by the World Health Organisation and the UK Government implemented a lockdown[209]. This came after the second time point of SENSE (February 2020) and before the third (May 2020). Due to the potential impact of this on students' mental health and financial situation[210–212], I have only analysed data from the first two time points, referred to here as baseline and follow-up. I am planning to use data from all four time points in a future analysis of the COVID-19 pandemic and students' mental health.

5.3.4 Measures

The SENSE survey collected information on students' sociodemographics, mental health and other aspects of university life (e.g. accommodation, workload and social support). Key measures were repeated every time. I have described here the measures used in analyses in my thesis, focusing on depression as an outcome and four domains of students' financial situation as exposures. The questionnaires used in the first two time points of the survey (baseline and follow-up) can be found in Appendix 2.

5.3.4.1 Outcome: Symptoms of depression

The 9-item Patient Health Questionnaire (PHQ-9[213]; depressive symptoms) was the main measure of depressive symptoms included in the SENSE survey. The PHQ-9 is a suitable measure for monitoring symptoms of depression in the general population, and is commonly used in UK primary care services[214,215]. The original validation study reported its sensitivity and specificity as 98% and 73% respectively in primary care patients[213]. It has been shown to have high internal consistency (α>0.85) and good criterion, concurrent and construct validity in university student, adult primary care and general population samples[216–220]. The PHQ-9 also has excellent 4-week test-retest reliability in students, with an intra-class correlation coefficient of 0.87[216].

Nine items are scored in terms of how often in the last two weeks the individual has experienced them, on a 4-point scale from 'Not at all' (coded as 0) to 'Nearly every day' (coded as 3). The score for each of the nine items is then summed to give a total score of between 0 and 27, with higher scores indicating more depressive symptoms. The PHQ-9 was completed at baseline and follow-up (four months later). I also conducted sensitivity analyses treating the PHQ-9 as a binary outcome, using a score of 10 or more as the threshold to indicate a level of symptoms of depression that is possibly clinically important[221,222]. This threshold has been shown to have a sensitivity and specificity of 90% and 94% respectively in a student population[216].

5.3.4.2 Exposures: Financial situation measures

Table 5-1 shows the measures of students' financial situation used in the present analyses. The income and loan income variables contained several items nested within one main question; the main question asked participants to indicate their amount of income from various sources, and each item (source) individually required a response. These questions were presented to participants in a matrix grid with the possible response options at the top and one row per item. The financial difficulties variable was presented as a list of items which could be selected or unselected. The debt variable was a standard single-choice single-answer question.

5.3.4.2.1 Income and loan income

The income variable measured the amount of income (i.e. money that did not need to be paid back) participants received on average per term from any source. This was chosen to measure the amount of money students had available to them to spend on a termly basis, without having to pay it back. The four items (sources) were as follows:

1. Parent(s)/carer(s), friends and/or other family members. This includes cash gifts, paying for rent, buying essentials, etc, but not loans
2. Paid employment
3. Maintenance grants, non-repayable bursaries, special support grants, PhD stipends and/or scholarships
4. Any other sources. This may include child-related income support or social security benefits, but not loans

Participants were asked to indicate their amount received using the following categories, and I coded their responses as the midpoint of the amount selected, as indicated in the brackets:

- None (0)
- Less than £100 (50)
- £100-249 (175)
- £250-499 (375)
- £500-999 (750)
- £1,000-1,999 (1500)
- £2,000-2,999 (2500)
- £3,000-3,999 (3500)
- £4,000 or more (4500)

These response options were based on averages from the Student Income and Expenditure Survey[195]. I then summed the values for the four items to give a total income score for each participant. These total income scores were then put into four categories as follows:

- Less than £1,000 (including zero)

- £1,000 to £1,999
- £2,000 to £3,999
- £4,000 or more

The loan income variable measured the amount of loan income (i.e. money that was available to spend but would need to be paid back) participants received on average per term from any source. This was chosen to measure the amount of money students had to spend on a termly basis, though they would need to pay it back in the future. This did not include student loans paid directly to the University for tuition fees. The four items (sources) were as follows:

1. Loans from the Student Loans Company or government paid directly to you (including maintenance loans and postgraduate loans)
2. Loans from parent(s)/carer(s), friends or other family members
3. Outstanding overdraft and credit card debt
4. Payday or other short-term loans
5. Loans from any other source

Participants were asked to indicate the amount they received from each source using the same categories as in the income question above. As with the income question, I coded their responses as the midpoint of the amount selected and then summed the values for the four items to give a total loan income score for each participant. These scores were then put into four categories as follows:

- None
- Less than £1,999 (not including zero)
- £2,000 to £3,999
- £4,000 or more

5.3.4.2.2 Financial difficulties

The financial difficulties variable measures students' ability to afford basic amenities, indicating the number of financial difficulties experienced by the participant that term (so far). This variable is an adapted version of the Index of Financial Stress (IFS[177]), a measure previously used in the student literature[36,223] that has a Chronbach's Alpha of

approximately .70[36,177]. As this measure was originally designed for use in the general adult population, I edited the response options to reflect students' common expenditures and financial priorities. This process was co-produced with students. The time period was changed to the current term instead of the past six months, so that the same question could be asked at each time point for a future study looking at changes in students' financial situation across the academic year without the time periods overlapping (as time points were four months apart). Additionally, two of the original eight items were removed - the item "unable to heat home" was removed due to being covered by the bills question, and "could you raise, within a week, £2000 for an emergency" was removed due to being less applicable to students, who receive their student loans in a lump sum at the beginning of term rather than a monthly income. Five new items were added, designed to reflect students' common expenditures (see Table 5-1). Items were presented as a multiple-choice multiple-answer tick list, where each item could be either selected or not selected depending on whether it had been experienced. The final item ("None of the above happened to me") was exclusive, such that selecting it automatically unselected any other selected items. I calculated the number of difficulties indicated out of a possible 11, such that a higher score indicates more financial difficulties experienced. The continuous scores were then put into four categories, as follows:

- None
- 1-2
- 3-4
- 5 or more

The original authors have previously recommended categorising this variable[224], as a continuous approach may be misleading. This is because individual items cannot be considered equal and a continuous analysis implies that each unit increase is equivalent.

5.3.4.2.3 Total expected debt

The debt variable measured the total amount of all debt (including student loans) individuals anticipated being in when they completed their current course. This measure was based on one used in the Futuretrack survey[225] and a similar study in the literature[175],

and was chosen to measure the total amount of debt students were burdened with. The five response options were as follows:

- None
- Up to £19,999
- £20,000 to £39,999
- £40,000 to £59,999
- £60,000 or more

Table 5-1. The measures of financial situation used in the SENSE survey.

Main question text	**Items**	**Response options**	**Variable name**
On average, how much money do you receive per term from each of the following sources? Do not include money you will be expected to repay, or money paid directly to UCL for your tuition fees.[a]	Parent(s)/carer(s), friends and/or other family members. This includes cash gifts, paying for rent, buying essentials, etc, but not loans. Paid employment. Maintenance grants, non-repayable bursaries, special support grants, PhD stipends and/or scholarships. Any other sources. This may include child-related income support or social security benefits, but not loans.	None Less than £100 £100-249 £250-499 £500-999 £1,000-1,999 £2,000-2,999 £3,000-3,999 £4,000 or more	Income
On average, how much money do you receive per term from each of the following sources in loans you will be expected to repay? Do not include money paid directly to UCL for your tuition fees.[a]	Loans from the Student Loans Company or government paid directly to you (including maintenance loans and postgraduate loans). Loans from parent(s)/carer(s), friends or other family members. Outstanding overdraft and credit card debt. Payday or other short-term loans. Loans from any other sources.	None Less than £100 £100-249 £250-499 £500-999 £1,000-1,999 £2,000-2,999 £3,000-3,999 £4,000 or more	Loan income
How much total debt (from all sources, including tuition fees and previous degrees) do you anticipate having when you have completed your current university course?	N/A	None Up to £4,999 £5,000-9,999 £10,000-19,999 £20,000-29,999 £30,000-39,999 £40,000-49,999 £50,000-59,999 £60,000-69,999 £70,000-79,999 £80,000-89,999 £90,000 or more	Total expected debt
Since the start of this term, did any of the following happen to you due to financial difficulties? Please tick all that apply.[b]	Could not pay bills on time (e.g. electricity, gas, internet or telephone)[c] Could not pay the rent or mortgage on time[c] Pawned or sold something[c] Went without meals or ate less[c] Was unable to socialise or attend a social event Was unable to take part in hobbies or sports Went without things I need for my course (e.g. books, printing costs) Could not travel to university	Yes (indicated by selecting) No (indicated by not selecting)	Financial difficulties

	Could not travel to visit family or friends Asked for financial help from friends or family[c] Asked for financial help from elsewhere (e.g. university, community organisations)[c] None of the above happened to me (exclusive option)		

Notes:
a. Question was presented as a matrix. Participants were required to give a response to each individual item in turn from the list of response options.
b. Question was presented as a list of items that could be selected and unselected.
c. These items were taken from the original version of the Index of Financial Stress[177]. The remaining items were created by me to reflect students' common expenditures.

5.3.4.3 Confounders

In the baseline survey, students were asked to consent to allow researchers to access their data held by UCL Student and Registry Services. This ensured I could collect reliable demographic and course information without participants having to enter it. Students who consented to this entered their student ID number, which I used to request their data from the UCL Registry. Students who did not consent were asked to self-report their demographic and course information in the survey. The survey questions therefore mirrored the Registry questions in terms of question text and response options so that this data could be combined. The Registry provided aggregate data on the whole University student population for each of these variables.

For anyone who provided Registry consent and also completed the self-report questions (for example, if they completed the survey twice and only gave Registry consent once), Registry data was used and any missing data filled with self-report data.

The socioeconomic and mental health variables were self-reported by all participants within the main survey and not available from the Registry, unless otherwise indicated.

Below I describe how each included confounding variable was measured.

5.3.4.3.1 Demographics

Demographic questions were asked by the University and the survey in the format required by HESA (Higher Education Statistics Agency).

5.3.4.3.1.1 Age

Indicates continuous age in years. Derived from date of birth, taken from Registry data. Asked only as month and year of birth in survey (only to those who did not consent to Registry data access), so 1st of the month was taken as the date by default. January was taken as the month if only the year was entered. I then calculated the participant's age using the survey end date (the time the participant's final questionnaire session ended, regardless of whether it was complete).

5.3.4.3.1.2 Sex

Indicates sex of participant. Taken from Registry data; question only asked to those who did not consent to Registry data access. Participants were asked 'What is your sex?' with four response options as follows:

- Male
- Female
- Other
- Prefer not to say

The latter two categories were recoded to missing due to very small numbers.

5.3.4.3.1.3 Ethnicity

Taken from Registry data; question only asked to those who did not consent to Registry data access. Participants were asked 'What is your ethnic group?' with 18 response options as follows:

- White - English, Welsh, Scottish, Northern Irish, British
- White – Irish
- Gypsy or Traveller
- Other White background
- Black or Black British – Caribbean
- Black or Black British – African
- Other Black Background
- Asian or Asian British – Indian
- Asian or Asian British – Pakistani
- Asian or Asian British – Bangladeshi
- Chinese
- Other Asian Background
- Mixed - White and Black Caribbean
- Mixed - White and Black African
- Mixed - White and Asian
- Other Mixed background

- Arab
- Other ethnic background
- Prefer not to say

I collapsed these options into the following five categories for analyses, due to small numbers in some categories:

- White
- Asian
- Black
- Mixed
- Arab or Other

The 'prefer not to say' option was recoded to missing.

5.3.4.3.2 Socioeconomic status

5.3.4.3.2.1 Parental housing tenure

Participants were asked 'Thinking about your family home, does your household own or rent this accommodation?' with six response options as follows:

- Owns outright
- Owns with the help of a mortgage or loan
- Part owns and part rents (shared ownership)
- Rents (with or without housing benefit)
- Lives there rent-free
- N/A

I collapsed these options into the following three categories for these analyses, due to small numbers in some categories:

- Owns outright or lives there rent-free
- Owns with the help of a mortgage or loan, or shared ownership
- Rents (with or without housing benefit)

The 'N/A' option was recoded to missing.

5.3.4.3.2.2 Parental education

Participants were asked ‘What was the highest level of education your parent(s)/carer(s) had attained before you started your course?’ with five response options as follows:

- Degree or higher
- A Level or equivalent
- GCSE, O Level or equivalent
- Other
- Unsure

The ‘unsure’ option was recoded to missing.

5.3.4.3.3 Course variables

Course variables are automatically taken from students’ enrolment records by the UCL Registry. Question wording therefore only reflects the self-report survey version of the variables.

5.3.4.3.3.1 Level of study

Participants were asked ‘What is your current level of study?’ with three response options as follows:

- Undergraduate
- Postgraduate taught (e.g. Master’s)
- Postgraduate research (e.g. MRes, PhD)

5.3.4.3.3.2 Fee status

Indicates participant’s fee status, as it relates to their country of domicile. Participants were asked ‘What is your fee status?’ with three response options as follows:

- UK
- EU
- Overseas

5.3.4.3.3.3 Faculty

Indicates the University faculty in which the participant's course or studying is primarily based. There was not a self-report survey question for this item, as it can be generated using either the name of the student's current programme or the department or institute that their current programme is based in (these were asked as self-report survey questions). I generated the faculty variable for any participants who did not give consent for us to access their UCL Registry data but did self-report their programme or department within the survey.

There were 13 possible options, as follows:

- Arts and Humanities
- Bartlett
- Brain Sciences
- Engineering Sciences
- UCL Qatar
- Institute of Education
- Laws
- Life Sciences
- Maths and Physical
- Medical Sciences
- Population Health Sciences
- Slavonic and Eastern European
- Social and Historical Sciences

UCL Qatar students were recoded as missing due to very small numbers (n = 5). I collapsed the remaining categories into the following four groups:

- Arts and Humanities - containing Arts and Humanities, Bartlett, and Laws
- Sciences and Engineering - containing Brain Sciences, Engineering Sciences, Life Sciences, Maths and Physical, and Population Health Sciences
- Medical Sciences - containing only Medical Sciences

- Social and Historical Sciences – containing Institute of Education, Slavonic and Eastern European, and Social and Historical Sciences

5.3.4.3.3.4 Mode

Question only asked to those who did not consent to Registry data access. Participants were asked "What is your mode of study?" with two response options, 'Full-time' or 'Part-time/Flexi'.

5.3.4.3.4 Health

5.3.4.3.4.1 Pre-existing mental health problems

I used two questions to investigate whether participants had pre-existing mental health problems, adapted from the Adult Psychiatric Morbidity Survey (APMS[13]). In the first question, participants were asked "Have you ever experienced any of the following mental health problems? Please tick all that apply." The list of mental health difficulties was as follows:

- Anxiety disorder (e.g. generalised anxiety disorder, social anxiety, panic attacks)
- Depression
- Obsessive Compulsive Disorder (OCD)
- Attention Deficit Hyperactivity Disorder (ADHD)
- Autism or autism spectrum disorder
- Eating disorder (e.g. anorexia, bulimia)
- Post-traumatic Stress Disorder (PTSD)
- Bipolar disorder, schizophrenia or psychosis
- Personality Disorder (e.g. Borderline Personality Disorder)
- Other (please indicate)
- I have never experienced any mental health problems

The final option was exclusive, such that if it was selected, other selected items were automatically unselected. Participants who selected this option were not shown the second question. If participants selected that they had ever experienced any mental health problem(s), the selected options were carried forward as possible responses to the second question. The second question asked "Please indicate which of these mental

health problems you had experienced before you started your current university course. Please tick all that apply." The exclusive option was "I had not experienced any of these mental health problems before I started my current university course.".

These two questions combined indicate whether the participant has ever experienced a mental health problem(s) and, if so, whether they had experienced the problem(s) before their current university course. If participants indicated in the first question that they had never experienced a mental health problem, they were coded as 'no'. If they indicated a mental health problem in the first question, their response to the second question was taken. Participants who indicated any mental health problems in response to the second question were coded as 'yes', and participants who selected the 'I had not experienced any of these mental health problems before I started my current university course' option were coded as 'no'.

5.3.4.3.4.2 Disability

Indicates whether the participant considers themselves to have any type of disability. All participants were asked "Do you consider yourself to have any of the following? Please tick all that apply.". The response options were as follows:

- A physical disability - this includes any physical condition that has an effect on your day-to-day activities
- A non-physical disability - this includes any learning difficulty, mental health condition or condition such as autism that has an effect on your day-to-day activities
- None of the above
- Prefer not to say.

The 'none of the above' and 'prefer not to say' options were exclusive. The 'prefer not to say' option was recoded to missing. This question text and response options were taken from a similar survey conducted at the University of Bristol[226], based on the question text used by the University of Bristol Registry. This question was chosen as it was shorter and asked for less personal detail than the HESA question, and so the surveys could be comparable.

As participants could tick more than one type of disability, a new variable was created that combined these responses. Where participants indicated that they had both types of disability, this variable coded participants as having a non-physical disability, as disabilities affecting mental health were more relevant for the present analysis. This was the case for 45 participants in the full sample. Missing data in this variable was replaced with information from the Registry (applicable for 82 participants in the full sample), with any other discrepancies ignored.

5.3.4.4 Auxiliary variables used in multiple imputation analyses

Below I describe how each auxiliary variable in the multiple imputation model was measured.

5.3.4.4.1 Campus

Taken from Registry data question only asked to those who did not consent to Registry data access. Participants were asked "Are you a campus-based or distance learner?" with two response options, 'Campus-based learner' or 'Distance learner'. Registry data is automatically taken from students' enrolment records.

5.3.4.4.2 Year of study

Taken from Registry data; question only asked to those who did not consent to Registry data access. Participants were asked "What is your current year of study (on your current course)?" with six response options as follows:

- 1st year
- 2nd year
- 3rd year
- 4th year
- 5th year
- 6th year or above

I combined the latter two categories into "5th year or above", due to small numbers in these groups.

5.3.4.4.3 Sexual orientation

Taken from Registry data; question only asked to those who did not consent to Registry data access. Participants were asked “What is your sexual orientation?” with six response options as follows:

- Bisexual
- Homosexual man/gay man
- Homosexual woman/lesbian
- Heterosexual/straight
- Other
- Prefer not to say

The ‘prefer not to say’ option was recoded to missing. Consistent with prior studies, I recategorised the remaining options into a binary variable indicating whether the participant identified as heterosexual/straight or not, due to small numbers in some groups.

5.3.4.4.4 Religion

Taken from Registry data; question only asked to those who did not consent to Registry data access. Participants were asked “Do you have a religion or belief?” with ten response options as follows:

- No religion
- Buddhist
- Christian
- Hindu
- Jewish
- Muslim
- Sikh
- Spiritual
- Any other religion or belief
- Prefer not to say

The ‘prefer not to say’ option was recoded to missing. Due to small numbers in some groups, I recategorised the remaining options into the following four categories:

- No religion
- Christian
- Muslim
- Other

5.3.4.4.5 Carer

Participants were asked “Do you have any caring responsibilities for a child or adult dependent?” with two response options of ‘yes’ and ‘no’.

5.3.4.4.6 Satisfaction with university

Participants were asked “Overall, how satisfied are you with your experience of university nowadays?” and moved a slider to indicate their response along a scale of 0-10. The ‘0’ option was labelled “Not at all” and the ‘10’ option was labelled “Completely”, such that a higher score indicates more satisfaction with university. This question was based on the life satisfaction item from the Office for National Statistics (ONS) ONS4 measure[227] (see Section 5.3.4.4.11).

5.3.4.4.7 University absences

Participants were asked “On average, how often do you miss lectures, seminars or other university commitments, for any reason?” The six response options were as follows:

- Very frequently
- Frequently
- Sometimes
- Rarely
- Never
- I don't have any university commitments at the moment

The latter option was recoded to missing as it indicates that the question was not applicable.

5.3.4.4.8 Stressful life events

Participants were asked “Have you experienced any of the following since starting your current university course? Please tick all that apply.” The response options were as follows:

- You failed an exam or assignment
- You suffered a serious illness or injury
- You suffered an assault
- You experienced bullying or harassment (including identity-based experiences such as racism or homophobia)
- A serious illness, injury or assault happened to a close friend or relative
- Your parent, child or partner died
- Another close friend or relative died
- A serious romantic relationship ended
- You had a serious problem with a close friend or relative
- You got in trouble with the police or law enforcement
- Something you valued was lost or stolen
- You experienced a significant stressful life event not listed here (please explain below, if you would like to)
- You have not experienced any significant stressful life events since starting your current university course

The final item was exclusive, such that selecting it automatically unselected any other selected items. The number of items selected (excluding the final item) were totalled to give a score.

5.3.4.4.9 Timetabled university hours

Participants were asked “How many hours in total each week do you normally spend in timetabled activities for your course, such as lectures, tutorials and practicals (during term time)? (If this varies from week to week or according to modules, please give an average).” The response options were a numbered drop-down list from 0 to 40, with added options for ‘More than 40’ and ‘N/A’.

5.3.4.4.10 Independent university hours

Participants were asked “How many hours in total each week do you normally spend on work or study related to your course outside timetabled activities (during term time)? (If this varies from week to week or according to modules, please give an average).” The response options were a numbered drop-down list from 0 to 40, with added options for ‘More than 40’ and ‘N/A’.

5.3.4.4.11 Life satisfaction

Participants were asked “Overall, how satisfied are you with your life nowadays?” and had to move a slider to indicate their response along a scale of 0-10. The ‘0’ option was labelled “Not at all” and the ‘10’ option was labelled “Completely”, such that a higher score indicates more life satisfaction. This question can be considered as part of a measure of personal wellbeing, taken from the Office for National Statistics (ONS) ONS4 measure[227].

5.3.4.4.12 Life worthwhile

Participants were asked “Overall, to what extent do you feel that the things you do in your life are worthwhile?” and had to move a slider to indicate their response along a scale of 0-10. The ‘0’ option was labelled “Not at all” and the ‘10’ option was labelled “Completely”, such that a higher score indicates a more worthwhile life. This question can be considered as part of a measure of personal wellbeing, taken from the Office for National Statistics (ONS) ONS4 measure[227].

5.3.5 Procedure and ethical approval

Participants accessed the survey through the email invitation link. The first time point of the survey began with the participant information sheet and consent form (see Appendix 2), which were compulsory to complete in order to continue. The only other compulsory question in the survey was participants’ email address, to ensure individuals’ responses across time points could be matched, and to confirm UCL student status. At the end of each survey page any unanswered questions were highlighted and participants were asked if they would like to answer them or proceed without doing so. In the middle and at the end of each survey, participants were signposted towards a range of mental health support options and more information about SENSE.

I obtained ethical approval from University College London Research Ethics Committee (project ID no.: 8227/002) and ensured that all procedures complied with the ethical standards of the relevant legislation, including the Helsinki Declaration (2008 revision), and the General Data Protection Regulation. Survey responses were stored securely using pseudonymised study IDs only, accessible only by the SENSE team.

5.3.6 Public and patient involvement (PPI) and pilot

I conducted public and patient involvement (PPI) consultation meetings with fellow UCL students to develop the SENSE recruitment methods and survey contents. Six consultation meetings were held before the first time point of the survey (i.e. the main recruitment period). Each meeting had approximately four current UCL students present, with a total of 22 students consulted. A group of four students from these consultation meetings continued to be involved throughout SENSE as a steering group. Two consultation meetings were held before the second time point, with eight attendees in total. All students were reimbursed for their time.

The SENSE logo and branding, email recruitment and reminder text, recruitment methods, and survey content for each time point was developed at consultation meetings. This ensured that the questions were clear, understandable and acceptable to students, that the response options were appropriate, and that there were not any technical issues. Students also helped me to optimise the recruitment text and test the length of the survey, to motivate as many participants as possible to complete each time point.

I conducted a pilot survey from 7th October 2019, open for two weeks. I piloted the first version of the survey on Qualtrics, with added extra free-text-response questions about the content and performance of the survey and software. Example extra questions included “Were there any questions which you found distressing to complete?” and “Did you feel that you could be open and honest with all of your responses?”. I recruited pilot participants via email newsletter advertisement to the University “student experience panel” (930 students). Those who completed the survey and extra questions were entered into a prize draw to win one of ten £20 Amazon vouchers, as an incentive. There were 78 complete responses. These pilot participants became part of the main SENSE

sample and were followed up at subsequent time points. I used their qualitative feedback to improve the contents and performance of the survey before the main launch.

I also held meetings with relevant stakeholders when designing the survey and recruitment plans, including the Head of Student Engagement, Head of Data and Insight (Education), various members of UCL Student Support and Wellbeing, and UCL Students' Union staff members. I used their expertise and feedback to improve the survey and recruitment methods.

5.3.7 Statistical analyses

5.3.7.1 Cross-sectional analysis

I performed analyses using Stata 16[98]. For the cross-sectional analysis, I used linear regression models to investigate associations between each financial situation measure (four exposures, in separate models) and symptoms of depression at baseline (outcome). Missing data on confounders and outcome were imputed using multiple imputation (see details below in Section 5.3.7.3), and analyses were weighted for non-response (sample weights; see Missing data). I checked that the assumptions of linear regression were met.

Each exposure was investigated separately (in separate models) because the measures are highly correlated with one another, and some may be on the causal pathway with one another (for example, financial difficulties could mediate the relationship between income and mental health). This also allowed me to better compare associations across different domains of financial situation. First, a univariable association was tested, then I incrementally added confounders to the model in groups in the following order: demographics, course variables, socioeconomic status, health. Participants were included in analyses if they had complete data on all four exposure variables so that the models were comparable. I tested for a non-linear association in each model using a quadratic exposure variable. Additionally, I ran each model with the exposure variable as continuous, to obtain an estimate of the overall association, reflecting my hypotheses that increasing levels of financial hardship would be associated with increasing levels of poor mental health. This also maximised statistical power.

5.3.7.2 Longitudinal analysis

For the longitudinal analysis, I used linear regression models to investigate associations between each financial situation measure (four exposures; separately) and symptoms of depression at follow-up (outcome). First, a univariable association was tested, then I incrementally added confounders to the model in groups in the following order: demographics, course, socioeconomic status, health, outcome at baseline. I adjusted for the outcome at baseline last as it could possibly be a mediator rather than a confounder, such that financial situation at baseline (experienced throughout that term) led to symptoms of depression at baseline which then led to symptoms of depression at follow-up. In this way, symptoms of depression at baseline would be a mediator on the causal pathway between the exposure and the outcome at follow-up. This also allows the cross-sectional and longitudinal models to be comparable until the final stage. Participants were included in analyses if they had complete data on all four exposure variables. Missing data on confounders and outcome were imputed, and analyses were weighted for non-response (sample weights; see Missing data).

5.3.7.3 Missing data

There were four ways in which data could be missing in my study. Firstly, there was missing data due to initial non-response to the survey; people who did not participate in the study at all. This could introduce bias as certain types of people may be more likely to take part in research, such as women. I accounted for this using sample weights to increase similarity between the sample and target population demographics. I used entropy balancing weights generated using the Stata user-written package ebalance[228,229]. I weighted my data to match the characteristics of the UCL student population at the time of data collection, according to aggregate data obtained from the UCL Registry. Weights were generated using the variables sex, ethnicity, level, fee status, mode and campus, chosen as the variables mostly likely to be associated with missingness and the outcome. Some participants were missing data on some of the variables used for generating weights. When this occurred, the most commonly imputed value (modal value) for that individual in the multiple imputation was used for the purposes of weighting. Both the cross-sectional and longitudinal analyses used these weights.

Secondly, there was incomplete outcome data, where participants had answered some items of the PHQ-9 but missed others. I addressed incomplete data on the outcome (PHQ-9 scores) by replacing the missing items with the mean score for that individual on the non-missing items. This is an appropriate method of dealing with missing data while maximising data completeness, as the PHQ has high internal consistency[219]. I only did this for individuals who had completed more than 60% of the items (6 or more items out of 9). This was the case for 15 participants in my sample at baseline, and for two participants at follow-up. These replaced values were used in all analyses.

Thirdly, there was missing data due to partial completion of the survey; starting the survey but not completing it. Participants who only partially completed the survey (at either or both time points) had missing data on some variables but not others. The exposure variables were the earliest in the survey, so were least likely to have missing data. The demographic and course variables were the latest in the survey, so were most likely to have missing data. These variables also came immediately after the question block containing the PHQ-9, so those with more symptoms of depression may have found the PHQ-9 more distressing to complete and therefore have been more likely to exit the survey at this point. Some symptoms of depression could also make it more difficult to complete the survey fully, for example difficulties with concentration. Excluding partial completion participants with missing demographic and course variables could therefore lead to bias.

Finally, missing data occurred due to attrition from baseline to follow-up. This could introduce bias as those with the outcome (more symptoms of depression) may be more likely to drop out due to symptoms such as a lack of concentration making it more difficult to complete the survey.

I addressed missing data due to partial completion and missing data due to attrition using multiple imputation with chained equations (MICE). I used MICE to replace missing data on confounders and outcome for everyone who had provided complete data on all four exposure variables (n = 2,725). I chose this as my main sample because (as described above) the exposure variables were first in the survey and asked together on the same survey page so there was little missing data between exposures (n = 165 participants had

partial exposure data), and this gave a consistent sample to use throughout the analysis. To predict missing values, I used all confounders and auxiliary variables (see Section 5.3.4), and imputed 50 values. In the regression analyses imputed values were combined using Rubin's rules[104].

5.3.7.4 Sensitivity analyses

I conducted sensitivity analyses for the cross-sectional and longitudinal data. The first treated the PHQ-9 as a binary outcome, repeating all analyses as logistic regressions. This allows me to display the findings in terms of the odds of being above the PHQ threshold for possible clinically important level of symptoms, which could be considered to have more utility in terms of service provision, and is more easily interpreted and communicated. Logistic regression also has the advantage that it relies on fewer assumptions.

The second sensitivity analysis repeated both the cross-sectional and longitudinal analyses without using sample weights or the multiply imputed dataset, to check the impact of these missing data methods on the findings. Analyses were run for all participants who provided complete data on exposures, confounders and outcome – N = 2,167 at baseline and N = 1,267 at follow-up.

5.4 Results

5.4.1 Sample characteristics

A total of 2,725 out of a possible 3,272 participants (83.3%) had complete data on the four exposure variables, and became my sample for all analyses. There were 165 participants who had data on some exposure variables but not others, so these were excluded from analyses. Of those with complete exposure data, 2,679 (98.3%) had complete data on the outcome at baseline, and 2,167 of these (79.5%) also had complete data on all potential confounders. At follow-up, 1,523 (55.9%) of the 2,725 had complete data on the outcome. Overall, 1,267 participants had complete data on all exposures, confounders and outcome at both time points, 46.5% of the 2,725. The amount of missing data for each potential confounder (for participants in the study sample) can be found in Table 5-3. The maximum amount of missing data was for the disability variable; 209 participants (7.7% of the study sample) had missing data.

Characteristics of the sample used for analyses at baseline are shown in Table 5-2, alongside the characteristics of the UCL student population overall where available (maximum N = 43,836; from aggregate data provided by the UCL Registry). The study sample was 72.7% female (N = 1,910), with a mean age of 24.6 years (standard deviation 7.0 years). 62.6% (N = 1,629) were of White ethnicity and 73.4% (N = 1,941) had a parent with a degree. 48.8% (N = 1,288) were undergraduates, 51.9% (N = 1,373) were home students in terms of their fees, and 90.2% (N = 2,384) were studying full-time. 54.9% of participants (N = 1,393) reported experiencing a mental health problem before they started their current university course.

There were differences between the characteristics of the study sample and the UCL population on several variables (see Table 5-2). A higher proportion of participants in the study sample were female and of White ethnicity. They were also more likely to be studying at postgraduate research level and less likely to be an Overseas student in terms of their fees.

Descriptive statistics for the exposure variables at baseline can be found in Table 5-4. The most commonly reported category for each variable indicated that participants had a

termly income of £4,000 or more (33.2%), received zero loans per term (52.4%), expected to have no debt when completing their current course (35.5%), and had experienced no financial difficulties since the start of term (44.6%).

The mean PHQ score at baseline was 9.29 (standard deviation [SD] 6.59), with 42.6% of participants (N = 1,140) scoring over the threshold of 10. The mean PHQ score at follow-up was 8.52 (SD 6.34), with 38.8% of participants (N = 591) scoring over the threshold of 10.

Table 5-2. Demographic and course characteristics of the study sample at baseline and University Registry sample.

Variable	**Study sample**	**University Registry sample**
Age[a] (years) – Mean (SD)	24.6 (7.0)	25.0 (7.22)
Sex[b, c]		
Male	717 (27.3%)	17,566 (40.1%)
Female	1,910 (72.7%)	26,253 (59.9%)
Ethnicity[b]		
White	1,629 (62.6%)	19,224 (44.8%)
Black	67 (2.6%)	1,711 (4.0%)
Asian	602 (23.1%)	17,703 (41.3%)
Mixed	193 (7.4%)	2,449 (5.7%)
Arab or Other	111 (4.3%)	1,829 (4.3%)
Parents' Housing Tenure[d]		
Owns outright or lives there rent-free	1,116 (43.5%)	-
Owns with the help of a mortgage or loan, or shared ownership	933 (36.4%)	-
Rents (with or without housing benefit)	514 (20.1%)	-
Parents' Highest Qualification[d]		
Degree or higher	1,941 (73.4%)	-

A Level or equivalent	296 (11.2%)	-
GCSE, O Level or equivalent	306 (11.6%)	-
Other	101 (3.8%)	-
Faculty[b]		
Medical Sciences	259 (9.9%)	
Sciences and Engineering	1,223 (46.9%)	
Arts and Humanities	435 (16.7%)	
Social and Historical Sciences	689 (26.4%)	
Degree level[b]		
Undergraduate	1,288 (48.8%)	19,994 (45.6%)
Postgraduate Taught (MA, MSc)	771 (29.2%)	17,916 (40. 9%)
Postgraduate Research (MRes, PhD)	583 (22.1%)	5,926 (13.5%)
Fee status[b]		
Home student	1,373 (51.9%)	20,575 (46.9%)
EU student	606 (22.9%)	6,830 (15.6%)
Overseas student	664 (25.1%)	16,431 (37.5%)
Study mode[b]		
Full-time	2,384 (90.2%)	36,976 (84.4%)
Part-time/Flexible	259 (9.8%)	6,860 (15.6%)
Pre-existing mental health problems[d,e]	1,393 (54.9%)	-
Disability[f]		
No disability	1,829 (72.7%)	39,918 (92.3%)
Physical disability	81 (3.2%)	686 (1.6%)
Non-physical disability	606 (24.1%)	2,657 (6.1%)

a. Calculated from date of birth to time of survey completion or last survey activity.

b. Data from the University registry used primarily, with data from the survey used when registry data was missing.

c. Sex measured by the Registry by asking 'What is your sex?' with four response options as follows: 'Male'; 'Female'; 'Other'; 'Prefer not to say'.

d. Survey data only (registry data not held or not used).

e. Participants were asked to indicate which (if any) of a list of mental health problems they had ever experienced and if any were selected, which they had experienced before they started their current university course. Those who selected 'none' in response to either question were coded as 'no', and those who selected any problems in response to the second question were coded as 'yes'.

f. Data from the survey used primarily, with data from the University registry used when survey data was missing.

Notes:

1. All data are N (%) unless otherwise specified.
2. Data from all participants who provided complete exposure data. N differs by variable; maximum N = 2,725.
3. Table displays raw data; unweighted and non-imputed.
4. All data available from the University Registry is provided. Blank cells indicate data not collected by University Registry. All data was provided at aggregate level only. N differs by variable; maximum N = 43,836.
5. Where participants and registry provided data for the same variable, participants' answers were taken and missing data filled with registry data.

Table 5-3. Proportion of participants in the study sample with missing data on potential confounding variables.

Variable	**Proportion of sample with missing data – N (%)**
Age	97 (3.6%)
Sex	98 (3.6%)
Ethnicity	123 (4.5%)
Parents' Housing Tenure	162 (5.9%)
Parents' Highest Qualification	81 (3.0%)
Faculty	119 (4.4%)
Degree level	83 (3.0%)
Fee status	82 (3.0%)
Study mode	82 (3.0%)
Pre-existing mental health problems	189 (6.9%)
Disability	209 (7.7%)
Notes: 1. Percentages of missing data out of a maximum N of 2,725, the number of participants who provided complete exposure data. 2. Missing data on potential confounders was imputed for the main analyses.	

Table 5-4. Financial exposure variables in the study sample at baseline.

Variable	N (%) or Mean (SD)
Income	
Less than £1,000	645 (23.7%)
£1,000 to £1,999	528 (19.4%)
£2,000 to £3,999	648 (23.8%)
£4,000 or more	904 (33.2%)
Loan income	
None	1,427 (52.4%)
Less than £1,999	549 (20.1%)
£2,000 to £3,999	386 (14.2%)
£4,000 or more	363 (13.3%)
Total expected debt	
None	967 (35.5%)
Up to £19,999	301 (11.0%)
£20,000 to £39,999	515 (18.9%)
£40,000 to £59,999	455 (16.7%)
£60,000 or more	487 (17.9%)
Financial difficulties	
None	1,214 (44.6%)
1-2	769 (28.2%)
3-4	477 (17.5%)
5 or more	265 (9.7%)
Notes: 1. Data from all participants who provided complete exposure data; N = 2,725. 2. Table displays raw data; unweighted and non-imputed.	

5.4.2 Cross-sectional analyses of the association between students' financial situation and symptoms of depression at baseline

5.4.2.1 Income

Results for the income exposure variable are shown in Table 5-5. In descriptive analyses, the mean PHQ score decreased as income level increased. Consistent with this, there was no evidence of non-linearity in the unadjusted (Model 1; p = .521) or fully adjusted regression model (Model 5; p = .117).

In the unadjusted model, there was strong evidence of an inverse association between income and symptoms of depression. Evidence of this remained in the fully adjusted model (Model 5) despite slightly attenuated effect sizes. For example, PHQ scores were 1.03 points lower (95% confidence interval [CI] -1.80 to -0.26) in those with an income of £4,000 or more (the highest income level) compared to those with an income of less than £1,000 (reference category). When treating the income variable as continuous, there was evidence that for each unit increase in income, PHQ score decreased by 0.35 points (95% CI -0.60 to -0.10, p = .006).

Table 5-5. Cross-sectional analysis: Mean difference in symptoms of depression at baseline according to income per term.

Mean Difference (95% Confidence Interval)					
	Less than £1,000	£1,000 to £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[f]
Mean (SD)	10.55 (7.01)	9.67 (6.81)	9.00 (6.46)	8.37 (6.07)	-
Model 1[a]	*Reference category*	-0.87 (-1.82 to 0.08)	-1.57 (-2.48 to -0.67)	-2.05 (-2.87 to -1.22)	-0.68 (-0.94 to -0.42), p < .001
Model 2[b]	*Reference category*	-0.91 (-1.86 to 0.03)	-1.50 (-2.39 to -0.62)	-1.63 (-2.45 to -0.81)	-0.53 (-0.80 to -0.27), p < .001
Model 3[c]	*Reference category*	-0.78 (-1.70 to 0.15)	-1.38 (-2.27 to -0.50)	-1.34 (-2.19 to -0.49)	-0.45 (-0.72 to -0.17), p = .001
Model 4[d]	*Reference category*	-0.73 (-1.66 to 0.19)	-1.37 (-2.26 to -0.48)	-1.22 (-2.08 to -0.36)	-0.41 (-0.69 to -0.14), p = .003
Model 5[e]	*Reference category*	-0.65 (-1.50 to 0.19)	-1.24 (-2.05 to -0.43)	-1.03 (-1.80 to -0.26)	-0.35 (-0.60 to -0.10), p = .006

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.2.2 Loan income

The results from the loan income exposure variable analyses can be found in Table 5-6. In descriptive analyses, the mean PHQ score decreased as loan income level increased. In the unadjusted model (Model 1), there was some evidence of non-linearity (p = .028). While there was evidence of a difference in PHQ scores between those with a loan income of less than £1,999 (the third loan income category) and those with no loan income (mean difference [MD] 2.23, 95% CI 1.39 to 3.07; reference category), the effect estimate for the second loan income category was similar to this, with overlapping confidence intervals (MD 2.19, 95% CI 1.32 to 3.06). The effect estimate then increased again for the highest loan income category (£4,000 or more) compared to those with no loan income (MD 3.20, 95% CI 2.29 to 4.10).

In the fully adjusted model (Model 5) there was no evidence of non-linearity (p = .312), but again effect estimates overlapped in the '£2,000 to £3,999' and 'less than £1,999' loan income groups relative to the 'none' group. Overall, the fully adjusted model found a positive association between loan income and PHQ scores, with scores in those with a loan income of £4,000 or more 2.51 points higher (95% CI 1.65 to 3.37) than those with no loan income. Treating the exposure variable as continuous showed that with each unit increase in loan income, participants' mean PHQ score increased by 0.80 points (95% CI 0.53 to 1.07, p < .001).

Table 5-6. Cross-sectional analysis: Mean difference in symptoms of depression at baseline according to loan income per term.

Mean Difference (95% Confidence Interval)					
	None	Less than £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[f]
Mean (SD)	8.23 (6.26)	9.96 (6.73)	10.33 (6.89)	11.33 (6.54)	-
Model 1[a]	*Reference category*	2.23 (1.39 to 3.07)	2.19 (1.32 to 3.06)	3.20 (2.29 to 4.10)	1.10 (0.83 to 1.37), p < .001
Model 2[b]	*Reference category*	2.02 (1.17 to 2.88)	2.02 (1.14 to 2.89)	3.13 (2.23 to 4.03)	1.05 (0.78 to 1.32), p < .001
Model 3[c]	*Reference category*	2.00 (1.12 to 2.89)	1.95 (1.04 to 2.86)	3.16 (2.24 to 4.07)	1.04 (0.75 to 1.32), p < .001
Model 4[d]	*Reference category*	1.95 (1.07 to 2.83)	1.87 (0.95 to 2.79)	3.12 (2.19 to 4.04)	1.02 (0.73 to 1.30), p < .001
Model 5[e]	*Reference category*	1.54 (0.74 to 2.35)	1.32 (0.42 to 2.22)	2.51 (1.65 to 3.37)	0.80 (0.53 to 1.07), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.2.3 Total expected debt

The results from the total expected debt exposure variable analyses can be found in Table 5-7. In descriptive analyses, the mean PHQ score increased as expected debt amount increased. There was weak evidence for non-linearity; p = .069 for the unadjusted model and p = .044 for the adjusted model. There was little evidence of a difference between the fourth debt category (up to £19,999) and the reference category (no debt; MD 0.90, 95% CI -0.01 to 1.81; Model 5), but a difference emerged when comparing the third debt category (£20,000 to £39,999) with the reference category (MD 1.70, 95% CI 0.90 to 2.50).

There was evidence of a positive association between debt amount and PHQ in both the unadjusted model (Model 1) and the fully adjusted model (Model 5). For example, after adjustment for potential confounders Model 5 found that PHQ scores were 1.87 points higher (95% CI 1.00 to 2.74) in those with £60,000 or more total debt than in those with no debt. Treating the total debt variable as continuous showed that with each unit increase in debt, participants' mean PHQ score increased by 0.50 points (95% CI 0.30 to 0.71, p < .001).

Table 5-7. Cross-sectional analysis: Mean difference in symptoms of depression at baseline according to total expected debt.

Mean Difference (95% Confidence Interval)						
	None	Up to £19,999	£20,000 to £39,999	£40,000 to £59,999	£60,000 or more	Continuous exposure[f]
Mean (SD)	8.02 (6.23)	8.64 (6.19)	10.12 (6.68)	10.20 (6.89)	10.49 (6.67)	-
Model 1[a]	*Reference category*	0.62 (-0.38 to 1.63)	2.10 (1.28 to 2.93)	2.34 (1.39 to 3.29)	2.45 (1.59 to 3.30)	0.69 (0.49 to 0.88), p < .001
Model 2[b]	*Reference category*	0.96 (-0.03 to 1.95)	1.97 (1.14 to 2.80)	2.09 (1.10 to 3.07)	2.27 (1.41 to 3.13)	0.61 (0.41 to 0.82), p < .001
Model 3[c]	*Reference category*	1.11 (0.14 to 2.07)	1.89 (1.02 to 2.75)	2.09 (1.05 to 3.13)	2.51 (1.58 to 3.43)	0.65 (0.42 to 0.87), p < .001
Model 4[d]	*Reference category*	1.10 (0.15 to 2.05)	1.92 (1.04 to 2.79)	2.05 (1.02 to 3.09)	2.48 (1.55 to 3.41)	0.64 (0.41 to 0.86), p < .001
Model 5[e]	*Reference category*	0.90 (-0.01 to 1.81)	1.70 (0.90 to 2.50)	1.78 (0.82 to 2.74)	1.87 (1.00 to 2.74)	0.50 (0.30 to 0.71), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.2.4 Financial difficulties

The results from the financial difficulties exposure variable analyses can be found in Table 5-8. In descriptive analyses, the mean PHQ score increased as number of financial difficulties experienced increased. In all models, there was evidence of a strong positive association between financial difficulties and symptoms of depression, with no evidence for non-linearity ($p = .772$ for the unadjusted model and $p = .634$ for the fully adjusted model). In the fully adjusted model (Model 5), I found that participants who had experienced five or more financial difficulties (the highest level) had PHQ scores 4.67 points higher (95% CI 3.63 to 5.71) than those who had experienced none (the lowest level). When treating the exposure variable as continuous, with each unit increase in number of financial difficulties, participants' mean PHQ score increased by 1.63 points (95% CI 1.33 to 1.92, $p < .001$).

Table 5-8. Cross-sectional analysis: Mean difference in symptoms of depression at baseline according to financial difficulties experienced.

Mean Difference (95% Confidence Interval)					
	None	1-2	3-4	5 or more	Continuous exposure[f]
Mean (SD)	7.49 (6.02)	9.21 (6.25)	11.67 (6.55)	13.55 (6.85)	-
Model 1[a]	*Reference category*	2.06 (1.37 to 2.74)	4.37 (3.54 to 5.20)	6.10 (5.02 to 7.18)	2.09 (1.80 to 2.39), p < .001
Model 2[b]	*Reference category*	1.86 (1.18 to 2.54)	4.26 (3.44 to 5.07)	6.00 (4.92 to 7.08)	2.04 (1.75 to 2.34), p < .001
Model 3[c]	*Reference category*	1.98 (1.30 to 2.67)	4.25 (3.44 to 5.06)	5.97 (4.91 to 7.04)	2.04 (1.75 to 2.34), p < .001
Model 4[d]	*Reference category*	1.98 (1.30 to 2.67)	4.25 (3.43 to 5.06)	5.90 (4.81 to 6.99)	2.03 (1.73 to 2.33), p < .001
Model 5[e]	*Reference category*	1.63 (0.98 to 2.28)	3.46 (2.68 to 4.24)	4.67 (3.63 to 5.71)	1.63 (1.33 to 1.92), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.3 Longitudinal analyses of the association between students' financial situation and symptoms of depression at follow-up

5.4.3.1 Income

The results from the income exposure variable analyses can be found in Table 5-9. The mean PHQ score decreased as income increased, though again were similar in the categories with an income of £1,000 to £1,999 and £2,000 to £3,999. There was no evidence for non-linearity (p = .799 for the unadjusted model and p = .863 for the fully adjusted model). In the unadjusted model (Model 1), there was evidence of an inverse association between income and PHQ scores, with those in the highest income category (£4,000 or more) scoring 1.61 points lower (95% CI -2.58 to -0.63) on the PHQ than those in the lowest income category (less than £1,000). However, this association did not remain after adjustment for socioeconomic variables (Model 3), and in the fully adjusted model there was no evidence of an association between income and symptoms of depression at follow-up.

Table 5-9. Longitudinal analysis: Mean difference in symptoms of depression at follow-up according to income.

Mean Difference (95% Confidence Interval)					
	Less than £1,000	£1,000 to £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[g]
Mean (SD)	9.44 (6.70)	8.71 (6.32)	8.71 (6.19)	7.72 (6.13)	-
Model 1[a]	*Reference category*	-0.69 (-1.80 to 0.42)	-1.12 (-2.17 to -0.07)	-1.61 (-2.58 to -0.63)	-0.52 (-0.83 to -0.22), p = .001
Model 2[b]	*Reference category*	-0.72 (-1.82 to 0.39)	-1.04 (-2.08 to -0.00)	-1.26 (-2.24 to -0.28)	-0.40 (-0.71 to -0.10), p = .010
Model 3[c]	*Reference category*	-0.48 (-1.57 to 0.61)	-0.81 (-1.86 to 0.24)	-0.83 (-1.86 to 0.19)	-0.27 (-0.60 to 0.05), p = .097
Model 4[d]	*Reference category*	-0.44 (-1.53 to 0.66)	-0.78 (-1.83 to 0.27)	-0.67 (-1.69 to 0.35)	-0.22 (-0.55 to 0.10), p = .175
Model 5[e]	*Reference category*	-0.38 (-1.42 to 0.67)	-0.67 (-1.67 to 0.33)	-0.52 (-1.48 to 0.44)	-0.18 (-0.48 to 0.13), p = .260
Model 6[f]	*Reference category*	0.09 (-0.74 to 0.92)	0.22 (-0.58 to 1.01)	0.22 (-0.57 to 1.00)	0.08 (-0.17 to 0.32), p = .547

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.3.2 Loan income

The results from the loan income exposure variable analyses can be found in Table 5-10. The mean PHQ score increased as loan income amount increased. In the unadjusted model (Model 1), there was some evidence of non-linearity (p = .033), with the confidence intervals largely overlapping between comparisons, but this had disappeared by the fully adjusted model (Model 5; p = .460). In Model 1, there was evidence that as loan income increased symptoms of depression increased, however this association attenuated when adjusting for potential confounders (Models 2-5) and there was no evidence of a difference after adjusting for PHQ scores at baseline (Model 6). There was no evidence of an association between loan income and symptoms of depression at follow-up – for example, a mean difference of 0.52 (95% CI -0.38 to 1.43) when comparing the highest loan income category with the lowest.

Table 5-10. Longitudinal analysis: Mean difference in symptoms of depression at follow-up according to loan income.

Mean Difference (95% Confidence Interval)					
	None	Less than £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[g]
Mean (SD)	7.45 (5.82)	8.92 (6.49)	9.99 (6.76)	10.76 (6.76)	-
Model 1[a]	*Reference category*	2.05 (1.11 to 2.99)	2.69 (1.67 to 3.70)	3.07 (1.97 to 4.17)	1.13 (0.81 to 1.44), p < .001
Model 2[b]	*Reference category*	1.96 (1.00 to 2.92)	2.64 (1.61 to 3.68)	3.06 (1.96 to 4.15)	1.11 (0.79 to 1.42), p < .001
Model 3[c]	*Reference category*	1.84 (0.84 to 2.84)	2.40 (1.35 to 3.46)	2.99 (1.89 to 4.09)	1.04 (0.72 to 1.37), p < .001
Model 4[d]	*Reference category*	1.75 (0.74 to 2.75)	2.27 (1.20 to 3.34)	2.87 (1.77 to 3.98)	1.00 (0.67 to 1.33), p < .001
Model 5[e]	*Reference category*	1.40 (0.43 to 2.36)	1.77 (0.72 to 2.81)	2.31 (1.25 to 3.37)	0.80 (0.47 to 1.12), p < .001
Model 6[f]	*Reference category*	0.30 (-0.46 to 1.06)	0.83 (0.00 to 1.65)	0.52 (-0.38 to 1.43)	0.23 (-0.04 to 0.49), p = .097

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.3.3 Total expected debt

The results from the total expected debt exposure variable analyses can be found in Table 5-11. The mean PHQ score increased as total debt amount increased, and consistent with this there was no evidence of non-linearity in any of the models (p = .131 for Model 1 and p = .892 for Model 6). In the unadjusted model (Model 1), there was evidence of a positive association between debt and PHQ symptoms – for example, those with £60,000 or more total debt (the highest debt category) had PHQ scores 2.73 points (95% CI 1.77 to 3.68) higher than those with no debt. However, this difference gradually attenuated when adjusting for potential confounders (Models 2-5). When adjusting for PHQ scores at baseline (Model 6), there was a significant difference between those in the highest debt category and those with no debt (MD 0.84, 95% CI 0.03 to 1.65), but not in any other category. There was very weak evidence of an association when treating the exposure variable as continuous (MD 0.17, 95% CI -0.03 to 0.37, p = .090).

Table 5-11. Longitudinal analysis: Mean difference in symptoms of depression at follow-up according to total expected debt.

Mean Difference (95% Confidence Interval)						
	None	Up to £19,999	£20,000 to £39,999	£40,000 to £59,999	£60,000 or more	Continuous exposure[g]
Mean (SD)	7.19 (5.71)	8.23 (6.23)	8.92 (6.22)	9.34 (6.58)	10.04 (6.95)	-
Model 1[a]	*Reference category*	1.23 (0.03 to 2.44)	1.98 (1.08 to 2.88)	2.34 (1.28 to 3.39)	2.73 (1.77 to 3.68)	0.71 (0.50 to 0.93), p < .001
Model 2[b]	*Reference category*	1.64 (0.44 to 2.83)	1.99 (1.07 to 2.92)	2.21 (1.11 to 3.32)	2.68 (1.70 to 3.65)	0.68 (0.45 to 0.91), p < .001
Model 3[c]	*Reference category*	1.69 (0.52 to 2.85)	1.77 (0.82 to 2.71)	1.98 (0.80 to 3.17)	2.83 (1.77 to 3.89)	0.68 (0.42 to 0.93), p < .001
Model 4[d]	*Reference category*	1.64 (0.48 to 2.79)	1.73 (0.78 to 2.68)	1.90 (0.72 to 3.09)	2.71 (1.64 to 3.78)	0.65 (0.39 to 0.90), p < .001
Model 5[e]	*Reference category*	1.45 (0.30 to 2.59)	1.51 (0.60 to 2.43)	1.66 (0.54 to 2.78)	2.17 (1.17 to 3.18)	0.53 (0.28 to 0.77), p < .001
Model 6[f]	*Reference category*	0.81 (-0.19 to 1.80)	0.30 (-0.44 to 1.04)	0.40 (-0.47 to 1.26)	0.84 (0.03 to 1.65)	0.17 (-0.03 to 0.37), p = .090

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.

f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.3.4 Financial difficulties

The results from the financial difficulties exposure variable analyses can be found in Table 5-12. The mean PHQ score increased as number of financial difficulties increased, and there was no evidence of non-linearity in any model (p = .581 in Model 1 and p = .616 in Model 6). In the unadjusted model (Model 1), there was evidence of a positive association between financial difficulties and PHQ scores at follow-up – for example, those who had experienced five or more financial difficulties (the highest category) had a mean PHQ score 5.47 points higher (95% CI 4.15 to 6.78) than those who had experienced none. After adjusting for all potential confounding variables (Model 5), there was still evidence of this positive association. However, the association largely disappeared when adjusting for PHQ scores at baseline (Model 6). When treating the exposure variable as continuous, there was still a small but statistically significant association; with each unit increase in financial difficulties, participants' mean PHQ score increased by 0.32 points (95% CI 0.01 to 0.63, p = .041).

Table 5-12. Longitudinal analysis: Mean difference in symptoms of depression at follow-up according to financial difficulties experienced.

Mean Difference (95% Confidence Interval)					
	None	1-2	3-4	5 or more	Continuous exposure[g]
Mean (SD)	7.09 (6.03)	8.70 (5.96)	10.24 (6.23)	12.26 (7.06)	-
Model 1[a]	*Reference category*	2.06 (1.24 to 2.88)	3.83 (2.84 to 4.83)	5.47 (4.15 to 6.78)	1.87 (1.51 to 2.23), p < .001
Model 2[b]	*Reference category*	1.96 (1.14 to 2.78)	3.82 (2.82 to 4.81)	5.48 (4.14 to 6.82)	1.86 (1.49 to 2.23), p < .001
Model 3[c]	*Reference category*	2.06 (1.25 to 2.87)	3.77 (2.78 to 4.75)	5.44 (4.14 to 6.74)	1.85 (1.48 to 2.21), p < .001
Model 4[d]	*Reference category*	2.03 (1.21 to 2.84)	3.73 (2.73 to 4.72)	5.32 (4.00 to 6.64)	1.82 (1.44 to 2.19), p < .001
Model 5[e]	*Reference category*	1.71 (0.93 to 2.50)	3.02 (2.03 to 4.00)	4.26 (2.97 to 5.55)	1.46 (1.10 to 1.83), p < .001
Model 6[f]	*Reference category*	0.57 (-0.07 to 1.21)	0.58 (-0.24 to 1.41)	0.98 (-0.08 to 2.04)	0.32 (0.01 to 0.63), p = .041

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.

5.4.4 Sensitivity analyses

5.4.4.1 Binary outcome

Sensitivity analyses using the PHQ as a binary outcome variable were conducted for each exposure variable, both cross-sectionally and longitudinally (Table 5-13 to Table 5-20). The findings were largely unchanged from the main analyses with PHQ as a continuous outcome.

The cross-sectional binary outcome analyses can be found in Table 5-13 to Table 5-16. In contrast to the main findings, for the income exposure variable (Table 5-13), there was no evidence in the fully adjusted model (Model 5) of an association between income and the number of participants reaching the PHQ threshold. For the loan income exposure variable (Table 5-14), consistent with the main analyses, there was evidence in the fully adjusted model (Model 5) of a positive association between loan income and the number of participants reaching the PHQ threshold. The analysis treating the exposure variable as continuous showed that with each unit increase in loan income, participants were 25% more likely (95% CI 1.13 to 1.37, $p < .001$) to meet the PHQ threshold. For the total expected debt exposure variable (Table 5-15), again consistent with the main analyses, there was evidence in the fully adjusted model (Model 5) of a positive association between debt and the number of participants reaching the PHQ threshold. The analysis treating the exposure variable as continuous showed that with each unit increase in expected debt, participants were 18% more likely (95% CI 1.09 to 1.27, $p < .001$) to meet the PHQ threshold. For the financial difficulties exposure variable (Table 5-16), there was again evidence in the fully adjusted model (Model 5) of a strong positive association between number of financial difficulties and the number of participants reaching the PHQ threshold. The analysis treating the exposure variable as continuous showed that with each unit increase in number of financial difficulties, participants were 64% more likely (95% CI 1.48 to 1.82, $p < .001$) to meet the PHQ threshold.

Table 5-13. Sensitivity analysis of income with baseline outcome as a binary variable (number above threshold).

Odds Ratio (95% Confidence Interval)					
	Less than £1,000	£1,000 to £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[f]
N (%)	314 (49.5%)	232 (44.8%)	263 (41.5%)	331 (37.1%)	-
Model 1[a]	*Reference category*	0.88 (0.67 to 1.17)	0.72 (0.55 to 0.94)	0.61 (0.47 to 0.78)	0.84 (0.78 to 0.91), p < .001
Model 2[b]	*Reference category*	0.87 (0.66 to 1.16)	0.74 (0.57 to 0.96)	0.69 (0.53 to 0.89)	0.88 (0.81 to 0.96), p = .002
Model 3[c]	*Reference category*	0.91 (0.69 to 1.22)	0.76 (0.58 to 1.00)	0.74 (0.56 to 0.98)	0.90 (0.82 to 0.98), p = .020
Model 4[d]	*Reference category*	0.93 (0.69 to 1.24)	0.77 (0.58 to 1.01)	0.76 (0.58 to 1.01)	0.91 (0.83 to 0.99), p = .033
Model 5[e]	*Reference category*	0.94 (0.69 to 1.27)	0.77 (0.58 to 1.03)	0.78 (0.58 to 1.05)	0.91 (0.83 to 1.00), p = .060

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. N (%) refers to the number of participants with a PHQ-9 score above 10.

Table 5-14. Sensitivity analysis of loan income with baseline outcome as a binary variable (number above threshold).

	Odds Ratio (95% Confidence Interval)				
	None	Less than £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[f]
N (%)	504 (35.9%)	250 (46.6%)	192 (50.3%)	194 (54.7%)	-
Model 1[a]	*Reference category*	1.80 (1.41 to 2.30)	1.90 (1.44 to 2.51)	2.21 (1.68 to 2.93)	1.33 (1.22 to 1.45), p < .001
Model 2[b]	*Reference category*	1.68 (1.31 to 2.15)	1.78 (1.34 to 2.36)	2.16 (1.63 to 2.87)	1.31 (1.20 to 1.42), p < .001
Model 3[c]	*Reference category*	1.68 (1.29 to 2.19)	1.75 (1.30 to 2.35)	2.18 (1.62 to 2.91)	1.30 (1.19 to 1.42), p < .001
Model 4[d]	*Reference category*	1.65 (1.27 to 2.16)	1.72 (1.28 to 2.32)	2.15 (1.60 to 2.89)	1.29 (1.18 to 1.42), p < .001
Model 5[e]	*Reference category*	1.54 (1.17 to 2.02)	1.55 (1.12 to 2.13)	1.94 (1.43 to 2.63)	1.25 (1.13 to 1.37), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:
1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. N (%) refers to the number of participants with a PHQ-9 score above 10.

Table 5-15. Sensitivity analysis of total expected debt with baseline outcome as a binary variable (number above threshold).

	Odds Ratio (95% Confidence Interval)					
	None	Up to £19,999	£20,000 to £39,999	£40,000 to £59,999	£60,000 or more	Continuous exposure[f]
N (%)	321 (33.8%)	118 (39.9%)	243 (47.5%)	216 (48.4%)	242 (51.0%)	-
Model 1[a]	*Reference category*	1.27 (0.92 to 1.76)	1.76 (1.35 to 2.29)	2.00 (1.51 to 2.64)	2.07 (1.59 to 2.71)	1.22 (1.15 to 1.30), p < .001
Model 2[b]	*Reference category*	1.39 (1.00 to 1.94)	1.66 (1.26 to 2.18)	1.84 (1.38 to 2.45)	1.93 (1.47 to 2.54)	1.19 (1.12 to 1.27), p < .001
Model 3[c]	*Reference category*	1.43 (1.02 to 2.00)	1.63 (1.23 to 2.17)	1.85 (1.36 to 2.53)	2.11 (1.56 to 2.85)	1.21 (1.12 to 1.29), p < .001
Model 4[d]	*Reference category*	1.43 (1.02 to 2.00)	1.64 (1.23 to 2.19)	1.83 (1.34 to 2.50)	2.09 (1.54 to 2.84)	1.20 (1.12 to 1.29), p < .001
Model 5[e]	*Reference category*	1.38 (0.97 to 1.96)	1.61 (1.19 to 2.18)	1.78 (1.30 to 2.46)	1.88 (1.36 to 2.60)	1.18 (1.09 to 1.27), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:
1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).

2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. N (%) refers to the number of participants with a PHQ-9 score above 10.

Table 5-16. Sensitivity analysis of financial difficulties with baseline outcome as a binary variable (number above threshold).

Odds Ratio (95% Confidence Interval)					
	None	1-2	3-4	5 or more	Continuous exposure[f]
N (%)	366 (30.6%)	325 (42.9%)	272 (57.9%)	177 (68.9%)	-
Model 1[a]	*Reference category*	1.83 (1.46 to 2.30)	3.27 (2.50 to 4.28)	5.31 (3.75 to 7.54)	1.77 (1.61 to 1.96), p < .001
Model 2[b]	*Reference category*	1.72 (1.37 to 2.18)	3.20 (2.45 to 4.19)	5.18 (3.63 to 7.41)	1.75 (1.59 to 1.94), p < .001
Model 3[c]	*Reference category*	1.78 (1.40 to 2.25)	3.19 (2.43 to 4.19)	5.19 (3.65 to 7.38)	1.75 (1.59 to 1.94), p < .001
Model 4[d]	*Reference category*	1.79 (1.41 to 2.27)	3.21 (2.44 to 4.22)	5.22 (3.65 to 7.46)	1.76 (1.59 to 1.95), p < .001
Model 5[e]	*Reference category*	1.68 (1.30 to 2.16)	2.80 (2.11 to 3.72)	4.20 (2.90 to 6.07)	1.64 (1.48 to 1.82), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:

1. Descriptive statistics display raw data; unweighted and non-imputed. N = 2,679 (all participants who provided complete exposure data and PHQ data).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. N (%) refers to the number of participants with a PHQ-9 score above 10.

The longitudinal binary outcome analyses can be found in Table 5-17 to Table 5-20. For the income exposure variable (Table 5-17), there was no evidence in the fully adjusted model (Model 6) of an association between income and the number of participants reaching the PHQ threshold, as in the main analyses. Similarly, there was also no evidence of an association for the loan income exposure variable (Table 5-18) in Model 6, as in the main analyses. There was only weak evidence of an association in the fully adjusted model (Model 6) for the total expected debt exposure variable, with the analysis treating the exposure variable as continuous estimating that with each unit increase in debt, a participant would be 12% more likely (95% CI 1.00 to 1.26, p = .052) to reach the PHQ threshold. There was some evidence that the financial difficulties exposure variable (Table 5-20) was associated with the outcome, with the analysis treating the exposure variable as continuous estimating that with each unit increase in number of financial difficulties, a participant would be 20% more likely (95% CI 1.02 to 1.41, p = .027) to reach the PHQ threshold. For example, there was an odds ratio of 1.48 (95% CI 0.86 to 2.54) when comparing those who had experienced five or more financial difficulties with those who had experienced none.

Table 5-17. Sensitivity analysis of income with follow-up outcome as a binary variable (number above threshold).

	Odds Ratio (95% Confidence Interval)				
	Less than £1,000	£1,000 to £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[g]
N (%)	149 (43.2%)	108 (39.3%)	144 (41.0%)	190 (34.4%)	-
Model 1[a]	*Reference category*	1.05 (0.71 to 1.54)	0.93 (0.65 to 1.33)	0.76 (0.54 to 1.06)	0.91 (0.81 to 1.01), p = .068
Model 2[b]	*Reference category*	1.01 (0.68 to 1.50)	0.92 (0.65 to 1.31)	0.80 (0.57 to 1.13)	0.93 (0.83 to 1.03), p = .168
Model 3[c]	*Reference category*	1.01 (0.68 to 1.49)	0.97 (0.67 to 1.40)	0.86 (0.59 to 1.23)	0.95 (0.84 to 1.07), p = .369
Model 4[d]	*Reference category*	1.00 (0.68 to 1.48)	0.96 (0.66 to 1.39)	0.87 (0.60 to 1.27)	0.95 (0.85 to 1.07), p = .439
Model 5[e]	*Reference category*	1.08 (0.72 to 1.62)	0.96 (0.65 to 1.42)	0.97 (0.67 to 1.40)	0.98 (0.87 to 1.10), p = .741
Model 6[f]	*Reference category*	1.10 (0.68 to 1.76)	0.90 (0.57 to 1.42)	1.03 (0.66 to 1.59)	0.99 (0.86 to 1.14), p = .920

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. N (%) refers to the number of participants with a PHQ-9 score above 10.

Table 5-18. Sensitivity analysis of loan income with follow-up outcome as a binary variable (number above threshold).

	Odds Ratio (95% Confidence Interval)				
	None	Less than £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[g]
N (%)	269 (33.1%)	133 (42.0%)	88 (45.1%)	101 (50.8%)	-
Model 1[a]	*Reference category*	1.66 (1.20 to 2.30)	1.95 (1.35 to 2.82)	2.26 (1.56 to 3.27)	1.34 (1.19 to 1.50), p < .001
Model 2[b]	*Reference category*	1.62 (1.16 to 2.27)	1.89 (1.30 to 2.75)	2.29 (1.58 to 3.32)	1.33 (1.19 to 1.49), p < .001
Model 3[c]	*Reference category*	1.57 (1.09 to 2.24)	1.77 (1.20 to 2.62)	2.32 (1.59 to 3.39)	1.33 (1.18 to 1.49), p < .001
Model 4[d]	*Reference category*	1.56 (1.09 to 2.22)	1.73 (1.17 to 2.57)	2.28 (1.56 to 3.34)	1.32 (1.17 to 1.49), p < .001
Model 5[e]	*Reference category*	1.39 (0.97 to 1.99)	1.49 (0.99 to 2.25)	1.97 (1.32 to 2.93)	1.25 (1.10 to 1.41), p < .001
Model 6[f]	*Reference category*	1.35 (0.91 to 2.01)	1.33 (0.81 to 2.19)	1.39 (0.84 to 2.29)	1.13 (0.96 to 1.31), p = .135

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. N (%) refers to the number of participants with a PHQ-9 score above 10.

Table 5-19. Sensitivity analysis of total expected debt with follow-up outcome as a binary variable (number above threshold).

Odds Ratio (95% Confidence Interval)						
	None	Up to £19,999	£20,000 to £39,999	£40,000 to £59,999	£60,000 or more	Continuous exposure[g]
N (%)	167 (31.7%)	59 (33.7%)	126 (43.0%)	111 (43.9%)	128 (46.6%)	-
Model 1[a]	*Reference category*	1.56 (1.00 to 2.44)	1.95 (1.36 to 2.79)	1.89 (1.30 to 2.75)	2.22 (1.55 to 3.18)	1.22 (1.13 to 1.33), p < .001
Model 2[b]	*Reference category*	1.71 (1.08 to 2.73)	1.94 (1.34 to 2.82)	1.85 (1.25 to 2.73)	2.22 (1.54 to 3.21)	1.22 (1.12 to 1.32), p < .001
Model 3[c]	*Reference category*	1.64 (1.04 to 2.59)	1.80 (1.23 to 2.62)	1.66 (1.08 to 2.53)	2.30 (1.55 to 3.42)	1.21 (1.10 to 1.33), p < .001
Model 4[d]	*Reference category*	1.61 (1.02 to 2.54)	1.76 (1.20 to 2.57)	1.65 (1.08 to 2.52)	2.22 (1.49 to 3.31)	1.20 (1.09 to 1.32), p < .001
Model 5[e]	*Reference category*	1.61 (0.98 to 2.64)	1.66 (1.12 to 2.46)	1.58 (1.02 to 2.46)	2.16 (1.43 to 3.26)	1.19 (1.08 to 1.32), p < .001
Model 6[f]	*Reference category*	1.49 (0.79 to 2.82)	1.51 (0.97 to 2.43)	1.39 (0.86 to 2.24)	1.63 (1.00 to 2.66)	1.12 (1.00 to 1.26), p = .052

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. N (%) refers to the number of participants with a PHQ-9 score above 10.

Table 5-20. Sensitivity analysis of financial difficulties with follow-up outcome as a binary variable (number above threshold).

Odds Ratio (95% Confidence Interval)					
	None	1-2	3-4	5 or more	Continuous exposure[g]
N (%)	206 (29.4%)	175 (39.9%)	133 (51.4%)	77 (61.6%)	-
Model 1[a]	*Reference category*	1.59 (1.17 to 2.16)	2.70 (1.90 to 3.83)	3.81 (2.34 to 6.21)	1.60 (1.40 to 1.83), p < .001
Model 2[b]	*Reference category*	1.55 (1.14 to 2.11)	2.73 (1.91 to 3.91)	3.88 (2.36 to 6.39)	1.61 (1.40 to 1.83), p < .001
Model 3[c]	*Reference category*	1.58 (1.16 to 2.16)	2.70 (1.87 to 3.89)	3.92 (2.41 to 6.37)	1.60 (1.40 to 1.84), p < .001
Model 4[d]	*Reference category*	1.58 (1.15 to 2.15)	2.70 (1.87 to 3.90)	3.82 (2.33 to 6.26)	1.60 (1.39 to 1.84), p < .001
Model 5[e]	*Reference category*	1.46 (1.05 to 2.03)	2.36 (1.61 to 3.48)	2.79 (1.70 to 4.58)	1.47 (1.27 to 1.69), p < .001
Model 6[f]	*Reference category*	1.25 (0.87 to 1.80)	1.61 (1.02 to 2.54)	1.48 (0.86 to 2.54)	1.20 (1.02 to 1.41), p = .027

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. Descriptive statistics display raw data; unweighted and non-imputed. N = 1,523 (all participants who provided complete exposure data and PHQ data at follow-up).
2. Regression models were run on multiply imputed data (outcome and confounders imputed) for all participants who provided complete exposure data (N = 2,725). Regression models were weighted using sample weights to account for non-response.
3. (%) refers to the number of participants with a PHQ-9 score above 10.

5.4.4.2 Unweighted and non-imputed data

Sensitivity analyses on unweighted and non-imputed data were conducted for each exposure variable, both cross-sectionally and longitudinally, and can be found in Table 5-21 to Table 5-28. The findings were largely unchanged from the main analyses with weighted and imputed data. Analyses were run for all participants who provided complete data on exposures, confounders and outcome – N = 2,167 at baseline and N = 1,267 at follow-up.

The cross-sectional analyses can be found in Table 5-21 to Table 5-24. The pattern of findings in the fully adjusted model (Model 5) is the same for the income exposure variable as in the main analyses, showing an inverse association between income and PHQ scores. Loan income also showed the same pattern of findings in the fully adjusted model (Model 5) as in the main analyses, with a positive association between loan income and PHQ scores. There was a slightly different pattern of findings for the total expected debt exposure variable in the fully adjusted model (Model 5), but the mean difference estimate in the analysis treating the exposure variable as continuous was also similar – 0.57 (95% CI 0.38 to 0.75, $p < .001$) compared with 0.50 (95% CI 0.30 to 0.71, $p < .001$) in the main analyses. The findings for the financial difficulties exposure variable were also consistent with the main analyses, showing good evidence for a positive association between financial difficulties and PHQ scores.

Table 5-21. Sensitivity analysis of mean difference in symptoms of depression at baseline by income, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)					
	Less than £1,000	£1,000 to £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[f]
Mean (SD)	10.12 (6.92)	9.63 (6.94)	8.85 (6.37)	7.97 (5.98)	-
Model 1[a]	*Reference category*	-0.49 (-1.33 to 0.35)	-1.26 (-2.06 to -0.47)	-2.15 (-2.88 to -1.41)	-0.73 (-0.96 to -0.49), p < .001
Model 2[b]	*Reference category*	-0.44 (-1.27 to 0.39)	-1.14 (-1.93 to -0.35)	-1.57 (-2.31 to -0.83)	-0.54 (-0.77 to -0.30), p < .001
Model 3[c]	*Reference category*	-0.34 (-1.18 to 0.49)	-1.10 (-1.90 to -0.31)	-1.30 (-2.07 to -0.52)	-0.46 (-0.70 to -0.21), p < .001
Model 4[d]	*Reference category*	-0.31 (-1.14 to 0.52)	-1.10 (-1.90 to -0.31)	-1.21 (-1.99 to -0.43)	-0.43 (-0.68 to -0.19), p = .001
Model 5[e]	*Reference category*	-0.08 (-0.85 to 0.69)	-1.05 (-1.78 to -0.31)	-0.86 (-1.58 to -0.13)	-0.34 (-0.57 to -0.11), p = .004

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders and outcome at baseline (N = 2,167).

Table 5-22. Sensitivity analysis of mean difference in symptoms of depression at baseline by loan income, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)					
	None	Less than £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[f]
Mean (SD)	7.89 (6.19)	9.59 (6.61)	10.15 (6.87)	11.09 (6.56)	-
Model 1[a]	*Reference category*	1.70 (1.00 to 2.40)	2.26 (1.44 to 3.07)	3.19 (2.37 to 4.02)	1.09 (0.84 to 1.34), p < .001
Model 2[b]	*Reference category*	1.51 (0.81 to 2.21)	1.90 (1.08 to 2.72)	3.12 (2.31 to 3.94)	1.03 (0.78 to 1.27), p < .001
Model 3[c]	*Reference category*	1.53 (0.80 to 2.25)	1.86 (1.01 to 2.71)	3.14 (2.30 to 3.98)	1.02 (0.76 to 1.28), p < .001
Model 4[d]	*Reference category*	1.51 (0.78 to 2.24)	1.79 (0.93 to 2.65)	3.10 (2.26 to 3.95)	1.00 (0.74 to 1.26), p < .001
Model 5[e]	*Reference category*	1.19 (0.51 to 1.87)	1.28 (0.49 to 2.08)	2.58 (1.79 to 3.36)	0.81 (0.56 to 1.05), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders and outcome at baseline (N = 2,167).

Table 5-23. Sensitivity analysis of mean difference in symptoms of depression at baseline by total expected debt, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)						
	None	Up to £19,999	£20,000 to £39,999	£40,000 to £59,999	£60,000 or more	Continuous exposure[f]
Mean (SD)	7.69 (6.11)	8.34 (6.17)	9.80 (6.68)	9.76 (6.74)	10.30 (6.74)	-
Model 1[a]	*Reference category*	0.65 (-0.29 to 1.59)	2.11 (1.34 to 2.88)	2.07 (1.26 to 2.89)	2.61 (1.82 to 3.39)	0.68 (0.50 to 0.86), p < .001
Model 2[b]	*Reference category*	0.91 (-0.02 to 1.84)	1.95 (1.17 to 2.72)	1.77 (0.95 to 2.58)	2.38 (1.59 to 3.17)	0.60 (0.41 to 0.78), p < .001
Model 3[c]	*Reference category*	1.04 (0.11 to 1.97)	2.04 (1.25 to 2.82)	1.91 (1.03 to 2.78)	2.79 (1.94 to 3.64)	0.69 (0.49 to 0.89), p < .001
Model 4[d]	*Reference category*	1.04 (0.11 to 1.98)	2.06 (1.27 to 2.85)	1.86 (0.97 to 2.74)	2.72 (1.86 to 3.58)	0.67 (0.47 to 0.88), p < .001
Model 5[e]	*Reference category*	0.73 (-0.13 to 1.60)	1.81 (1.08 to 2.54)	1.52 (0.71 to 2.34)	2.27 (1.47 to 3.07)	0.57 (0.38 to 0.75), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders and outcome at baseline (N = 2,167).

Table 5-24. Sensitivity analysis of mean difference in symptoms of depression at baseline by financial difficulties, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)					
	None	1-2	3-4	5 or more	Continuous exposure[f]
Mean (SD)	7.26 (5.96)	9.07 (6.28)	11.22 (6.65)	13.04 (6.74)	-
Model 1[a]	*Reference category*	1.81 (1.18 to 2.44)	3.96 (3.21 to 4.72)	5.78 (4.85 to 6.72)	1.94 (1.68 to 2.21), p < .001
Model 2[b]	*Reference category*	1.63 (1.01 to 2.26)	3.81 (3.06 to 4.56)	5.66 (4.74 to 6.59)	1.89 (1.63 to 2.15), p < .001
Model 3[c]	*Reference category*	1.72 (1.10 to 2.34)	3.75 (3.01 to 4.50)	5.55 (4.63 to 6.47)	1.86 (1.59 to 2.12), p < .001
Model 4[d]	*Reference category*	1.73 (1.11 to 2.35)	3.76 (3.01 to 4.51)	5.54 (4.60 to 6.48)	1.86 (1.59 to 2.12), p < .001
Model 5[e]	*Reference category*	1.34 (0.75 to 1.92)	3.04 (2.33 to 3.74)	4.38 (3.49 to 5.27)	1.48 (1.23 to 1.73), p < .001

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders and outcome at baseline (N = 2,167).

The longitudinal analyses can be found in Table 5-25 to Table 5-28. The pattern of findings in the fully adjusted model (Model 6) were largely unchanged for both the loan and loan income exposure variables, with similar effect estimates and no association found between these financial variables and symptoms of depression at follow-up. For total expected debt, the fully adjusted model (Model 6) did not find evidence of an association between debt and PHQ scores in any of the comparisons. The findings for the financial difficulties variable differed from the main analyses, in that there was evidence for a positive association between financial difficulties and PHQ scores with a significant difference at each level. When treating the exposure variable as continuous, it was estimated that with each unit increase in financial difficulties, participants' mean PHQ score at follow-up increased by 0.37 points (95% CI 0.11 to 0.63, p = .005). By contrast, the main analyses only found evidence of an association when treating the exposure variable as continuous, and not in any of the individual category comparisons.

Table 5-25. Sensitivity analysis of mean difference in symptoms of depression at follow-up by income, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)					
	Less than £1,000	£1,000 to £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[g]
Mean (SD)	9.34 (6.84)	8.83 (6.44)	8.73 (6.17)	7.55 (6.26)	-
Model 1[a]	*Reference category*	-0.51 (-1.64 to 0.61)	-0.61 (-1.67 to 0.45)	-1.79 (-2.74 to -0.84)	-0.58 (-0.88 to -0.28), p < .001
Model 2[b]	*Reference category*	-0.63 (-1.74 to 0.49)	-0.58 (-1.63 to 0.46)	-1.33 (-2.28 to -0.37)	-0.41 (-0.72 to -0.11), p = .008
Model 3[c]	*Reference category*	-0.54 (-1.66 to 0.58)	-0.45 (-1.51 to 0.62)	-0.97 (-2.00 to 0.05)	-0.29 (-0.62 to 0.04), p = .081
Model 4[d]	*Reference category*	-0.53 (-1.66 to 0.59)	-0.47 (-1.54 to 0.60)	-0.86 (-1.90 to 0.17)	-0.26 (-0.59 to 0.07), p = .127
Model 5[e]	*Reference category*	-0.07 (-1.13 to 1.00)	-0.40 (-1.41 to 0.62)	-0.43 (-1.42 to 0.55)	-0.16 (-0.47 to 0.15), p = .318
Model 6[f]	*Reference category*	-0.05 (-0.81 to 0.71)	0.04 (-0.68 to 0.77)	0.09 (-0.62 to 0.79)	0.04 (-0.19 to 0.26), p = .746

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders, and outcome at baseline and follow-up (N = 1,267).

Table 5-26. Sensitivity analysis of mean difference in symptoms of depression at follow-up by loan income, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)					
	None	Less than £1,999	£2,000 to £3,999	£4,000 or more	Continuous exposure[g]
Mean (SD)	7.24 (5.90)	8.89 (6.59)	10.14 (6.84)	10.74 (6.77)	-
Model 1[a]	*Reference category*	1.65 (0.76 to 2.54)	2.90 (1.82 to 3.98)	3.50 (2.44 to 4.56)	1.25 (0.93 to 1.57), p < .001
Model 2[b]	*Reference category*	1.44 (0.55 to 2.33)	2.52 (1.43 to 3.60)	3.43 (2.38 to 4.48)	1.18 (0.86 to 1.49), p < .001
Model 3[c]	*Reference category*	1.42 (0.49 to 2.34)	2.34 (1.22 to 3.45)	3.53 (2.45 to 4.61)	1.18 (0.84 to 1.51), p < .001
Model 4[d]	*Reference category*	1.33 (0.40 to 2.26)	2.21 (1.08 to 3.35)	3.42 (2.33 to 4.51)	1.13 (0.79 to 1.47), p < .001
Model 5[e]	*Reference category*	1.09 (0.21 to 1.97)	1.73 (0.65 to 2.80)	2.96 (1.92 to 4.00)	0.96 (0.64 to 1.28), p < .001
Model 6[f]	*Reference category*	0.38 (-0.26 to 1.02)	0.74 (-0.05 to 1.52)	0.38 (-0.39 to 1.15)	0.18 (-0.06 to 0.42), p = .133

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders, and outcome at baseline and follow-up (N = 1,267).

Table 5-27. Sensitivity analysis of mean difference in symptoms of depression at follow-up by total expected debt, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)						
	None	Up to £19,999	£20,000 to £39,999	£40,000 to £59,999	£60,000 or more	Continuous exposure[g]
Mean (SD)	7.07 (5.79)	8.09 (6.43)	8.72 (6.21)	9.29 (6.63)	10.09 (7.09)	-
Model 1[a]	*Reference category*	1.03 (-0.17 to 2.22)	1.65 (0.66 to 2.64)	2.22 (1.16 to 3.27)	3.02 (2.01 to 4.03)	0.74 (0.51 to 0.97), p < .001
Model 2[b]	*Reference category*	1.17 (-0.02 to 2.36)	1.52 (0.53 to 2.51)	1.97 (0.90 to 3.04)	2.79 (1.77 to 3.81)	0.67 (0.44 to 0.91), p < .001
Model 3[c]	*Reference category*	1.24 (0.04 to 2.44)	1.54 (0.53 to 2.55)	1.99 (0.85 to 3.13)	3.18 (2.09 to 4.28)	0.75 (0.49 to 1.01), p < .001
Model 4[d]	*Reference category*	1.16 (-0.04 to 2.36)	1.45 (0.44 to 2.47)	1.88 (0.73 to 3.04)	3.02 (1.91 to 4.14)	0.71 (0.45 to 0.98), p < .001
Model 5[e]	*Reference category*	1.06 (-0.07 to 2.20)	1.26 (0.30 to 2.22)	1.67 (0.57 to 2.76)	2.87 (1.82 to 3.93)	0.67 (0.42 to 0.92), p < .001
Model 6[f]	*Reference category*	0.43 (-0.39 to 1.25)	0.02 (-0.68 to 0.72)	0.49 (-0.31 to 1.28)	0.69 (-0.08 to 1.46)	0.15 (-0.03 to 0.34), p = .100

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders, and outcome at baseline and follow-up (N = 1,267).

Table 5-28. Sensitivity analysis of mean difference in symptoms of depression at follow-up by financial difficulties, using unweighted and non-imputed data.

Mean Difference (95% Confidence Interval)					
	None	1-2	3-4	5 or more	Continuous exposure[g]
Mean (SD)	6.91 (6.11)	8.80 (6.09)	10.36 (6.48)	11.95 (6.82)	-
Model 1[a]	*Reference category*	1.88 (1.08 to 2.69)	3.44 (2.44 to 4.44)	5.04 (3.76 to 6.32)	1.70 (1.35 to 2.06), p < .001
Model 2[b]	*Reference category*	1.67 (0.87 to 2.48)	3.28 (2.28 to 4.27)	4.86 (3.59 to 6.14)	1.63 (1.28 to 1.98), p < .001
Model 3[c]	*Reference category*	1.78 (0.97 to 2.58)	3.24 (2.25 to 4.23)	4.91 (3.63 to 6.19)	1.64 (1.28 to 1.99), p < .001
Model 4[d]	*Reference category*	1.76 (0.95 to 2.56)	3.21 (2.21 to 4.21)	4.85 (3.56 to 6.15)	1.62 (1.26 to 1.98), p < .001
Model 5[e]	*Reference category*	1.40 (0.63 to 2.17)	2.65 (1.69 to 3.61)	3.78 (2.53 to 5.03)	1.29 (0.94 to 1.64), p < .001
Model 6[f]	*Reference category*	0.58 (0.02 to 1.15)	0.77 (0.06 to 1.48)	1.05 (0.12 to 1.98)	0.37 (0.11 to 0.63), p = .005

a. Unadjusted model.
b. Adjusted for age, sex and ethnicity.
c. Model 2 plus level of study, fee status, university faculty and mode of study.
d. Model 3 plus parent's housing tenure and parents' highest qualification.
e. Model 4 plus mental health difficulties prior to university and disability.
f. Model 5 plus PHQ scores at baseline.
g. Model with exposure variable treated as continuous.

Notes:
1. All data is raw data; unweighted and non-imputed.
2. Analyses were run for all participants who provided complete data on exposures, confounders, and outcome at baseline and follow-up (N = 1,267).

5.5 Discussion

In this study, I examined how students' financial situation is associated with symptoms of depression. To do this, I designed and conducted a prospective cohort study measuring various domains of students' financial situation and mental health outcomes at several time points. This study focuses on income, loan income, financial difficulties and total expected debt across two time points, four months apart.

5.5.1 Summary of findings

The cross-sectional findings were largely consistent with my hypotheses. I hypothesised that income would be inversely associated with depression, such that those with less income would experience more symptoms of depression (**Hypothesis 3**). I found evidence that as students' income decreased, symptoms of depression increased. I hypothesised that loan income would be positively associated with depression, such that those with more loan income would experience more symptoms of depression (**Hypothesis 4**). I found that those with more loan income had more symptoms of depression. I hypothesised that total expected debt would not be associated with symptoms of depression (**Hypothesis 5**). Contrary to this hypothesis, I found that students with more expected debt had more symptoms of depression. Finally, I hypothesised that financial difficulties would be positively associated with depression, such that those who had experienced more financial difficulties would experience more symptoms of depression (**Hypothesis 6**). I found evidence that as the number of financial difficulties experienced increased, so did students' symptoms of depression.

I did not find evidence to support all of my hypothesis longitudinally. After adjustment for confounders and baseline PHQ scores, there was some evidence that as number of financial difficulties experienced increased, so did symptoms of depression at follow-up, in line with **Hypothesis 6**. There was also weak evidence that those with the most expected debt had more symptoms of depression at follow-up than those with no debt, in contrast to **Hypothesis 5**. After adjusting for baseline PHQ scores, there was no longer any evidence of a longitudinal association between loan income and PHQ scores at follow-up, in contrast to **Hypothesis 4**. I did not find any evidence of a longitudinal

association between income and PHQ scores at follow-up, in contrast to **Hypothesis 3**. Possible reasons for these findings are discussed further in Section 0 and Chapter 6.

5.5.2 Strengths and limitations

5.5.2.1 Strengths

This is the first study that I am aware of to investigate the financial situation of university students in England and its association with students' mental health since the student funding changes in 2012 and 2016 (see Section 5.2.2). I addressed limitations in the existing literature by using: a large sample size, longitudinal data, adjustment for a wide range of potential confounding variables, and detailed measures of students' financial situation. As highlighted in Chapter 4, the majority of the previous literature in this area used small sample sizes, cross-sectional designs and did not adjust for variables such as socioeconomic status. The sample size in my study is considerably larger than is usual in the literature in this area, and the largest out of those identified in the rapid review in Chapter 4. I am not aware of any existing studies in the UK that measure students' income or loan income, while debt and financial difficulties are often measured with single items. Additionally, the existing research is mostly outdated, as it is not able to measure the impact of the large increase in undergraduate tuition fees, the abolition of maintenance grants leading to larger maintenance loans, and the introduction of postgraduate loans, all of which have resulted in high debt amounts among many higher education students in England. In this study, I have addressed these limitations.

I designed and adapted the financial situation measures used in my study with university students, aiming to capture the nuance of students' financial situation. It is a strength of the SENSE study that there are multiple questions assessing various financial domains in a detailed way. For example, the income variable is broken down into separate questions for each possible income source and totalled, which is likely to yield a more accurate result than a single item. What may be considered to be debt is broken down into two separate variables, loan income and debt. While there is overlap between these variables (maintenance loans will be given as termly income and contribute to expected debt upon graduation), the amount of money students borrow regularly and the larger amount of money they owe on a long-term basis are likely to have different psychological

implications, so separating them is a strength. Taken together, this means that my study is able to provide a fuller, more up to date picture of the relative impact of the different domains of students' financial situation on their mental health. It also provides a basis for future research into this topic – for example, future studies could use the version of the Index of Financial Stress (IFS) that I have adapted for use in students.

5.5.2.2 Limitations of the sample

Despite my sample size being larger than is usual in the literature, the response rate was very low considering that I contacted all students enrolled at University College London. The sample of 2,725 participants used in this analysis is only 6.2% of the students I invited to take part in the SENSE study, despite extensive recruitment efforts. This limits the generalisability of my findings to the wider UCL student population. This can be seen in that there are some differences between the study sample and the University population (see Table 5-2), such as in terms of sex, ethnicity, and fee status. It is very common in research generally and with university students for a disproportionate amount of female students to take part[41,172] – in this case, my sample was 72.7% female compared to 59.9% of all students enrolled at the University. It could be the case that financial variables impact female students differently to male students, which could have skewed my results. However, I would not expect this association to differ by gender. There has been little research investigating this so far, and what does exist has not found evidence to support this[175]. I addressed this issue of selection bias by creating sample weights to address missing data due to survey non-response, weighting the data to the key demographic variables of sex, ethnicity, level, fee status, mode and campus. This strengthens the generalisability of my findings to the demographics of the UCL population. Moreover, the findings from my unweighted sensitivity analyses (see Section 5.4.4.2) do not differ in any substantial way to those from my main weighted analyses, suggesting that my conclusions are valid.

Another key difference between my sample and the wider UCL student population is mental health. As measured by the disability variable, 24% of participants in the study sample reported a non-physical disability compared with 6% in the University sample (see Table 5-2). This could be partly due to response bias, as students are likely to be more

comfortable reporting a mental health disability to a pseudonymous online mental health survey than disclosing it to their University, where there may be other consequences. However, it could also be selection bias, as students with mental health problems may be more likely to volunteer to take part in mental health research[172,230]. In my recruitment materials, I emphasised the mental health aspect of the study and also stated that we would use our findings to try to improve mental health support in universities. Students with mental health problems may be more motivated by this perceived benefit, as it relates to their experiences. This is supported by the high percentage of students who indicated at baseline that they had experienced mental health problems before (55%; see Table 5-2). This may also partly explain why more female students took part, as female students may be more likely to experience mental health problems[27,34,36,60]. Similarly, students with a physical disability were over-represented, which may be due to comorbidities with mental health problems. This limits the generalisability of my findings, suggesting that they may be more applicable to students who feel they are struggling with their mental health than the overall student population.

It is also important to note that the UCL student population is likely to differ from the overall student population in England in important ways. It is expensive to be a student in London, particularly in terms of living costs, so it is likely to attract a higher proportion of students from high socioeconomic backgrounds. On top of this, UCL is a Russell Group university. University applicants from lower socioeconomic backgrounds are less likely to apply to Russell Group universities than their comparably qualified counterparts, and of those who do apply, those from state schools are less likely to receive offers or attend than equivalently qualified peers from private schools[231,232]. In my sample, 73% of students reported that their parents had a higher education qualification. In data provided by the UCL registry, 67% of undergraduate home students had parents who were in the top two categories of the seven-category National Statistics Socio-Economic Classification (NS-SEC), indicating managerial and professional occupations. The equivalent figures for the total student population in England would be approximately 49% and 50% for the 2019/20 academic year[20]. Therefore, although there are differences between my study sample and the UCL student population, even if there were not, my findings may not be generalisable to the wider student population in England. However,

it is not necessarily the case that the associations observed in my study would differ in samples from other higher education institutions. If it is possible to observe an association between a worse financial situation and more symptoms of depression among a comparatively well-off sample of students, I would expect it would still be present in more socioeconomically diverse samples. Ideally, future research would recruit a larger number of students from a wide range of institutions across the country to participate. Until this is possible, overall I believe that my findings are the best representation that exists of students' current financial situation and mental health in England.

There was a substantial amount of dropout in the SENSE study between baseline and follow-up – 2,679 participants provided exposure and outcome data at baseline and 1,523 (56.8%) provided outcome data at follow-up. I made efforts to try to limit attrition, including keeping in touch with participants between waves via twitter, email and website updates. I also sent several email reminders, with text co-produced in consultation meetings with students. I addressed missing data due to attrition using multiple imputation of the outcome, symptoms of depression measured using the PHQ-9. This process used the wide range of variables available in the SENSE dataset to improve the quality of the estimates. Findings did not differ in sensitivity analyses that repeated the analyses using data that had not been imputed (see Section 5.4.4). However, this amount of dropout may have introduced some bias and it cannot be ruled out that my findings may have differed if there had been less attrition. It may be that differential dropout occurred based on the outcome – for example, participants whose mental health had worsened were less likely to participate in the follow-up survey – but this is not possible to determine for certain from the available data. In line with this, though, those who reported more symptoms of depression at baseline were more likely to be missing from follow-up (OR 1.01, 95% CI 1.02 to 1.04, $p < .001$). Nevertheless, I think that multiple imputation was the best method to address missing data due to attrition.

5.5.2.3 Limitations of the measures

There are also some limitations of the financial measures I used. It is a strength that I used several detailed variables to explore various domains of students' financial

situation, but each of the measures still combines several types of each domain together. For example, the loan income and total expected debt on graduation variables combine multiple forms of debt that may have different mental health implications. Student loans have favourable repayment and interest terms, do not require payment until students graduate and the repayments are based on income, so they potentially cause less distress than other types of debt (particularly while still studying). On the other hand, payday loans are more immediately distressing as they require payment in the short-term and build up high amounts of interest very quickly. It could be that some types of debt (such as student loan debt) have no impact on mental health but others do. The total expected debt and loan income variables would categorise someone with a lot of student loans in the same way as someone with fewer student loans but lots of payday loans. This could explain why the effect estimates for the three highest total debt categories (compared with no debt) were very similar to one another – it was not as simple as debt amount increasing, but instead different combinations, amounts and types of debt. The loan income variable also combines maintenance loans, payday loans and loans from friends and family, all of which may have different implications for students' financial situation and the mental health impact of this (a concept explored in the general adult population by Meltzer et al.[165]). This is similar for the income variable, where income from bursaries could bolster mental health due to the financial benefits, but money taken from friends and family may not due to anxiety over whether they can afford it; it would not be possible to discern this from my analyses as they are combined. Finally, the financial difficulties variable totals the number of difficulties students have experienced, giving equal weight to each difficulty. However, it may be that some difficulties have a stronger association with mental health than others – for example, going without meals may cause more distress than not travelling to visit family or friends. In general, while measuring different aspects of students' income and loan income separately is likely to have led to more accurate estimates than a single item, combining them loses some of this detail and may be masking different effects of each source. This is also an issue for the financial difficulties variable, which in creating a total score gives equal weight to each difficulty, and for the total expected debt variable. In future analyses, I could analyse each item of the income, debt and financial difficulties measures separately. This would allow an

estimate of the individual impacts of payday loans, grants and bursaries, and overdrafts, for example, which would be useful for intervention and prevention planning.

The financial measures require largely objective responses, but nevertheless are vulnerable to response bias. Firstly, students may report their financial situation inaccurately due to a lack of knowledge about the details of, for example, their income or loan amounts. This could bias my findings if those who were struggling with their mental health were less likely to keep track of their financial situation and so were more likely to report a worse situation (such as overestimating their amount of debt; see below). Secondly, an individual's demographics may affect their likelihood of reporting that they are experiencing financial hardship, and participants may respond differently based on this - for example, reporting that they receive more income than they do. A large US survey of students' financial situation found that students who were male, Black and/or had high GPAs were less likely to report that they were struggling financially[144]. Lastly, financial questions may also be subject to reporting bias based on the stigma or shame students feel for experiencing financial hardship[137], which could also lead to participants underreporting their total amount of expected debt, for example.

There may be an element of measurement error where students experiencing mental health difficulties are more likely to report a worse financial situation, thus affecting my cross-sectional findings. For example, those who are experiencing symptoms of depression may overestimate their total debt amount due to the negative cognitive biases commonly seen in depression[175,184,185]. My other three financial variables leave less room for estimation and individual judgment than the total expected debt variable – for example, asking whether someone has not been able to pay their bills on time – but there is still some room for some bias in responses to these variables. Negative cognitive biases could make an individual's appraisal of their financial situation more negative, which could mean that they are more likely to feel that they cannot afford to pay their bills even if objectively they have enough money to do so, leading to a late payment. The fact that much of the association between financial variables and symptoms of depression diminished in the longitudinal analyses after adjusting for baseline symptoms supports this argument; once mental health is accounted for, less of an effect remains. It may also be that adjusting for baseline symptoms as a confounder in the longitudinal

analyses is removing some of the causal pathway, if an association does exist in the opposite direction. Nevertheless, it seems unlikely that this is entirely responsible for my findings. Some significant findings do remain after adjusting for prior depression scores in the longitudinal analyses. Even in the cross-sectional analyses, it could be argued that there is some temporality, as the PHQ-9 measures depression symptoms over the past two weeks, whereas the financial questions ask about the whole term. Additionally, similar research, such as that by Andrews and Wilding[41], found that students' financial situation is associated with depression where other aspects of student life are not, despite all questions arguably being subject to a negative reporting bias.

While it can be an advantage that the measurement of students' total expected debt was similar to what is commonly used in the existing literature[175,176], it is a single-item measure and does not specify the sources of debt. For most of my sample, the majority of their debt will be in the form of student loans, but the question still required students to calculate their total expected debt to respond. Research has found that students are bad at estimating how much total student loan debt they have[175,197]. This could have lead to unreliable or biased responses to this question, for example influenced by participants' mental health (as above). It is also important to note that as a result of the phrasing of this question, my findings apply to all debt that students expect to have, rather than specifically to student loans.

I adapted the Index of Financial Stress (IFS) to be more relevant for students – for example, adding items such as 'Went without things I need for my course (e.g. books, printing costs)' to reflect common expenditures for students. This was coproduced with students over several focus groups and qualitative feedback from the pilot study. Whilst I am confident in the expertise from lived experience that the students I worked with brought, nevertheless this measure has not been validated in this form. Future research should seek to establish the validity and reliability of my student version of the IFS.

Finally, the demographic data used in my study was taken from the UCL Registry. This is a strength of this study, as for many of the measures (such as ethnicity) it ensures that the data is reliable, limits the length of the survey and therefore participant burden, and reduces the chance of human error. It also allows me to directly compare the

demographics of my sample with the whole University sample. However, there are also limitations to this approach. For some variables, reporting bias in the University context may mean that students are less likely to report certain characteristics due to fear of discrimination in their studies, for example that they identify as a sexual minority. If they had been answering as a participant in a pseudonymised research study this would not have been the case – and students may have been more likely to report minority status. In this way, for some variables Registry data may be less reliable than if I had asked the questions in the SENSE survey. Additionally, the Registry asks demographic questions in the same format as the Higher Education Statistics Agency (HESA). This means that my demographics are likely to be in the same format as data from other institutions and similar studies, which is useful for comparing samples. However, I was also constrained by this format. For example, the HESA question measures participant's sex by asking 'what is your sex?'. It would have been more valid to ask for the participant's gender, to more accurately reflect the gender diversity in the population and individuals' experience of their gender.

5.5.2.4 Other limitations

My analyses did not separate students by degree level. Students of different degree levels are very different from one another in many ways, including their financial situation and eligibility for government funding. For example, postgraduate research PhD students are not eligible to receive maintenance loans like undergraduate students are (loan income), but if their PhD is funded they are paid a monthly stipend towards their living costs that they will not need to pay back (income). Differences between these groups could have implications for government policy. Similarly, these groups have very different demographics. It may be that there is more of a detrimental effect of experiencing financial difficulties on PhD students, as they are likely to be older in age and therefore more likely to have caring responsibilities, whereas it may be more socially acceptable to struggle financially as a younger undergraduate. This is similarly an issue within degree levels, where overseas students would not have been eligible for UK government loans at all. Although I adjusted for fee status and degree level in all analyses, by grouping all students together I may have masked differences between these groups in the association between financial situation and mental health.

Some analyses may have been underpowered to detect an effect. Despite the overall sample size being large, as the exposure variables were categorical there were wide confidence intervals for some comparisons, such as those using the “5 or more” financial difficulties category. This could have led to a type II error (false negative). Nevertheless, this is not the case for the analyses with the continuous exposure, which allowed for an overall estimate of the effect. I interpreted my findings with respect to individual comparisons as well as this overall estimate.

For the longitudinal analyses, I adjusted for the outcome at the previous wave as a confounder in the final model. This may be an over-adjustment if it is actually a mediator, on the causal pathway between financial situation at baseline and mental health symptoms at follow-up. This could have led me to underestimate the observed associations, and in all comparisons the effect size did attenuate substantially at this stage. For example, there were null findings in Model 6 for loan income and total expected debt, where there hadn’t been in Model 5. Similarly, for the financial difficulties variable the effect size estimate when treating the exposure variable as continuous decreased from 1.46 in Model 5 to 0.32 in Model 6. It may be that this approach is too cautious and downplays my findings; my results should be considered in light of this.

Finally, observational research is always limited in its ability to conclude whether any observed associations are causal in nature. I have used longitudinal data to try to establish temporality, adjusted for a range of variables to minimise confounding, used weighting and multiple imputation to limit selection bias, and explored the most likely sources of measurement bias. I believe that my conclusions are robust. Nevertheless, there is always room for doubt and I cannot say that I have fully established causality in these associations.

Other threats to the validity of the findings in this thesis will be discussed in detail in the general discussion (Chapter 6).

5.5.3 Meaning of findings

5.5.3.1 Domains of financial situation

I have found good evidence that the number of financial difficulties students experience (if any) is associated with their symptoms of depression, both cross-sectionally and longitudinally. This provides further support for the existing literature as outlined in Section 4.5.2, in which all seven studies included in my review found an association between experiencing financial difficulties and worse mental health. I have also built on this by providing evidence that there is a longitudinal association between financial difficulties and depression at four-month follow-up. This indicates that there is some temporality to this association, providing evidence for causality.

The effect sizes in the cross-sectional financial difficulties analysis were large, indicating that with each increase of one to two difficulties PHQ scores increased by 1.63 points. This meant that those who had experienced five or more financial difficulties had PHQ scores on average 4.67 points higher than those with none. In the clinical trial literature, an improvement of five points is considered to represent the Minimum Clinically Important Difference (MCID) on the PHQ-9[233]. Similarly, the sensitivity analysis found that the odds of scoring above the PHQ threshold, another measure of a clinically important difference, were more than four times for those who had experienced five or more financial difficulties compared to those with none. These findings therefore represent differences between these groups of students that are likely to be of clinical importance.

My findings suggest that the total amount of debt students expect to have at the end of their current degree is also an important aspect of their financial situation, in terms of mental health impact. This is in contrast to my hypothesis (**Hypothesis 5**) and much of the existing research in this area (see Section 4.5.3). However, only one of the studies included in my review had been conducted since the recent increases in tuition fees, and none since maintenance grants were abolished and postgraduate loans were introduced. Participants in these studies would have had much less student loan debt than those in my sample – for example, Ross et al.[65] reported that the median student loan debt in their sample was £6,000, and prior to the tuition fee rise in 2012, the average amount of student loan debt was £19,000[191] – and therefore much less total expected debt. In my

analyses, I found that those with up to £19,999 in expected debt did not have significantly more symptoms of depression at baseline than those with no debt. As the majority of participants in the existing studies would fall into this category, this explains why these studies did not find evidence of an association. By contrast, the majority of students in England (and in my sample) now take on more than £20,000 in debt, suggesting that they are likely to experience more symptoms of depression. Overall, my findings highlight the detrimental impact of the higher education funding changes and large increases in student loan debt on students' mental health while they are studying. There is also some suggestion that this may be a longitudinal association, particularly for those with over £60,000 of expected debt.

I also found evidence that there is a cross-sectional association between students' amount of income and symptoms of depression, and loan income and symptoms of depression. These variables had not previously been measured in the student literature, but the findings were consistent with my hypotheses based on what we know about income and debt in the general population. Receiving more money in income per term is associated with fewer symptoms of depression, whereas taking more money out in loans per term is associated with more symptoms of depression. This raises important questions about maintenance loans - it seems that simply having money available to spend is not necessarily beneficial for students if it is in the form of loans. It is also important to note that this affects the students from the poorest backgrounds the most, as they receive the most money in maintenance loans. In conjunction with my findings on total expected debt above, this provides further evidence consistent with the hypothesis that student debt and loans have a detrimental impact on students' mental health (despite being necessary for many students to access higher education). However, there are also other types of loans included which may also contribute to this. The relative associations of each of the aspects of the income and loan income variables with symptoms of depression should be investigated in future research (as discussed in Section 5.5.2.3).

5.5.3.2 Cross-sectional vs longitudinal findings

Overall, the cross-sectional analyses of the association between financial variables on symptoms of depression at baseline found much stronger evidence than the longitudinal follow-up analyses. In particular, I did not find evidence of an association between income and loan income at baseline and mental health at follow-up, while the effect sizes for total expected debt and financial difficulties were greatly attenuated. This builds on previous research, which found that financial difficulties were associated with symptoms of depression longitudinally[41], and that tuition fee (debt) amount was associated with symptoms of depression at two-month follow-up[172]. I have also contributed new evidence with regards to income and loan income, which had not previously been investigated, and the longer-term implications of the large amount of debt currently taken out by students in England.

One explanation for the pattern of findings in the longitudinal data could be that students' financial situation had changed. Financial situations are dynamic and these variables measured a lot of short-term and one-off elements such as payday loans, money received from families and friends, and not being able to afford to attend social events. Students' financial situations are very reliant on unstable factors – for example, parents' ability to provide support or loans, and the availability of part-time and flexible employment opportunities. This could mean that students' financial situation had changed by the follow-up time point – for example, if a credit card debt from last term had been paid off or a parent had reduced the amount of money they could give them this term. It would then make sense that the previous term's financial situation was no longer relevant to their mental health. This is most applicable to income and loan income, which are more changeable in the ways I have explained. This argument is less applicable for financial difficulties, which arguably represent a worse financial situation that can be difficult to resolve quickly and which typically persist throughout students' degree[36], and total expected debt, which is unlikely to have changed after four months. This therefore seems to explain the differences in findings between these variables. Future analyses could incorporate financial information from follow-up (i.e. measures of whether and how students' financial situation has changed) to investigate this further.

5.5.4 Implications of findings

My findings have implications for higher education institutions, governmental policy, and student mental health support. Of the four domains I investigated, financial difficulties showed the strongest association with students' mental health, and there was still evidence of this association after four months. As financial difficulties may be a product of receiving insufficient income and having to pay off some types of debts, if this were a causal association it would suggest that the most important aspect of a students' financial situation is the impact that it has on their everyday life, ability to afford necessities and participation in society. I found evidence that students' exact income or amount they are relying on loans is associated with symptoms of depression, but the extent to which this results in financial difficulties appears to be more important for mental health. This suggests a need for more of a focus on students who may have less of a financial safety net and could slip into experiencing financial hardship.

Universities could support students experiencing financial difficulties with financial hardship funds and emergency funds. These should be readily available for students who may find themselves in temporary financial hardship (such as to pay for a large expenditure like a new laptop), as well as those who are struggling more generally with affording higher education (such as to supplement a loss of income during exam time)[34]. This would also help to avoid students having to seek extra loan income, such as high-interest payday loans which snowball in size, which I have also found to be associated with worse mental health. Many universities already have some emergency funds available to students, however these rely on students seeking help, which may be unlikely due to stigma and shame[137]. Furthermore, certain types of students may be less likely to seek help. For example, one study in the US[234] found that male students were less likely than female students to seek help, and White students were less likely than Black students. It could be that there is an element of need affecting this, but it also raises questions for how to target services and outreach. Some have suggested that interventions focused on improving students' financial knowledge and financial self-efficacy (which could be available to all students) may help students be empowered to recognise when they need financial help and to seek it[144,187,234].

One preventative approach would be to focus on students who are more likely to experience financial difficulties, such as those from lower socioeconomic backgrounds. These students have less of a financial safety net when they are struggling financially and have more student loan debt (from maintenance loans) than their peers. In recent years, higher education institutions have been encouraged to put money towards improving access and equal opportunities for these students, but there have been reports that once they attend university their financial needs are not well-supported[142]. My findings suggest that supporting these students via financial aid to ensure that they do not reach the point of experiencing financial difficulties would improve their mental health[154,188]. For example, offering means-tested university bursaries to students under a certain threshold as standard, on a sliding scale based on parental household earnings.

There are also several changes higher education institutions could implement that would benefit all students by reducing the living costs of attending. For example, offering subsidised and low-cost food and social events on campus would make eating and participating in activities with peers more affordable[144]. Many universities have subsidised canteens and bars available, for example those run by the students' union, but more can be done. For example, research in the US has suggested that financial difficulties may affect mental health by negatively impacting students' social lives[137,235]. In qualitative research, students who are struggling financially report that they feel embarrassed at having to say no to things they cannot afford, and left out when they cannot pay to attend social events[137]. Creating more affordable social opportunities could help to address this further. Additionally, flexible, well-paid, part-time work opportunities could help students to avoid financial difficulties and increase their income, which I found was associated with better mental health. Universities should seek to employ students for on-campus positions – for example, library work, service roles in food and drink establishments, administrative work, and research and teaching support roles[137]. This could avoid students having to take on work that is inflexible around their studies, and in the case of the latter roles could also allow students to gain relevant work experience relevant to their career. Work-Study programmes like this are commonly implemented in the US.

Other changes at institution level would need more financial support from the government. For example, universities could build more accommodation for their students, and ensure rent is affordable in line with students' maintenance loans. This would help to alleviate financial difficulties with paying rent and bills, and make students' biggest expenditure more affordable. This would also allow universities to implement financial safety nets for students on what will be most students' largest regular expenditure. These could include subsidising accommodation for students from low-income backgrounds, allowing students experiencing financial hardship to skip a month of rent, and having flexible rent due dates based on when students receive their student loans. Living in university accommodation would also allow students to only pay rent during the academic year, rather than for the full calendar year as private renters may have to do. Another type of financial difficulty measured by my adapted Index of Financial Stress (IFS) was going without course necessities. This could be avoided if institutions offered necessary course materials to students for free, such as loan laptops, computers available to use on site, lots of copies of textbooks in the university library, and specialist equipment available to borrow. Courses could also be designed with this in mind, for example by selecting a textbook that costs less or is already in stock in the university library[137]. Many of these suggestions are likely already implemented by institutions, but it may be that more funding is needed to expand the schemes further.

I have also found good evidence supporting the hypothesis that students' amount of expected debt is negatively associated with their mental health. Although I had not hypothesised this based on prior research in studies (see Section 4.5.3), it is in line with existing knowledge on debt in the general population (see Section 4.3.2). As students' total expected debt is made up mostly of student loan debt, this has implications for governmental policy. My findings suggest that the increase in tuition fees in England in 2012 and the move from maintenance grants to loans in 2016 have had a detrimental impact on students' mental health, and may be responsible for symptoms of depression among students. Nevertheless, students rely on maintenance loans for their living costs and to avoid experiencing financial difficulties, so it would not make sense to abolish or reduce these. Instead, replacing these with means-tested grants and bursaries to cover students' living costs would be justified, as this would increase students' income,

decrease their loan income and reduce their expected debt total. If they were of large enough amounts (perhaps in line with the typical cost of living), they could also prevent students experiencing financial difficulties. In this way, grants and bursaries to cover maintenance costs would address all domains of students' financial situation, and my findings suggest that this would be beneficial for students' mental health.

These findings also suggest that forging links between institutions' mental health and financial services may be beneficial[172]. For higher education students who are struggling with their mental health, their financial situation may be a stressor, so those who seek mental health support should be asked about this, and offered support with managing it or applying for hardship funds. Similarly, those who seek financial support could be screened for CMD or referred to mental health support services[188]. Relevant psychological support could include techniques for reframing how student debt is perceived. Research suggests that how students perceive their debt or financial situation (i.e. their financial concern) mediates the relationship between their financial situation and mental health[176,186,189]. By targeting this, psychological interventions focused on finances could help to improve students' mental health even if their financial situation remained the same or deteriorated. For example, institutions could offer all students more information on student loan debt and the favourable repayment terms[186]. Harrison & Agnew[142] found that debt anxiety is inversely related to viewing student debt as a form of educational investment, so sessions could reframe debt in this way and cite the financial benefits of higher education. Some studies have also noted other psychological elements that represent targets for interventions for those struggling with their financial situation, such as hopelessness, self-efficacy, and interpretations of inequality and unfairness[186,187,234]. Financial management courses for all students, including budgeting advice, could help with students' perceived self-efficacy regarding their financial situation.

5.5.5 Future directions

While the financial variables used in my study were chosen to give a fuller picture of students' overall financial situation than in the existing literature, future research could build on this by measuring other variables such as spending. It is not clear whether

students who indicated that they could not afford some necessities on the IFS measure could not do so because of a lack of resources or because they had spent their money on other things. Mack and Lansley[149] state in their landmark work "Poor Britain" that it is a misconception that those in poverty go without necessities to spend money on other things. They argue that spending priorities (such as food and bills) are the same for everyone regardless of financial situation. Nevertheless, students who are struggling with their mental health may be more likely to gamble[236], experience compulsive buying[237], or use illegal drugs[238] (reverse causality). This could potentially lead to a cycle of poor mental health and financial difficulties, which our financial variables would not have captured. It is also important to make use of the financial concern data I collected in the SENSE study. In the future, I intend to use this to investigate whether the amount of stress or worry individuals feel over their financial situation is associated with their mental health. In line with the multilevel model of economic stress (see Section 4.3.1), I could also investigate whether financial concern is a mediator of the relationship between the more objective financial variables used in this study and mental health symptoms. Overall, there is room for further research to expand upon the present financial measures to understand more about students' financial situation and its association with mental health symptoms.

In this study, students' financial situation at baseline was used as the exposure in cross-sectional and longitudinal analyses. Financial variables were measured at every time point of SENSE, so it would also be possible to look at the cross-sectional association between finances and mental health at the follow-up time point, and at the two subsequent follow-up time points not included in the present study. This could shed light on whether the cross-sectional associations seen here are consistent across the academic year. Additionally, this could also further investigate the additional finding from this study that students' symptoms of depression, on average, decreased between baseline and follow-up. The majority of our sample (52%) were in the first year of a degree, so would have been transitioning to a new financial situation at the baseline time point[29]. Even for students not in their first year, the beginning of the academic year still brings a financial transition from the long summer between terms, where students are not supported by maintenance loans and many move back in with their parents. This could partly explain why there is less of an association between financial variables and symptoms of

depression at follow-up. It could be that finances are more strongly associated with students' mental health at the beginning of the academic year, when they are beginning to settle into student life and managing their finances[29,31,172]. As students adjust to understanding and managing their financial situation, their mental health is no longer affected by their financial situation and so it improves. Comparing the findings from cross-sectional analyses at each time point would allow this to be investigated.

Future research should also explore the role of socioeconomic status. I adjusted for two socioeconomic variables (parental education and parental housing tenure) as confounders in my analysis, but it could be that socioeconomic status is a moderator of the relationship between total expected debt, for example, and symptoms of depression. Students from a lower socioeconomic background may be more concerned about their financial situation, perhaps due to prior bad experiences or a lack of a financial safety net, which could lead to their mental health being negatively affected to a larger extent by stressors such as debt and financial difficulties[136,186,239]. As well as affecting current students, this could also affect who applies to university or which university they attend, and therefore has implications for access and equality[240,241]. Future research should investigate this further.

With a large proportion of students, and particularly students from low-income backgrounds, working alongside their studies (see Section 5.2.2), it is also important to consider the impact of employment on students' mental health. There have been very mixed findings so far with regards to the impact of working alongside studying. Researchers have posited that the financial benefits are likely to be outweighed by the potential negative mental health impact of additional stress and less time for academic and social activities[34,175,242], a concern that is often echoed by students themselves[137,243]. On the other hand, many studies have found no impact or a positive impact of paid employment on mental health, and no impact on academic performance[23,41,65,144,244]. I did not design my study to investigate this, but income from employment was measured in the income variable, which overall showed that the more income a student has, the better their mental health. This could provide some insight into this debate, suggesting that the overall mental health effect of paid employment may be positive for students, but (as discussed in Section 5.5.2.3) future analyses could build on this by separating the

different components of the income variable to see whether employment income confers a mental health benefit on its own.

Little is known about the psychological mechanisms by which each domain of students' financial situation may affect their mental health. It has been posited that increased debt may lead to increased financial concern and worry about debt, which in turn causes symptoms of anxiety and depression[53]. In this way, it would not necessarily be the objective amount of debt (or debts) that matters, but the subjective aspect of how these debts are perceived. This could be impacted by psychological elements such as hopelessness, self-efficacy, interpretations of inequality and unfairness, and so on[186,187]. Further research is needed to understand this further.

Future research could also investigate whether there is evidence for the longitudinal associations I have observed after a longer follow-up. This would also add to our understanding of the longer-term implications of students' financial situation in terms of their mental health. This was my original intention, as I collected data at four time points over a calendar year for SENSE. However, this was beyond the scope of the present study due to the COVID-19 pandemic and its potential repercussions for students' mental health and financial situation[210–212]. In future research, I hope to incorporate data from the second and third follow-up time points of the SENSE study, taking into account the fact that students' situations had likely changed substantially due to the COVID-19 pandemic.

Finally, I hope to build on this work in the future by repeating these analyses looking at symptoms of anxiety (measured using the GAD-7) as an outcome. The majority of students who experience depression also experience anxiety[41], and experiencing both depression and anxiety is associated with marked impairment in students[57]. I could use SENSE data to look at whether students' financial situation is associated with symptoms of anxiety. I could also investigate the association between experiencing financial hardship and the likelihood of experiencing comorbid depression and anxiety. This would be useful for understanding students' mental health support needs.

5.5.6 Conclusions

In conclusion, I have provided evidence that all four financial domains of interest (income, loan income, total expected debt and financial difficulties) are associated with students' mental health cross-sectionally. The largest effect sizes and longitudinal associations were seen for financial difficulties and total expected debt. My findings highlight the role of governmental policy in students' mental health, and suggest that universities could address student mental health by helping students to manage their finances and avoid experiencing financial difficulties. This may be particularly important for students from lower socioeconomic backgrounds.

Chapter 6 Discussion

6.1 Summary

In this chapter, I summarise the main findings of my thesis and how they relate to the objectives I set out in Chapter 1. I explore threats to the validity of my findings, including chance, bias and confounding, and how they may have influenced my results. I then discuss the meaning of my findings, how they relate to the existing literature, and their implications for institutions and governmental policy. Finally, I propose future directions to build on this work, and draw final conclusions.

6.2 Summary of findings

6.2.1 Thesis objectives and hypotheses

The objectives of my thesis were as follows:

Objective 1 (presented in Chapter 3): To investigate whether attending higher education is associated with increased symptoms of CMD in young people in England, during and after attendance.

Hypothesis 1: I hypothesised that higher education attendance would be associated with CMD, such that those who attend would experience more symptoms of CMD than those who do not**.**

Objective 2 (presented in Chapter 3): To investigate whether young people in England who go on to attend higher education have more symptoms of CMD during secondary school compared to those who do not.

Hypothesis 2: I hypothesised that there would be no difference in symptoms of CMD between those who attend higher education and those who do not during secondary school.

Objective 3 (presented in Chapter 4): To rapidly review the peer-reviewed evidence on the association between financial situation and mental health among higher education students in the UK.

Objective 4 (presented in Chapter 5): To investigate the association between different domains of financial situation and symptoms of depression in a sample of higher education students at a University in England, both cross-sectionally and longitudinally.

Hypothesis 3: I hypothesised that income would be inversely associated with depression, such that those with less income would experience more symptoms of depression.

Hypothesis 4: I hypothesised that loan income would be positively associated with depression, such that those with more loan income would experience more symptoms of depression.

Hypothesis 5: I hypothesised that total expected debt would not be associated with symptoms of depression.

Hypothesis 6: I hypothesised that financial difficulties would be positively associated with depression, such that those who had experienced more financial difficulties would experience more symptoms of depression.

6.2.2 Main findings from my thesis

In the first study in my thesis (presented in Chapter 3), I used data from the two LSYPE cohorts to test my hypotheses. My exposure was higher education attendance (measured at age 18/19 in both cohorts and additionally at age 19/20 in LSYPE1), and my outcome was symptoms of CMD. Firstly, I compared the mental health of those who attended higher education with those who did not, at age 18/19 (during HE, in LSYPE2) and age 25 (after HE, in LSYPE1). I found that, during HE, those who attended higher education experienced more symptoms of CMD than those who did not. There was no evidence of this association at age 25, after HE, when there was no difference between the two groups. This suggests that attending HE is a risk factor for experiencing mental health problems during HE, but that this is not the case when individuals are no longer in higher education. Secondly, I compared the mental health of these groups (those who go on to

attend HE and those who do not) at several points during secondary school. There were mixed findings across time points and cohorts, broadly suggesting that future HE students may experience fewer symptoms of CMD than their peers at age 14/15, but more than their peers at age 16/17. This provides a valuable starting point for research into whether differences between these groups observed during HE actually pre-date the experience of higher education.

Building on my findings in Chapter 3, I considered stressors experienced by higher education students but not by their peers who do not attend HE. One such area is students' financial situation. In Chapter 4, I conducted a rapid review to inform the design of the SENSE study. I synthesised the existing evidence on the association between financial situation and mental health among higher education students in the UK. I screened 1,272 citations and included 11 studies in a narrative synthesis and critical appraisal. I found some evidence of an association between financial difficulties and poor mental health, but little evidence of an association between debt and mental health. There was some evidence that financial concern was associated with mental health. However, there was a lack of longitudinal studies that use a range of measures of students' financial situation and adjust for socioeconomic confounders. Domains such as income had not been measured in any studies. Additionally, the included studies were almost all outdated in relation to the financial situation (particularly amount of debt) of current students in England.

I then conducted an online prospective cohort study, the SENSE study, measuring mental health, financial situation and demographic variables in students at UCL (see Chapter 5). I used my rapid review findings to help choose which domains of financial situation to investigate, design measures and make hypotheses. I used data from the first two time points, conducted four months apart, to examine whether each of four financial situation exposure variables (income, loan income, total expected debt and financial difficulties) were associated with symptoms of depression, cross-sectionally and longitudinally. Using data from 2,725 participants, I found strong evidence that a lower income, higher loan income, higher total expected debt amount and more financial difficulties were associated with experiencing more symptoms of depression cross-sectionally. I also found weak evidence that higher total expected debt amount and more financial

difficulties were associated with experiencing more symptoms of depression at follow-up.

6.3 Findings in context

6.3.1 Do higher education students have worse mental health than those who do not attend higher education?

It appears from my findings that higher education students do experience worse mental health than those who do not attend, but only during higher education. This suggests that there is something about the experience or environment of higher education that may precipitate an increase in symptoms of CMD among students. After students have left higher education, they are no longer experiencing these stressors and I found evidence that their mental health is no worse than their peers'. It does not appear that my findings can be explained by consistent differences in mental health during secondary school. These groups may show some differences in mental health before higher education, but these could be explained by secondary education stressors that have more of an effect on those hoping to achieve the grades required to progress on to HE.

These findings are in line with various reports, statistics, research and media articles (outlined in Chapter 2) suggesting that student mental health is an important issue to tackle, and that the prevalence of mental health problems is higher among students than their general population peers[1,47,63,66,68,77]. It is also in opposition to some other research which suggests that students' mental health is not worse than their peers[34,60,84], or even that it is better[61,82,83,85] (see Chapter 2). There are several possible reasons for these discrepant findings. Firstly, my sample is larger than many of the studies that found no difference. Despite my findings being important, the difference I observed was small, and it may be that those studies were underpowered to detect this effect. Nevertheless, there are larger studies that did not find clear evidence of a difference, such as one using three nationally representative Australian datasets including over 3,000 students, and another Australian study with over 6,000 students. This may be explained by my second reason, geographical differences that translate into higher education policy and environment differences. My findings from the LSYPE datasets can only be said to represent the

situation for those who attended secondary school in England, and it may be that higher education attendance in Australia and other countries does not confer the same stressors on students. This could be due to differences in the higher education experience such as the proportion of students living at home with their family while studying.

Thirdly, while there are two studies that were conducted using large, nationally representative datasets in the UK (APMS[84] and UKHLS[85]), thus addressing the first two explanations, the way that student status was measured differs in important ways. In my study, for the comparison measuring mental health during HE, students were defined as those attending higher education when asked at age 18/19. In the APMS study[84], which found no difference between groups, only those who were not in any paid work in the last week were asked if they were a student. As approximately 74% of students undertake part-time employment[86], this sample is biased; it only represents a minority of students, and if these are the ones who are not experiencing any financial difficulties (and so do not need to work), this could explain why their mental health is better than other students' and therefore on par with those not attending higher education. The UKHLS[85] study, which found that those who attended HE had better mental health than those who did not, grouped together current students and anyone with a degree aged 17-24. If, as my results suggest, students' mental health does not differ from their peers' when they leave higher education (often at age 21 or 22), including people who have left HE in the student sample may have masked the difference seen during HE. Moreover, I cannot rule out that students' mental health becomes more in line with their peers' even before they leave higher education. My study only examined those aged 18/19 at the beginning of their period in HE (for most students, this will be the first year of their undergraduate degree). It may be that by their second year, once they have adjusted to the HE environment, their mental health is more in line with their peers'. If this is the case, this could also help to explain the differences in findings, as both of these studies grouped together students from all years of study.

Overall, there are mixed findings in the existing literature, likely due to methodological limitations that I have addressed, and I do not believe that the discrepant findings undermine my conclusions. By using high-quality research addressing several important

limitations, I have improved and built upon this literature to make a valuable contribution.

6.3.2 Students' financial situation and their mental health

My research, presented in Chapter 5, suggests that higher education students' financial situation plays a role in their mental health, such that students who are in a worse financial situation are likely to have poorer mental health than students in a better financial situation. This is true cross-sectionally for all four financial situation domains I explored: income, loan income, total expected debt and financial difficulties. Students with less termly income, more termly loan income, more total expected debt and more experience of recent financial difficulties are also likely to be experiencing worse mental health. While it is difficult to infer causation, I found evidence that some effect of debt and financial difficulties on mental health is still present four months later. I also found that financial difficulties had the strongest relationship with mental health, followed by loan income, then total expected debt, and finally income.

In line with the existing literature in this area, I found evidence of a strong association between experiencing more financial difficulties and worse mental health. This previous research was limited for several reasons, as highlighted in Chapter 3. Firstly, many of the studies used small opportunity samples of mostly psychology students. Secondly, many used single-item measures limited in their scope. I have provided support for the findings in these studies and improved upon their methods. My findings are in line with those of Andrews and Wilding[41], who found that there is a longitudinal relationship between financial difficulties and depression. Richardson et al.[36], the only other UK study to use a similar multi-item measure, did not find that financial difficulties were associated with symptoms of depression four months later, as I found. This is likely due to a small sample size meaning the analyses were underpowered to detect an effect.

I also found an association between students' total expected debt and their mental health, which I did not originally hypothesise based on the literature I reviewed in Chapter 4 (see **Hypothesis 5**). While findings in that literature have been mixed, the studies with the largest sample sizes found no association between debt and CMD[172,175]. My findings may differ from those studies because they are outdated in terms of the

amount of debt students typically have now; two were conducted before any tuition fees were introduced in the UK, and the smallest one reported that the mean amount of debt among participants was £4,081, much less than the average student loan debt for an undergraduate degree today. Only one study was conducted after tuition fees tripled in England in 2012, but this study found no difference in mental health between groups with different tuition fee amounts[172]. Nevertheless, there have been important policy changes recently which mean that students' total expected debt is much higher than it would have been in any of these studies (see Section 5.2.2). My findings reflect the experiences of current students in England in a way that previous research could not, which is important in the context of recent increases in student mental health problems (see Section 2.5). Nevertheless, future research is needed to replicate this finding.

Previous research had neglected to measure students' income or loan income, so it is difficult to consider my findings in the context of existing literature. I am not aware of any other studies that investigated these variables in the UK. This means that my findings provide an important first step towards investigating these domains of financial situation and their potential impact on students' mental health. Another key strength of my study over the existing research is that, having measured these variables, I am able to draw comparisons across multiple domains of financial situation. The existing literature in the general population suggests that financial difficulties are more important for mental health than other financial variables such as income[149,168]. My finding that the domain with the largest effect sizes was financial difficulties adds weight to this. The smallest effect sizes were observed for the income variable, again supporting assertions that income is not always a reliable or effective indicator of financial situation[150]. This may be in part because some income is likely to come from employment, which may negatively affect students' mental health for other reasons[34,137,242,243].

The difference between my cross-sectional and longitudinal findings may imply that some domains of financial situation, in particular income and loan income, are temporary stressors. If these domains are only associated with mental health symptoms in the short-term, this could explain my findings from Chapter 3, where students' mental health is worse during higher education than those who are not in education but not at age 25. By age 25, students' financial situation would be very different from during HE, most notably

in terms of income and loan income; their income would likely be higher and more stable, with less reliance on loan income.

6.4 Threats to validity

When interpreting my findings, it is important to consider that there are several threats to validity in any epidemiological research. While I have discussed the strengths and limitations of each of my studies within the relevant chapters, this section explores the possible threats to validity applicable throughout my thesis. These are chance, bias, confounding and reverse causation.

6.4.1 Chance

Throughout my thesis I have made a large number of comparisons, which increases the possibility that some of my findings have occurred due to chance. It is important for this reason to define study hypotheses and statistical analysis plans *a priori*. This avoids the temptation of p-hacking, data-dredging, and cherry-picking results, practices that have contributed to issues with poor replication in scientific research[245]. I defined my hypotheses and devised my statistical analysis plans before beginning my analyses. I did not pre-register my protocol to demonstrate this, but in future I will do so.

Some researchers have called for limiting the use of p values and removing significance thresholds to prevent over-emphasis on results that have been found by chance[246]. It is important not to rely on the conventional 0.05 significance level of p values as an absolute cut-off. A significant finding using the 0.05 criteria indicates that there is a 5% possibility that the results are due to chance (a false positive, or type I error). I have been conscious of this throughout my thesis, primarily interpreting my findings in relation to the effect sizes (mean difference or odds ratio) and corresponding 95% confidence intervals. Where p values are reported, the exact p values are given rather than solely an indication of whether the value met the 0.05 threshold. Where I have reported strong evidence, I have interpreted effect sizes and confidence intervals as well as p values. These practices are consistent with recommendations made by Sterne and Davey Smith when discussing this issue[247]. For this reason, I do not think that it is likely that my main findings have been

observed due to chance. Nevertheless, I cannot be certain, and where I have not found strong evidence I am cautious in my conclusions and replication is needed. One example of this is the finding that total expected debt was associated with symptoms of depression at follow-up.

There is also the possibility that type II errors (false negatives) have occurred due to chance. This is more likely in some of my comparisons that have smaller sample sizes, for example in the SENSE study only 265 participants indicated that they had experienced five or more financial difficulties. In the longitudinal analysis, I did not find evidence of a difference between this category and the reference category (no financial difficulties). This may have been due to a lack of statistical power to reject the null hypothesis, rather than a lack of an effect.

6.4.2 Bias

There are many types of bias, several of which I have discussed in previous chapters. Here I will briefly highlight some of these, and other biases related to my approaches.

One common type of bias is selection bias, which can be defined as bias in an effect estimate due to systematic differences between those included in a study and those not included[248]. Both of the main studies in my thesis (found in Chapter 3 and Chapter 5) are subject to non-response bias, arising from participants who did not initially take part. I addressed non-response bias in both studies by using sample weights in my analyses. This is important as there are certain common demographic biases, such as a greater response rate among women and girls[200]. The LSYPE cohorts were designed to be nationally representative, and the sample weights provided in the datasets helped to ensure that this is also true of my findings. In the SENSE study, I created sample weights to apply to my analyses, making my findings more representative of the wider UCL population. It is still possible, though, that those who did not take part in these studies differed systematically from those who did in ways that were not measured, which could have biased my findings. For example, it has been suggested that students with mental health problems and lower academic achievement are more likely to take part in mental health research[27,200]. There is also the issue that, even if my sample could be said to represent UCL students, this does not mean that they represent all higher education students in

England or the UK. The demographics of students differ across higher education institutions and geographical locations – it is important to note that UCL is a Russell Group university in a capital city – as well as the government higher education funding context differing across the different nations of the UK. However, I do not think that the observed associations are likely to differ at different institutions. Until a larger study exists recruiting students from a range of institutions across the UK, my findings can be said to be the best representation that exists of students' current financial situation and mental health in England and, tentatively, the UK.

Attrition bias is another type of selection bias, arising from participants who dropped out before the follow-up. This is a potential issue in both of my studies, as they are longitudinal. It may be the case that participants whose mental health has worsened were less likely to participate in follow-up time points in both studies. I used multiple imputation to address this, using a range of variables to improve the quality of the estimates. This also tackled any possible bias due to missing information (or partial completion), as confounders that were missing from other time points could be also imputed. This ensured that my analyses could include the full sample of participants, so I was not limited only to the sample who provided complete data, who may have differed systematically from the target population. My findings did not differ largely from those in the non-imputed sensitivity analysis, suggesting that there had not been substantial bias in my data, but any that did exist would have been mitigated by this method. Selection bias in my studies is also discussed in Section 3.5.2.2 and Section 5.5.2.2.

Another common type of bias is measurement bias, which occurs during data collection[248]. The data in both of my main studies were self-reported, and mental health symptoms may be underreported due to a social desirability bias. However, in both analyses, I would not expect this to differ between the exposure groups, meaning it should not have biased the association. Additionally, in the SENSE study, students experiencing mental health problems may be more likely to report a worse financial situation, for example overestimating their total expected debt amount due to negative cognitive biases commonly seen in depression[175,184,185]. Nevertheless, it seems unlikely that this is entirely responsible for my findings as I used multiple detailed measures of students' financial situation, some of which (financial difficulties, for example) are less

vulnerable to these biases but still observed a strong association. Similar research has also found that students' financial situation is associated with depression where other aspects of student life are not, despite all questions arguably being subject to a negative reporting bias[41]. Recall can also be an issue for self-reported data, however in both studies the data analysed was collected concurrently, asking about current exposures and outcomes. The longest time frame used in the SENSE measures is 'since the start of this term', which would cover a maximum of 12 weeks if students completed the survey on the last day of term. This was also the last day of data collection, and the vast majority of participants took part at the beginning of the data collection period, so would be considering a period of around six weeks. I do not think that this is long enough for recall to affect my findings. Finally, both studies used well-validated outcome measures (the GHQ-12 and PHQ-9) to limit random measurement error. Measurement bias in my studies is also discussed in Section 3.5.2.3 and Section 5.5.2.3.

My rapid review in Chapter 4 is limited in its conclusions by the possibility of publication bias in this area of research. This is where the findings from published work do not represent the findings from unpublished work. This is difficult to rule out entirely. The existing studies on this topic typically use small sample sizes which may be underpowered to detect an effect and therefore more likely to produce null findings, which are less likely to be published. However, the fact that some of the included studies reported null findings suggests this may not always be the case. My review may also be biased by my search strategy being non-systematic. A rapid review approach was taken as a more pragmatic and efficient alternative to a full systematic review within the time I had available. I used appropriate search terms and searched multiple databases, which has been shown to improve the validity of the findings from rapid reviews[129]. However, it is possible that some relevant papers were missed, and that this may have introduced some bias. For example, citation bias means that more highly cited papers are easier to find and so are more likely to be included[248]. Similarly, I did not include grey literature and was the only person to screen citations. Nevertheless, rapid reviews typically yield similar findings to full systematic reviews[128], and through my knowledge of the subject area I am confident that the overall conclusions of my review are justified.

6.4.3 Confounding

Confounding occurs when an additional variable related to both the exposure and outcome distorts the observed relationship between the two. Although I adjusted for a wide range of potentially important confounders in my studies, residual confounding cannot be ruled out in observational studies. There may be other variables confounding the relationship between my exposure and outcome that I have not accounted for. Additionally, it is not possible to measure all potential confounders for practical reasons; research must balance gathering data with reducing participant fatigue and burden. Some variables I would have liked to include as potential confounders, such as whether the young person had a family history of mental health problems, were not available in the LSYPE datasets and not measured in the SENSE study. I also would have liked to include whether the young person had pre-existing mental health problems in my LSYPE analyses. Adjusting for this in the SENSE analysis improves the likelihood that I have sufficiently accounted for confounding, as it is likely to be associated with many unobserved confounders. Overall, I believe that the breadth of potential confounders I adjusted for means that it is unlikely that I have produced spurious findings due to confounding.

There is always a possibility that the confounders I included in my analyses were measured imperfectly, which could leave room for residual confounding. For example, socioeconomic status is an important confounder in both of my main associations: HE attendance and mental health, and financial situation and mental health. In the LSYPE datasets, this was measured using a detailed measure of parental occupation and qualifications. However, in the SENSE study it was measured by asking students about their parents' housing tenure and qualifications. Many participants may not have known this information, which may have introduced bias – for example, those who were in a worse financial situation and had worse mental health may have been more likely to report that their parents were of a lower socioeconomic status. However, I do not think that this is likely to have had a substantial impact on my findings.

In all of my longitudinal analyses, in the final model I adjusted for the outcome at the previous wave. This is a cautious approach but may be an over-adjustment. For example,

if students' financial problems existed before the beginning of the study (which seems likely as the question asked about the whole term and students' general financial situation), symptoms at baseline could have already been caused by the financial problems previously. In this way, prior symptoms could then be on the causal pathway, mediating the relationship between financial situation at baseline and mental health symptoms at follow-up. This could have led me to underestimate the observed associations, and in both of my main studies, the effect size did attenuate substantially at this stage. In some cases, such as in the longitudinal analysis of loan income and symptoms of depression, there were null findings after this step. My results should be considered in light of this, and weight can be given to the findings from Model 5 as well as the final model.

6.4.4 Reverse causation

It is plausible that reverse causation could be responsible for an observed association between higher education attendance and mental health in my cross-sectional analyses. It is likely that those with poorer mental health would be less likely to attend higher education, due to the toll their symptoms could take on their academic attainment. This means that if there is an element of reverse causation in my findings, it would have biased the findings in the direction of those who did not attend HE having poorer mental health. However, since I found that those in higher education had worse mental health than those who were not, reverse causation may only have led to an underestimation of the difference between the two groups rather than being responsible for my findings.

It is also plausible that reverse causation could be responsible for an observed association between financial situation and mental health in my cross-sectional analyses. Those with worse mental health may struggle with their finances for several reasons related to their symptoms, such as difficulty gaining or keeping employment, gambling behaviour, or increased spending or susceptibility to accruing debt[77,144,156,164,165,189,236] (social drift theory; see Section 4.3.2). However, I conducted a longitudinal analysis, which allowed me to begin to establish a temporal relationship. Even in my cross-sectional analyses, the exposures were measured across the term whereas the outcome measure asked about symptoms in the past two weeks, which may imply some temporality[249]. Additionally, my

review in Chapter 4 only found some weak evidence from one prior study suggesting that CMD may be associated with more financial difficulties four months later (see Section 4.5.2). Particularly for the variables that showed a longitudinal association with mental health, this relationship is therefore unlikely to be a result of reverse causation. These analyses also adjusted for mental health scores at the previous time point. However, these findings were diminished considerably in comparison with the cross-sectional findings. Previous longitudinal research in students has found that a longitudinal relationship between finances and mental health does exist, such that worse financial situation is associated with worse subsequent mental health, but it is much weaker than the opposite direction[36]. Additionally, where variables are likely to be stable (as some financial variables, including total expected debt, would be over this timescale) they can operate as proxies for concurrent measures, removing some of the advantage of temporality. I therefore cannot exclude the possibility that some of my findings could be partly explained by reverse causation, but I do not think that it accounts for all of my findings.

6.5 Implications of findings

I have discussed the implications of my findings in detail within the relevant chapters, but this section will highlight some overarching implications of my findings, when taken together.

Firstly, there is a need for changes to governmental policy to better support students' mental health. I have provided evidence that students' mental health is impacted by their financial situation, and suggested that this may partly explain poorer mental health among HE students compared to their peers. This could be addressed by the government in a number of ways. They could abolish or reduce the cap on the tuition fees students are liable to pay to reduce their total expected debt, or bring back and increase maintenance grants to increase income, reduce loan income, reduce expected debt and help students to avoid financial difficulties. The changes to higher education funding in England in the past ten years reflect broader societal changes in how higher education is perceived, which is now as more of a private benefit rather than a public good[250]. From

this perspective, policies have followed that shift the cost of higher education onto individuals and away from the government and taxpayers, as students themselves are considered the main beneficiaries of higher education[250]. If this were to be reversed or challenged, arguably on the basis that a better educated society has benefits for all its members[250], there may be more political and public support for changes to higher education funding policy. Another key issue is the cost of accommodation for students. For students studying away from home – particularly in London, as many of the students in my study would have been – renting a room costs around 88% of the maximum student loan amount, or all of the average maintenance loan[251]. More could be done to ensure that these costs are subsidised through public funds, or at least covered by the existing governmental loans or grants. Additionally, more funding for institutions to put towards mental health and wellbeing resources and interventions is needed for institutions to enact further changes. My findings suggest that this could improve students' mental health during their studies.

Secondly, it is clear that there is a need for higher education institutions to implement mental health interventions for all students. Students have called for institutions to offer a broader range of support[30]. Interventions may benefit from focusing on areas in which students are likely to differ from their counterparts who are not in higher education, in ways that may be important for their mental health. My research has highlighted that financial situation is one important area where support is needed. It has already been suggested that while students are a subgroup of a broader general population of young people, mental health interventions need to be student-specific[30,34]. For example, mental health promotion campaigns that focus on the impact of finances on mental health are a good idea, but they should focus on students' particular situations rather than finances more generally, such as expected debt, issues with loan income, income support from parents, and so on. For students who are experiencing mental health problems, exploring the specific aspects of the higher education experience that may be acting as stressors would be valuable. As discussed in Chapter 5, financial interventions to help students who are experiencing financial difficulties would also likely alleviate strain on students' mental health.

Lastly, students as a group are defined by their occupation as learners, so it is important to consider the implications of my findings in terms of their academic performance. If students are experiencing poor mental health during higher education, this may affect their education. Some students may underperform as a result of symptoms or consequences of CMD such as lack of motivation[188] and cognitive impairment[252], and others may end up dropping out in order to focus on improving their mental health[242]. It is therefore important to act because regardless of whether there is a lasting mental health impact, there could be a lasting academic impact. Several studies have supported this[57,78,253,254]. This could be partly due to finances; Andrews and Wilding[41] found that in the UK depression symptoms and financial difficulties were both significantly associated with worse exam results, and furthermore that depression symptoms mediated the relationship between financial situation and exam performance. Similarly, a US study[242] found that those who were struggling with their finances were more likely to drop out than those who were not. In qualitative focus groups, students have reported several ways that stress about finances affects their ability to succeed academically[137]. These include time taken up by employment and having to prioritise employment, preoccupation with money worries, difficulty sleeping due to stress about finances, and inability to purchase course materials[137]. These findings, taken together, suggest that improving students' mental health, perhaps by improving their financial situation, is likely to improve their academic performance. As well as being good for individuals, this is also in the best interests of institutions and society more widely.

6.6 Future directions

I have discussed my suggestions for future research in detail within the relevant chapters, but this section will highlight some broader directions that future research could take based on what I have found.

Bringing together my main studies, future research could build on my findings to incorporate financial variables when comparing the mental health of those who attend HE with those who do not. Since I conducted these analyses, data linking LSYPE1 data with Student Loans Company records have become available. This could have been a

valuable addition to my thesis, allowing me to more directly investigate whether the financial situation of students (such as their student loan debt and maintenance loan income) in the LSYPE datasets could help explain their worse mental health compared to their peers at age 18/19.

While I have focused here on financial situation as an explanation for the difference in CMD symptoms seen during HE in Chapter 3, there are nevertheless many other possible stressors that may contribute towards or explain this. Several of these were measured in the SENSE study but were beyond the scope of my thesis, such as accommodation type, workload and contact hours, and social support. Continuing to investigate stressors related to the HE environment are likely to help explain my findings and provide avenues for prevention and treatment of mental health problems among students. Universities are ideally situated to carry out this work. Furthermore, further research investigating how students' mental health changes during higher education, and when the gap closes between those who attend HE and those who do not, would be valuable in identifying the optimum time for prevention and intervention as well as possible explanations.

Finally, investigating the impact of the COVID-19 pandemic on student mental health was beyond the scope of my thesis. However, in the future I would like to use data from all four time points of the SENSE study to investigate how students' mental health changed during the pandemic. Some common stressors for higher education students, for example social isolation, may have been heightened during this time, so investigating the association between these stressors and mental health before and during the pandemic could help us to identify areas for improvement in the usual higher education experience.

6.7 Conclusions

My thesis comprises a body of work investigating CMD among higher education students. My research offers a valuable contribution to knowledge in this area, overviewing and then building on the existing literature on student mental health as well as students' financial situation and mental health. I have analysed existing datasets and also generated novel high-quality data which addresses substantial gaps in the literature.

From my findings, I conclude that attending higher education is a potential risk factor for experiencing mental health problems, such that those who attend HE are likely to experience poorer mental health during this time than those who do not. While there may be some differences between these two groups during secondary school, this does not seem to explain the difference seen during higher education. Moreover, it does not appear that this difference is sustained, with no difference between groups by age 25. Possible stressors that contribute to the unique experience of higher education are therefore important for understanding this further. I found that one such stressor, financial situation, is associated with students' mental health. In the first study in the UK to use detailed measures of four domains of students' financial situation, I found that a worse financial situation is associated with more symptoms of depression cross-sectionally. There is evidence for some of these relationships longitudinally. Although causality cannot be directly inferred from the observational studies I have conducted, this points towards financial situation as a promising area to begin to address mental health problems among students. Despite the large amount of attention given to students' mental health in recent years, it remains under-researched. My findings have highlighted potential avenues for further investigation, for prevention and treatment, and for government policy change.

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Appendices

Appendix 1: Publications and related work

The research contained in my thesis has resulted in the following publications:

1. Lewis, G., McCloud, T., & Callender, C. (2021). Higher education and mental health: analyses of the LSYPE cohorts: Research report. *Department for Education*. https://www.gov.uk/government/publications/higher-education-and-mental-health-analyses-of-the-lsype-cohorts (from Chapter 3)
2. McCloud T, Bann D. Financial stress and mental health among higher education students in the UK up to 2018: Rapid review of evidence. *J Epidemiol Community Health*. 2019. doi:10.1136/jech-2019-212154 (from Chapter 4)
3. McCloud T, Kamenov S, Callender C, Lewis G, Lewis G. The association between Higher Education attendance and common mental health problems among young people: an analysis of two prospective cohort studies. (TBD) [in preparation] (from Chapter 3)
4. McCloud T, Callender C, Lewis G, Lewis G. The association between university students' financial situation and symptoms of depression. (TBD) [in preparation] (from Chapter 4)

I have also contributed to the following related research projects during my PhD:

1. An evaluation of a study groups social intervention to support the mental health and wellbeing of MSc students; *UKRI SMaRteN Student Mental Health Research Network* (£9,951.18); July 2020 – July 2021. [Role: PI]

2. Wellbeing Workshops: Supporting DoP PGR student wellbeing and development during lockdown and remote working; *UCL Changemakers Postgraduate Research Projects* (£500); June – August 2020. [Role: PI]

3. Analysis of mental health and well-being in higher education students and comparison with the general population using the LSYPE datasets; *Department for Education* (£30,000); November 2019 – November 2020. [Role: Co-applicant]

4. You-COPE: Youth COVID Response Personal Experience: Tracking health and wellbeing amongst 16-24 year olds in the UK during and after the COVID-19 pandemic. [Role: Research Associate]

Appendix 2: Study documents for Chapter 5 (SENSE study)

1. Study information sheet
2. Study consent form
3. Study flyer example
4. Baseline invitation email
5. Follow-up invitation email
6. Survey time point 1
7. Survey time point 2

1. Study information sheet

Participant Information Sheet for all UCL students

UCL Research Ethics Committee Approval ID Number: 8227/002

PLEASE DOWNLOAD A COPY OF THIS INFORMATION SHEET

Title of Study: Student mENtal health SurvEy (SENSE): Understanding the wellbeing and mental health of students

Department: Division of Psychiatry; Division of Psychology and Language Sciences

Name and Contact Details of the Researchers:

Tayla McCloud (t.mccloud@ucl.ac.uk); Dr Laura Gibbon (l.gibbon@ucl.ac.uk); Phoebe Barnett (phoebe.barnett@ucl.ac.uk); General study email (SENSEstudy@ucl.ac.uk)

Name and contact details of the Principal Researchers:

Professor Glyn Lewis, Professor of Epidemiological Psychiatry, Head of the Division of Psychiatry (glyn.lewis@ucl.ac.uk/ 0207 679 9253)

Professor Peter Fonagy, Head of the Division of Psychology and Language Sciences (p.fonagy@ucl.ac.uk/ 0207 679 1474)

Professor Steve Pilling, Head of the Research Department of Clinical, Educational and Health Psychology (s.pilling@ucl.ac.uk/ 020 7679 1784)

1. What is the project's purpose?

Over the last decade, the number of students reporting a mental health problem has increased dramatically. Whilst the main risk factors for the most common mental health problems are well known in the general population, it is also important to investigate these in the student population. In addition, the life of a university student presents its own unique challenges which may affect mental health and wellbeing.

To understand how best to provide support for students, we need to investigate factors that might affect students' wellbeing and mental health, and estimate how many students experience mental health problems. In particular, we want to understand:

- How common mental health problems are in UCL students
- What factors might increase risk of mental health problems in students
- How students seek help for their mental health
- How wellbeing and mental health change throughout the academic year and over time.

The study team are students and researchers at UCL. The core study team are independent of UCL senior management, which means we will not share your individual data with the University Registry, your department, or anyone else at UCL outside the study team. The main findings and conclusions from this research will be published and communicated to organisations such as the UCL Union and NUS, and relevant UCL departments. In this way, we hope this research will influence UCL senior management to make changes to improve students' wellbeing and mental health, including improvements in the UCL Student Support and Wellbeing services.

2. Why have I been chosen?

Every UCL student has been invited via email to take part in this study. Any UCL student over the age of 18 years who decides to complete the survey can take part. No particular students are being directly approached or targeted.

You can participate in the study if:

- You are a student enrolled on any type of course at UCL – including undergraduate, masters taught, masters research, PhD, professional doctorate, pre-sessional and affiliate students.
- You are at least 18 years old.

You do not need to have experienced mental health difficulties to take part. We would like to hear from as many students as possible, with a range of experiences.

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

Online survey – term 1

If you consent to take part in this study, you will go through to the online student wellbeing and mental health survey. This should take approximately 10-15 minutes to complete. The survey includes questions about your mental health and other related factors such as finances, workload and accommodation, among others. There will be some questions on whether you have recently harmed yourself or thought about harming yourself.

The only mandatory data you will be asked for is your email address. No other questions are compulsory, so you can leave out any questions you do not wish to answer. We will not ask for your name.

Follow-up surveys – one per term

Our study will last for one calendar year, and we will be asking the same students to take part in the survey several times throughout the year to see how wellbeing and mental health changes over time. By taking part in this survey once you are under no obligation to complete it again in the future.

Linking the survey data with UCL Registry data

To address our research questions (see section 2), we need to collect demographic information and details about your course. To keep the survey as short as possible, we want to access the demographic information you have already provided to UCL. So that we can do this, you will be asked whether you consent to us accessing your data held by the UCL Registry. We will then need your Student ID number.

If you *do* consent to us accessing your Registry data, **none of your individual data or survey responses will be shared with UCL**. You can withdraw your consent at a later date if you change your mind, up until the end of the study (February 2021).

If you *do not* consent to us collecting this information from the UCL Registry, you will be asked to complete some questions about your demographics and course at the end of the main survey. As with the rest of the survey, these questions will not be mandatory.

This Registry data we will receive does not include your name. It covers routine data collected by the registry office from students on enrolment and includes (if completed):

- For everyone: Date of birth; Sex; Gender identity; Ethnicity; Sexuality; Religion; Domicile country/region; Nationality; Fee status (UK/EU/Overseas); Year of study or start date; Campus/distance learning; Mode of study; Academic programme; Academic level (e.g. undergraduate); Duration of programme; Faculty; Department; Accommodation type; Disability status.
- For UK students only: Parental occupation; Parental higher education; POLAR classification group (the proportion of 18 year olds from your home area who enter higher education); State/Independent schooling; Domicile UK region.

If you have any questions about this, please do not hesitate to contact us via email to SENSEstudy@ucl.ac.uk.

4. Do I have to take part?

It is completely up to you whether you take part in this study. If you do decide to take part, we will ask you to indicate your consent to take part in this study in the online consent form. You are free to withdraw at any time without giving a reason, without this impacting your studies or any care or support you receive.

You can stop completing the survey at any time. When discontinuing the online survey, your answers will be saved automatically up until the point you stop the survey, so that you can return to finish the survey later if you would like to. If you wish for your responses to be deleted, then you can request this by email to the study email address (SENSEstudy@ucl.ac.uk) at any time up until the end of the study (February 2021).

If you complete the survey in term 1, you will be invited to complete additional surveys once per term over the next year. This is so we can track how student wellbeing and mental health changes over the academic year. If you would like to withdraw from the follow-up time points, you can request this by email to the study email address (SENSEstudy@ucl.ac.uk) at any time without giving a reason.

5. What are the possible disadvantages and risks of taking part?

Whilst we have consulted with students throughout the process of designing this survey, it is possible that you may feel discomfort or distress as a result of being asked questions about your mental health and related factors. You can exit the survey at any time. There is also a range of support available if you want help with your wellbeing and mental health:

- *UCL Student Support and Wellbeing:* a team of expert wellbeing, disability and mental health advisers within UCL (visit https://www.ucl.ac.uk/students/student-support-and-wellbeing).

- *UCL Student Psychological and Counselling Services*: a free service providing short-term counselling, cognitive behavioural therapy, psychiatric support and psycho-educational groups (visit https://www.ucl.ac.uk/students/support-and-wellbeing/student-psychological-and-counselling-services).

- *UCL Student Funding Advisors:* confidential financial support, advice and guidance for UCL students struggling with money management or complex funding issues. (email studentfundingwelfare@ucl.ac.uk or visit https://www.ucl.ac.uk/students/funding/financial-support/welfare-adviser).
- *Care First*: counselling support available by telephone or online (instant messaging) out of hours - during UCL closure, weekends, bank holidays and overnight (call 0800 197 4510 or visit https://www.ucl.ac.uk/students/support-and-wellbeing/evening-and-weekend-support).
- *Samaritans:* a free, 24-hour confidential listening and support service for people experiencing feelings of distress (call 116 123).
- *Nightline:* a confidential listening, support and practical information service for students by students, open 6pm to 8am every night of term (call 0207 631 0101, text 07717 989 900, or email listening@nightline.org.uk).
- *Papyrus Hopeline:* Provides information and support for anyone under 35 who is struggling with suicidal feelings, or anyone concerned about a young person who might be struggling, open weekdays 10am-10pm and weekends 2pm-10pm (call 0800 068 4141 or text 07786 209 697).
- *iCope:* A confidential NHS psychological therapy service for those over 18 registered with a Camden, Islington or Kingston GP. Find more information and request an appointment here: https://www.icope.nhs.uk/camden-islington/.

If you feel like you need further support with your mental health you can discuss this with your GP. If you feel at risk of harming yourself, please discuss this with your GP, or go to a hospital A&E department.

6. What are the possible benefits of taking part?

This work will contribute to knowledge in this important area, adding to our understanding of what affects the wellbeing and mental health of students, and potentially improving the support provided to students at UCL and other universities. However, there is no direct compensation for taking part.

7. What if something goes wrong?

Any serious adverse events should be reported to the Principal Researcher, Professor Glyn Lewis (glyn.lewis@ucl.ac.uk/ 0207 679 9253). If participants wish to raise a complaint regarding their treatment by the study researchers, they can do so by contacting the Principal Researcher (Prof Glyn Lewis; glyn.lewis@ucl.ac.uk). If participants feel their complaint has not been handled to their satisfaction, they can contact the Chair of the UCL Research Ethics Committee by email (ethics@ucl.ac.uk).

8. Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential, and all efforts will be made to ensure that you cannot be identified. Your responses will not be passed on to any third parties and this includes your academic department, UCL student support services and your GP. Individuals will not be able to be identified in any resulting reports or publications. There are no limits to this confidentiality.

If you take part in the study, you will be automatically assigned a study ID number. Your survey responses and data from the UCL Registry will be linked to this study ID number only. Your student ID number and email address will not be stored with your survey responses. A file with your

Student ID number, email address and study ID number will be stored separately from the study data, encrypted, password-protected and on a secure UCL server.

All data will be collected and stored in accordance with the General Data Protection Regulation (GDPR), 2018. Only the researchers involved in this study will have access to your pseudonymised survey answers. These will not be shared with any third parties, as above.

9. What will happen to the results of the research project?

The researchers will write up the results as part of their PhD theses, to be submitted in September 2021 (TM) and September 2023 (PB). These findings will also be disseminated more widely through published peer-reviewed journal articles and presentations at conferences before this time and afterwards. Participants will be able to obtain copies of any publications which are produced as part of this project by emailing the study email address (SENSEstudy@ucl.ac.uk), and will find dissemination updates on the study website (www.sensestudy.co.uk).

The results of this study will be disseminated to UCL senior management and student support services, and may also be disseminated to national policy organisations, such as NUS, Universities UK and the Office for Students. It will not be possible to identify any individuals from any of these reports or publications as only summary data will be presented.

The pseudonymised data collected during the course of the project might be used for additional or subsequent research (e.g. looking at whether the wellbeing and mental health of students at UCL changes over time, or as a comparator for future research in other universities) by the wider UCL SENSE study team and other affiliated individuals. All data gathered in this study will be stored securely and pseudonymously (identified by a study ID number only) throughout. Pseudonymised data will be stored on secure UCL servers until the end of the main study (September 2021) and potential additional follow-up period (September 2026), after which time it will be anonymised and archived.

10. Local Data Protection Privacy Notice

The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at data-protection@ucl.ac.uk. This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice here. The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

The categories of mandatory personal data used will be email address. The categories of non-mandatory personal data will be demographic characteristics from the linked registry data (optional) and survey questions, and self-reported mental health diagnoses, treatment and symptoms. The demographic characteristics requested include special category personal data such as ethnicity, sexual orientation and religious beliefs.

The lawful basis that would be used to process your *personal data* will be performance of a task in the public interest. The lawful basis used to process *special category personal data* will be for scientific and historical research or statistical purposes. Your personal data will be processed so long as it is required for the research project – up to September 2026. For the duration of the project, we will pseudonymise the personal data you provide using study IDs. We will endeavour to minimise the processing of personal data wherever possible. At the end of the project, data will be fully anonymised. Anonymised data will be retained for up to 20 years after the project is

complete, as it may be used as a comparison for future studies (e.g. to determine whether student mental health at UCL changes).

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk.

11. Who is organising and funding the research?

This research is organised and funded by University College London (UCL).

12. Contact for further information

If you have any further questions, please contact one of the researchers:

- General study team:

Email: SENSEstudy@ucl.ac.uk

- Dr Laura Gibbon (Teaching Fellow and Clinical Psychologist):

Email: l.gibbon@ucl.ac.uk
Tel.: 020 7679 5997

- Miss Tayla McCloud (PhD student)

Email: t.mccloud@ucl.ac.uk
Tel.: 020 3108 7765
You can also visit the SENSE website (www.sensestudy.co.uk) for more information.

Thank you for reading this information sheet and for considering to take part in this research study. Please save a copy of this PDF for your records. You will also be able to access this Participant Information Sheet at any time on the SENSE website (www.sensestudy.co.uk) or by emailing the study email address (SENSEstudy@ucl.ac.uk).

2. Study consent form

Student mENtal health SurvEy (SENSE): consent form

Thank you for considering taking part in this research. Please do not hesitate to contact us if you have any questions or concerns before you decide whether to participate (contact details below).

This study has been approved by the UCL Research Ethics Committee. Project ID number: 8227/002.

By selecting 'Yes' to each statement below you are consenting to that element of the study. If you do not indicate 'Yes', it will be assumed that you DO NOT consent to that part of the study. This may make you ineligible for the study.

		Consent	
		Yes	No
1.	I confirm that I am a UCL student, aged 18 years or older.		
2.	I confirm that I have read and understood the Participant Information Sheet (above) for this study. I have had the opportunity to consider the information and ask questions, which have been answered to my satisfaction.		
3.	I understand that my data will be kept confidential, stored securely, and all efforts will be made to ensure I cannot be identified. I acknowledge that my anonymised information will be used in scientific publications, research and reports. I understand that I will be able to withdraw my data up until February 2021 by emailing the researchers.		
4.	I understand that my email address is required to participate in this study. This is so that we can invite you to participate in three future time points of the survey (one per term). I understand that should I not wish to answer any other questions, I am free to leave them unanswered. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing my personal data.		
5.	I agree that my pseudonymised research data (email address removed, identified by a study ID number only) may be used for future research. *(optional)*		
6.	I agree to participate in this study (SENSE).		

Please indicate below whether you would like your contact details to be retained, so that you can be contacted in the future by UCL researchers affiliated with the SENSE team who would like to:

- *invite you to participate in follow up studies to this project*
- *invite you to participate in future studies of a similar nature*

	Yes, I would be happy to be contacted in this way
	No, I would not like to be contacted

Further information:
www.sensestudy.co.uk

General study enquiries:
SENSEstudy@ucl.ac.uk

Researchers to contact:
- Tayla McCloud, PhD student and SENSE study lead, Division of Psychiatry (t.mccloud@ucl.ac.uk)
- Kirsty Nisbet, Research Coordinator, Division of Psychology and Language Sciences (k.nisbet@ucl.ac.uk)
- Principal Researcher (for any complaints): Professor Glyn Lewis, Psychiatrist and Professor of Epidemiological Psychiatry (glyn.lewis@ucl.ac.uk)

Accessing Registry data

To address our research questions, we need to collect demographic information and details about your course. To keep the survey as short as possible, we want to access the demographic and course information you have already provided to the UCL Registry.

To do this, we need your consent and your Student ID number. This is not compulsory for your participation but it does make the survey shorter.

The Registry data we will receive does not include your name. It covers routine data collected by the registry office from students on enrolment and includes demographic information such as date of birth, ethnicity, nationality, faculty and programme of study. Full details are in the information sheet here.

If you consent to this, none of your data or survey responses will be shared with UCL. We will only request data from UCL, not share any of your data with the University.

If you do not consent to us collecting this information from the UCL Registry, you will be asked to complete this information yourself. As with the rest of the survey, none of these questions are mandatory.

You can withdraw this consent at a later date if you change your mind, up until the end of the main study (February 2021). If you have any questions, please email the researchers at SENSEstudy@ucl.ac.uk.

	I consent to allow the researchers to access my data held by the UCL Registry.
	I do not consent to the researchers accessing my data held by the UCL Registry. (You will be asked to complete your demographic and course information.)

3. Study flyer example

SENSE

Help us to understand UCL students' mental health and wellbeing. Complete the **SENSE** survey.

www.SENSEstudy.co.uk

Open until the end of term.

@SENSEstudy

4. Baseline invitation email

Dear Students,

We are a team of UCL students and researchers passionate about improving the mental health and wellbeing of students, and **we need your help.**

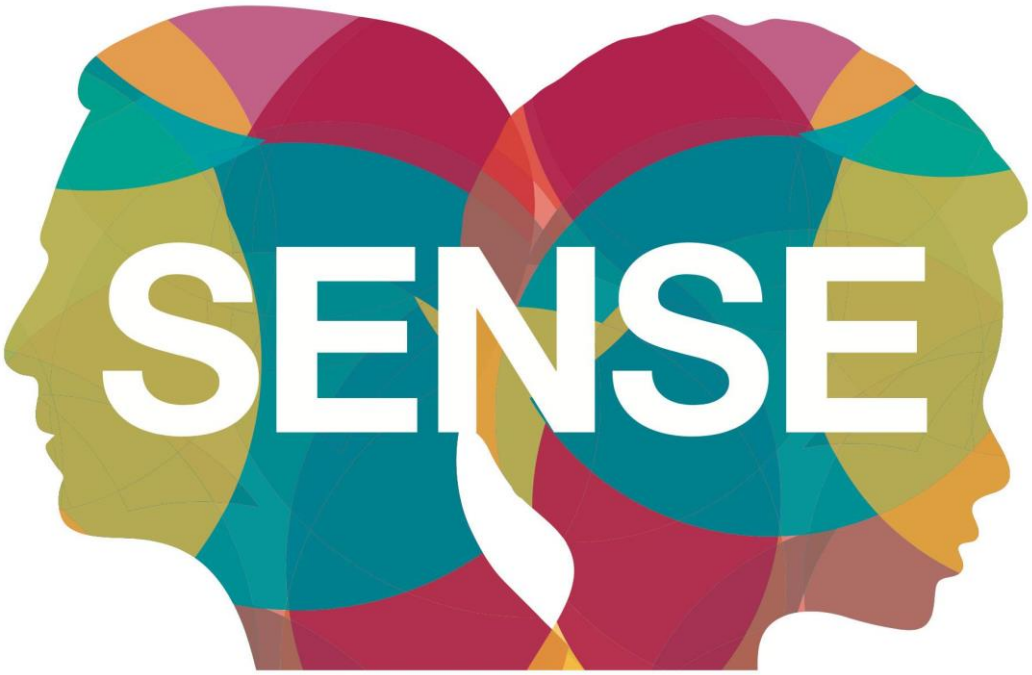
We want to learn more about how the stresses of university life impact **everyone**. To do this, **we want as many UCL students as possible to take part in SENSE, a confidential online survey.** It is important we hear from you even if you have never experienced any mental health issues.

To take part or read more, click here. *[survey link]*
It only takes **10-15 minutes** and will help us make a difference. Your answers will be treated in confidence, and only anonymised findings reported.

SENSE is the first survey like this at UCL. We're asking about finances, living situation and more, to understand how they affect your mental health and wellbeing. We will feed back our findings to senior UCL staff, the Students' Union and national policymakers to try to improve things for everyone.

You can find more information on our website www.sensestudy.co.uk, or respond to this email if you have any questions. You can also paste the following link into your browser to take part: *[survey URL]*

Many thanks,
Tayla McCloud (UCL PhD student) and the rest of the SENSE study team



Website: www.sensestudy.co.uk
Twitter: @SENSEstudy

All data will be collected and stored in accordance with the General Data Protection Regulation (GDPR), 2018. Participation will be strictly confidential. Participants can withdraw from the study at any time.

5. Follow-up invitation email

Dear SENSE participant,

Thank you for taking part in the SENSE student mental health and wellbeing survey last term, the first survey of its kind at UCL. We received responses from over **3,000 students**!

Now we need your help again. We want to understand whether students' mental health and wellbeing **changes over time** and at different points in the academic year.

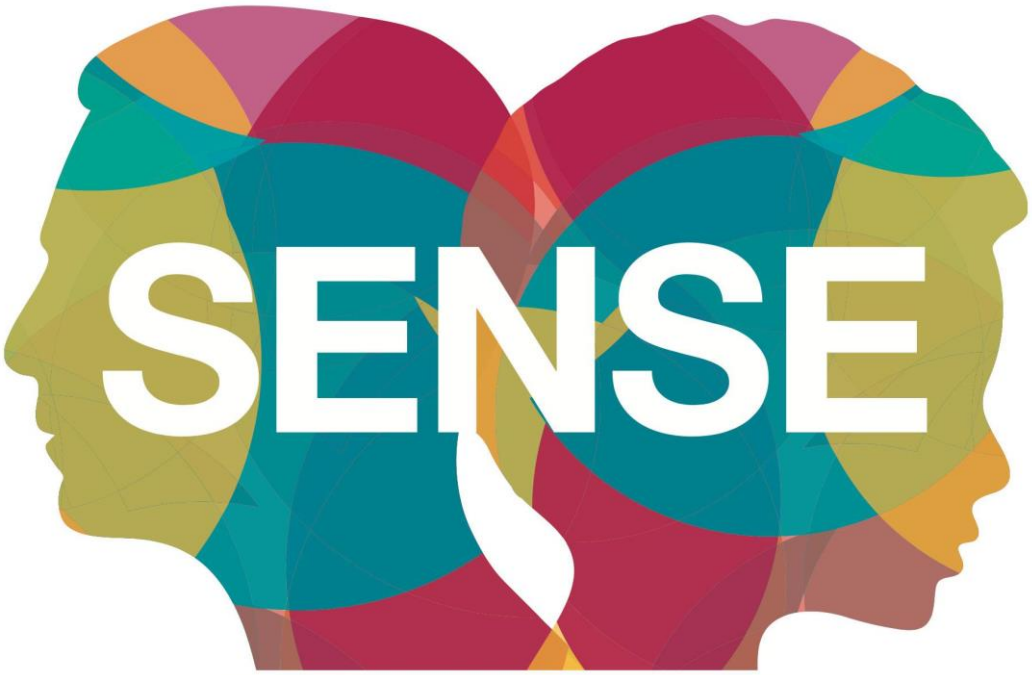
To do this, we need as many students as possible to take part in phase two of the SENSE survey**.** Some questions are repeated, and some are new. Together with your answers from last time, your response will help us **make a difference to the support available for students at UCL**.

To take part, click here *[survey link].* It only takes **10-15 minutes**. Please do not forward this link to anyone else.

You do not need to have experienced mental health difficulties to take part, and your answers do not need to have changed from last time. It is vital that we hear from students with a range of experiences. **We will not ask for your name**. Your answers will be treated in confidence, and only **anonymised** results reported.

You can find more information on our website www.sensestudy.co.uk, or respond to this email if you have any questions. You can also paste the following link into your browser to take part: *[SurveyURL]*

Many thanks,
Tayla McCloud (UCL PhD student) and the rest of the SENSE study team



Website: www.sensestudy.co.uk
Twitter: @SENSEstudy

All data will be collected and stored in accordance with the General Data Protection Regulation (GDPR), 2018. Participation will be strictly confidential. Participants can withdraw from the study at any time.

6. Survey time point 1

SENSE survey (main email version)

Start of Block: Introduction + information sheet

Student mENtal health SurvEy (SENSE): study information

Every UCL student has been invited via email to take part in this research study, which aims to better understand the wellbeing and mental health of UCL students. You do not need to have experienced mental health difficulties to take part. We would like to hear from as many students as possible, with a range of experiences. Your participation is completely voluntary and you are free to withdraw at any time without giving a reason. If you decide to withdraw or not to participate, this will be in no way detrimental to you, personally or academically.

Before you decide whether you would like to take part, please read the following information carefully. Please do not hesitate to get in touch with us using the contact details below if you have any questions or concerns.

What does the SENSE study involve?

This survey includes questions about your wellbeing and mental health, and other related factors such as finances, workload and accommodation. There will be some questions on whether you have recently harmed yourself or thought about harming yourself.

The only compulsory question asks for your email address. We will not ask for your name. No other questions are compulsory, so you can leave out any questions you do not wish to answer.

The SENSE study will last for one calendar year, and we will ask you to take part in the survey once per term throughout this year, to see how your wellbeing and mental health changes over time. You do not have to participate every time, and can withdraw from being contacted for future time points of the survey and request any data already entered to be deleted by emailing the researchers at any time.

How long does the survey take?

This survey should take approximately 10-15 minutes to complete. We recommend that you complete the survey in one sitting if possible, but if for any reason you need to stop, you can return to complete it within two weeks. The future surveys will also take around 10-15 minutes to complete.

What will happen to the results of SENSE?

The study team are PhD students and researchers at UCL. The core study team are independent of UCL senior management, which means we will not share your individual data with anyone at UCL outside the study team, including the University

Registry, Student Support and Wellbeing, your department, or anyone else. Confidential results will be stored by University College London (UCL) in accordance with usual research practice.

No individual or organisation will be identifiable in any subsequent publication or report of the results. The findings from this research will be published and communicated to organisations such as the UCL Union and relevant UCL departments. In this way, we hope this research will help influence UCL senior management to adopt policies that might improve UCL students' wellbeing and mental health.

Please click below to download a detailed description of the study. You can view this at any time on the SENSE study website.

Contact details

Further information:

www.sensestudy.co.uk

General study enquiries:

SENSEstudy@ucl.ac.uk

Researchers to contact:

- Tayla McCloud, PhD student and SENSE study lead, Division of Psychiatry (t.mccloud@ucl.ac.uk)
- Kirsty Nisbet, Research Coordinator, Division of Psychology and Language Sciences (k.nisbet@ucl.ac.uk)
- Principal Researcher (for any complaints): Professor Glyn Lewis, Psychiatrist and Professor of Epidemiological Psychiatry (glyn.lewis@ucl.ac.uk)

Browser Meta Info
Browser
Version
Operating System
Screen Resolution
Flash Version
Java Support
User Agent

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End of Block: Introduction + information sheet

Start of Block: Consent form

Student mENtal health SurvEy (SENSE): consent form

Thank you for considering taking part in this research. If you have any questions arising from the Information Sheet, please contact the researchers before you decide whether to participate (contact details below). This study has been approved by the UCL Research Ethics Committee. Project ID number: 8227/002.

By selecting 'Yes' to each statement below you are consenting to that element of the study. If you do not indicate 'Yes', it will be assumed that you

DO NOT consent to that part of the study. This may make you ineligible for the study.

	Yes	No
1. I confirm that I am a UCL student, aged 18 years or older.	○	○
2. I confirm that I have read and understood the Participant Information Sheet for this study. I have had the opportunity to consider the information and ask questions, which have been answered to my satisfaction.	○	○
3. I understand that my data will be kept confidential, stored securely, and all efforts will be made to ensure I cannot be identified. I acknowledge that my anonymised information will be used in scientific publications, research and reports. I understand that I will be able to withdraw my data up until February 2021 by emailing the researchers.	○	○
4. I understand that my email address is required to participate in this study. This is so that we can invite you to participate in three optional future time points of the survey (one per term). I understand that should I not wish to answer any other questions, I am free to leave them unanswered. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing my personal data.	○	○

5. I agree that my pseudonymised research data (i.e. email address removed, identified by a study ID number only) may be used for future research. (**optional**)	○	○
6. I agree to participate in this study (SENSE).	○	○

Please indicate below whether you would like your contact details to be retained, so that you can be contacted in the future by UCL researchers affiliated with the SENSE team who would like to invite you to participate in:

· **other follow up studies to this project** · **future studies of a similar nature**

○ Yes, I would be happy to be contacted in this way

○ No, I would not like to be contacted

*

Please enter your UCL email address below, so that we can contact you to complete the survey again in a few months. (<u>compulsory</u>)

Please enter this in the form of your single sign-on, e.g. rejutlm@ucl.ac.uk.

_____

*

Please repeat your UCL email address, as above.

_____

*

Please enter an alternative contact email address. We may use this to contact you in the future, for example if you leave UCL before the study ends.

_____

_

Please do not hesitate to contact us if you have any questions or concerns.
Further information:
www.sensestudy.co.uk
General study enquiries:
SENSEstudy@ucl.ac.uk
Researchers to contact:
- Tayla McCloud, PhD student and SENSE study lead, Division of Psychiatry (t.mccloud@ucl.ac.uk)
- Kirsty Nisbet, Research Coordinator, Division of Psychology and Language Sciences (k.nisbet@ucl.ac.uk)
- Principal Researcher (for any complaints): Professor Glyn Lewis, Psychiatrist and Professor of Epidemiological Psychiatry (glyn.lewis@ucl.ac.uk)

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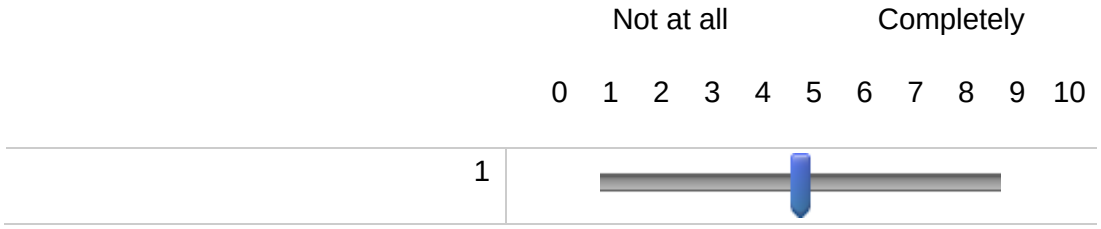
End of Block: Consent form

Start of Block: University life

SECTION 1 OF 5

The following questions are about what your **everyday life** is like when you are at university. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Overall, how satisfied are you with your experience of university nowadays?



How many hours in total <u>each week</u> do you normally spend <u>in timetabled activities</u> for your course, such as lectures, tutorials and practicals (during

term time)? (If this varies from week to week or according to modules, please give an average).

- ○ N/A
- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
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- ○ 35
- ○ 36
- ○ 37
- ○ 38
- ○ 39
- ○ 40
- ○ More than 40

How many hours in total <u>each week</u> do you normally spend on work or study related to your course <u>outside timetabled activities</u> (during term time)? (If

this varies from week to week or according to modules, please give an average).

- ○ N/A
- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
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- ○ 35
- ○ 36
- ○ 37
- ○ 38
- ○ 39
- ○ 40
- ○ More than 40

On average, how many hours <u>per week</u> do you normally work in paid employment during term?
(If this varies from week to week, please give an average).

- ○ N/A
- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
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- ○ 36
- ○ 37
- ○ 38
- ○ 39
- ○ 40
- ○ More than 40

On average, how often do you miss lectures, seminars or other university commitments, for any reason?

- ○ Very frequently
- ○ Frequently
- ○ Sometimes
- ○ Rarely
- ○ Never

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SECTION 1 OF 5

Have you experienced any of the following since starting your current university course? Please tick all that apply.

- ☐ You failed an exam or assignment
- ☐ You suffered a serious illness or injury
- ☐ You suffered an assault
- ☐ You experienced bullying or harassment (including identity-based experiences such as racism or homophobia)
- ☐ A serious illness, injury or assault happened to a close friend or relative
- ☐ Your parent, child or partner died
- ☐ Another close friend or relative died
- ☐ A serious romantic relationship ended
- ☐ You had a serious problem with a close friend or relative
- ☐ You got in trouble with the police or law enforcement
- ☐ Something you valued was lost or stolen
- ☐ ⊗ You have not experienced any significant stressful life events since starting your current university course
- ☐ You experienced a significant stressful life event not listed here (please explain below, if you would like to)

_____

If English isn't your first language, has this caused you difficulty on your university course?

- ○ Yes, a lot
- ○ Yes, a bit
- ○ Not at all
- ○ English is my first language

Have you ever (on your current university course) submitted an Extenuating Circumstances form in relation to your mental health?

- ○ Yes
- ○ No

Have you seriously considered abandoning or interrupting your university course because of any emotional difficulties?

- ○ Yes
- ○ No

Have you repeated a year or interrupted your current course, because of any emotional difficulties?

- ○ Yes
- ○ No

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SECTION 1 OF 5 The following questions are about your **living situation** during term time. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not the browser buttons. Press Next when you are ready to continue.

Where do you live during university term-time?

- ○ University Hall of Residence
- ○ Private Hall of Residence
- ○ Flat/house rented from a private landlord
- ○ In family home, with parent(s)/carer(s)
- ○ In a house/flat that you own
- ○ Other (please specify)

_____

How long does it take you to travel to your main university campus?

- ○ 15 minutes or less
- ○ 16-30 minutes
- ○ 31-45 minutes
- ○ 46-60 minutes
- ○ 61-75 minutes
- ○ 76-90 minutes
- ○ More than 90 minutes

How satisfied are you with your living situation?

- ○ Very satisfied
- ○ Quite satisfied
- ○ Neither satisfied nor dissatisfied
- ○ Quite dissatisfied
- ○ Very dissatisfied

Do you have any caring responsibilities for a child or adult dependent?

- ○ Yes
- ○ No

How many other people (not including yourself) do you live with? This refers to your individual dwelling, e.g. your flat or house.

- ○ None, I live alone.
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5 or more.

In general, how well do you get along with those you live with?

- ○ Extremely well
- ○ Moderately well
- ○ Not very well
- ○ Not well at all
- ○ I live alone

End of Block: University life

Start of Block: Finances

SECTION 2 OF 5 The following questions are about your **financial situation**. For any questions you do not know the answer to, please make a reasonable guess. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

How well would you say you are managing financially these days? Would you say you are...

- ○ Living comfortably
- ○ Doing alright
- ○ Just about getting by
- ○ Finding it quite difficult
- ○ Finding it very difficult

How much stress does your financial situation cause you?

- ○ None at all
- ○ A little
- ○ A moderate amount
- ○ Quite a lot
- ○ A great deal

How stressed do you feel about your level of debt?

- ○ Not at all stressed
- ○ A little stressed
- ○ Quite stressed
- ○ Very stressed

Have you seriously considered abandoning or interrupting your university course because of any financial difficulties?

- ○ Yes
- ○ No

Thinking about your family home, does your household own or rent this accommodation?

- ○ Owns outright
- ○ Owns with the help of a mortgage or loan
- ○ Part owns and part rents (shared ownership)
- ○ Rents (with or without housing benefit)
- ○ Lives there rent-free
- ○ N/A

If you went to school in the UK, did you ever receive free school meals?

- ○ Yes
- ○ No
- ○ I did not attend school in the UK

What was the highest level of education your parent(s)/carer(s) had attained before you started your course?

- ○ Degree or higher
- ○ A Level or equivalent
- ○ GCSE, O Level or equivalent
- ○ Other
- ○ Unsure

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SECTION 2 OF 5

Since the start of this term, did any of the following happen to you due to financial difficulties? Please tick all that apply.

- ☐ Could not pay bills on time (e.g. electricity, gas, internet or telephone)
- ☐ Could not pay the rent or mortgage on time
- ☐ Pawned or sold something
- ☐ Went without meals or ate less
- ☐ Was unable to socialise or attend a social event
- ☐ Was unable to take part in hobbies or sports
- ☐ Went without things I need for my course (e.g. books, printing costs)
- ☐ Could not travel to university
- ☐ Could not travel to visit family or friends
- ☐ Asked for financial help from friends or family
- ☐ Asked for financial help from elsewhere (e.g. university, community organisations)
- ☐ ⊗ None of the above happened to me

On average, how much money do you receive per term from each of the following sources?

Do <u>not</u> include money you will be expected to repay, or money paid directly to UCL for your tuition fees.

	None	Less than £100	£100-£249	£250-£499	£500-£999	£1,000-£1,999	£2,000-£2,999	£3,000-£3,999	£4,000 or more
Parent(s)/carer(s), friends and/or other family members. This includes cash gifts, paying for rent, buying essentials, etc, but not loans.	○	○	○	○	○	○	○	○	○
Paid employment.	○	○	○	○	○	○	○	○	○
Maintenance grants, non-repayable bursaries, special support grants, PhD stipends and/or scholarships.	○	○	○	○	○	○	○	○	○
Any other sources. This may include child-related income support or social security benefits, but not loans.	○	○	○	○	○	○	○	○	○

On average, how much money do you receive <u>per term</u> from each of the following sources in <u>loans you will be expected to repay</u>?
Do <u>not</u> include money paid directly to UCL for your tuition fees.

	None	Less than £100	£100-£249	£250-£499	£500-£999	£1,000-£1,999	£2,000-£2,999	£3,000-£3,999	£4,000 or more
Loans from the student loans company or government paid directly to you (including maintenance loans and postgraduate loans).	○	○	○	○	○	○	○	○	○
Loans from parent(s)/carer(s), friends or other family members.	○	○	○	○	○	○	○	○	○
Outstanding overdraft and credit card debt.	○	○	○	○	○	○	○	○	○
Payday or other short-term loans.	○	○	○	○	○	○	○	○	○
Loans from any other sources.	○	○	○	○	○	○	○	○	○

How much <u>total</u> debt (<u>from all sources</u>, including tuition fees and previous degrees) do you anticipate having when you have completed your current university course?

- ○ None
- ○ Up to £4,999
- ○ £5,000-£9,999
- ○ £10,000-£19,999
- ○ £20,000-£29,999
- ○ £30,000-£39,999
- ○ £40,000-£49,999
- ○ £50,000-£59,999
- ○ £60,000-£69,999
- ○ £70,000-£79,999
- ○ £80,000-£89,999
- ○ £90,000 or more

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End of Block: Finances

Start of Block: GAD-7

<u>SECTION 3 OF 5</u>

The following questions are about how you have been feeling over **the past 2 weeks.** Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you

would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
Feeling nervous, anxious or on edge	○	○	○	○
Not being able to stop or control worrying	○	○	○	○
Worrying too much about different things	○	○	○	○
Trouble relaxing	○	○	○	○
Being so restless that it is hard to sit still	○	○	○	○
Becoming easily annoyed or irritable	○	○	○	○
Feeling afraid as if something awful might happen	○	○	○	○

Display This Question:

If Over the last 2 weeks, how often have you been bothered by any of the following problems? [Not at all] (Count) < 7

How <u>difficult</u> have these problems made it for you to do your work, take care of things at home, or get along with other people?

- ○ Not difficult at all
- ○ Somewhat Difficult
- ○ Very Difficult
- ○ Extremely Difficult

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End of Block: GAD-7

Start of Block: PHQ-9

<u>SECTION 3 OF 5</u> The following questions are about how you have been feeling over **the past 2 weeks**. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	○	○	○	○
Feeling down, depressed, or hopeless	○	○	○	○
Trouble falling/staying asleep, sleeping too much	○	○	○	○
Feeling tired or having little energy	○	○	○	○
Poor appetite or overeating	○	○	○	○
Feeling bad about yourself – or that you are a failure or have let yourself or your family down.	○	○	○	○
Trouble concentrating on things, such as reading the newspaper or watching television.	○	○	○	○
Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual.	○	○	○	○

Thoughts that you would be better off dead or of hurting yourself in some way.	○	○	○	○

Display This Question:

If Over the last 2 weeks, how often have you been bothered by any of the following problems? [Not at all] (Count) < 9

How <u>difficult</u> have these problems made it for you to do your work, take care of things at home, or get along with other people?

- ○ Not difficult at all
- ○ Somewhat Difficult
- ○ Very Difficult
- ○ Extremely Difficult

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End of Block: PHQ-9

Start of Block: Self harm

<u>SECTION 3 OF 5</u> The following questions are about some experiences you may have had. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Have you ever hurt yourself on purpose in any way (e.g by taking an overdose of pills or by cutting yourself)?

- ○ Yes
- ○ No

Display This Question:

If Have you ever hurt yourself on purpose in any way (e.g by taking an overdose of pills or by cutti... = Yes

Have you hurt yourself on purpose in any way in the past 12 months (e.g by taking an overdose of pills or by cutting yourself)?

- ○ Yes
- ○ No

Display This Question:

If Have you hurt yourself on purpose in any way in the past 12 months (e.g by taking an overdose of... = Yes

In the past 12 months, have you needed to seek medical help or treatment as a result of hurting yourself on purpose (e.g by taking an overdose of pills or by cutting yourself)?

- ○ Yes
- ○ No

In the past 2 weeks have you thought of taking your life, even if you would not really do it?

- ○ Yes
- ○ No

In the past 12 months have you made a suicide attempt?

- ○ Yes
- ○ No

This is a reminder that if you need support with your mental health, there are services which can help.

Some options are listed: In the Participant Information Sheet (downloaded at the start of the survey) On our website (www.sensestudy.co.uk) At the end of the survey

Please click Next to continue the survey. We really appreciate your participation.

Timing
First Click
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Page Submit
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End of Block: Self harm

Start of Block: Registry consent

SECTION 4 OF 5

Accessing Registry data **To address our research questions, we need to collect demographic information and details about your course.** To keep the survey as short as possible, we want to access the demographic and course information you have already provided to the UCL Registry. To do this, we need your consent and your Student ID number. This is not compulsory for your participation but it does make the survey shorter. **The Registry data we will receive does not include your name.** It covers routine demographic data collected by the registry office from students on enrolment, including information such as date of birth, ethnicity, nationality, faculty and programme of study. Full details are in the information sheet, downloaded at the beginning of this survey or available here. **If you consent to this, none of your data or survey responses will be shared with UCL. We will only request data from UCL, not share any of your data with the University. If you do not consent to us collecting this information from the UCL Registry, you will be asked to complete this information yourself.** As with the rest of the survey, none of these questions are mandatory.

You can withdraw this consent at a later date if you change your mind, up until the end of the main study (February 2021). If you have any questions, please email the researchers at SENSEstudy@ucl.ac.uk.

○ I consent to allow the researchers to access my data held by the UCL Registry.

○ I do not consent to the researchers accessing my data held by the UCL Registry. (You will be asked to complete your demographic and course information.)

Timing
First Click
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Page Submit
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End of Block: Registry consent

Start of Block: Registry linkage

SECTION 4 OF 5

Please enter your UCL Student ID Number (SN). This is so that we can access your demographic data held by UCL Registry. Your Student ID Number (SN) can be found on your UCL ID card, as indicated below.
If you cannot enter your student ID number at this time, please enter your UCL email in the form of your single sign-on, e.g. rejutlm@ucl.ac.uk.

My UCL Student ID Number (SN) is:
If you cannot enter your student ID number at this time, please enter your UCL email in the form of your single sign-on, e.g. rejutlm@ucl.ac.uk.

_____

_

Please enter your UCL Student ID Number (SN) again:
If you cannot enter your student ID number at this time, **please enter your UCL email in the form of your single sign-on, e.g. rejutlm@ucl.ac.uk.**

_

Please click Next to continue with the survey. There is only one more section left.

Timing
First Click
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Page Submit
Click Count

End of Block: Registry linkage

Start of Block: Registry demographics

SECTION 4 OF 5

These are demographic questions we would like you to complete. There are two pages. You may skip any questions you do not wish to answer. Once you complete these, there is only one more short section of the main survey left.
Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. Press Next when you are ready to continue.

Please enter your month and year of birth. (e.g. January, 1990)

_

What is your sex?

- ○ Male
- ○ Female
- ○ Other
- ○ Prefer not to say

Does your gender identity match your sex as registered at birth?

- ○ Yes
- ○ No
- ○ Prefer not to say

What is your sexual orientation?

- ○ Bisexual
- ○ Homosexual man/gay man
- ○ Homosexual woman/lesbian
- ○ Heterosexual/straight
- ○ Other
- ○ Prefer not to say

What is your ethnic group?

- ○ White - English, Welsh, Scottish, Northern Irish, British
- ○ White - Irish
- ○ Gypsy or Traveller
- ○ Other White background
- ○ Black or Black British - Caribbean
- ○ Black or Black British - African
- ○ Other Black background
- ○ Asian or Asian British - Indian
- ○ Asian or Asian British - Pakistani
- ○ Asian or Asian British - Bangladeshi
- ○ Chinese
- ○ Other Asian background
- ○ Mixed - White and Black Caribbean
- ○ Mixed - White and Black African
- ○ Mixed - White and Asian
- ○ Other mixed background
- ○ Arab
- ○ Other ethnic background
- ○ Prefer not to say

Do you have a religion or belief?

- ○ No religion
- ○ Buddhist
- ○ Christian
- ○ Christian - Church of Scotland
- ○ Christian - Roman Catholic
- ○ Christian - Presbyterian Church in Ireland
- ○ Christian - Church of Ireland
- ○ Christian - Methodist Church in Ireland
- ○ Christian - Other denomination
- ○ Hindu
- ○ Jewish
- ○ Muslim
- ○ Sikh
- ○ Spiritual
- ○ Any other religion or belief
- ○ Prefer not to say

What is your country of legal nationality?

- ○ United Kingdom
- ○ Andorra
- ○ Afghanistan
- ○ Algeria
- ○ Antigua and Barbuda
- ○ Anguilla
- ○ Albania
- ○ Armenia
- ○ Angola
- ○ Argentina
- ○ American Samoa
- ○ Austria
- ○ Australia
- ○ Azerbaijan
- ○ Bosnia and Herzegovina
- ○ Barbados
- ○ Bangladesh
- ○ Belgium
- ○ Belarus
- ○ Burkina Faso
- ○ Bulgaria
- ○ Bahrain

- ○ Burundi
- ○ Benin
- ○ Bermuda
- ○ Brunei [Brunei Darussalam]
- ○ Bolivia [Plurinational State of]
- ○ Brazil
- ○ British Indian Ocean Territory (BIOT)
- ○ Bahamas, The
- ○ Bhutan
- ○ Botswana
- ○ British Virgin Islands
- ○ Belize
- ○ Cambodia
- ○ Canada
- ○ Congo (Democratic Republic)
- ○ Central African Republic
- ○ Congo
- ○ Chad
- ○ Chile
- ○ Cameroon
- ○ Channel Islands not otherwise specified
- ○ China
- ○ Colombia

- Costa Rica
- Comoros
- Croatia
- Cuba
- Cape Verde
- Cayman Islands
- Cyprus
- Czech Republic
- Djibouti
- Denmark
- Dominica
- Dominican Republic
- Ecuador
- Estonia
- Egypt
- El Salvador
- Eritrea
- Ethiopia
- Finland
- Fiji
- Falkland Islands [Malvinas]
- Faroe Islands
- France

- Gabon
- Germany
- Grenada
- Georgia
- Guernsey
- Ghana
- Gibraltar
- Greenland
- Gambia, The
- Guinea
- Equatorial Guinea
- Greece
- Guatemala
- Guam
- Guinea-Bissau
- Guyana
- Hong Kong (Special Administrative Region of China)
- Honduras
- Haiti
- Hungary
- Indonesia
- Ireland
- Israel

- Isle of Man
- India
- Iraq
- Iran [Islamic Republic of]
- Iceland
- Italy
- Ivory Coast [Côte D'ivoire]
- Jersey
- Jamaica
- Jordan
- Japan
- Kenya
- Kyrgyzstan
- Kiribati
- Korea (North) [Democratic People's Republic of]
- Korea (South) [Republic of]
- Kosovo
- Kuwait
- Kazakhstan
- Laos [Lao People's Democratic Republic]
- Lebanon
- Liechtenstein
- Liberia

- ○ Lesotho
- ○ Lithuania
- ○ Luxembourg
- ○ Latvia
- ○ Libya
- ○ Morocco
- ○ Monaco
- ○ Moldova [Republic of]
- ○ Montenegro
- ○ Madagascar
- ○ Marshall Islands
- ○ Macedonia [The Former Yugoslav Republic of]
- ○ Mali
- ○ Myanmar [Burma]
- ○ Mongolia
- ○ Macao (Special Administrative Region of China)
- ○ Northern Mariana Islands
- ○ Mauritania
- ○ Montserrat
- ○ Malta
- ○ Mauritius
- ○ Maldives
- ○ Malawi

- ○ Micronesia [Federated States of]
- ○ Mexico
- ○ Malaysia
- ○ Mozambique
- ○ Namibia
- ○ Niger
- ○ Nigeria
- ○ Nicaragua
- ○ Netherlands
- ○ Norway
- ○ Nepal
- ○ Nauru
- ○ New Zealand
- ○ Oman
- ○ Panama
- ○ Peru
- ○ Papua New Guinea
- ○ Philippines
- ○ Pakistan
- ○ Poland
- ○ Pitcairn, Henderson, Ducie and Oeno Islands [Pitcairn]
- ○ Occupied Palestinian Territories [State of Palestine]
- ○ Portugal

- Palau
- Paraguay
- Qatar
- Romania
- Russia [Russian Federation]
- Rwanda
- Samoa
- Serbia
- Saudi Arabia
- Solomon Islands
- Click to write Choice 224
- Seychelles
- Sudan
- Sweden
- Singapore
- St Helena, Ascension and Tristan da Cunha
- Slovenia
- Slovakia
- Sierra Leone
- San Marino
- Senegal
- Somalia
- South Georgia and The South Sandwich Islands

- Spain
- Sri Lanka
- St Kitts and Nevis
- St Lucia
- St Vincent and The Grenadines
- Suriname
- South Sudan
- Sao Tome and Principe
- Swaziland
- Switzerland
- Syria [Syrian Arab Republic]
- Turks and Caicos Islands
- Togo
- Thailand
- Tajikistan
- East Timor [Timor Leste]
- Turkmenistan
- Tunisia
- Tonga
- Turkey
- Trinidad and Tobago
- Tuvalu
- Taiwan [Province of China]

- ○ Tanzania [United Republic of]
- ○ Ukraine
- ○ Uganda
- ○ United Arab Emirates
- ○ United States
- ○ Uruguay
- ○ Uzbekistan
- ○ Vatican City [Holy See (Vatican City State)]
- ○ Venezuela [Bolivarian Republic of]
- ○ Vietnam [Viet Nam]
- ○ Vanuatu
- ○ Western Sahara
- ○ Yemen
- ○ Zambia
- ○ Zimbabwe
- ○ Not known
- ○ Stateless
- ○ Prefer not to say

What is your fee status?

- ○ UK
- ○ EU
- ○ Overseas

Did you attend a state or independent (fee-paying) school before entering higher education?

- ○ State school (including state-funded comprehensive, selective and grammar schools)
- ○ Independent fee-paying school
- ○ Don't know

Page Break

SECTION 4 OF 5

What is your mode of study?

- ○ Full-time
- ○ Part-time

What is your current level of study?

- ○ Undergraduate
- ○ Postgraduate taught (e.g. Masters)
- ○ Postgraduate research (e.g. MRes, PhD)

What is your current year of study (on your current course)?

- ○ 1st year
- ○ 2nd year
- ○ 3rd year
- ○ 4th year
- ○ 5th year
- ○ 6th year or above

Are you a campus-based or distance learner?

- ○ Campus-based learner
- ○ Distance learner

What is the name of your current programme? (e.g. BSc Psychology)

_____

_

Which department or institute is your current programme based in?

_____

_

Please click Next to continue with the survey. There is only one more section left.

Timing
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End of Block: Registry demographics

Start of Block: CCAPS-34

SECTION 5 OF 5

The following statements describe thoughts, feelings and experiences that people may have. Please indicate how each statement describes you, **during the past two weeks,** from "not at all like me" (0) to "extremely like me" (4), by marking the correct number. Please read each statement carefully and select only one answer per statement. Please try to answer as honestly and accurately as you can. If you

would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

	Not at all like me (0)	1	2	3	Extremely like me (4)
I am shy around others	○	○	○	○	○
My heart races for no good reason	○	○	○	○	○
I feel out of control when I eat	○	○	○	○	○
I don't enjoy being around people as much as I used to	○	○	○	○	○
I feel isolated and alone	○	○	○	○	○
I think about food more than I would like to	○	○	○	○	○
I am anxious that I might have a panic attack while in public	○	○	○	○	○
I feel confident that I can succeed academically	○	○	○	○	○
I have sleep difficulties	○	○	○	○	○
My thoughts are racing	○	○	○	○	○
I feel worthless	○	○	○	○	○
I feel helpless	○	○	○	○	○
I eat too much	○	○	○	○	○
I drink alcohol frequently	○	○	○	○	○

I have spells of terror or panic	○	○	○	○	○
When I drink alcohol I can't remember what happened	○	○	○	○	○
I feel tense	○	○	○	○	○
I have difficulty controlling my temper	○	○	○	○	○
I make friends easily	○	○	○	○	○
I sometimes feel like breaking or smashing things	○	○	○	○	○
I feel sad all the time	○	○	○	○	○
I am concerned that other people do not like me	○	○	○	○	○
I get angry easily	○	○	○	○	○
I feel uncomfortable around people I don't know	○	○	○	○	○
I have thoughts of ending my life	○	○	○	○	○
I feel self conscious around others	○	○	○	○	○
I drink more than I should	○	○	○	○	○

I am not able to concentrate as well as usual	○	○	○	○	○
I am afraid I may lose control and act violently	○	○	○	○	○
It's hard to stay motivated for my classes	○	○	○	○	○
I have done something I have regretted because of drinking	○	○	○	○	○
I frequently get into arguments	○	○	○	○	○
I am unable to keep up with my university work	○	○	○	○	○
I have thoughts of hurting others	○	○	○	○	○

Timing
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End of Block: CCAPS-34

Start of Block: Mental health diagnoses

SECTION 5 OF 5

The following questions are about physical and mental health problems you may have experienced. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can.

You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Do you consider yourself to have any of the following? Please tick all that apply.

- [ ] A physical disability - this includes any physical condition that has an effect on your day-to-day activities
- [ ] A non-physical disability - this includes any learning difficulty, mental health condition or condition such as autism that has an effect on your day-to-day activities
- [ ] ⊗ None of the above
- [ ] ⊗ Prefer not to say

Have you <u>ever</u> experienced any of the following mental health problems? Please tick all that apply.

- ☐ Anxiety disorder (e.g. generalised anxiety disorder, social anxiety, panic attacks)
- ☐ Depression
- ☐ Obsessive Compulsive Disorder (OCD)
- ☐ Attention Deficit Hyperactivity Disorder (ADHD)
- ☐ Autism or autism spectrum disorder
- ☐ Eating disorder (e.g. anorexia, bulimia)
- ☐ Post-traumatic Stress Disorder (PTSD)
- ☐ Bipolar disorder, schizophrenia or psychosis
- ☐ Personality Disorder (e.g. Borderline Personality Disorder)
- ☐ Other (please indicate)

_____

- ☐ ⊗ I have never experienced any mental health problems.

Display This Question:

If Have you ever experienced any of the following mental health problems? Please tick all that apply. = Anxiety disorder (e.g. generalised anxiety disorder, social anxiety, panic attacks)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Depression

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Obsessive Compulsive Disorder (OCD)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Attention Deficit Hyperactivity Disorder (ADHD)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Autism or autism spectrum disorder

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Eating disorder (e.g. anorexia, bulimia)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Post-traumatic Stress Disorder (PTSD)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Bipolar disorder, schizophrenia or psychosis

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Personality Disorder (e.g. Borderline Personality Disorder)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Other (please indicate)

Carry Forward Selected Choices from "Have you ever experienced any of the following mental health problems? Please tick all that apply."

Please indicate which of these mental health problems you have experienced <u>since the start of this term</u>. Please tick all that apply.

☐ I have not experienced any of these mental health problems since the start of this term.

☐ Anxiety disorder (e.g. generalised anxiety disorder, social anxiety, panic attacks)

☐ Depression

☐ Obsessive Compulsive Disorder (OCD)

☐ Attention Deficit Hyperactivity Disorder (ADHD)

☐ Autism or autism spectrum disorder

☐ Eating disorder (e.g. anorexia, bulimia)

☐ Post-traumatic Stress Disorder (PTSD)

☐ Bipolar disorder, schizophrenia or psychosis

☐ Personality Disorder (e.g. Borderline Personality Disorder)

☐ Other (please indicate)

_____

☐ ⊗ I have never experienced any mental health problems.

Display This Question:

If Have you ever experienced any of the following mental health problems? Please tick all that apply. = Anxiety disorder (e.g. generalised anxiety disorder, social anxiety, panic attacks)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Depression

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Obsessive Compulsive Disorder (OCD)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Attention Deficit Hyperactivity Disorder (ADHD)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Autism or autism spectrum disorder

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Eating disorder (e.g. anorexia, bulimia)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Post-traumatic Stress Disorder (PTSD)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Bipolar disorder, schizophrenia or psychosis

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Personality Disorder (e.g. Borderline Personality Disorder)

Or Have you ever experienced any of the following mental health problems? Please tick all that apply. = Other (please indicate)

Carry Forward Selected Choices from "Have you ever experienced any of the following mental health problems? Please tick all that apply."

Please indicate which of these mental health problems you had

experienced before you started your current university course**. Please tick all that apply.**

☐ I had not experienced any of these mental health problems before I started my current university course.

☐ Anxiety disorder (e.g. generalised anxiety disorder, social anxiety, panic attacks)

☐ Depression

☐ Obsessive Compulsive Disorder (OCD)

☐ Attention Deficit Hyperactivity Disorder (ADHD)

☐ Autism or autism spectrum disorder

☐ Eating disorder (e.g. anorexia, bulimia)

☐ Post-traumatic Stress Disorder (PTSD)

☐ Bipolar disorder, schizophrenia or psychosis

☐ Personality Disorder (e.g. Borderline Personality Disorder)

☐ Other (please indicate)

_____

☐ ⊗ I have never experienced any mental health problems.

Have you ever received any of the following treatments for a mental health problem? Please tick all that apply.

- ☐ Medication (e.g. antidepressants)
- ☐ Therapy, counselling or coaching
- ☐ Other (please indicate)

_____

- ☐ ⊗ No, I have never received any treatment for a mental health problem

Display This Question:

If Have you ever received any of the following treatments for a mental health problem? Please tick a... = Medication (e.g. antidepressants)

Or Have you ever received any of the following treatments for a mental health problem? Please tick a... = Therapy, counselling or coaching

Or Have you ever received any of the following treatments for a mental health problem? Please tick a... = Other (please indicate)

Carry Forward Selected Choices from "Have you ever received any of the following treatments for a mental health problem? Please tick all that apply."

X→

Have you received any of the following treatments for a mental health problem since the start of this term? Please tick all that apply.

- ☐ I have not received any of these treatments since the start of this term.
- ☐ Medication (e.g. antidepressants)
- ☐ Therapy, counselling or coaching
- ☐ Other (please indicate)

_____

- ☐ ⊗ No, I have never received any treatment for a mental health problem

Timing
First Click
Last Click
Page Submit
Click Count

End of Block: Mental health diagnoses

Start of Block: Psychosis

SECTION 5 OF 5

The next set of questions is about unusual experiences that you may have had, like seeing visions or hearing voices. We don't expect these questions to apply to everyone, but would like to get an idea of how common they are. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Did you ever see something that wasn't really there that other people could not see? Please do not include any times when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Did you ever see something that wasn't really there that other people could not see? Please do no... = Yes

About how many times in your life did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____

_

Did you ever hear things that other people said did not exist, like strange voices coming from inside your head talking to you or about you, or voices coming out of the air when there was no one around? Please do not include any times when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Did you ever hear things that other people said did not exist, like strange voices coming from in... = Yes

About how many times in your life did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____

_

Did you ever believe that a strange force was trying to communicate directly with you by sending special signs or signals that you could understand but that no one else could understand (for example through the radio or television)? Please do not include any times when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Did you ever believe that a strange force was trying to communicate directly with you by sending... = Yes

About how many times in your life did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____

_

Did you ever believe that that there was an unjust plot going on to harm you or to have people follow you, and which your family and friends did not believe existed? Please do not include any times when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Did you ever believe that that there was an unjust plot going on to harm you or to have people fo... = Yes

About how many times in your life did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____

_

Display This Question:

If Did you ever see something that wasn't really there that other people could not see? Please do no... = Yes

Or Did you ever hear things that other people said did not exist, like strange voices coming from in... = Yes

Or Did you ever believe that a strange force was trying to communicate directly with you by sending... = Yes

Or Did you ever believe that that there was an unjust plot going on to harm you or to have people fo... = Yes

How often did any of these experiences happen in the past 1 year (seeing a vision, hearing a voice, or believing that something strange was trying to communicate with you, or there was a plot against you)?

- ○ Not at all
- ○ Once or twice
- ○ Less than once a month
- ○ More than once a month
- ○ Nearly every day or daily
- ○ Prefer not to answer

Display This Question:

If Did you ever see something that wasn't really there that other people could not see? Please do no... = Yes

Or Did you ever hear things that other people said did not exist, like strange voices coming from in... = Yes

Or Did you ever believe that a strange force was trying to communicate directly with you by sending... = Yes

Or Did you ever believe that a strange force was trying to communicate directly with you by sending... = Yes

How distressing did you find having any of these experiences (seeing a vision, hearing a voice, or believing that something strange was trying to communicate with you, or there was a plot against you)?

- ○ Not distressing at all, it was a positive experience
- ○ Not distressing, a neutral experience
- ○ A bit distressing
- ○ Quite distressing
- ○ Very distressing
- ○ I do not know
- ○ Prefer not to answer

Timing
First Click
Last Click
Page Submit
Click Count

End of Block: Psychosis

Start of Block: Help seeking

SECTION 5 OF 5

The following questions are about **help and support** you may have received. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

If you were experiencing a mental health or an emotional problem, which of the following sources would you seek help from? Please tick all that apply.

- ☐ Partner/significant other (e.g. boyfriend, girlfriend)
- ☐ Friend (not related to you)
- ☐ Parent / carer
- ☐ Other relative / family member
- ☐ Peer Supporter or Peer Mentor
- ☐ General Practitioner (GP) or Doctor
- ☐ Mental health professional (psychiatrist or psychologist, counsellor or social worker)
- ☐ Personal tutor / academic mentor
- ☐ Other member of academic staff within your university (e.g. lecturer)
- ☐ Member of university support staff (e.g. Student Wellbeing Advisor)
- ☐ Telephone-based support (e.g. Nightline, Samaritans)
- ☐ The internet / other online support
- ☐ Religious leader
- ☐ ⊗ None of the above
- ☐ Other (please specify)

_____

Which of the following have you <u>ever</u> sought help from for mental health or an emotional problem <u>since you started university</u>? Please tick all that apply.

- ☐ Partner/significant other (e.g. boyfriend, girlfriend)
- ☐ Friend (not related to you)
- ☐ Parent / carer
- ☐ Other relative / family member
- ☐ Peer Supporter or Peer Mentor
- ☐ General Practitioner (GP) or Doctor
- ☐ Mental health professional (psychiatrist or psychologist, counsellor or social worker)
- ☐ Personal tutor / academic mentor
- ☐ Other member of academic staff within your university (e.g. lecturer)
- ☐ Member of university support staff (e.g. Student Wellbeing Advisor)
- ☐ Telephone-based support (e.g. Nightline, Samaritans)
- ☐ The internet / other online support
- ☐ Religious leader
- ☐ ⊗ None of the above
- ☐ Other (please specify)

_____

Display This Question:

If Which of the following have you ever sought help from for mental health or an emotional problem s... = Partner/significant other (e.g. boyfriend, girlfriend)

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Friend (not related to you)

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Parent / carer

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Other relative / family member

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Peer Supporter or Peer Mentor

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = General Practitioner (GP) or Doctor

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Mental health professional (psychiatrist or psychologist, counsellor or social worker)

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Personal tutor / academic mentor

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Other member of academic staff within your university (e.g. lecturer)

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Member of university support staff (e.g. Student Wellbeing Advisor)

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Telephone-based support (e.g. Nightline, Samaritans)

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = The internet / other online support

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Religious leader

Or Which of the following have you ever sought help from for mental health or an emotional problem s... = Other (please specify)

Carry Forward Selected Choices from "Which of the following have you ever sought help from for mental health or an emotional problem since you started university? Please tick all that apply."

Alongside each support source you have used during your time at University, please indicate how useful this source was.

	Extremely useful	Very useful	Moderately useful	Slightly useful	Not at all useful
Partner/significant other (e.g. boyfriend, girlfriend)	○	○	○	○	○
Friend (not related to you)	○	○	○	○	○
Parent / carer	○	○	○	○	○
Other relative / family member	○	○	○	○	○
Peer Supporter or Peer Mentor	○	○	○	○	○
General Practitioner (GP) or Doctor	○	○	○	○	○
Mental health professional (psychiatrist or psychologist, counsellor or social worker)	○	○	○	○	○
Personal tutor / academic mentor	○	○	○	○	○
Other member of academic staff within your university (e.g. lecturer)	○	○	○	○	○
Member of university support staff (e.g. Student Wellbeing Advisor)	○	○	○	○	○
Telephone-based support (e.g. Nightline, Samaritans)	○	○	○	○	○
The internet / other online support	○	○	○	○	○
Religious leader	○	○	○	○	○

⊗ None of the above	○	○	○	○	○
Other (please specify)	○	○	○	○	○

If you have had an emotional or mental health problem, and have <u>not</u> used the university's support services, please indicate what the main barriers were. Please tick all that apply.

- ☐ ⊗ I have not had a problem
- ☐ Lack of time
- ☐ Lack of confidentiality
- ☐ Concern that no one will understand my problems
- ☐ I didn't know where to find help
- ☐ Stigma of mental health care
- ☐ Fear of unwanted intervention
- ☐ Fear of documentation on academic record
- ☐ Difficulty with access to care
- ☐ Lack of available services
- ☐ Other (please specify) _____

Timing
First Click
Last Click
Page Submit
Click Count

End of Block: Help seeking

Start of Block: UCLA loneliness 3-item version

SECTION 5 OF 5

The next questions are about **how you feel** about different aspects of your life. For each one, please indicate how often you feel that way. When answering the questions, please remember there are no right or wrong answers, we would like you to be completely honest. In answering the questions it is best to think of your life as it generally is now (we all have some good or bad days). If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

How often do you feel that you lack companionship?

- ○ Hardly ever
- ○ Some of the time
- ○ Often

How often do you feel left out?

- ○ Hardly ever
- ○ Some of the time
- ○ Often

How often do you feel isolated from others?

- ○ Hardly ever
- ○ Some of the time
- ○ Often

Timing
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End of Block: UCLA loneliness 3-item version

Start of Block: ONS life satisfaction

SECTION 5 OF 5

The next questions are about your feelings on aspects of your life. There are no right or wrong answers. For each of these questions please give an answer on a scale of 0 to 10, where 0 is “not at all” and 10 is “completely”. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

	Not at all 0 1 2 3 4 5 6 7 8 9 10 Completely
Overall, how satisfied are you with your life nowadays?	
Overall, to what extent do you feel that the things you do in your life are worthwhile?	

Timing
First Click
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End of Block: ONS life satisfaction

7. Survey time point 2

SENSE survey WAVE 2

Start of Block: Introduction + information sheet

Student mENtal health SurvEy (SENSE): study information

This is the **second phase** of the SENSE survey, which is being sent to everyone who completed the first phase last term. Completing this again will help us, a team of PhD students and researchers at UCL, to understand how the wellbeing and mental health of UCL students may **change over time and throughout the academic year.**

This survey should take approximately **10-15 minutes** to complete. We recommend that you complete the survey in one sitting if possible, but if for any reason you need to stop, you can return to complete it later.

Many of the questions will be very similar to the last wave, though some are new. None of the questions are compulsory, so **you can leave out any questions you do not wish to answer.**

You do not need to have experienced mental health difficulties to take part**.** It is important that we hear from as many students as possible, with a range of experiences.

What will happen to my answers? We will not ask for your name or share any of your responses with the University or anyone outside the study team**.** Your answers will be treated in confidence, and only anonymised findings reported. After the study, we will feed back a summary of our findings to senior UCL staff, the Students' Union and national policymakers to try to improve support services for students.

Please do not hesitate to get in touch with us by email if you have any questions or concerns.

Do I have to participate?

Whilst your responses are very valuable to us, your participation is completely voluntary and you are free to withdraw at any time without giving a reason and without any negative consequences. You can withdraw from being contacted for future time points of the survey by emailing the researchers at any time.

Please click below to download a detailed description of the study. You can view this at any time on the SENSE study website.

Please enter your UCL email address in the form of your single sign-on, e.g. rejutlm@ucl.ac.uk.

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Contact details
Further information:
www.sensestudy.co.uk
General study enquiries:
SENSEstudy@ucl.ac.uk
Researchers to contact:
- Tayla McCloud, PhD student and SENSE study lead, Division of Psychiatry (t.mccloud@ucl.ac.uk)
- Kirsty Nisbet, Research Coordinator, Division of Psychology and Language Sciences (k.nisbet@ucl.ac.uk)
- Principal Researcher (for any complaints): Professor Glyn Lewis, Psychiatrist and Professor of Epidemiological Psychiatry (glyn.lewis@ucl.ac.uk)

Browser Meta Info
Browser
Version
Operating System
Screen Resolution
Flash Version
Java Support
User Agent

Timing
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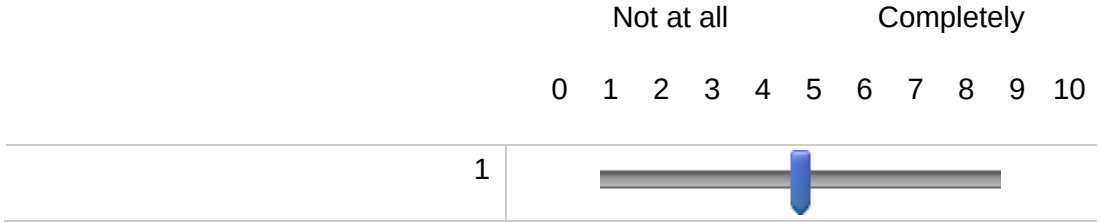
End of Block: Introduction + information sheet

Start of Block: University life

SECTION 1 OF 5

The following questions are about what your **everyday life** is like when you are at university. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Overall, how satisfied are you with your experience of university nowadays?



How many hours in total <u>each week</u> do you normally spend <u>in timetabled activities</u> for your course, such as lectures, tutorials and practicals (during term time)? (If this varies from week to week or according to modules, please give an average).

▼ N/A ... More than 40

How many hours in total <u>each week</u> do you normally spend on work or study related to your course <u>outside timetabled activities</u> (during term time)? (If

this varies from week to week or according to modules, please give an average).

▼ N/A ... More than 40

On average, how many hours <u>per week</u> do you normally work in paid employment during term?
(If this varies from week to week, please give an average).

▼ N/A ... More than 40

On average, how often do you miss lectures, seminars or other university commitments, for any reason?

- ○ Very frequently
- ○ Frequently
- ○ Sometimes
- ○ Rarely
- ○ Never

Timing
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Page Break

SECTION 1 OF 5

On average, how many times per week do you take part in organised non-academic activities such as clubs and societies?

▼ 0 ... 10 or more

On average, how many evenings do you spend socialising with friends per week?

▼ 0 ... 7

Please indicate the extent to which you agree with the following statements.

I feel I have an adequate social support network:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
among other students in the department	○	○	○	○	○
among those I live with	○	○	○	○	○
elsewhere in the university/the student union	○	○	○	○	○
outside university life	○	○	○	○	○
that has met my needs since starting university	○	○	○	○	○
that would meet my needs if I were to have problems	○	○	○	○	○

Timing
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Click Count

Page Break

SECTION 1 OF 5

Have you experienced any of the following since the start of this term? Please tick all that apply.

- ☐ You failed an exam or assignment
- ☐ You suffered a serious illness or injury
- ☐ You suffered an assault
- ☐ You experienced bullying or harassment (including identity-based experiences such as racism or homophobia)
- ☐ A serious illness, injury or assault happened to a close friend or relative
- ☐ Your parent, child or partner died
- ☐ Another close friend or relative died
- ☐ A serious romantic relationship ended
- ☐ You had a serious problem with a close friend or relative
- ☐ You got in trouble with the police or law enforcement
- ☐ Something you valued was lost or stolen
- ☐ ⊗ You have not experienced any significant stressful life events since the start of this term
- ☐ You experienced a significant stressful life event not listed here (please explain below, if you would like to)

_____

Since the start of this term, have you submitted an Extenuating Circumstances form in relation to your mental health?

- ○ Yes
- ○ No

Since the start of this term, have you seriously considered abandoning or interrupting your university course because of any emotional difficulties?

- ○ Yes
- ○ No

Have you repeated a year or interrupted your current course, because of any emotional difficulties?

- ○ Yes
- ○ No

Timing
First Click
Last Click
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Page Break

SECTION 1 OF 5 The following questions are about your **living situation** during term time. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not the browser buttons. Press Next when you are ready to continue.

Has your living situation changed since last term?

- ○ Yes
- ○ No

Display This Question:

If Has your living situation changed since last term? = Yes

Where do you live during university term-time?

- ○ University Hall of Residence
- ○ Private Hall of Residence
- ○ Flat/house rented from a private landlord
- ○ In family home, with parent(s)/carer(s)
- ○ In a house/flat that you own
- ○ Other (please specify)

_____

Display This Question:

If Has your living situation changed since last term? = Yes

How long does it take you to travel to your main university campus?

- ○ 15 minutes or less
- ○ 16-30 minutes
- ○ 31-45 minutes
- ○ 46-60 minutes
- ○ 61-75 minutes
- ○ 76-90 minutes
- ○ More than 90 minutes

Display This Question:

If Has your living situation changed since last term? = Yes

How many other people (not including yourself) do you live with? This refers to your individual dwelling, e.g. your flat or house.

- ○ None, I live alone.
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5 or more.

Do you have any caring responsibilities for a child or adult dependent?

- ○ Yes
- ○ No

How satisfied are you with your living situation?

- ○ Very satisfied
- ○ Quite satisfied
- ○ Neither satisfied nor dissatisfied
- ○ Quite dissatisfied
- ○ Very dissatisfied

In general, how well do you get along with those you live with?

- ○ Extremely well
- ○ Moderately well
- ○ Not very well
- ○ Not well at all
- ○ I live alone

Timing
First Click
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End of Block: University life

Start of Block: Finances

SECTION 2 OF 5 The following questions are about your **financial situation**. For any questions you do not know the answer to, please make a reasonable guess. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

How well would you say you are managing financially these days? Would you say you are...

- ○ Living comfortably
- ○ Doing alright
- ○ Just about getting by
- ○ Finding it quite difficult
- ○ Finding it very difficult

How much stress does your financial situation cause you?

- ○ None at all
- ○ A little
- ○ A moderate amount
- ○ Quite a lot
- ○ A great deal

How stressed do you feel about your level of debt?

- ○ Not at all stressed
- ○ A little stressed
- ○ Quite stressed
- ○ Very stressed

Since the start of this term, have you seriously considered abandoning or interrupting your university course because of any financial difficulties?

- ○ Yes
- ○ No

Timing
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Page Break

SECTION 2 OF 5

Since the start of this term, did any of the following happen to you due to financial difficulties? Please tick all that apply.

- ☐ Could not pay bills on time (e.g. electricity, gas, internet or telephone)
- ☐ Could not pay the rent or mortgage on time
- ☐ Pawned or sold something
- ☐ Went without meals or ate less
- ☐ Was unable to socialise or attend a social event
- ☐ Was unable to take part in hobbies or sports
- ☐ Went without things I need for my course (e.g. books, printing costs)
- ☐ Could not travel to university
- ☐ Could not travel to visit family or friends
- ☐ Asked for financial help from friends or family
- ☐ Asked for financial help from elsewhere (e.g. university, community organisations)
- ☐ ⊗ None of the above happened to me

Has the money you receive on average per term (e.g. from parents, paid employment or grants) changed substantially since last term?

Do not include money you will be expected to repay, or money paid directly to UCL for your tuition fees.

- ○ Yes
- ○ No

Display This Question:

If Has the money you receive on average per term (e.g. from parents, paid employment or grants) chan... = Yes

On average, how much money do you receive per term from each of the following sources?

Do <u>not</u> include money you will be expected to repay, or money paid directly to UCL for your tuition fees.

	None	Less than £100	£100-£249	£250-£499	£500-£999	£1,000-£1,999	£2,000-£2,999	£3,000-£3,999	£4,000 or more
Parent(s)/carer(s), friends and/or other family members. This includes cash gifts, paying for rent, buying essentials, etc, but not loans.	○	○	○	○	○	○	○	○	○
Paid employment.	○	○	○	○	○	○	○	○	○
Maintenance grants, non-repayable bursaries, special support grants, PhD stipends and/or scholarships.	○	○	○	○	○	○	○	○	○
Any other sources. This may include child-related income support or social security benefits, but not loans.	○	○	○	○	○	○	○	○	○

Has the money you receive on average per term in <u>loans you will be expected to repay</u> (e.g. from parents or outstanding overdraft debt) changed

substantially since last term?
Do <u>not</u> include money paid directly to UCL for your tuition fees.

- ○ Yes
- ○ No

Display This Question:

If Has the money you receive on average per term in loans you will be expected to repay (e.g. from p... = Yes

On average, how much money do you receive <u>per term</u> from each of the following sources in <u>loans you will be expected to repay</u>?
Do <u>not</u> include money paid directly to UCL for your tuition fees.

	None	Less than £100	£100-£249	£250-£499	£500-£999	£1,000-£1,999	£2,000-£2,999	£3,000-£3,999	£4,000 or more
Loans from the Student Loans Company or government paid directly to you (including maintenance loans and postgraduate loans).	○	○	○	○	○	○	○	○	○
Loans from parent(s)/carer(s), friends or other family members.	○	○	○	○	○	○	○	○	○
Outstanding overdraft and credit card debt.	○	○	○	○	○	○	○	○	○
Payday or other short-term loans.	○	○	○	○	○	○	○	○	○
Loans from any other sources.	○	○	○	○	○	○	○	○	○

How much <u>total</u> debt (<u>from all sources</u>, including tuition fees and previous degrees) do you anticipate having when you have completed your current university course?

- ○ None
- ○ Up to £4,999
- ○ £5,000-£9,999
- ○ £10,000-£19,999
- ○ £20,000-£29,999
- ○ £30,000-£39,999
- ○ £40,000-£49,999
- ○ £50,000-£59,999
- ○ £60,000-£69,999
- ○ £70,000-£79,999
- ○ £80,000-£89,999
- ○ £90,000 or more

Timing
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End of Block: Finances

Start of Block: GAD-7

<u>SECTION 3 OF 5</u>

The following questions are about how you have been feeling over **the past 2 weeks.** Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you

would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
Feeling nervous, anxious or on edge	○	○	○	○
Not being able to stop or control worrying	○	○	○	○
Worrying too much about different things	○	○	○	○
Trouble relaxing	○	○	○	○
Being so restless that it is hard to sit still	○	○	○	○
Becoming easily annoyed or irritable	○	○	○	○
Feeling afraid as if something awful might happen	○	○	○	○

Display This Question:

If Over the last 2 weeks, how often have you been bothered by any of the following problems? [Not at all] (Count) < 7

How <u>difficult</u> have these problems made it for you to do your work, take care of things at home, or get along with other people?

- ○ Not difficult at all
- ○ Somewhat Difficult
- ○ Very Difficult
- ○ Extremely Difficult

Timing
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End of Block: GAD-7

Start of Block: PHQ-9

<u>SECTION 3 OF 5</u> The following questions are about how you have been feeling over **the past 2 weeks**. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	○	○	○	○
Feeling down, depressed, or hopeless	○	○	○	○
Trouble falling/staying asleep, sleeping too much	○	○	○	○
Feeling tired or having little energy	○	○	○	○
Poor appetite or overeating	○	○	○	○
Feeling bad about yourself – or that you are a failure or have let yourself or your family down.	○	○	○	○
Trouble concentrating on things, such as reading the newspaper or watching television.	○	○	○	○
Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual.	○	○	○	○

Thoughts that you would be better off dead or of hurting yourself in some way.	○	○	○	○

Display This Question:

If Over the last 2 weeks, how often have you been bothered by any of the following problems? [Not at all] (Count) < 9

How <u>difficult</u> have these problems made it for you to do your work, take care of things at home, or get along with other people?

- ○ Not difficult at all
- ○ Somewhat Difficult
- ○ Very Difficult
- ○ Extremely Difficult

Timing
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Last Click
Page Submit
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End of Block: PHQ-9

Start of Block: Self harm

<u>SECTION 3 OF 5</u> The following questions are about some experiences you may have had. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Since the start of this term, have you hurt yourself on purpose in any way (e.g by taking an overdose of pills or by cutting yourself)?

- ○ Yes
- ○ No

Display This Question:

If Since the start of this term, have you hurt yourself on purpose in any way (e.g by taking an over... = Yes

Since the start of this term, have you needed to seek medical help or treatment as a result of hurting yourself on purpose (e.g by taking an overdose of pills or by cutting yourself)?

- ○ Yes
- ○ No

In the past 2 weeks have you thought of taking your life, even if you would not really do it?

- ○ Yes
- ○ No

Since the start of this term, have you made a suicide attempt?

- ○ Yes
- ○ No

This is a reminder that if you need support with your mental health, there are services which can help.

Some options are listed: In the Participant Information Sheet (downloaded at the start of the survey) On our website (www.sensestudy.co.uk) At the

end of the survey
Please click Next to continue the survey. We really appreciate your participation.

Timing
First Click
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End of Block: Self harm

Start of Block: Mental health diagnoses

SECTION 3 OF 5

The following questions are about physical and mental health problems you may have experienced. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. You may skip any questions you do not wish to answer. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Do you consider yourself to have any of the following? Please tick all that apply.

- ☐ A physical disability - this includes any physical condition that has an effect on your day-to-day activities
- ☐ A non-physical disability - this includes any learning difficulty, mental health condition or condition such as autism that has an effect on your day-to-day activities
- ☐ ⊗ None of the above
- ☐ ⊗ Prefer not to say

Please indicate which of these mental health difficulties you have experienced since the start of this term. Please tick all that apply.

- ☐ Anxiety disorder (e.g. generalised anxiety disorder, social anxiety, panic attacks)
- ☐ Depression
- ☐ Obsessive Compulsive Disorder (OCD)
- ☐ Attention Deficit Hyperactivity Disorder (ADHD)
- ☐ Autism or autism spectrum disorder
- ☐ Eating disorder (e.g. anorexia, bulimia)
- ☐ Post-traumatic Stress Disorder (PTSD)
- ☐ Bipolar disorder, schizophrenia or psychosis
- ☐ Personality Disorder (e.g. Borderline Personality Disorder)
- ☐ Other (please indicate)

_____

- ☐ ⊗ I have not experienced any mental health problems this term.

Have you received any of the following treatments for a mental health difficulty since the start of this term? Please tick all that apply.

- [ ] Medication (e.g. antidepressants)
- [ ] Therapy, counselling or coaching
- [ ] Other (please indicate)

_____

- [ ] ⊗ No, I have not received any treatment for a mental health problem this term

---

How would you rate your overall physical health?

- ○ Excellent
- ○ Very good
- ○ Good
- ○ Fair
- ○ Poor

How would you rate your overall mental health?

- ○ Excellent
- ○ Very good
- ○ Good
- ○ Fair
- ○ Poor

Thinking about the last month, how many nights a week did you have a problem with your sleep?

- ○ 0-1
- ○ 2
- ○ 3
- ○ 4
- ○ 5-7

Thinking about the past month, to what extent has poor sleep troubled you in general?

- ○ Not at all
- ○ A little
- ○ Somewhat
- ○ Much
- ○ Very much

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End of Block: Mental health diagnoses

Start of Block: CCAPS-34

SECTION 4 OF 5

The following statements describe thoughts, feelings and experiences that people may have. Please indicate how well each statement describes you, during the past two weeks, from "not at all like me" (0) to "extremely like me" (4), by marking the correct number.

Please read each statement carefully and select only one answer per statement. Please try to answer as honestly and accurately as you can. If you would like to go

back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

	Not at all like me 0	1	2	3	Extremely like me 4
I am shy around others	○	○	○	○	○
My heart races for no good reason	○	○	○	○	○
I feel out of control when I eat	○	○	○	○	○
I don't enjoy being around people as much as I used to	○	○	○	○	○
I feel isolated and alone	○	○	○	○	○
I think about food more than I would like to	○	○	○	○	○
I am anxious that I might have a panic attack while in public	○	○	○	○	○
I feel confident that I can succeed academically	○	○	○	○	○
I have sleep difficulties	○	○	○	○	○
My thoughts are racing	○	○	○	○	○
I feel worthless	○	○	○	○	○
I feel helpless	○	○	○	○	○
I eat too much	○	○	○	○	○

I drink alcohol frequently	○	○	○	○	○
I have spells of terror or panic	○	○	○	○	○
When I drink alcohol I can't remember what happened	○	○	○	○	○
I feel tense	○	○	○	○	○

Please continue indicating how well each statement describes you, during the past two weeks.

	Not at all like me 0	1	2	3	Extremely like me 4
I have difficulty controlling my temper	○	○	○	○	○
I make friends easily	○	○	○	○	○
I sometimes feel like breaking or smashing things	○	○	○	○	○
I feel sad all the time	○	○	○	○	○
I am concerned that other people do not like me	○	○	○	○	○
I get angry easily	○	○	○	○	○
I feel uncomfortable around people I don't know	○	○	○	○	○
I have thoughts of ending my life	○	○	○	○	○
I feel self conscious around others	○	○	○	○	○
I drink more than I should	○	○	○	○	○
I am not able to concentrate as well as usual	○	○	○	○	○
I am afraid I may lose control and act violently	○	○	○	○	○

It's hard to stay motivated for my classes	○	○	○	○	○
I have done something I have regretted because of drinking	○	○	○	○	○
I frequently get into arguments	○	○	○	○	○
I am unable to keep up with my schoolwork	○	○	○	○	○
I have thoughts of hurting others	○	○	○	○	○

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End of Block: CCAPS-34

Start of Block: Psychosis

SECTION 4 OF 5

The next set of questions is about unusual experiences that you may have had, like seeing visions or hearing voices. We don't expect these questions to apply to everyone, but would like to get an idea of how common they are. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Since the start of this term, did you ever see something that wasn't really there that other people could not see? Please do not include any times when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Since the start of this term, did you ever see something that wasn't really there that other peop... = Yes

About how many times since the start of this term did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____
_

Since the start of this term, did you ever hear things that other people said did not exist, like strange voices coming from inside your head talking to you or about you, or voices coming out of the air when there was no one around? Please do not include any times when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Since the start of this term, did you ever hear things that other people said did not exist, like... = Yes

About how many times <u>since the start of this term</u> did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____

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<u>Since the start of this term</u>, did you ever believe that a strange force was trying to communicate directly with you by sending special signs or signals that you could understand but that no one else could understand (for example through the radio or television)? Please do not include any times when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Since the start of this term, did you ever believe that a strange force was trying to communicate... = Yes

About how many times <u>since the start of this term</u> did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____

_

<u>Since the start of this term</u>, did you ever believe that that there was an unjust plot going on to harm you or to have people follow you, and which your family and friends did not believe existed? Please do not include any times

when you were dreaming or half-asleep or under the influence of alcohol or drugs.

- ○ Yes
- ○ No
- ○ Do not know
- ○ Prefer not to answer

Display This Question:

If Since the start of this term, did you ever believe that that there was an unjust plot going on to... = Yes

About how many times <u>since the start of this term</u> did this happen (when you were not dreaming, not half-asleep, and not under the influence of alcohol or drugs)?

_____

_

Display This Question:

If Since the start of this term, did you ever see something that wasn't really there that other peop... = Yes

Or Since the start of this term, did you ever hear things that other people said did not exist, like... = Yes

Or Since the start of this term, did you ever believe that a strange force was trying to communicate... = Yes

Or Since the start of this term, did you ever believe that that there was an unjust plot going on to... = Yes

How often did any of these experiences happen in the past 1 year (seeing a vision, hearing a voice, or believing that something strange was trying to communicate with you, or there was a plot against you)?

- ○ Not at all
- ○ Once or twice
- ○ Less than once a month
- ○ More than once a month
- ○ Nearly every day or daily
- ○ Prefer not to answer

Display This Question:

If Since the start of this term, did you ever see something that wasn't really there that other peop... = Yes

Or Since the start of this term, did you ever hear things that other people said did not exist, like... = Yes

Or Since the start of this term, did you ever believe that a strange force was trying to communicate... = Yes

Or Since the start of this term, did you ever believe that a strange force was trying to communicate... = Yes

How distressing did you find having any of these experiences (seeing a vision, hearing a voice, or believing that something strange was trying to communicate with you, or there was a plot against you)?

- ○ Not distressing at all, it was a positive experience
- ○ Not distressing, a neutral experience
- ○ A bit distressing
- ○ Quite distressing
- ○ Very distressing
- ○ I do not know
- ○ Prefer not to answer

Timing
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End of Block: Psychosis

Start of Block: Help seeking

SECTION 5 OF 5

The following questions are about **help and support** you may have received. Please read each question carefully and choose the most appropriate response. Please try to answer as honestly and accurately as you can. If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

If you were experiencing a mental health or an emotional problem, which of the following sources would you seek help from? Please tick all that apply.

- ☐ Partner/significant other (e.g. boyfriend, girlfriend)
- ☐ Friend (not related to you)
- ☐ Parent / carer
- ☐ Other relative / family member
- ☐ Peer Supporter or Peer Mentor
- ☐ General Practitioner (GP) or Doctor
- ☐ Mental health professional (psychiatrist or psychologist, counsellor or social worker)
- ☐ Personal tutor / academic mentor
- ☐ Other member of academic staff within your university (e.g. lecturer)
- ☐ Member of university support staff (e.g. Student Wellbeing Advisor)
- ☐ Telephone-based support (e.g. Nightline, Samaritans)
- ☐ The internet / other online support
- ☐ Religious leader
- ☐ ⊗ None of the above
- ☐ Other (please specify)

_____

Which of the following have you sought help from for mental health or an emotional problem since the start of this term? Please tick all that apply.

- ☐ Partner/significant other (e.g. boyfriend, girlfriend)
- ☐ Friend (not related to you)
- ☐ Parent / carer
- ☐ Other relative / family member
- ☐ Peer Supporter or Peer Mentor
- ☐ General Practitioner (GP) or Doctor
- ☐ Mental health professional (psychiatrist or psychologist, counsellor or social worker)
- ☐ Personal tutor / academic mentor
- ☐ Other member of academic staff within your university (e.g. lecturer)
- ☐ Member of university support staff (e.g. Student Wellbeing Advisor)
- ☐ Telephone-based support (e.g. Nightline, Samaritans)
- ☐ The internet / other online support
- ☐ Religious leader
- ☐ ⊗ None of the above
- ☐ Other (please specify)

_____

Display This Question:

If Which of the following have you sought help from for mental health or an emotional problem since... = Partner/significant other (e.g. boyfriend, girlfriend)

Or Which of the following have you sought help from for mental health or an emotional problem since... = Friend (not related to you)

Or Which of the following have you sought help from for mental health or an emotional problem since... = Parent / carer

Or Which of the following have you sought help from for mental health or an emotional problem since... = Other relative / family member

Or Which of the following have you sought help from for mental health or an emotional problem since... = Peer Supporter or Peer Mentor

Or Which of the following have you sought help from for mental health or an emotional problem since... = General Practitioner (GP) or Doctor

Or Which of the following have you sought help from for mental health or an emotional problem since... = Mental health professional (psychiatrist or psychologist, counsellor or social worker)

Or Which of the following have you sought help from for mental health or an emotional problem since... = Personal tutor / academic mentor

Or Which of the following have you sought help from for mental health or an emotional problem since... = Other member of academic staff within your university (e.g. lecturer)

Or Which of the following have you sought help from for mental health or an emotional problem since... = Member of university support staff (e.g. Student Wellbeing Advisor)

Or Which of the following have you sought help from for mental health or an emotional problem since... = Telephone-based support (e.g. Nightline, Samaritans)

Or Which of the following have you sought help from for mental health or an emotional problem since... = The internet / other online support

Or Which of the following have you sought help from for mental health or an emotional problem since... = Religious leader

Or Which of the following have you sought help from for mental health or an emotional problem since... = Other (please specify)

Carry Forward Selected Choices from 'Which of the following have you sought help from for mental health or an emotional problem since the start of this term? Please tick all that apply.'

Alongside each support source you have used this term, please indicate how useful this source was.

	Extremely useful	Very useful	Moderately useful	Slightly useful	Not at all useful
Partner/significant other (e.g. boyfriend, girlfriend)	○	○	○	○	○
Friend (not related to you)	○	○	○	○	○
Parent / carer	○	○	○	○	○
Other relative / family member	○	○	○	○	○
Peer Supporter or Peer Mentor	○	○	○	○	○
General Practitioner (GP) or Doctor	○	○	○	○	○
Mental health professional (psychiatrist or psychologist, counsellor or social worker)	○	○	○	○	○
Personal tutor / academic mentor	○	○	○	○	○
Other member of academic staff within your university (e.g. lecturer)	○	○	○	○	○
Member of university support staff (e.g. Student Wellbeing Advisor)	○	○	○	○	○
Telephone-based support (e.g. Nightline, Samaritans)	○	○	○	○	○
The internet / other online support	○	○	○	○	○
Religious leader	○	○	○	○	○

⊗ None of the above	○	○	○	○	○
Other (please specify)	○	○	○	○	○

If you have had an emotional or mental health problem, and did <u>not</u> use the university's support services this term, please indicate what the main barriers were. Please tick all that apply.

- ☐ ⊗ I have not had a problem
- ☐ Lack of time
- ☐ Lack of confidentiality
- ☐ Concern that no one will understand my problems
- ☐ I didn't know where to find help
- ☐ Stigma of mental health care
- ☐ Fear of unwanted intervention
- ☐ Fear of documentation on academic record
- ☐ Difficulty with access to care
- ☐ Lack of available services
- ☐ Other (please specify) _____

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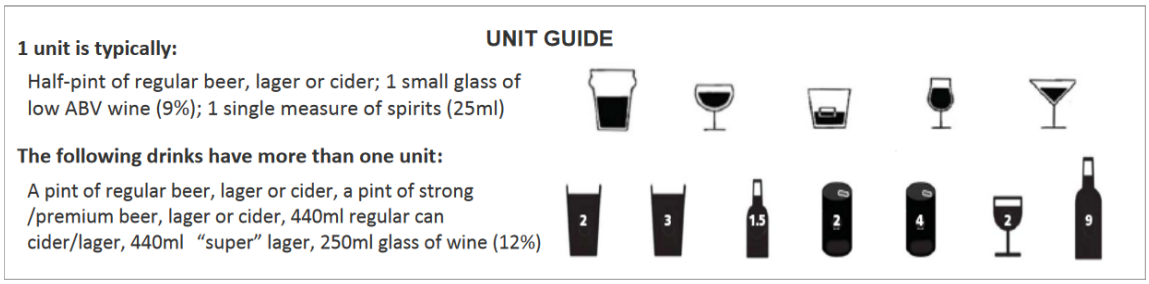
End of Block: Help seeking

Start of Block: AUDIT-C, MINI-SPIN & SCOFF

SECTION 5 OF 5

The next few questions are about your use of **alcoholic drinks** during this past year.

If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.



How often do you have a drink containing alcohol?

- ○ Never
- ○ Monthly or less
- ○ 2-4 times a month
- ○ 2-3 times a week
- ○ 4 or more times a week

Display This Question:

If How often do you have a drink containing alcohol? != Never

How many units of alcohol do you have on a typical day? Please calculate the number of units using the guide above.

- ○ 1 or 2
- ○ 3 or 4
- ○ 5 or 6
- ○ 7 to 9
- ○ 10 or more

Display This Question:

If How often do you have a drink containing alcohol? != Never

How often have you had 6 or more units if female, or 8 of more if male, on a single occasion in the last year?

- ○ Never
- ○ Less than monthly
- ○ Monthly
- ○ Weekly
- ○ Daily or almost daily

The next few questions are about **food and eating**.

Do you make yourself sick because you feel uncomfortably full?

- ○ Yes
- ○ No

Do you worry you have lost control over how much you eat?

- ○ Yes
- ○ No

Have you recently lost more than one stone (6.35kg) in a 3 month period?

- ○ Yes
- ○ No

Do you believe yourself to be fat when others say you are too thin?

- ○ Yes
- ○ No

Would you say that food dominates your life?

- ○ Yes
- ○ No

Timing
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End of Block: AUDIT-C, MINI-SPIN & SCOFF

Start of Block: UCLA loneliness 3-item version & ONS life satisfaction

SECTION 5 OF 5

The next questions are about **how you feel** about different aspects of your life. For

each one, please indicate how often you feel that way. When answering the questions, please remember there are no right or wrong answers, we would like you to be completely honest. In answering the questions it is best to think of your life as it generally is now (we all have some good or bad days). If you would like to go back, please use the buttons at the bottom of the screen, and not your browser buttons. Press Next when you are ready to continue.

Please read each statement and click in the column that indicates how much the statement applied to you <u>over the past week.</u>

	Not at all	A little bit	Somewhat	Very much	Extremely
Fear of embarrassment causes me to avoid doing things or speaking to people	○	○	○	○	○
I avoid activities in which I am the centre of attention.	○	○	○	○	○
Being embarrassed or looking stupid are among my worst fears	○	○	○	○	○

How often do you feel that you lack companionship?

- ○ Hardly ever
- ○ Some of the time
- ○ Often

How often do you feel left out?

- ○ Hardly ever
- ○ Some of the time
- ○ Often

How often do you feel isolated from others?

- ○ Hardly ever
- ○ Some of the time
- ○ Often

For each of these questions please give an answer on a scale of 0 to 10, where 0 is “not at all” and 10 is “completely”. There are no right or wrong answers.

	Not at all 0 1 2 3 4 5 6 7 8 9 10 Completely
Overall, how satisfied are you with your life nowadays?	
Overall, to what extent do you feel that the things you do in your life are worthwhile?	

Timing
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End of Block: UCLA loneliness 3-item version & ONS life satisfaction