How is Genetic Psychiatric Research Presented in the UK Media?

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ABSTRACT

Introduction: The history of psychiatric research has shown the dominance of the biological model which has advocated the use of genetic research to explain mental health conditions. The dominance of the biomedical model is reflected in frequency of how such research is reported in the media, such as the newspapers. Researchers have shown the use of media frames that develop hype and hope about the utility of genetic psychiatric research however it is not clear how these frames develop.

Aims: To examine what types of mental health research are reported in British newspapers? To explore what themes are used in British newspapers when reporting on mental health genetic research and how are these themes are transformed between researchers and journalists?

Method: A mixed-methods design was employed. Quantitative content analysis was used to explore the types of psychiatric research reported in a range of UK newspapers over the last five years. A discursive thematic analysis (DTA) was completed on a sample of articles and research papers concerned with psychiatric genetics. A case study of a research paper, its corresponding press release, and newspaper article is presented to examine the transformation of themes across the documents.

Results: The content analysis of UK newspapers highlighted that a majority of articles reported on research looking at environmental factors (29.4%). Genetic research was present in 5.2% of newspaper articles. The DTA found three main themes present in the reporting of research: genetic confidence, genetic optimism, and genetic caution. The case study found elements of transformation in the themes of genetic confidence and optimism.

Conclusion: These findings demonstrate that three themes are found in the reporting of genetic research into mental health conditions within the UK news. These themes present a taken-for-granted confidence regarding the heritability of mental health conditions and demonstrate optimism about the utility of this research.

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1. INTRODUCTION

1.1. Overview

This thesis will examine how research that examines the genetic aetiology of mental health conditions is represented within the UK newspapers. It will also examine if the presentation within newspapers is comparable to that within peer reviewed research papers with the hope to identify any transformation of genetic narratives that may occur during the process of reporting on mental health research.

In order to explore this topic, this thesis contains a mixed-methods two-armed process. It first attempts to understand the frequency of research topics covering mental health in UK newspapers, including a focus on research exploring the aetiologies of mental health, through the use of a content analysis. This analysis will then provide both an overview of the current landscape of mental health research reporting and also provide the sample for the second arm of the study which will employ a discursive thematic analysis to explore how research that focuses on the genetic aetiology of mental health is reported in UK newspapers.

In this chapter, I hope to set the study into media coverage of mental health research in context by offering an understanding of the way in which bio-genetic research has developed over time. Throughout history, there have been several different models for understanding mental health conditions and within this, different ways to conceptualise the role of biology on psychiatry. Many writers have noted that there is a current dominance of bio-medical and genetic models of mental health (Jones and Wilsdon, 2018). Previous research has also demonstrated that the media has major influences on how the public understands the role of genetics and how these are conceptualised with regards to mental health. Research into other fields has suggested that media coverage of genetics research has several narratives and discursive features that may be problematic and may result in inaccurate understandings of the role genes play. Research so far has been completed on examining the role of these narratives

and frames within the US and Australia and so this research is hoping to examine if there is a comparable state-of-affairs in the UK.

The chapter will therefore start with a brief history of the influential models within psychiatry and will review the current state of mental health research. It will then move on to examine the relationship between science and the media, focusing on mental health research.

1.2. History of Psychiatric Models

Over the history of psychiatry, there have been three competing models of aetiology that psychiatry has used to explain the development of mental health conditions. These can be named as sociogenic, psychogenic and somatogenic. Historically, these models have had dominance at different times however, writers have highlighted the cultural dominance of the somatogenic model within recent psychiatric research and practice (Kingdon & Young, 2007). For context, I will discuss all three models below but dedicate the most time and detail to that of the somatogenic model as this is the focus of this thesis.

1.3. Sociogenic Model

The sociogenic model of psychiatry posits that particular social conditions such as poverty, world events such as war and difficult relationships with others cause stress within humans which are major contributors to the development of mental health conditions. An early sociogenic argument of mental health can be found in Marx (1858) who argued that the increase in patients presenting at asylums was a direct effect of capitalism. This model would also include behaviourism (Clark, 2004; Watson, 1913), the traumagenic model (Read et al., 2014) and the anti-psychiatry movement (Goffman, 1961; Szasz, 1960) among others.

1.4. Psychogenic Model

A second model that rose and fell in dominance over the history of psychiatry is the psychogenic model that posits that mental health conditions arise out of the mind and so are often concerned with individual factors such as personality and its impact on distress. Two important movements within this model concerns psychoanalysis (Freud, 1953) and Cognitive Behavioural Theory (Beck, 2019).

1.5. Somatogenic Model

The final model that has held dominance in psychiatry is the somatogenic model which posits that mental health conditions are the results of biology and functions within the body. This model can be traced back to early Greek and Roman theories such as Galenic humours (Ghaemi, 2013). In this section, I will cover some wider movements within this model before focusing in on the history of the genetics theory of mental health specifically to give an overview of how ideas about genes and heritability of mental health developed and to give context to the current research.

1.5.1. The Brain

Evidence for organic causes of mental health conditions began to be explored within early ideas of anatomy. Proof of a causal relationship between syphilis and mental health impacts in 1897 was seen as a cause for celebration and a signifier that psychiatrists were on the correct track to discovering organic aetiologies. Harrington (2019) notes that the belief at the time was that the development of brain anatomy based on the developments around syphilis would hold the key to identifying the neurological causes of mental health conditions but that this was a dead end due to the use of autopsy. Neurologists at this time noted that despite the hope that the brain would hold answers, little evidence of mental health conditions and their impact of brain tissue could be gleaned.

Despite the lack of clear anatomical evidence regarding the role of the brain in mental health conditions, Moniz pioneered the surgical intervention known colloquially as the lobotomy (Tierney, 2000). This involved the destruction of brain tissue in an attempt to “cure” individuals with mental health conditions. This technique became so popular that later iterations developed by Freeman (Freeman et al., 1942) were used across America as Freeman travelled promoting his technique in roadshows (Caruso & Sheehan, 2017).

1.5.1.1. Role of Neurotransmitters

Later neurologists moved their attention from anatomy to the impact of chemistry on the brain, developing hypotheses that it was an overabundance or underabundance of neurological chemicals in the brain that lead to the development of mental health conditions. An example of such a hypothesis is that of the impact of serotonin on the development of depression. This hypothesis was developed in the 1960s and has persisted into today’s beliefs about the aetiology of depression. This theory developed from the observations of the depressive effects of pharmaceutical which had an impact of serotonin on the brain (Copen, 1967). Vigeland et al. (2002) note that this way of theory making which identifies other actions of pharmaceuticals to biochemical causality has been common in psychiatric biology. Despite this, the serotonin hypothesis has never been clearly substantiated however, its ideas persist heavily in the marketing of antidepressants and in the understanding of the aetiology of depression in the general public (Cowen, 2008).

1.5.1.2. Development of Psychopharmaceuticals

Research into the impact of pharmaceuticals in animal studies lead to a bolstering of the biological model of mental health and ignited a hunt for the chemicals involved in the development of mental health conditions and the medications that could “fix them”. The first medication, chlorpromazine, approved for the treatment of mental health conditions was in 1954 and was sold vigorously by the pharmaceutical industry as a panacea for all the possible difficulties encountered in patients within mental health hospitals. The developers of chlorpromazine saw their profits increase eightfold (Harrington,

2019). Numerous further psychopharmaceutic were developed and released across the next thirty years and marketing for these medications highlighted the longstanding model of chemical imbalance in the brain.

Another important development within the history of psychopharmaceuticals was the introduction of Monoamine Oxidase Inhibitors (MAOIs) as an antidepressant in the 1950s (Culpepper, 2013). This followed the observation of serotonin syndrome (in which patients were less fatigued, increased appetite and their mood appear improved) in individuals being treated by an MAOI iproniazid for tuberculosis (Mitchell, 1955). Iproniazid was then given experimentally to individuals with depression and it was believed that this medication demonstrated improvements in the patients through the increase of serotonin (Sandler, 1990). The drug was then marketed as a 'psychic energiser', the first of its kind and the first to use this term (Loomer et al., 1957) and later as an antidepressant. Whilst popular at first, MAOIs have fallen out of regular use in psychiatry due to the need for patients to have dietary restrictions when taking them and the interactions they had with a number of other drugs (Fiedorowicz & Swartz, 2004).

Despite the economic success of psychopharmaceuticals, there has been little to no conclusive evidence of the role of neurochemicals in the development of mental health conditions and recent clinical trials have shown that many antidepressants do not outperform placebos (Moncrieff & Kirsch, 2005). This research adds very little credence to the neurochemical/neurobiological model held in psychiatry.

1.5.1.3. Brain Imaging

Finally, massive developments in modern imaging techniques have allowed a window into the functions of the brain. Despite the hope offered by the techniques success in identifying brain disease in individuals before autopsy (e.g., tumours), there has been much less consistent evidence of the use of these mechanisms to support the diagnosis and prognosis of mental health conditions such as depression and psychosis. Falkai et al's (2018) review paper of the results of number of brain imaging studies demonstrates a lack of

conclusive evidence in the neuropathology of bipolar disorder, schizophrenia and depression.

We will now turn our attention to the specific history and development of genetic research within the somatic model of psychiatry.

1.5.2. Genetics and Epigenetics

1.5.2.1. Genetic Research

The field of genetics is likely derived from the work of Mendel (1866) which examined the heritability of traits within plants and further influenced by the work of Bateson in 1905 (Bateson, 2002) and Johanssen (1909) who utilised the word gene as a descriptor of a unit of Mendelian inheritance. Development in terminology also coined the term Mendelian disorders to describe genetic conditions which can be characterised by mutations in a single gene which have been identified through research. Here we will examine two forms of genetic research, behavioural genetics, and molecular genetics.

1.5.2.1.1. Behavioural Genetics

The study of behavioural genetics concerns the correlations between mental health conditions and patterns of genetic relatedness. The beginnings of this form of study focus on early ideas about heritability which developed prior to a complete understanding of the way in which genes function within the human body. Kendler (2021) reviewed literature ranging from 1780 to 1910 which referenced the inheritance ideas of “insanity”. This demonstrated several interesting conclusions across the range of authors. There was a consensus in this literature that heredity was the strongest risk factor for mental ill health. Despite this, the idea of inheritance was mostly focused on a risk of inheriting the predisposition for insanity rather than the particular condition being inherited in families. Gaps in the literature which confirmed these ideas and evidence that demonstrated a lack of pattern in heritability was explained away by these authors as describing insanity as “skipping generations” or only affecting a proportion of siblings. Similarly, literature was focused on heterogenous

transmission in which the children of insane parents would often display a wide variety of psychiatric conditions and noted that homogenous transmission was the exception.

Due to the lack of scientific technology, much of early theories of heritability can be seen to be based purely on ideologies such as that of social Darwinism and eugenics.

1.5.2.1.1.1. Social Darwinism

The impact of Darwin's theory of natural selection had a significant impact on politics and public policy. Many used Darwin's theory of "survival of the fittest" (Darwin, 1859) to develop ideas of degenerationist theory and to justify the oppression of the weak by the strong. Over the period of 1860-1945, a school of thought known as Social Darwinism began to take on movement. Hawkins and Hawkins (1997) studied this period of thought extensively and developed four main assumptions of the Social Darwinists:

1. Biological laws govern the whole of nature, including humans
2. There is pressure from population growth on resources (food, shelter) that creates a struggle of existence
3. Particular physical or psychological traits give advantages in the above-described struggle to individuals within society and these advantages can, through inheritance be spread in the population
4. The cumulative effects of natural selection in the population over time will account for both the emergence of a "new species" and the elimination and extinction of others

These degenerationist beliefs suggest that certain members of society that are "unfit" and that this degeneracy is cumulative over generations (Morel, 1860). Lombroso (Lombroso, 2006) described those with mental health conditions and criminals as being genetically inferior. These ideas gained ground across Europe and the USA and by the late 19th century had significantly influenced the theory of eugenics.

1.5.2.1.1.2. Eugenics

The theory of eugenics emerged in the late Victorian age which built on the ideas posited by Social Darwinism and dengenerationists (Bannister, 2010) along with the work of Malthus (Chase, 1980) and Galton (1883) which sought to eradicate supposed "genetic defects" in the population through selective breeding and sterilisation programmes. Galton described the work of eugenics as:

> *The science of improving stock, which is by no means confined to questions of judicious mating, but which, especially in the case of man, takes cognisance of all influences that tend in however remote a degree to give to the more suitable races or strains of blood a better chance of prevailing speedily over the less suitable than they otherwise would have had. The word "eugenics" would sufficiently express the idea. (1883, p. 3)*

Eugenics projects also aimed to reduce the rates of mental health conditions and "morally deviant behaviours" through the forceful sterilisation of psychiatric patients (Mottier, 2008). These eugenicist beliefs were not uncommon among the psychiatric profession who would often direct potential candidates in their care for sterilisation (Luty, 2014).

Within the 1800s, the predestinationist claims which split populations along racial, gender and class lines clearly drew on the biological narratives established within psychiatry and other sciences to justify oppression and discrimination. By 1907, the US had developed and started to act upon the ideas of eugenics and over the 20th century, roughly 60,000 forced sterilisations occurred (Stern et al., 2017). The theories of eugenics permeated the Nazi regime of Germany and evidence shows how these beliefs led psychiatrists to support or even become involved in the killing or sterilising of individuals who were identified as disabled or mentally ill to ensure the "genetic purity of the German population" (Cocks, 2018).

Whilst very few individuals claim to hold eugenics beliefs today, many writers have reported concerns that modern genetics research can provide information and rationale as well the development of new technologies such as prenatal screening for current eugenics practice (Dyck, 1997; Wertz, 1998). These will

be important ethical questions to hold in mind as we continue to examine the history of genetic research and later when we begin to examine how messages about genetics are developed within the UK media.

1.5.2.1.2. Twin Studies

The method of studying genetics through the observation of monozygotic twins was pioneered in the field of dermatology by Herman Werner Siemens (Bataille et al., 2012). Twin studies found purchase in psychiatry as a low-technological way to explore the role of genes in the development of mental health conditions. This is done by comparing the rates of psychological conditions in reared together monozygotic twins versus those in reared together dizygotic twins. Following Gusella et al.'s (1983) work to identify the Huntington's gene, this methodology was then incorporated into studies to find the genetics behind mental health conditions such as schizophrenia and bipolar affective disorder (Detera-Wadleigh et al., 1987). These studies found that the genetic differences between those with schizophrenia or bipolar and those without these conditions was of "borderline significance".

These studies have not produced fully convincing evidence of the importance of genetics in the developmental of mental health conditions. Gottesman (1991) produced a review in which they pooled the concordance rates of twin studies. They demonstrated that for the case of schizophrenia, environmental influences accounted for more than half of the variance in both mono and dizygotic twins.

There has also been a wealth of criticism surrounding the methodology of these studies with rely on the equal environment assumption. The equal environment assumption suggests that the environmental influences operate equally for both monozygotic and dizygotic twins.

Joseph (2002) provides a review of such studies and concludes that this assumption cannot be met in most twin studies therefore. This is a similar case for studies of reared-apart twins. Joseph's reports that if this assumption cannot be met then twin studies cannot provide any conclusive evidence in favour of the genetic influence of psychiatric disorders.

1.5.2.1.3. Molecular Genetics

Molecular genetics research involves working with sequences of DNA that can be computerised. This scientific field of study developed out of the advances in the discovery of DNA structure which has been attributed to Watson and Crick in the 1950s, however this is contested and controversial (Pray, 2008). The Human Genome Project launched in 1990 also triggered significant developments in the technology used to advance the understanding of human DNA.

Molecular genetic research relies on several methodologies which will be described briefly here. The first is linkage studies which attempt to identify genetic markers that can be linked with specific diseases using statistical analysis to establish whether such associations might have occurred by chance (Vigeland, 2021). A second methodology used within molecular genetics is the genome scan which analyses the whole genome of the individual and compares this against known markers for diseases (Brown, 1994). This methodology has been the dominant form of psychiatric genetic research and will compare the genomes of unrelated individuals who have all been given the same mental health diagnosis (e.g., depression) and against a control group without this diagnosis. Using computerised scanning methods, genomes are examined for single nucleotide polymorphism (SNPs) which are previously identified markers of genetic variation. If those with a diagnosis of a mental health condition have more frequent SNPs in their genomes, then the research will conclude that these variations are associated with the condition (Avramopoulos, 2010).

Several methodological critiques of molecular genetics can be made. Studies have demonstrated that false positives are common within this type of research and so replication is essential before any conclusions from studies can be accepted (Alper & Beckwith, 2002; Pearson & Manolio, 2008). Disconfirmation of genetic findings are also important to our overall understanding of the role of genetic within mental health however Propping (2005) have shown that this studies are much harder to get published in academic spaces. Joseph (2006) has demonstrated that these studies often over state significance due to not appropriately adjusting the level needed for significance in their analysis due to multiple hypothesis testing.

1.5.2.2. Review of genetic research

With this brief overview of the development of genetic research, we turn to a brief review of the findings of these advances in psychiatric genetics.

Smoller (2014) notes some explicit goals within psychiatric genetic research which posits that increasing knowledge about the genetic origins of mental health conditions will improve the standard of personalised medicine in three ways:

1. By understanding genetic risk, we can identify new treatment targets as well as identify drugs that may target genes which have a therapeutic effect
2. Genetic research will help to clarify blurry diagnostic boundaries and again use this information to inform treatment selection as well as identify aetiologically-related groups that may preferentially benefit from particular treatments
3. Finally, genetic research may yet help inform use about potential response to psychopharmacological treatment. (Smoller, 2014).

However, despite these stated goals, several researchers have reviewed the history of genetic findings and have drawn the conclusion that the search has often been inconclusive at best:

> *"We have hunted for big, simple neuropathological explanations for psychiatric disorders and have not found them. We have hunted for big, simple neurochemical explanations for psychiatric disorders and have not found them. We have hunted for big, simple genetic explanations for psychiatric disorders and have not found them"* (Kendler, 2005)

Joseph (2006) also observes that the excitement in genetic methodological developments in the 1980s soon deteriorated after no definitive breakthroughs over the next twenty years.

Nikolas Rose points to an example of this lack of solid evidence in his book Our Psychiatric Future. In 2001 Leutwyler published research with the title 'First Gene for Schizophrenia Discovered'. This article noted the significance of this discovery for the development of treatments for this "devastating and cost-intensive disorder" (Leutwyler, 2001). Despite this optimism, Rose points out

that a rapid influx of evidence demonstrated that no such link could be replicated. Rose concludes his examination of the impact of psychiatric genetic research on schizophrenia by stating:

> *"So what, in fact, have we discovered? Simply, that there are many hundreds of small variations in basic neural processes, each of which, in various combinations, may lead to a slight increase or decrease in the risk of being diagnosed with any one of a whole variety of mental disorders. We have found evidence of many variations among individuals in basic neuronal processes, some but not all of which, unsurprisingly, are linked to variations in inherited DNA. But have we discovered anything about the genetic basis of a brain disorder termed schizophrenia? I do not think so*"(N. Rose, 2018, p. 107)

Joseph (2010) later notes that despite these inconclusive findings and lack of breakthroughs in genetic research, the findings of such research are often subjected to rhetorical manipulation in which these failures to find the genetics associated with mental health conditions are instead reframed as evidence of the complex genetic nature of such entities. As we shall see later, research about how these rhetorical reframings happen are important to this thesis.

1.5.2.3. Epigenetics

Recent interest within genetic psychiatry have appeared to try to reconcile inconclusive results of genetic studies with the growing evidence of the role of environmental factors in the developmental of mental health conditions (Manseau, 2014; Varese et al., 2012) via epigenetics.

Epigenetics is not a new discipline as highlighted by Peedicayil (2014) who traces the routes back to the work of Waddington and Hadom who posited the connection between the fields of genetics and developmental biology. The term epigenetics was coined by Waddington in the 1940s as the resulting field which looked at both developmental biology and genetics in tandem. This field aims to examine the ”turning off and on” of genes within the human genome, the experiences and factors that influence these and how environmental factors may mediate such mechanisms to produce mental health conditions in individuals and populations (Mahgoub & Monteggia, 2013).

Kendler (2005) identifies four major paradigms within psychiatric genetic research. The first two paradigms, basic and advance genetic epidemiology aggregate so-called genetic risk factors which can be inferred from patterns within families. Paradigms three and four refer to gene finding methods and molecular genetics which instead study individual genes identified in the human genome that can be labelled as “susceptible”. Kendler notes that recent technological advances in genetic analysis may result in these last two paradigms overtaking the first two however uncertain the possibility is that we can identify all the susceptibility genes that equate to genetic risk factors. This leads to a state in which the current research cannot confirm nor deny evidence about genetic risk factors. Kendler instead posits that good psychiatric genetic research should encompass all four paradigms which highlights integrations of epidemiological insights.

Epigenetics has also aimed to answer the concerns raised regarding conventional twin studies by acknowledging that the equal environment assumption cannot be met and so a focus should shift to dissolving the nature vs nurture paradigm and moving towards integrating the evidence of both the genetic state and environmental factors influencing development within twins.

Epigenetic models of mental health research are not without criticism. Cromby et al. (2019) reviewed the research of epigenetic studies into the aetiology of schizophrenia and concluded that whilst this new paradigm is posited by proponents as “revolutionary”, findings from the research does not support such a strong assertion. Cromby notes that these studies are still primarily driven by a search of biological mechanisms and often condense environmental influences, reducing their impact to molecular consequences. Stephen and Hilary Rose (2010) also concur with this conclusion reporting that this reductionist stance does not demonstrate a truly integrative model of psychiatric aetiology and instead reduces the overall complexity of both the nature of environmental influences on human behaviour and of the complex nature of genetic mechanisms to provide a new form of biological determinism. They claim that this results in two antithetical positions, one in which our biology is determined by the genetic destiny as a result of evolutionary forces, but a second opposing ideology held that our genetics can be changed and adapted by our own human actions.

1.6. Current context of psychiatric research

The above history demonstrates that there are competing models of explanation within psychiatry. For this thesis, we have chosen to examine the way in which research, particularly genetic research is presented in the UK media.

Given the extensive history of genetics within psychiatric research and the contentious nature of its findings, we turn now to examining the current landscape of psychiatric research to place us in the contexts of the type of research we will be examining in this thesis.

The tensions of this debate have also been encapsulated in the nature/nurture divide within the science of human development. Whilst a move towards an integrated model of nature and nurture within epigenetics has been attempted, criticism above have demonstrated that the resulting model will often hold onto the dominance of biological ideas, reducing environmental influences and reducing complex mechanisms to linear, causal explanations. Singh et al. (2012) highlights that the increasing advancement of biotechnology has in fact increased the nature/nurture divide. Through the combination of biological science, technology and politics, human behaviours have been reduced to:

> *"biological trace elements, functions and structures" and that this level of biological determinism has become accepted as a "way forward to understanding not only the root causes of aberrant human behaviours, but also the mechanisms underlying those behaviours*".(Singh, 2012, p. 310)

1.6.1. Landscape of Mental Health Literature

Pincus et al. (1993) examined the trends in research published in two psychiatric journals, the American Journal of Psychiatry (AJP) and the Archive of General Psychiatry between 1969 and 1990. Whilst these researchers were looking at the general trends in what research was presented across these journals, they noted that their research indicated an increasing emphasis of

studies examining biological models of mental health, which they called “clinical psychobiology”.

Moncrieff and Crawford (2001) examined the permeation of the biological model within psychiatric research literature over the 20th century. They examined articles published in the British Journal of Psychiatry (BJP) published in the mid-point of each decade to attain a picture of the changes or consistency of explanatory models. They discovered that there was a continual and enduring interest in the biological models of treatment and explanation in all the published articles across the 20th century.

Whilst it is important to note that this study only examined the contents of a single journal, the choice of Moncrieff and Crawford (2001) to examine the BJP was twofold. Firstly, it is the longest running psychiatric journal within the UK having been originally published as the Asylum Journal in 1853 therefore giving the longest period of data for their analysis. Secondly, the BJP is highly influential in its scope, being automatically sent out to all members of the Royal College, a society that includes most psychiatrists within the UK. The journal aims to help inform practice and policy and so analysis of its content would be a good litmus test of the current and historical interests of practicing psychiatrists and researchers within the UK.

The biological models covered in these articles included what Moncrieff and Crawford (2001) calls “basic science” (biochemistry, brain anatomy, endocrinology etc). The results demonstrated a quarter of articles in 1905 and 1915 reported results discussing these models of mental health, which increased to 30% in 1925. The lowest number observed was 8% of articles covering these topics in 1975. Moncrieff and Crawford (2001) also examined the number of articles across this period that examined genetic and family studies which was at its highest in 1915 at 8% and its lowest in 1965 at 2% of articles. There was a period of four decades between 1925 and 1955 in which no genetic articles appeared in the BJP.

The BJP articles reviewed at different points across the century highlighted the movement of scientific ideas within psychiatry including a focus on brain surgery during the 1940s, a high level of interest in psychopharmacology (particularly chlorpromazine) in the 1950s, an increase in genetics and the hereditary nature

of mental health conditions between the 1960s and 70s, and increased interest in neurology during the 1980s.

They noted that there was little evidence of coverage of alternative explanations including psychoanalysis with the most articles found in 1945 (2%) and social psychology with the largest number of articles published in 1995 (13%). Moncrieff and Crawford (2001) concluded that the role of biological models within psychiatry have remained a stable interest within the research printed in the BJP and that the modern interests in biological psychiatry appear to reflect these long-standing patterns.

Jarvis et al. (2015) conducted an analysis examining the preponderance of articles examining the biological aetiology of psychosis published in three major psychiatric journals: the AJP, the Canadian Journal of Psychiatry (CJP) and the BJP between 2005 and 2007.

They defined biological as including a range of topics including genetics and neurology. This was compared against articles looking at the social aetiology of psychosis which including work on the impacts of poverty and discrimination. The authors also categorised papers into “other” aetiology which they described as articles examining cognitive or developmental aetiologies.

95% of AJP articles reported on the biological aetiology of psychosis. Both the BJP and CJP had a slightly smaller percentage of articles that focused on the biological aetiology of psychosis, however biological articles were still found to be many articles in these journals at 75% of both the BJP and CJP. Jarvis et al. understandably conclude that the overwhelming model represented across all three journals is that of a biological explanation for psychosis. The authors also go on to say that the results also imply that attempts to adopt the combined “biopsychosocial” model have been met with limited success due to the overwhelming persistence of the biological model which leaves little room for the examination of the role of psychological and social factors contributing to the development of psychosis. Of course, one caveat to this study is that it only examined this pattern of dominant explanation for a single psychiatric diagnosis. There are no comparable studies regarding other psychiatric diagnoses found by the author of this thesis for comparison.

1.6.2. Future Research Directions

The dominant coverage of biological models within psychiatric literature observed in the above studies has been met with calls for a move away from research focusing on biological models and a move towards social and psychological factors contributing to the development of mental health conditions. Leff (2008) has argued that there appears to be a shift within psychiatric literature towards embracing a more social model of mental health aetiology. Priebe et al.'s (2013) editorial within the BJP claimed strongly that the past 30 years of research have produced no meaningful changes to psychiatric practice. They cite the prevailing domination of the biological model within research and claims that this has "stifled creativity". They argue that embracing a social paradigm within research would help shift the profession toward generating real progress towards supporting those with mental health conditions.

Several pieces of research into the research priorities of service users and others invested in the care of those with mental health conditions do not suggest a desire for further research into genetics or biological aetiologies. Wykes et al. (2021) identified that the current priorities of mental health research should be on public health prevention as well as individual treatment. Through interviewing service user groups within the UK, Ghisoni (2017) identified two main research priorities which include developing the knowledge about mental health issues to overcome stigma and to provide early intervention around managing mental health needs, as well as developing education as a tool for recovery within mental health services. Owens et al. (2008) found an overlap in the research priorities between service users, carers and mental health practitioners which focussed on ideas of self-esteem, impendence and recovery.

This suggests that there is a tension between the ways in research is viewed by researchers and the way in research is viewed by service users and practitioners. We may ask how much these tensions are felt in the coverage and dissemination of genetic research that not only has failed to manifest the promises highlighted by Smoller (2014) but also does not address these concerns highlighted by populations who are affected by mental health conditions.

1.6.3. Influence in Current Psychiatric Practice

This tension is also addressed in discussion of psychiatric practice. Spenrath et al. (2011) discusses the implication of the epigenetic model for those working within Child and Adolescent Mental Health Services and whilst noting that there is research demonstrating the impacts of poverty on the mental health of families, refuses to let go of the overarching biological model of heritability and genetic risk factors. Jiménez et al. (2018) also appears cautious at times when writing about epigenetics and considering why talking therapies are effective, noting that evidence is yet to be conclusive but also still reporting that genetics is their underlying ontology for understanding any results.

Some writers take a less cautious approach. Kandel (1998) discusses what they consider to be the five key principles of psychiatry, four of which explicitly mention the role of genetics in the psychiatrist's understanding of mental health conditions. Kandel even reports that a psychiatrist should understand the positive impacts of therapy as having impacts on the genes of the patient:

> *"Insofar as psychotherapy or counselling is effective and produces long-term changes in behaviour, it presumably does so through learning, by producing changes in gene expression that alter the strength of synaptic connections and structural changes that alter the anatomical pattern of interconnections between nerve cells of the brain. As the resolution of brain imaging increases, it should eventually permit quantitative evaluation of the outcome of psychotherapy*". (Kandel, 1998, p. 460)

It is interesting to note that these hopes put forward by Kandel over twenty years ago have still not been realised. Despite this, they are still held by modern writers such as Pariante (2016) who reports:

> "*Psychiatry is having a great time. Over the last few years, we have seen an exceptional explosion in neuroscience knowledge, and especially in our understanding of the molecular mechanisms through which environmental and genetic factors affect the brain and regulate behaviour, while at the same interacting with peripheral ('body') functions."* (Pariante, 2016, p. 101)

Despite these reports from Pariante (2016), many researchers have remarked on the paucity of conclusive evidence to suggest that our understanding of the biological or genetic mechanisms. Insel and Lehner (2007) describes the history of psychiatric genetics as a "story of unreplicated discoveries and unrealised expectations". It is also clear that the impact of genetics on the day-to-day care of people with mental health conditions can be described as minimal (Kingdon, 2020). Those that provide talking therapies do not routinely run genetic tests prior or post therapy. The treatment decisions of psychiatrists prescribing medication for psychiatric problems has been described as "poorly understood" (Angell & Bolden, 2015) and are not made upon knowledge about an individual's genetics. Neither are genetics used within psychiatric diagnostics currently and are unlikely to be in the near future (Kendler, 2006).

However, an article produced by Nurnberger et al. (2018) reports that it is important that psychiatrists know about genetic models of mental health due to pressures from patients to know more:

> *"Psychiatrists are already confronted with questions about genetics in their daily work. Patients want to know the risks of passing on illness to offspring. They may ask about genetic testing for pharmacologic treatment selection. Sometimes they will bring such information to their clinicians from the internet or from DNA test results."* (Nurnberger et al., 2018, p. 1)

This suggests that uncritical beliefs about the genetic model of mental health are not just held within the psychiatric profession but have permeated into the public. To explore this, we will now turn in the following sections to examining how the media has created a relationship with science, how journalists cover themes of mental health and specifically mental health research as well as the possible impacts of these on the public.

1.7. Science and the Media

1.7.1. Science Capital

A recent publication by the UK Government assessed the changing public attitudes towards science in the UK (Department for Business & Strategy,

2020). Overall, this report demonstrated that the public have an increasingly positive attitude towards science overall between 2014 and 2019. The researchers found that since 2014, the public were more likely to feel well informed about science and less likely to feel that science and technology are too specialist for them to understand. The writers of this report utilised the idea of science capital (Archer et al., 2015) which is defined as the sum of all science related knowledge, values, beliefs and resources an individual builds. The researchers in the Government report found that high levels of science capital correlated with positive views about science.

One way the researcher examined how science capital was obtained was through public interactions with the UK media. This report found that despite descriptions of declining levels of overall trust in the UK media, around 50% of those reviewed felt that the information reported about science in the media is generally true. 36% of respondents felt they could not give an opinion about the truthfulness of science reporting in the media suggesting possible ambivalence or confusion. The report reinforces this further by demonstrating that 65% of respondents felt that there was too much conflicting information about science to truly know what to believe and 62% of respondents felt that the media sensationalised science.

This report suggests that whilst there are positive attitudes towards science as a whole and its role in society, there is some ambivalence about how science is presented in the media and how this affects the creation of science capital. It is therefore important to examine how science is reported in the media and to think about how this reporting impacts on public beliefs.

This view has also been corroborated by the Science Media Centre (2002) whose statement about the role of media in our culture highlights that the media can be more influential in the views of the public and health workers than the government or individual scientists. The Centre highlights the duty of both journalists and editors in ensuring that scientific stories are covered responsibly and the duty of scientist to communicate effectively with the media and the public.

1.7.2. Relationship Between Scientists and the Media

Historically, scientific communities were known to discourage members from communicating with the media for fear that it may pose a risk to their academic reputation (Dunwoody & Ryan, 1985). Studies highlighted the incompatible world views and professional cultures between journalists and scientists which include competing time pressures and organisational demands (Reed, 2001). Despite this studies have also shown that scientists are highly motivated to interact with the media (Gunter et al., 1999).

Peters (2013) completed a large scale survey of scientists across a number of countries about their relationships with the media. They found that there was a clear distinction within the minds of those surveyed between the communication within internal scientific communities and the public communication via journalism. This distinction took on two aspects: the exclusion of the public from the communication that deals with knowledge creation and validation and the specialisation of scientific knowledge. Peters noted that these distinctions led to scientists engaging in a pattern of communication that is termed “popularisation” defined as the use of tailored, simplified and “sensationalised” messages when addressing the public.

Peters also pointed out that the scientists’ readiness to engage with the media have several psychological factors attributed to it. Peters hypothesised that this is not always about the moral imperative for science to be a public good but can also be seen as a “playing along” to support gains of reputation, either individual or institutional.

Peters’ work focussed on a large number of scientists from different disciplines, not specifically health researchers and so this framework may not be fully applicable across the board, but it does pose an interesting quandary about how we motivate scientists to engage with the media and how this reward-based motivation may impact the types of messages given to journalists about scientific research.

1.7.3. Reporting of Medical Science in the Media

Weitkamp (2003) reviewed how health science and medicine were covered in five UK newspapers. They found that medical topics accounted for 50% of

science reporting in these newspapers and concluded that this may reflect the need for journalists to try and make science reporting relevant to the general reader. This suggests that medical science reporting is an area in which is it important to focus our exploration of how scientists and journalists work together as this is likely to have a large impact.

Picard and Yeo (2011) note that generally medical professionals have been critical of media coverage of medical and health science in the UK. These authorities often complain that coverage into health science is limited, skewed, or emphasises negatives such as risk. These medical professionals often place the blame on journalists, particularly how they present and select experts to offer opinions on health science topics.

Viswamath et al. (2008) found a limited level of understanding by health professionals on how news stories are developed by editors and journalists in their study. They advise the value of being critical and questioning how topics are chosen and by who, who writes the articles and who has the power to edit and publish them.

We shall now turn to the reporting of mental health within the media to see if similar concerns reported by the researchers above are also present when journalists write about mental health conditions more broadly and when they cover mental health research.

1.7.4. Reporting of Mental Health in the Media

Hallam (2002) reports that the press within the UK have demonstrated an influential role in public attitudes towards mental health as well as shaped governmental policies. Hallam reviewed the press coverage of the cases of Christopher Clunis who murdered a stranger at a London tube station and Ben Silcock who climbed into the lions' den at London Zoo. Both these gentlemen had schizophrenia and Hallam (2002) notes that media coverage highlighting the risk that those with schizophrenia pose to themselves, and others contributed to the development of policy measures to impose additional restraints on individuals with mental health conditions. Hallam (2002) highlights that this policy change was influenced by the response from the public whose

concerns about the dangerousness of such individuals was increased by the emotive media coverage.

Huang and Priebe (2003) examined how mental health care was reported in print media across the UK, USA and Australia. They found that the tone across all three countries was predominantly negative, with the focus of articles being on crime, particularly homicide, as well as feelings of prognostic pessimism with a focus on suicide and the failings of psychiatric services. This fits with Searle's (1999) observation that UK newspapers often focussed in on risk and violence when reporting on mental health conditions as well as work from Sieff (2003) which demonstrated that mental ill health is represented in mass media as negative and in a stereotyped manner.

Allen and Nairn (1997) conducted a discourse analysis of a New Zealand newspaper and how mental health conditions were constructed. They concluded that the way mental health was reported encouraged readers to construct mental health conditions as something that makes people dangerous and unpredictable. The texts then reinforce these constructions of mental health by using language that draws the reader's attention to descriptions of risk and danger.

The picture is not entirely negative. Francis et al. (2004) found that negative images or terminology about mental health was not used in a majority of Australian broadcast and print media. They did note some sensationalism in term of language but concluded that overall reporting was accurate and balanced. Hildersley et al. (2020) also found that the Time to Change anti-stigma campaign had a significant impact on the number of anti-stigma articles about mental health present in UK newspapers from 2008 to 2019. They did however find that there were differences in the amount of stigmatising articles present depending on mental health condition: articles covering depression received less stigma whereas articles reporting on schizophrenia were most likely to be stigmatising, with articles about schizophrenia being 6.37 times more likely to be stigmatising than any other diagnosis.

Research also demonstrates that there is a dominant narrative within the reporting of mental health conditions that focusses heavily on the biomedical model. Rowe et al. (2003) found that journalists often relied heavily on the

expert knowledge of psychiatrists and that alternative knowledge of those with lived experience was lacking. Bilic and Georgaca (2007) reviewed discourses within Serbian newspapers and found that psychiatrists were consistently presented by journalists as the most reliable sources of information and thus this reinforced the biomedical model that constructs mental health conditions as medical disorders which can only be managed by psychiatrists.

As we can see from the above research, the media representations of mental health more broadly often incorporate negative stereotypes and focus on the presence of risk, dangerousness, or pessimism. One hope of the genetic revolution within mental health research was to counteract some of these stigmatising narratives perpetuated within the media (Biesecker, 2001) and so we will now turn to explore whether this has been the case.

1.7.5. Public Beliefs about Genetics and Mental Health

Dar-Nimrod and Heine (2011) defined a particular style of thinking about genetics called genetic essentialism. This style of thinking means that individuals believe that genetic causes are immutable and deterministic, arguing that if a person possess a gene linked to a condition, the individual will develop said condition. This thinking style also means that other potential causes or factors relating to a particular condition are discounted leaving the genetic attributions as the dominant cause.

Phelan (2005) has suggested that genetic essentialist thinking would suggest that geneticisation of mental health conditions will increase stigma by increasing ideas of differentness and transmissibility which may lead to increasing social distance from those with mental health conditions. Through use of a vignette experiment, Phelan demonstrated that responses were consistent with this genetic essentialism thinking. Even more concerning, this type of thinking style was found by Cheung et al.(2021) to be correlated with increased scores on measures of eugenics acceptance.

Similarly, Bennett et al. (2008) utilised a vignette experiment and found an increase in stigmatising attitudes towards those with mental health conditions when participants were presented with evidence of genetic causation over environmental causation. These attitudes included viewing recovery as less

likely when given evidence of genetic causation as well as an increased perception of the subject's dangerousness.

Other studies have found differences in how different mental health conditions are perceived when attributed to genetic or psychosocial causation. Schomerus et al. (2014) found that biogenetic beliefs were associated with lower levels of social acceptance in schizophrenia and depression and with high social acceptance in alcohol dependency. This was particularly mediated by feelings of perceived differentness and dangerousness in schizophrenia and depression. When examining the impact of psychosocial causes, they found higher levels of social acceptance in schizophrenia when current stress was associated as cause but lower social acceptance in depression when causes were related to childhood adversity.

Schnittker (2008) drew on models of genetic arguments in popular media to assess their impacts on public views about mental health conditions. They found that genetic arguments were positively associated with public beliefs regarding violence and this result was similar to beliefs about violence when schizophrenia was attributed to bad character. However, they found positive association with social acceptance when genetic arguments were applied to depression.

It appears therefore, that the use of genetic explanations of mental health conditions do not overall improve public attitudes towards those with mental health conditions however this effect is varied across the literature and appears to vary across diagnoses. There are also questions about how the media may mediate these beliefs in the manner they report on genetic research about mental health. To begin to examine this question we will now turn to how mental health research and specifically genetic research is reported in the media.

1.7.6. Reporting of Mental Health Research in the Media

There are very few studies that examine how mental health research specifically is reported within the media.

Lewison et al. (2012) reviewed articles relating to mental health research covered in both the BBC and The New Scientist between 1999 and 2008.

Through a content analysis of the data, they found that there was an overall emphasis on biological research in both sources during this time, with this being more notable in the New Scientist.

This research found that studies examining neurological causes of mental health was found in 17.2% and 15% of articles in the BBC and New Scientist respectively. Genetic causes were identified in 9.1% of BBC articles and 12.8% of New Scientist articles. In contrast environmental causes were found in 15.6% of BBC articles and 12.8% of New Scientist articles. Finally, reference to psychosocial risk factors was identified in 8.7% of BBC articles and none of the New Scientist articles.

Lewison et al. (2012) also noted that there was a significant under-representation of research covering psychological intervention in both sources, only 1% in the BBC and 1.5% in the New Scientist. This is in comparison to the percentage of articles covering pharmacological treatments (12.6% in BBC and 7.5% in the New Scientist) and other biological treatments such as surgery or electroconvulsive therapy (4.6% in the BBC and 4.5% in the New Scientist).

Lewison et al. concluded that this is likely to influence public perceptions of mental health research and so it is important for both researchers and journalists to consider their reporting of mental health conditions to support greater understanding and support for mental health research in the public.

To explore the way in which the media reporting on research may influence the narratives of the general public we will now turn to framing theory to guide our discussion and review a number of examples of research that will support this thesis.

1.8. Framing Theory

Within media studies research, a popular way of examining and understanding how the media influences public beliefs is through framing theory. This theory posits that the construction and presentation of information within media reports provide the consumer with a perspective with which to interpret and respond to

the news or information (Reese, 2007). These frames will actively include and exclude information in order to present a consistent frame (Binder, 1993). Journalists and editors must choose what to report on, which experts to quote, which sources to use and how to write the narrative of the report and so become more than just messengers of pure information (Gans, 1979). This may be of particular importance to medical and health topics, including mental health research. Mass media will often use frames related to factors such as prevalence, risk, and efficacy of treatments and so how these frames are utilised within the media influences the public perception of not just these areas of public health but also on what things are important for research. It is well known that powerful medical research institutions and pharmaceutical companies employ press relations to increase coverage for their research, ensuring that their work is given a positive framing within the media (Goldacre, 2010). This will likely skew the framing of particular types of medical and mental health research in ways which may not always be evident to the reader or to the journalist themselves (Bauer & Bucchi, 2007).

Below, I will cover four research papers covering the way in which media frames are used to discussing genetic research.

1.8.1. Framing the “Gay Gene”

Work by Conrad and Markens (2001) identified the differing ways in which one research study that proclaimed to have found “the gay gene” was framed across UK and USA news sources. They noted that the “discovery” was met with “cautious optimism” in the US press. These papers reported a level of optimism in the findings and their implications, often suggesting that this could reduce stigma against homosexuality. This stance was reinforced in articles by quoting the views of Gay Rights activists that were positive about the potential implications of the study. They also demonstrated optimism in the study by citing the study’s significance as “strongest evidence yet”. The authors noted that there was caution in the reporting of the results which noted that this was only a single study and needed replication.

The UK press however used a frame that Conrad and Markens named “the perils of finding the gay gene”. Here they found that newspapers highlighted the

eugenicist potential that such a finding could have through “testing and termination”. Any optimism about the research was muted and very few articles contained any specifics about the research or its findings. Conrad and Markens also noted that in this frame much less attention was given to whether this study was good science and little discussion about scientific replication.

1.8.2. Framing Genetics in Health Reporting

Carver et al. (2008) developed a model for how genetics are discussed across both the media and in scientific research. They noted a total of five frames that are utilised: materialistic, deterministic, relativistic, evolutionary, and symbolic. The materialist frame involves framing the gene as a distinct molecular unit whilst the evolutionary frame treats genes as dynamic and abstract entities. The deterministic frame sees the gene as a causal agent and is often held up as a contrary force to environmental factors. In contrast, the relativistic frame instead sees the gene as a predisposing factor that can play a part in the development of health conditions alongside other factors. Finally, the symbolic frame uses the gene as a metaphor of information transfer for example, within computing and programming or as an abstract representation of inheritance without scientific evidence.

Carver et al. (2008) demonstrated that within the discussion of genetics in the media the frame has moved from a relativistic one to a more deterministic one, concluding that its use within the media is due to this frame being the “most succinct and sensational”. They note that this deterministic frame is often used alongside a materialistic one which posits the existence of an identified gene as a material entity and so reinforces the deterministic framing further. The less frequent use of the relativistic frame is explained by Carver et al (2008) as being due to the level of complexity it introduces by challenging the concept of genetic risk. Therefore, the transformation of a relativist framing into a determinist one by journalists is to be expected if their focus is to create catchy news stories.

Carver et al. (2008) also concludes that this dominance of the deterministic frame in the media will have an impact on the ways in which the public understand genetic research as the adoption of a deterministic perspective may lead to an overestimation of the influence of genetics on their health.

1.8.3. Framing Genetics and Mental Health

Conrad (2001) explored the media framing of genetic research about mental health conditions by reviewing US news coverage of research between 1987-1994. Conrad identified the consistent use of a particular frame he named "genetic optimism" being employed in coverage of genetic research. Conrad reported that this frame contained three elements.

The first was that a gene for the disorder exists which created a taken-for-granted stance relating to the idea that mental health conditions are heritable. Conrad noted that newspapers would often report discoveries of genetic markers as if this was conclusive evidence of a "genetic flaw" that caused mental health conditions. Similarly, to the optimism identified in the previous study about coverage of the "gay gene", newspapers would describe the genetic evidence in their articles as a "breakthrough" or the "strongest yet". When disconfirmations in genetic research were presented, they often ended on a hopeful note, maintaining the genetic optimism frame.

The second element of genetic optimism was that it [the gene] will be found. Conrad noted that despite failure to find conclusive evidence of a particular "depression gene" or "schizophrenic gene", journalists would demonstrate confidence that these discoveries would be made with the advent of new technology.

The final element of the genetic optimism frame identified by Conrad was that it [the discovery of a specific gene] would be a good thing which journalists used to convey optimism that any discovery of a particular mental health condition gene would be an unquestioned good thing for patients, their families and for society. This was often in terms of positing that genetic explanations would reduce stigma or provide novel treatment options. Conrad noted that there was no place in these articles to question the value of genetic research or to be critical of this unquestioned good.

Conrad concludes that the genetic optimism frame was the dominant frame of this time in US press and whilst the scientific accuracy of such news reports was high, this frame manipulates the findings and "misrepresents and reifies the impact of genes on mental disorder and leaves no space for critics or an examination of potential negative impacts." (p. 239). Conrad identifies the role

of journalists, editors, and scientists in the maintenance of this frame and argues that it is important we re-evaluate the contribution to “hype and hope” contained within these articles.

1.8.4. Psychiatric Genetics in Australian Media

Wilde et al. (2011) utilised framing analysis to examine how psychiatric genetics have been portrayed in Australian newspapers between 1996 and 2009. They found that 51% of examined articles attributed the aetiology of psychiatric disorders to gene-environment interactions, whereas 30% of articles reviewed research that attributed mental health conditions to genetics alone and 20% to environmental factors alone.

Wilde et al. (2011) then reviewed those articles that attributed genetic factors to the development of mental health conditions and found that the majority of these (78%) used frames of genetic determinism to discuss the findings. They defined genetic determinism as a frame which portrays genes as the cause of a condition. They also found a majority use of the genetic optimism frame (78%) with 22% of articles using a genetic pessimism frame. They defined genetic optimism as a frame which emphasises the positive impact on f the role of genetic research on society, whereas the pessimism frame presents genetic research leading to “social dystopia”. Similarly, to Conrad’s (2001) work, Wilde et al (2011) also found very few articles that acknowledged psychosocial or ethical implications within psychiatric genetic research (22%).

Finally, Wilde et al. (2011) examined the outcomes of 22 articles that made predictions about the development of genetic research, for example, predictions made about the development of psychopharmaceutical from the discovery of genetic links to schizophrenia. Wilde et al. (2011) found that 20 of these 22 predictions (91%) failed to materialise.

1.8.5. Development of Frames from Research to Journalism

Conrad (2001) identifies that the roles for maintaining particular frames within the media are the responsibility of all parts of the media process. This includes researchers and scientists as well as journalists and editors. Despite this

assertion, it is still unclear how each party plays a role in the creation and development of frames within the reporting of genetic research on mental health. Zuckerman (2003) highlights that scientists can engage in “checkbook science” which uses the “hype and hope” used by journalists and editors in their own reporting of research to sell themselves, their research and institutions as well as selling products and shaping corporate interests, as well as ensuring access to research grants.

It is still not clear the exact way this hype is developed, from the writing up of scientific research for publication by journals to the press release given to the media for journalists to create news articles.

1.9. Aims of this Research

From the introduction above, several areas in which research is lacking becomes clear. There have only been a small number of studies that examine the landscape of mental health research reporting in the UK press overall and those identified above have only focussed on the BBC. There are several national and local newspaper options available to the public in the UK and it does not appear that these have been used as a source to examine how mental health research is reported on in the UK press.

The research on framing of genetic research in the media has focussed on America as in Conrad’s (2001) study and a comparison such as in Conrad and Markens’ study has not been made. Further, the work of Carver et al. (2008) is incredibly useful, but this focussed more broadly on all genetic research rather than just its use in mental health research.

Finally, there has not been a clear discussion of the interactions between scientists and journalists with regards to how genetic frames are maintained in the entire research and news production cycle.

These are important areas for study as the above research demonstrates that despite a dominant history of biogenetic thought in psychiatry, research has produced very little dividends with regards to diagnosing or treating mental health conditions (Kingdon & Young, 2007). This “biomedical bubble” that

current research is contained in has implications in which it may diminish and obscure novel and innovative practices that may be described as psychosocial (Jones & Wilsdon, 2018).

It should also be clear from the information represented in this chapter that the media plays a considerable role in influencing both public perception and governmental policies which have had negative impacts for those with mental health conditions, particular around experiences of stigma and negative public attitudes.

Therefore, we can identify three important research questions that we hope to answer within this study:

1) What types of mental health research are reported in British newspapers?
2) What themes can be found within British news outlets when reporting on mental health genetic research?
3) How are these themes used and transformed between researchers and journalists?

2. METHODS

2.1. Overview

The following chapter introduces the methods used within this study. There will be a focus on the epistemological position along with discussion of the design and research procedure utilised. Whilst this project did not require ethical approval due to the use of data available in the public domain, there will be a brief discussion of potential ethical issues and personal reflexivity of the researcher.

2.2. Epistemology

The research proposed here will be informed by critical realism, defined by Roy Bhaskar (Collier, 1994) as a philosophical stance that assumes the existence of objects in our real world and posits that these have properties that can be known through scientific endeavour. The critical realists also recognise that knowledge is also subjective and is bound within discourse and social construction.

Pilgrim (2019) posited three elements of critical realism that formed the rationale for utilising this epistemological stance throughout this research. Firstly, Pilgrim explains that critical realism takes an ontologically realist assumption on the nature of knowledge. Critical realism posits that there are things that are knowable and have influence on our world.

Thus, it is assumed that the media, both scientific and general, have real-world influence. These include impacts on the general culture concerning mental health and how science is positioned within the populations that consume this media. This provides an important starting point for the research presented here as it allows us to explore the discursive mechanisms through which this influence may work and to hypothesise about its impact more generally, along with the interactions with the material circumstances that produced them.

Pilgrim's second element concerns the nature of how knowledge is generated within a critical realist stance. He calls this epistemological relativism. This posits that several different methodologies can be used within research and knowledge generation. Pilgrim highlights that as human we consistently use several different ways to observe and understand the world around us and so it follows that utilising multiple methodologies in research will also benefit knowledge production. This means that no one methodology can be seen as the only way knowledge can be gained as all methods have constraints and assumptions implicit within them that can blind us to some elements of knowledge whilst also highlighting other areas. The critical realist stance gives a level of methodological freedom which instead means that analysis is based on the type of information we wish to seek and allows us to think about what type of knowledge different methodologies might provide us with, ensuring space of personal and methodological reflexivity.

As such, this research uses more than one analytic method to explore the research questions posited above. To begin to explore our first research question, we begin with utilising content analysis. This is hoped to provide a broad picture of psychiatric reporting in the news. It will ensure that we are taking a wider frame for our first question and so hopefully, along the lines of Lewison et al. (2012) provide a framework on which to build our more in depth analysis.

Our second and third research questions require a more detailed analysis to explore how particular themes and discourses are utilised at different levels to create and discuss genetic research into mental health. This deeper reading of the data requires a methodology that will give us a way to inspect and hypothesise on how discursive tools and themes construct narratives in our media and to identify the process in which these narratives are changed through the process of reporting of scientific literature. For this reason, the analysis chosen was Discursive Thematic Analysis (DTA).

Finally, Pilgrim explains that the stance of critical realism allows the notion of judgemental rationality which he describes as "the human capacity to weigh up what is likely to be true in a particular context" (Pilgrim, 2019 pg. xv). Pilgrim's judgemental rationality posits that there are ways in which to weigh up different claims about knowledge and so, critical realism supports the integration of

multiple forms of knowledge production, such as from the two methodologies above, to make claims that can be weighed up to suggest some knowledge or truth about our world.

2.3. Design

This research utilised a mixed methods design with both quantitative and qualitative methods to explore and answer the above research questions. The reasons for this are presented below.

As highlighted in the section above regarding epistemological position, the nature of our research question involves taking multiple views of the area of interest. Taking multiple views means that the research questions are best explored utilising multiple methods and to utilise the benefits that can be provided by using qualitative and quantitative methods. The quantitative aspect of our mixed methodology allows us to take a broader scope whereas the qualitative analysis allows us to narrow that scope down.

The use of quantitative methods in the form of content analysis allows us to take a wide range look at the nature of how psychiatric research is reported in the UK news. It allows a large amount of data to be analysed and thus gives a broader scope when exploring the first research question. It can also be easily replicated and for the purposes of this study gives further rationale to the deeper analysis completed on a smaller sample. As described by Krippendorf, the purpose of such analysis is to make “replicable and valid inferences from texts . . . to the contexts of their use” (Krippendorff, 2018, p. 19).

The second and third research questions instead look at meaning making and the process of transformation within the identified texts. For this reason, a qualitative method was utilised. Kidder and Fine (1987) describe how qualitative research is concerned with open-ended methods that are concerned with “theory generation and the exploration of meaning”. The hope is that by using qualitative methods such as DTA, meaning can be made beyond just counting the instances of psychiatric literature being reported in the news and instead

can focus on the way in which knowledge and meaning are constructed through discourses and to begin to hypothesis the impacts that these have on our world.

Qualitative methods also provide a further benefit which highlights the importance of reflexivity. Reflexivity speaks to the need to explore the ways in which a researcher's involvement with a particular study influences, acts upon and informs such research' (Nightingale & Cromby, 1999). This is an important aspect of the research process, particularly when discussing topics than can be sensitive and emotive, such as mental health. For this reason, my own positions as a researcher have been identified and the possible impacts these may have had on my analysis within this research are also discussed.

2.4. Materials

The materials used within this research included newspaper articles gathered through the Lexis Nexis database. This database contains newspaper articles from online and in print newspapers from a wide range of news sources. The current data was obtained from national newspapers including The Independent, The Daily Mail etc as well as local newspapers. The newspapers used were from the UK, including papers from England, Scotland, Northern Ireland, and Wales.

For the second analysis, the materials included the original published research papers cited in the identified newspaper articles along with the press releases obtained from the university press offices of the paper's authors.

2.5. Procedure

The first research question was first explored through utilising content analysis. This analysis was also utilised to identify the appropriate sample for the later DTA. The data for this analysis was obtained from a database search on Lexis Nexis. The search terms used are included in Appendix A. These were identified from the original search terms utilised in the Lewison et al. (2012) study and included only terms related to functional mental health conditions.

Functional mental health conditions are defined by Hatfield and Dening (2013, p.191) as “The term 'functional' mental illness applies to mental disorders other than dementia, and includes severe mental illness such as schizophrenia and bipolar mood disorder.” This meant that terms such as dementia, Autism and ADHD were not included as they are considered neurological/neurodevelopmental conditions. Physical health terms such as ME were also excluded from the search. The reason for these exclusions is related to the contentious nature of aetiological research in mental health conditions. There is a long history of unsubstantiated genetic research findings when it relates to mental health conditions such as depression, psychosis and bipolar affective disorder that has been covered in the Introduction chapter. Therefore, it was felt that these exclusions would allow the research to be focussed on these conditions that have been a focus of genetic research and have provided inconclusive results.

All these terms were searched alongside the word “research”. The results were then filtered to only include English language newspaper articles and those that had been published over the past 5 years. This period was decided as it incorporated the most current newspaper articles however the researcher was aware that the impact of COVID-19 on both the media and on the landscape of health research has been significant. This means that it was felt five years would give the most up-to-date picture of the newspaper coverage of mental health conditions whilst also accounting for the dominance of COVID-19 in the UK newspapers. This initial search produced a total of 25,530 results. The number of results for each search term are included in Table 1.

Table 1. Number of results found from Lexis Nexis search

Search Term	**Total results**
Addiction	3672
Affective Disorder	574
Agoraphobia	29
Anorexia Nervosa	159
Antisocial Personality Disorder	32
Anxiety	10644

Bipolar Disorder	222
Borderline Personality Disorder	48
Bulimia	81
Delusional Disorder	50
Depression	7592
Dissociative	17
Hypochondria	10
Mania	197
Obsessive Compulsive Disorder	79
Panic Disorder	25
Paranoia	314
Phobia	202
Post-Traumatic Stress Disorder (PTSD)	942
Psychosis	296
Psychosexual	23
Schizoid	0
Schizophrenia	322

Following this initial database search, the top 1000 results for each search category were selected. The headlines for these results were then reviewed by the researcher manually to exclude results that included the search terms in ways that were outside the scope of this analysis. This included use of terms such as depression in economic terms or terms such as paranoia or delusion used in non-psychiatric ways (e.g., as descriptors). Duplications of any newspaper articles, for example multiple versions of the same article within local newspapers were also excluded from the content analysis.

Finally, a content analysis was conducted on the remaining search results. The entire newspaper articles, including headline and body were read and coded by the type of research they reported on. Table 2 contains the codes and descriptions used within this analysis.

Table 2. Codes used in the content analysis

Name of code	Description of code
Demographics/Prevalence	Research that examines how often mental health disorders in communities and who is most likely to experience them
Environmental Causes	Research that reports the causes of mental health conditions include environmental aspects such as toxins and pollution, illegal substance use, poverty, diet etc
Genetic Causes	Research that reports the causes of mental health conditions as due to genetics/heritability
Brain Function	Research involving studies of brain function, often reporting fMRI results
Personality Causes	Research that reports the causes of mental health conditions as related to individual personality factors (e.g., neuroticism)
Other Biological Causes	Research that reports the causes of mental health conditions as related to hormonal/metabolic/immune systems within the individual (without directly linking this to either the brain or an individual's genes)
Treatment: Psychotherapy	Research that explores the use of various psychological or therapeutic methods to treat mental health disorders (e.g., mindfulness, CBT)
Treatment: Medication	Research that explores the uses of licenced mental health medication (e.g., antipsychotics)

Treatment: Other	Research that explores a wide range of alternative treatments for mental health conditions (e.g., exercise, diet, use of psychedelics)

From these results, a total of 60 articles reporting on genetic research were identified. These 60 articles were reviewed and a total of 19 newspaper articles were selected for further analysis. These newspaper articles were selected on the basis that: they clearly identified the study the report was referring to; the research was recent (not historic); and the reports covered a wide range of mental health disorders. From these 19 newspaper reports, 14 individual research articles were identified. The number of research articles was smaller because they were mentioned in more than one of the selected articles. Overall, this selection included one research paper on addiction (specifically intravenous drug addiction), one research paper on Anorexia Nervosa, four research papers on Depression, two research papers on Post Traumatic Stress Disorder (PTSD), and six research articles on Psychosis (including Bipolar and Schizophrenia).

The newspaper articles and research papers were then carefully read, re-read, and coded for emerging discursive themes. Though Conrad's (2001) work on genetic optimism informed the analysis, the researcher remained open to other features of the text. These themes were grouped together to create a hierarchy of main themes and subthemes and placed as coherent structures to describe the way in which discursive devices and themes were utilised in the construction of narratives within the texts.

In the final stage of the research a case study was selected which would enable an analysis of how a study's findings were differently represented in three different forms: published research paper; press release; and newspaper article. DTA was used to code the emerging discursive devices and themes utilising the work from the previous analysis within all three documents, focusing on how these themes were transformed across the examined documents.

2.6. Analytic Approach

Two forms of analysis were employed in this study: content analysis and discursive thematic analysis (DTA).

2.6.1. Content Analysis

Historically, content analysis has been placed as a tool within the broader definition of textual analysis and has been defined as a technique for reducing the volume of text into content categories based on the identifying and grouping together of codes (Berelson, 1952; Krippendorff, 1980). Stemler (2000) identifies that this tool can also allow for inferences which can then be corroborated through evidence gained from a wide range of data collection methods and can enable results to be connected to their context and the material world in which this data exists (Downe-Wamboldt, 1992).

As described in the sections above, it was decided that content analysis would provide a useful tool in our analysis to fulfil three functions:

1) To systematically reduce the volume of collected newspaper articles concerning reporting on mental health research

2) To provide an objective and replicable way of identifying and quantifying the types of research discussed within these newspaper articles

3) To begin to make inferences about the collected data and its context in preparation for identifying the sample for further analysis using DTA.

As a quantitative methodology, content analysis counts the presence of codes within the data selection which are then expressed as percentages. The purpose of this method is to provide a quantitative summary of the large amount of data collected (Krippendorff, 2018). In this context, we were seeking to find out how often particular forms of mental health research were reported in the newspaper over the last five years.

This method is also described as manifest content analysis which, differing from latent content analysis, is concerned with describing what is occurring on the surface of the text rather than making interpretations about hidden meanings

within the texts as a means to understand the prevalence of particular phenomena (Kleinheksel et al., 2020).

The process of content analysis can be broken into steps which are described below.

1. Identify appropriate data (text or other communicative material)

The research question focussed on newspaper articles and so this was the data used for this analysis. Non-English newspaper articles were excluded as they were not within the scope of this research.

2. Determine sampling method and draw sample.

Data was drawn from a systematic search of the Lexis Nexis database. Each search of the database included two search terms one which included a term to describe a functional mental health condition (e.g., depression) and the term “research”. A full list of search terms used is included in Appendix A. Exclusion criteria were also placed on the search which included only searching articles published in the last five years and excluding all non-English newspapers and articles. From this initial search, the first 1000 results were then taken. The headlines of all articles were read first by the researcher to exclude any repetition in the results. The resulting articles were then read in full to exclude those articles that utilised the search terms in a colloquial manner or in ways which was not of interest to the study (for example, articles that described public figures such as Trump as delusional or when the term depression was used in economic terms).

3. Establish data collection unit and unit of analysis as well as coding scheme before coding data

Codes are defined as descriptive labels that assign attributes to units of meaning within the text. They are often symbolic and in the case of quantitative content analysis are determined a priori prior to coding (White & Marsh, 2006).

Codes themselves are short, descriptive labels that symbolically assign a summative or salient attribute to more than one unit of meaning identified in the text (Saldaña, 2021).

In quantitative content analysis the coding scheme is determined a priori, that is, before coding begins. A coding scheme operationalizes concepts that may in themselves be amorphous. It establishes categories that are relevant and valid.

The coding scheme for this research was influenced by the work completed by Lewison et al. (2012) which identified several categories of psychiatric literature reported on in the BBC and New Scientist. The codes used by Lewison et al. (2012) were:

- Genetic causes of mental disorders (including twin and family studies)
- Functioning of the brain – direct studies of brain or where brain effect of biological or causal mechanisms is central to the account
- Environmental causes – e.g., toxicity, illicit drugs, noise
- Psychosocial environmental causes or risk factors – e.g., social adversity, ethnicity, occupation
- Nutrition – including dietary supplements and alcohol benefits
- Diagnosis – clinical features, diagnostic tests and markers
- Health impacts – incidence and prevalence (but not risk factors), costs
- Interaction between mental disorders and physical illness (both directions)
- Pharmacological treatment with new or existing drugs
- Biological treatments – surgery, electroconvulsive therapy, stem cells, experimental treatments
- Psychological treatments – including cognitive behavioural therapy
- Non-structured or unconventional treatments – e.g., art, laughter, music

This coding was used as a framework for the current research to support comparison of the two studies however differences to the coding scheme were made in response to the texts. This included adding codes such as aetiological research referring to personality factors which were not included in Lewison et al.' (2012) research. Other codes that were present in Lewison et al.'s (2012) research were not present in the data within this study, for example research about diagnostic criteria.

The texts were then read and re-read to identify the types of research contained within the articles. These were coded firstly as a description of the research directly lifted from the text. For example, research that identified pollution as a contributing factor to the development of mental health conditions. Following this coding, the codes were then reviewed again by the researcher to identify the larger groups of codes that cohesively formed the overall coding scheme. For illustration, then coding the above example of pollution into the larger code of environmental factors.

4. Check for reliability of coding and adjust coding process if necessary

Adjustments were made to the initial coding scheme replicated from Lewison et al (2012) through reading of the texts and of the initial codes developed. There were several codes identified in the Lewison et al. (2012) study that were not utilised in this coding scheme due to having no texts associated with them in this data sample (e.g., psychosocial environmental causes or risk factors was not observed in this data sample). Similarly, some categories were renamed to appropriately mirror the content of this data set (e.g., 'health impacts' was renamed to prevalence as prevalence research was included in Lewison et al's health impacts code alongside research into costs which was not observed in this data set). Finally, one code was observed in this data set which was not included in Lewison et al's (2012) coding scheme – personality factors and so was included in the current coding scheme to again appropriately mirror the content of the texts studied.

An inter-rater analysis was completed using one extra rater (a third-year trainee clinical psychologist) to assess the reliability of the codes used in the content analysis. This produced a total of 91%.

5. Analyse coded data, applying appropriate statistical test(s) and write up results

This coding scheme was used across all search terms and individual counts for each functional mental health search term are included in the Appendix B. Finally, these counts were combined to provide the overall percentages included in the results chapter.

2.6.2. Discursive Thematic Analysis (DTA)

To address the second and third research question, DTA was used. This method of analysis identifies themes within a text whilst focusing on the discursive and rhetorical design and the ideological implications of the theme (Taylor & Ussher, 2001). DTA involves attending to the role of language in construction of ideas and meanings of social entities which pulls on the ideology of thematic analysis whilst also paying close interest to the "patterned meanings" within the data and draws on work from Potter and Wetherell (1987) to inform its analysis. For the purposes of this current study, the methods used were principally thematic and used discursive ideas to guide thinking when analysing the materials rather than an explicit focus on the rhetorical devices utilised by the authors of the articles.

The merging of thematic analysis with discourse analysis has been used previously in a number of papers (Botelle & Willott, 2020; Clarke, 2005). I will discuss the two key elements thematic analysis and discursive concepts below.

2.6.2.1. Thematic analysis

Thematic analysis is described as "a search for themes that emerge as being important to the description of the phenomenon under investigation" (Fereday & Muir-Cochrane, 2006). The analysis involved a systematic working through of the data to identify common meanings across the texts and bring these together into cohesive categories that speak to the phenomena observed within the data.

The data sample for this analysis was identified in the content analysis which identified the newspaper articles reporting over the last five years on genetic research about a range of mental health conditions. These articles were then examined to ensure that the original research papers were identifiable from their content and were not related to historical research. This resulted in a total of 19 newspaper articles and 14 research papers. A list of the newspaper articles and research papers used is included in Appendix C.

Thematic analysis has been described as following six steps (Braun & Clarke, 2006) which have been detailed below:

1. Familiarisation with the Data

The familiarisation process began with the initial reading of all the newspaper articles and research papers in the data set. These texts were read a number of times during which notes were taken in the margins reflecting on some of the meaning making process and devices being used in the texts.

2. Generating Initial Codes

The texts were then coded further utilising these initial impressions from the familiarisation process. The data was coded for as many themes as possible, and extracts were identified to illustrate the emerging codes. At this stage the themes were separated across the two data sets, newspaper articles and research papers to ensure neither data set influenced the coding of another too heavily.

3. Searching for Themes

Initial codes were organised in overarching themes using tables and extracts from the texts to explore how the subthemes cohered. At this point, reflections of emerging themes across both data sets were brought together to explore relationships between theme hierarchies.

4. Reviewing Themes

The themes were reviewed through examining the textual extracts used to illustrate each identified theme as well as by reading the texts again to ensure the validity and cohesiveness of the hierarchies identified. All the themes and subthemes identified in this analysis were discussed within supervision.

5. Defining and Naming Themes

The defining and naming of themes occurred in both a top-down and bottom-up fashion in which Conrad's (2001) work was a guiding principle where examples of genetic optimism were found in the texts. However new main themes not

previously identified as well as subthemes were named based on the content of the texts.

6. Producing the Report

In this final report, the narratives of the theme hierarchies were explored along with their impacts on the text and examples to provide context.

2.6.2.2. Discursive theoretical concepts informing the thematic analysis

DTA is informed by a range of discursive analysis traditions. Here I will discuss key discursive concepts and relevant studies.

Discourse analysis based on discursive psychology is interested in how micro-level practices such as rhetorical devices impact on relational and interpersonal contexts when used in speech acts. Rhetorical devices can be defined as speech or text acts which are used to convey meanings to a reader or listener with the goal of persuading them toward a particular position (Crews-Anderson, 2007). Edwards and Potter (1992) found several different rhetorical devices that were used when speakers constructed facts in their narratives. These include: category entitlements in which people in certain positions are expected to have expert knowledge; systematic vagueness in which vague formulations with only essential details are presented which prevent easy undermining that high levels of detail world encourage; and consensus and corroboration in which accounts are made plausible by highlighting agreement between witnesses or experts. As such, our analysis is also interested in exploring how rhetorical and discursive devices ae used by scientists and journalists construct accounts of genetic research.

Discourse analysis also attempts to examine how texts serve a number of ‘personal, interpersonal, social, institutional and societal interests’ (Harper, 1995) and so our analysis can be curious about the impacts both of audience on the use of discursive devices in account construction but also the reciprocal impacts that these accounts constructed using particular discursive devices have on their audiences. The model of media framing has been explored in the Introduction chapter and can be used as a framework to identify overall links

between discursive techniques to create an overall frame through which a piece of media constructs a narrative.

Discourse analysis has been used in research on newspaper coverage in a number of settings including election coverage (Dekavalla, 2010), attitudes to abortion (Purcell et al., 2014) and racism (Teo, 2000). Richardson (2017, p. 13) explains:

> *''Journalism has social effects: through its power to shape issue agendas and public discourse, it can reinforce beliefs; it can shape people's opinions not only of the world, but of their place and role in the world'.*

Previous discursive research into the ways in which news is presented shows that how information is presented by journalists can offer us insights into how its audience may seek information and how this information in turn is provided (or not) with differing levels of authority (Mautner, 2008). Headlines are powerful tools to deliver what are seen as key messages for those who do not always go on to read the full article and quotes can be used in ways that speak to authority and power (Munro, 2018). Conrad's (2001) research identified such discursive practices when looking at genetic research in the newspapers and hypothesised about its impacts on the wider audience of readers. Less research has looked specifically at how discursive practices are used within research papers to discuss genetic research and how these compare to the writing of journalists. To explore this, a discursive focus was included in the above thematic analysis by paying specific attention to the use of rhetorical devices, narratives used and framing of discursive structures when coding themes.

It is important to state here that the state of current newspaper coverage has been impacted by economic and technological changes which have caused a decline in print media and reduction in the number of journalists employed by newspapers. Some have argued that because journalists have less time to research and write stories they have become dependent on press releases from industries, academia and institutions, in a process described as "churnalism" (Jackson & Moloney, 2016). To examine the relationship between research, press releases and media stories, and to add depth to our research a single case study was utilised which examined the discursive practices across a portion of this process: starting with the published research paper, the press

release, and the newspaper article. The sample case for this analysis was selected as the first example of a research article with a widely available press release.

Analysis was completed across all three texts in the same manner described above. During the reviewing of themes, comparison was instead made to identify similarities and differences in the prevalence of themes and in how the texts presented these themes.

2.7. Ethics

Due to the materials used in this research being publicly available forms of data, ethical approval was not required. Researchers and journalists are therefore identifiable in this research, but this is due to research papers, press releases and media stories being publicly available. The analysis in this research is also focussed on the content of the papers and articles and not on the individual authors. As all the texts available for analysis in this research study have been made public available, this itself is not a breach of ethical standards.

2.7.1. Personal Reflexivity

One important factor of many qualitative methodologies is that of personal reflexivity. It is noted by many methodologies that the researcher is not just a neutral observer of data within qualitative methods (Silverman, 1997) as the process involves meaning making on the part of the researcher (Atkinson & Silverman, 1997). As such the promotion of personal reflexivity is encouraged to ensure the researcher remains aware of their contribution to the construction and analysis of the data along with an acknowledgement of epistemological reflexivity which requires a research to engage with questions about how particular research questions came to be (Willig, 2001, p.10).

Personal reflexivity encourages the researcher to think about and reflect on how their own values and ideologies as well as personal experiences and social identities shape the process of research, from the choice of research question to data collection and analysis. To begin to explore this, I have described some

parts of myself below which will be pertinent to this research topic and will be reflected on further in the discussion chapter of this thesis.

- I am a woman who has lived experience of mental health disorders and as such I have needed to craft my own narrative and meaning to make sense of these experiences. Whilst I try to hold nuance about the multitudes of different personal narratives that might exist to make sense of mental health distress, it can be difficult and jarring when alternative views come into conflict with our own personal stories.
- I am also aware of my use of terms and language for my experiences and how these may not reflect the wider social descriptors for mental health conditions. There may need to be times within this research that compromise is found between using language I personally find uncomfortable and accurately reflecting the content of the data I am researching.
- Finally, I am a third year DClinPsych student at the University of East London. My position within the role of psychology means that I again may take on narratives and explanations about the nature of mental health which means I may have to actively check in with my own preconceptions about the narrative and explanations of either journalists or psychiatric researchers to ensure I am giving a level of curiosity to the texts that I read.

2.8. Evaluative Criteria of Research Quality

This research will be critically evaluated on the quality of its methodology in the Discussion chapter. For ease, I will spend a few lines here describing the framework that will be used to complete this evaluation. The framework comes from the work of Spencer and Ritchie (2011) who identify three elements that must be considered when evaluating qualitative research: contribution and the value of the research; the credibility that the research has; and the rigour of its conduct and analysis.

3. RESULTS

3.1. Content Analysis

A content analysis was completed on a total of 1153 newspaper articles across a range of newspapers. The results from this analysis are presented in Table 3 below and the description for each code can be found previously in Table 2. A further breakdown of the content analysis by search term is included in Appendix B.

Table 3. News articles discussing mental health research coded by type over the last 5 years.

Code and Description	Number of Articles	Percentage of Total
Environmental Causes	339	29.4%
Demographics/Prevalence	324	28.1%
Treatment: Other	212	18.4%
Brain Function	77	6.7%
Treatment: Psychotherapy	61	5.3%
Genetic Causes	60	5.2%
Treatment: Medication	54	4.7%
Other Biological Causes	14	1.2%

Personality Causes	12	1.0%

From this analysis it is clear that environmental themes are the most frequently seen within this sample of newspaper articles, and genetic themes instead make up a small fraction of the newspaper articles reviewed in this analysis. Furthermore, whilst there are several articles reporting on the genetic causes of mental health conditions, this is not as prevalent as other causes such as brain functioning or environmental factors. The number of newspaper articles reporting research that examines the environmental causes of mental health conditions was larger than all the other causes combined. Interestingly, the large proportion of this research may have been due to the impacts of the recent COVID-19 pandemic as a high number of articles reviewed research that explored the impacts of lockdown, of burnout and trauma resulting from the pandemic along with research about the mental health impacts of long COVID-19. Whilst the researcher did increase the search time span from 3 to 5 years to account for the impacts of the pandemic, it is understandably an important factor to consider when reviewing these results.

It is also understandable that the increased number of articles found that fall into the environmental causes category may be due to the wide range of different items that make up this category. Whilst biological categories such as brain function and genetics examine discrete factors, the research that investigates environmental factors is much broader as it essentially contains everything else that is not biological.

3.2. Discursive Thematic Analysis (DTA)

The DTA presented here was completed on a total of 19 newspaper articles and 14 research papers. For a full list of newspaper articles and research papers used in this analysis, please see Appendix C.

Both the newspaper articles and the corroborating research papers were analysed using DTA. The themes are reported below. In addition to this analysis presented here, in order to show the use and transformation of discursive themes across the process of mental health genetic research reporting to both the scientific community and general public, a case study is presented of a single research paper exploring the genetic factors in the development of Anorexia Nervosa, along with its corresponding press release and a single published newspaper article.

The themes were broken into three main themes: genetic confidence, genetic optimism, and genetic caution. Each contains several subthemes used across newspaper articles, research papers or both. Please see Table 4 for a hierarchy of themes found and whether they are used within newspaper articles, research papers or both.

Table 4. Hierarchy of discursive themes in newspaper articles and research papers

Discursive Theme	**Utilised in newspaper articles, research papers or both**
MAIN THEME 1	
Genetic Confidence	
• A gene exists/has been found	Newspaper articles
• Assumptions of Pathways and Mechanisms	Research papers
• Overemphasis of Results	Both
• Referencing genetic confidence in other disorder	Newspaper articles
• De-emphasising other factors	Both
MAIN THEME 2:	
Genetic Optimism	
• We will find it	Both
• It will be a good thing	Both
○ Significance of the study	Both

○ Negative language about gene/disorder	Both
○ Need for further research	Research papers
○ Practical implications of research	Newspaper articles
○ Absence of ethical concerns	Both
MAIN THEME 3	
Genetic Caution	
• Cautious language	Both
• Clear references to other factors	Both
• Failure to replicate previous findings	Research paper
• Limitations acknowledged	Research paper

3.2.1 Theme 1: Genetic Confidence

The first theme found across both the newspaper articles and the research papers was that of genetic confidence – a sense of certainty that there are genetic causes to mental health conditions, that this is a fact of our world and does not need discussion. This creates a taken-for-grantedness in the basic assumptions of genetic confidence and does not clearly state these assumptions. Any evidence reported is seen as all encompassing, despite the limitations of the study or of research that suggests a more complex picture of mental health aetiology. This theme encompasses six further subthemes that vary in their use across newspaper articles and research papers: a gene exists/has been found, assumptions of pathways and mechanisms, overemphasising of results, referencing genetic confidence in other disorder and de-emphasising other factors.

Genetic confidence presents in slightly different ways across newspapers and research articles. Research papers avoided such definitive claims as a gene exists (e.g., naming an ‘anorexic gene’) and instead present a level of genetic confidence when discussing the genetic influence of processes and

mechanisms in the body that contribute to mental health. Despite this, it is noted that research articles describe mental health conditions as heritable or genetic without apparent qualification of these statements.

Whilst research articles also suggest the impact that their findings may have on other related mental health conditions, they use much more cautious language suggesting that although their results do not explicitly look at genetic causes for other mental health conditions, there may be links upon further examination of their research. Newspaper articles however are considerably less cautious and more certain about these links, often stating them as facts and adding to the overall narrative that genetic causes are taken-for-granted.

Below are the six subthemes used to create the overall discursive theme of genetic certainty.

3.2.1.1. A gene exists/has been found

This theme was found only in the newspaper articles, often within the headlines or subheadings of the articles and was found in a total of eight newspaper articles. A common formulation involved giving the gene the name of the mental health condition:

> *"Addiction genes inserted into humans' 'dark DNA' by ancient viruses, study finds"* (Headline from a newspaper article discussing researching into genetics and addiction).

This implies that this gene is definitively linked to the condition and that those that have this gene will present with the condition linked to it.

Headlines were also seen to utilise the idea that a single gene has been discovered that is associated with the condition, giving a sense of certainty, and again implying that the presence of the condition would also imply the presence of this particular gene:

> *"Depression could be linked to single gene, say Dutch scientists"* (Headline from newspaper article discussing research into genetics and depression)

The use of this devise within the headline may also lead to a sense of taken-for-grantedness as it is unable to express the level of nuance displayed within the body of the article.

Newspaper articles would often describe mental health conditions as being "*genetically predisposed"* (Newspaper article reporting on research about genetics and anorexia nervosa) which further adds to the implication described above which simplifies the process of genetic predisposition and the impacts that genetics may have on phenotype expression.

> *"People genetically predisposed to disorder, study finds"* (Subheading of newspaper article discussing research into genetics and anorexia nervosa)

Newspapers also spoke of genetic research that will help us:

> "*truly understand the root causes of psychiatric disorders"* (Newspaper article discussing research into genetics and schizophrenia).
>
> *"Anorexia 'has physical roots and not just psychological'"* (Headline of newspaper article discussing research into genetics and anorexia nervosa)

This implies that the causes of such disorders are biological in nature in two ways. Firstly, it takes for granted that the research looking at genetic factors will have the capabilities to discover such things as the root cause. Secondly, the use of the term root as a biological feature of plants adds to the notion that causes of mental health conditions must be held in their biological structure. The buried nature of roots is also interesting as this gives a sense of mystery to the processes being examined in such research and adding to the justification for this research by both implying that such a root does in fact exist and that just because it is currently hidden, does not mean it will not eventually be unearthed. This further links to the points below about the use of quest narratives which speak of mystery and hope being employed to describe the search for genetic factors.

Finally, there were newspaper articles describing the conditions intrinsically being genetic forms:

> *"GROUND-BREAKING research led by the University of Glasgow has uncovered a novel therapeutic approach against genetic forms of schizophrenia"* (Newspaper article discussing research into genetics and schizophrenia).

This also perhaps implies that there are indeed other "forms" of schizophrenia and make work as a justification against criticism from the research suggesting the impact of environmental and social factors on the development of schizophrenia – we are not talking about *that* form of schizophrenia but the genetic form of schizophrenia here.

The above newspaper article also interchangeably referred to schizophrenia as hereditary, not referring to its links within families that may be explained outside of a genetic framework but as an implicit stand in term for genetic.

> *"Contemporary studies have highlighted that people with a hereditary form of schizophrenia, or a subset of the general schizophrenic population, are deficient in DISC1"* (Newspaper article discussing research into genetics and schizophrenia)

This allows for both the genetic research to sit alongside apparently contradictory research about the social nature of the development of schizophrenia without needing to concede ground but also without acknowledging the possible interactions between biology and environment.

3.2.1.2. Assumptions of pathways and mechanisms

In contrast, research papers did not claim to have discovered the 'disorder' genes. Instead, they demonstrate a level of confidence about how the genes they have studied affect mechanisms in our bodies which lead to mental health conditions. This subtheme was identified in a total of 10 research papers. This has a particular taken-for-grantedness about the mechanism behind systems within our biology and rest upon the idea that genetic influence these mechanisms in causal ways.

> "*Using genetic variants for diurnal preference, this study adds to the evidence base that being a morning person lowers the likelihood for*

depressive symptoms" (Research paper discussing the findings of their study into genetics and depression)

The above quote makes two assumptions, the first that diurnal preferences impact the likelihood of depression and secondly that there is a causative genetic mechanism at work behind diurnal preference. The link between these two mechanisms is not clarified in this statement and so it may be read as genes influence diurnal preference which in turn influence likelihood of depression, again compressing the complexity of interacting biological pathways and mechanisms to simplify the role of genes in the process.

> *"One of the solitary HK2 LTR polymorphic integrations lies between exons 17 and 18 of RASGRF2, a gene that affects dopaminergic activity and is thus related to addiction"* (Research paper discussing the location of studied genes and the role of these in addiction).

Similarly, this extract takes-for-granted the function of dopamine on the brain and relies on a further hypothesis regarding how dopamine is linked to addiction. This was also found when articles discussed the role of genes on neurological pathways and their association with depression without elaboration on how neurological pathways are involved in the genesis of depression.

> *"We identified 102 independent variants, 269 genes, and 15 gene-sets associated with depression, including both genes and gene-pathways associated with synaptic structure and neurotransmission."* (Research paper discussing their findings in a study about genetics and depression).

Similarly, the below quote also obfuscates the way in which genetic risk impacts on mental health disorders and instead both simplifies and broadens these interactions into a "pathophysiological framework" – a term that is purely biological in its nature.

> *"Our data support this model and ground it in developmental neurobiology, embedding genetic risk for multiple disorders in a common pathophysiological framework."* (Research paper discussing the implications of their findings from a study examining genetics in schizophrenia and related psychiatric disorders)

The below quote also demonstrates this simplification and broadening of the pathways involved in the development of schizophrenia without giving clear instruction into how these things come about and the impact of genetics on each of these pathways in turn.

> "Systems *genomics analysis highlights six gene sets that are independently associated with schizophrenia and point to molecular, physiological and behavioural pathways involved in schizophrenia pathogenesis."* (Research paper discussing the findings of their study into genetic and schizophrenia).

In one research paper, the term causal was used when discussing their findings:

> *"Through integrating genomic fine-mapping with brain expression and chromosome conformation data, we identify candidate causal genes within 33 loci."* (As above)

Again, the mechanisms behind this causality are not elaborated and the mechanisms are taken-for-granted in this statement.

Whilst explicit statements of causation were rare, similarly, to the newspaper articles, the research papers also added to the narrative of genetic confidence by giving descriptions of conditions as heritable. Whilst the term heritable may present a simple Mendelian understanding of genetics, the term could also obscure other influences on the presence of conditions within families. This similarly has been discussed above when the term is used interchangeably in newspaper articles for genetic.

> *"Depression has a heritable component that has remained difficult to elucidate with current sample sizes due to the polygenic nature of the disorder ... Twin studies have provided heritability estimates of the disease of approximately 30-40% 3, however depression is a polygenic trait influenced by many genetic variants each of small effect"* (Research paper on the rationale for the current study into the genetics of depression)

This term heritable appears to be taken-for-granted even though the authors of the above paper acknowledge the limited success in evidencing this fact.

Instead, the argument is further bolstered by highlighting the disorder as polygenic.

Other research papers also referred to disorders as polygenic:

> *"Schizophrenia is a highly polygenic disorder with important contributions from both common and rare risk alleles"* (Abstract of research paper looking at genetics and schizophrenia).

> *"Depression is a polygenic trait that causes extensive periods of disability. Previous genetic studies have identified common risk variants which have progressively increased in number with increasing sample sizes of the respective studies"* (Abstract of research paper exploring genetics and depression)

This devise both contributes to the narrative that disorders are but also bolsters against critiques of inconclusive findings or inconsistent genes being identified in the mental health literature by acknowledging the multiplicity of the genes involved in the development of the disorder.

It was found that many of these statements and devices were included in the introduction or abstracts of research papers suggesting a sense of confidence even before a reader has been able to see the research findings.

3.2.1.3. Overstating of importance

Both newspaper articles and research papers overstated the impact of genetics within the study. This subtheme was identified in six research papers and nine newspaper articles. Newspaper articles would often give the details of the research findings which included the percentages of variance accounted for by the genetic structures without comment on the relative size of this:

> "*NKPDI gene accounted for a 4% rise in the risk of experiencing the symptoms of depression"* (Newspaper article discussing genetic research into depression)

This percentage removed from context is therefore difficult to critique or question the meaningfulness of these findings.

But these would compare with more definitive statements about the role of genetics held within other portions of the article:

> *“A person's genetic make-up is believed to play a role in the likelihood that they will develop the mental illness”* (See above)

This percentage was taken from the corresponding research article which gives further context to the 4% statistic:

> *“We detected significant association of depressive symptoms with a gene NKPD1 (p 5 3.7 3 10208). Nonsynonymous variants in the gene explained 0.9% of sex- and age-adjusted variance of depressive symptoms in the discovery study, which is translated into 3.8% of the total estimated heritability (h2 5 0.24)”* (Research paper on genetics in depression)

When viewed in this manner, the variance explained by the genetic research can be seen to be very low and so the importance of these findings promoted by the newspaper article appears to be overinflated.

Some newspapers were seen to express the number of genes found in a study that were purported to be linked with a particular condition, again without comment on how this number compares with the overall human genome, removing important context that could be used to understand or critique the research presented in the newspaper article:

> *“HUNDREDS of genes have been newly linked to depression in an international study led by Scottish scientists, shedding light on its origins and highlighting at-risk personality types”* (Headline of newspaper article reporting on research into the genetics of depression)

Further to this, newspaper articles were found to discuss these numbers alongside words such as “pinpointed” or “homed in” suggesting a level of precision which appears antithetical to the large number of genes identified in the research:

> *“Scientists led by the University of Edinburgh studied information from three large datasets of anonymised health and DNA records and*

pinpointed 269 genes that were linked to depression" (Body of newspaper article described above)

The corresponding research paper also provides a more detailed break-down of these "hundreds of genes" but similarly appears to demonstrate the defuse nature of the influence of genetic on the development of depression:

"We identified 102 independent variants, 269 genes, and 15 gene-sets associated with depression," (Research paper on genetics in depression)

Some newspaper articles did highlight the rarity of the identified genes within the study:

"The mutations were very rare, found in around three in 3,000 individuals diagnosed with schizophrenia" (Newspaper article reporting on research on genetics in schizophrenia)

But qualifies this rarity with statements that re-establish the importance and influence of these genes in the body and in the development of mental health conditions:

"The importance lies not in how common the mutations are but the area of biology highlighted, namely one of the main chemical transmitters of the central nervous system, known as GABA. This points towards alterations in how brain cells communicate as a potential cause of schizophrenia." (See above)

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3.2.1.4. Referencing genetic confidence in other disorders

This subtheme refers to the assumptions of genetic aetiology in other mental health conditions other than the target of the research study. This was found in three research papers and six newspaper articles.

Research papers referenced the potential for their findings to highlight the genetic causes of other mental health conditions, however this was often presented with a level of cautious language:

> "*potential shared genetic risk with schizophrenia, bipolar disorder, and major depressive disorder"* (A research paper looking into the genetics of PTSD)

The term risk is used which implies a level of caution when implicating the genetic findings of this paper into the causality of other functional mental health conditions. However, risk is abstract and does not give a clear indication of just how much the identified genes impact the development of other mental health conditions. This statement also presents a taken-for-grantedness that the genetic risk is ontologically real and that particular genes create or increase/decrease risk within mental health.

Newspaper articles would present these proposed links without such cautious language:

> "*found genetic links between anorexia and schizophrenia, as well as neuroticism"* (A newspaper article discussing genetic research into anorexia nervosa).

This article uses the definitiveness of the word 'found' which appears to overshadow the use of the work links which denotes that there are correlations or associations and not definitive causality. This type of statement again adds to the view that there is an unquestioned reality in which mental health conditions, and in this case even personality factors, have genetic "links". It is possible that the scientific use of links and associations seen in research papers may hold a different meaning to the authors of research papers (i.e., correlations have been found) over a more general view of the term used in newspapers (i.e., a relationship between two things that influence each other).

Finally, newspapers also referred to previous research results on the genetic aetiology of mental health conditions and report them without reference to specific studies and as fact. These "facts" are often presented within the model of genetics as taken-for-granted and are presented with no critique of alternative information from studies about other models of mental health aetiology. Taken together this adds to the building of genetic confidence for the current research results as it appears to fit with the literature overall:

"*scientists have already pinpointed specific genes that can predispose people to neuropsychiatric disorders"* (A newspaper article reporting on the genetic research of schizophrenia).

3.2.1.5. De-Emphasising other factors

In both newspaper articles and research papers, other potential factors that may contribute to the development of mental health conditions are only mentioned briefly. This subtheme was found in a total of five newspaper articles and reference to other factors was only found in a single research paper. This suggests that many of the research articles not only de-emphasised other factors but failed to mention them at all.

There are some difficulties with qualifying the de-emphasis of alternative models or the impact of other factors such as diet, poverty, and trauma on mental health within these research paper and newspaper articles as this would mean attempting to quantifying a negative. The below example of this subtheme demonstrates how even when the possibility of alternative factors are mentioned, they are often given very few words and are seen as secondary to the main results that bolster the genetic model.

"In HK2 the infections dates back to some of our earliest ancestors and is replicated in many of our genomes without effect, but still with the potential to cause serious harm when added to other factors that can lead to people becoming addicts" (Newspaper article reporting on findings about the genetic cause of addiction)

The above extract shows how the effect of genetics on the development of addiction are impacted by further factors, named "other" in this newspaper, offering some suggestion that the genetic model cannot completely explain the development of addiction. They even note that these genetic markers can be present in many genomes without the individual developing an addiction. However, these "other" factors are not named, no examples of these factors are given, and no space is dedicated to discussing these mediating effects between "other factors" and genes. This gives the impression that these other factors are not as important as the results of the genetic study.

A further example of this de-emphasis can be found below:

> *"This could suggest that it is the combination of these psychological risk factors which turns these superficially healthy metabolic factors into a serious illness"*. (A newspaper article discussing the genetic research into anorexia nervosa)

Again, the importance of these psychological risk factors is not discussed and given no more space in the article than that above.

Only a single research study actively identified other potential factors and gave some discussion about how cannabis use may interact with the genetic framework of schizophrenia they were researching. Again, this technique adds to a level of certainty as it gives the impression that there are no other possible causes of mental health conditions outside of the genetic or if it acknowledges them, they are seen as secondary.

3.2.2 Theme 2: Genetic Optimism

Genetic optimism was comprised of two subthemes: "we will find it" and "it will be a good thing." These are two of the elements of the genetic optimism frame identified by Conrad (2001).

The first subtheme was much less common across the newspaper articles and research papers as there was a more significant sense of genetic confidence therefore reducing the need for optimism about finding "the gene".

However, the second subtheme was identified more often. This subtheme was again broken down in to five further subthemes which created this sense of optimism in different ways across the newspaper articles and research papers.

3.2.1.1. We will find it

This subtheme often demonstrated more of the hope described in Conrad's (2001) genetic optimism frame than the previous theme of genetic confidence. It was often reflective of a quest narrative that the research was a positive step in the right direction to finding the hidden or mythical gene that would give a complete explanation for the aetiology of a functional mental health condition.

This subtheme was not found throughout all the newspaper articles and very few research papers as there was a stronger sense of genetic confidence which holds an assumption that the answer to the genetic quest has already been found. However, some of the language used in the newspaper articles suggests a lessening of certainty and an increase of caution (e.g., the use of ‘may’ and ‘potentially’). Overall, this subtheme was found in seven newspaper articles and one research paper.

Newspaper articles would discuss the inconclusive nature of the current research as a positive result which will further the genetic quest and will uncover truth and secrets:

> *“Looking into this 'dark’ part of the genome will unlock more genomic secrets”* (Newspaper article looking at the genetic research on addiction)

> “*researchers hope will shed light on the little-understood condition.”* (A newspaper article reporting on the genetic research of depression)

Interestingly, none of these newspaper articles are explicit in stating that future research will definitively provide answers and so this likening to a quest narrative when talking about the development of genetic research which will shed light or give clues to future answers or truths may be a form of hedging. This is a linguistic device used to express ambiguity or caution within statements.

Curiously, only a single research paper used this subtheme. This was a research paper discussing results into the genetics underlying PTSD. It may well be that PTSD has only recently been a condition under genetic scrutiny and so the taken-for-grantedness of genetic confidence may be more reduced than in other conditions such as schizophrenia.

> *“These results portend future success in identifying specific PTSD risk loci”* (A research paper on the genetics of PTSD)

What is interesting in this extract is the use of the word portend which while not exclusively used for negative events, is often used to describe the foreshadowing of calamities or of destruction. It is also a word that can be synonymously used with mystical terms such as prophesise. This extract appears to both retain the magical quality of the quest narrative identified above

in the newspaper articles however doesn't appear to engender the same hope that has been seen in previous examples of this subtheme.

3.2.1.2. It will be a good thing

Whilst both research papers and newspaper articles implicitly assume that finding a genetic cause of mental health would be a positive, they focused on this in two different ways. For the research articles, this positive outcome of the research would add to the knowledge base and many articles were explicit about the need for more research. They did not explicitly discuss the practical applications or hopes for the research however. This instead was much more prevalent in the newspaper articles which would often include quotes form researchers about their hopes for the practical use for this knowledge. Both newspaper articles and research papers also created the context of the positive assumption by the language used when describing the study itself and the language chosen when talking about the mental health condition or genes under study.

This theme was further comprised of five subthemes.

3.2.1.2.1. Significance of the study

One way in which the implicit assumption that the finding of genetic aetiology would be a positive thing was the use of positive language about the significance of the reported study. This was present in three research articles and eight newspaper articles.

This language was often more exaggerated in the newspaper articles, with studies being described as "*groundbreaking*" "*state-of-art*" or being a "*breakthrough*". The use of positive language about the study was less verbose and instead researcher referred to their project with more caution:

> "*we conducted the largest genetic-association study" (*Research paper on genetics and bipolar disorder)
>
> *"we show for the first time"* (Research paper on genetics and depression*)*

The use of this positive language supports the genetic optimism theme by reducing the space of criticism and by often using this language in conjunction with negative language about the disorder of study. It is understandable that newspapers may use more explicitly positive language as this may help gain views on their content whereas research studies which are peer reviewed may need to tone down statements of significance.

3.2.1.2.2. Negative language about gene/disorder

In contrast to the positive language levied at the study itself, both newspaper articles and research papers used negative language when referring to the mental health conditions under study. This was found in eight newspaper articles and four research papers.

This negative language would often posit the disease narrative and highlight the misery associated with mental health conditions and was often found in sections of research papers where the authors explained the justifications for their research:

> "*schizophrenia is a debilitating psychiatric condition" (*Research paper on genetics in schizophrenia)
>
> *"[depression] causes extensive periods of disability*" (Research paper on genetics in depression)

This is similarly the case in newspaper articles which often present a very negative image of mental health conditions without any alternative views (i.e., from those with lived experience):

> *"a major cause of disability and trauma"* (Newspaper reporting on research into genetics and schizophrenia)

Within the newspaper articles, it was also observed that this negative language was also used alongside descriptions of the genes studied, often describing them as "defective", or being "to blame". There was also language alluding to physical violence "scars" when discussing PTSD.

This negative language works alongside the positive language about the study to paint a one-sided picture of the negative nature of mental health which is

something that needs to be stopped or treated and adds to the narrative that research into genetic causes is the way in which we can end this misery. It also contributed to the overall inability to offer criticism or nuanced discussion of the ethical nature of the research.

3.2.1.2.3. Need for further research

Part of the genetic optimism theme includes needing to explain why this research is a good thing. It was noted that the research papers did this by alluding to the need to increase the knowledge base for the genetic aetiology of mental health conditions. Three research papers explicitly cited how their research findings were a good thing due to their highlighting of new areas for further research:

> "*these findings advance our understanding of the underlying genetic architecture of depression and provide novel avenues for future research"* (Research paper on genetics in depression).

Only two of the research papers highlighted the future practical implications for their research and those that do are not explicit in how they see their research being used, instead saying that the work could be used for "*improving outcomes"* (Research paper on genetics and anorexia nervosa*)* or *"therapeutic use"* (Research paper on genetics and schizophrenia).

3.2.1.2.4. Practical Implications of research

Unlike the research papers, newspaper articles often explicitly discussed what the practical use of the research could be, often highlighting potential new treatments. This was observed in twelve newspaper articles:

> "*herald new treatment hope"* (Newspaper article discussing research on genetics and depression)
>
> *"pave the way for better diagnosis and treatments for people suffering the condition"* (Newspaper article reporting on research on genetics and schizophrenia).

There was no evidence in any article about how this treatment would look and how the genetic research itself would lead to this treatment.

Interestingly, these hopes for treatment often were reported as quotes from researchers in the newspaper articles and were not seen within their research papers themselves. This suggest that a level of transformation in the subthemes used to denote genetic optimism happens between the creation of a research paper and its reporting in the newspaper. We may also hypothesise that the need for more absolute and practical implications of research are important when disseminating research to the public.

3.2.1.2.5. Absence of ethical considerations

DTA allows the analyst to look for absences and the choices not made. This is also highlighted in research on media frames introduced in the first chapter which discusses how journalists and editors keep consistency in the frames used by choosing to omit information from their presentation. In this case, the omission of ethical considerations regarding the nature of the research.

Neither the newspaper articles nor the research papers held any space for a critical discussion on the ethical implications for the genetic findings. This may be that the possible ethical considerations highlighted in the previous chapters around genetic research are ignored, including its links to eugenics and its role in the creation of stigma for those with mental health conditions as well as the lack of significant practical advances following from genetic research. It is hypothesised that this has been done so to keep an optimistic stance regarding the research presented.

3.2.3 Theme 3: Genetic Caution

The final theme that was identified across both the newspaper articles and the research papers was that of genetic caution. This was only found in two research papers and three newspaper articles. It was categorised as attempting to present a less certain picture of the nature of genetic research, often by using very cautious language and offering alternative examples of factors in the development of mental health disorder.

Overall, two research papers and their corresponding newspaper articles displayed genetic caution and one newspaper article employed this frame despite the corresponding research paper not doing so. This suggests the impact that the themes employed in the writing of the research paper is potentially considerable on the themes identified in the newspaper articles reporting on them. This may be more so when it comes to presenting caution or even criticism as a journalist when the research paper instead presents a genetically confident stance.

3.2.3.1. Cautious language

Within both the newspaper articles and the research papers that employed a genetically cautious frame, the use of cautious language and hedging as a device was present, often being explicit in the need for caution when interpreting results:

> *"the PRS findings should be treated with caution*" (Research paper on genetics and psychosis)

One newspaper article actively stated that there was no conclusive result from the research:

> *"however a single gene has not been categorically linked to the condition and environmental factors are also thought to play a part"* (Newspaper article on research about depression and genetics)

Whilst one research paper demonstrated a level of confidence in their own findings, they acknowledge the historical lack of success of conclusive research within the field of genetic psychiatry:

> *"Despite high heritability, little success was achieved in mapping genetic determinants of depression-related traits by means of genome-wide association studies*" (Research paper on depression and genetics)

3.2.3.2. Clear references to other factors

In combination to this cautious language, the highlighted research papers and corresponding newspaper articles also made more explicit reference to interaction with genetic and environmental factors and the size of the effect, providing a more balanced account of the complexity of mental health aetiology:

> *"we found that the likelihood of having a psychotic experience is determined by genetics to some degree - but the contribution is small" (*Research paper on genetics and psychosis)

The corresponding newspaper article also highlights the impact of other factors over the role of genetics:

> ***"**This means that environmental factors may have a greater influence over genetics in causing isolated psychotic experiences in people without schizophrenia"* (Newspaper article reporting on research paper about psychosis and genetics)

It is noted that in one newspaper article, the reporters explicitly sought out the counter opinions of a mental health charity, publishing the quote which urges caution about the genetic research and highlighting the impact of environmental factors:

> *"There's no escaping from the fact that in Scotland, people in the most deprived areas are four times more likely to report two symptoms of depression than those in the least deprived areas. Our immediate environment, such as financial circumstances, family, relationships, housing and welfare will have the biggest impact on our mental health."* (Newspaper article on research about genetics and depression)

This alternative viewpoint was not present in the original research paper.

3.2.3.3. Failure to replicate previous findings

One way of demonstrating genetic caution in the research papers was the acknowledgement of the lack of consistency in the genetic literature which was

seen in a single research paper. This worked as a counter point to the implicit taken-for-grantedness about the model of genetic psychiatry present in the previous genetic confidence and optimism themes:

> *"We did not find evidence of association of previously reported genes*" (Research paper on genetics and depression)

3.2.3.4. Limitations acknowledged

Finally, one research paper using the genetic cautious theme explicitly discussed the limitations of their study with regards to providing definitive knowledge about the role of genetics in mental health conditions which focused on how mechanisms underlying their results cannot be discerned from their study:

> *"The mechanisms underlying the high genetic correlation between depression and psychotic experiences cannot be discerned from our analysis"* (Research paper on psychosis and genetics*)*

3.2.4. Transformation of Discursive Themes

To further explore the transformation of research literature to newspaper articles and how the different genetic frames are utilised at which point, a second analysis was completed on a single research paper along with its corresponding newspaper article and the associated press release. The research paper examined the genetic contributions to the aetiology of Anorexia Nervosa and the newspaper article covering this research from The Independent. Copies of these annotated documents can be found in Appendix D.

3.2.4.1 Discursive themes of the research paper

Through analysis of the research paper, several themes discussed above were identified. The paper demonstrated a level of genetic confidence in the manner that it discussed the functioning of the discovered genes on the body and these links to anorexia nervosa, specifically through the metabolic system:

> "*The genetic architecture of anorexia nervosa mirrors its clinical presentation showing significant genetic correlations with psychiatric disorders, physical activity, metabolic (including glycaemic), lipid, and anthropometric traits*"

This was discussed above as a softer form of genetic confidence as it posits that the genes impact on other biological mechanisms that aetiologically effect the development of the condition rather than specifying causal genes.

Whilst there was also some observation of genetic optimism in the form of giving possible uses of this research, it was not particular direct with these conclusions, instead presenting a level of caution and positing that instead the research could be employed to "*improve outcomes*" without giving examples of what those outcomes might be and the ways in which genetic research would provide improvement.

Finally, the optimism was maintained to some degree in the research paper by utilising negative language when discussing anorexia nervosa, focusing on an illness narrative, describing it as a "*serious illness*" and the negative impact of anorexia on its "*sufferers*".

3.2.4.2. Discursive themes of the press release

Analysis of the press release identified use of positive language directly about the study often in conjunction with the same negative language about anorexia nervosa seen in the original research paper. This positive language was seen in both describing the significance of the study as well as explicitly giving notice to the prestige of the universities and institutions involved:

> *"[institution] is consistently ranked among the top medical schools in the US"*

The press release also demonstrated a more direct reference to why this research is a good thing than the original paper by giving direct quotes about how the research might be used to support the treatment of anorexia nervosa:

> *"may yield powerful new clues about their causes and may change how we approach and treat anorexia"*

and contrasting this with comment that the current knowledge base/treatment has been failing people with the condition:

> *"A failure to consider the role of metabolism may have contributed to the poor track record among health professionals in treating this illness"*

The press release also demonstrated a strong level of genetic confidence in its language use, talking about finding the "*origins*" of anorexia nervosa and directly linking the genetic research to the aetiology of anorexia nervosa:

> *"identified eight genetic variants significantly associated with anorexia nervosa"*

This is unlike the original paper which instead focused its confidence on the pathways in which the genes play a role on an individual's metabolic system which in turn is implicated in the development of anorexia nervosa.

Finally, it was noted that the press release gave a level of transparency to the research paper by giving clear information on the sources of funding and the researchers involved in the paper.

3.2.4.3. Discursive themes of the newspaper article

The newspaper article is written from the above press release by a health correspondent journalist. It is clear that large portions of press release are used within the article without transformation however there are areas in which the journalist has reworded or added content to the press release to transform its content.

An analysis of this article found an increase level of genetic certainty by obfuscating the pathway/genetic mechanisms conclusion found in the research paper further. This is a similar transformation to that found above in the press release, but the language has been changed to suggest the genetic aetiology has been found.

> *"An international team of researchers found people who develop anorexia are genetically predisposed"*

The second thing to note in the article is that there is much more focus on the genetic optimism theme that states that this is a good thing, often employing the

positive language describing the study seen in the press release along with the same negative language, describing "*sufferers".* It also uses more hyperbolic language to describe the study which was not seen in the press release nor the original article:

> *"This is ground-breaking research that significantly increases our understanding of the genetic origins of this serious illness"*

This creates a setting in which the research must be a good thing and then goes on to again to describe how the research may support treatment of individuals with anorexia nervosa:

> *"This may explain why existing therapy struggles to treat the serious and life-threatening condition and point the way to potential drug treatments in future, pharmacological implications".*

3.2.4.4. Transformation across sources

3.2.4.4.1. Transformation of justifications of genetic research

As described in the theme of genetic optimism, the observed increase in the positive language of the study which was introduced in the press release which is copied across into the newspaper article adds to the justification of the research, even if the findings are inconclusive. This is presented alongside negative language about the condition, framed often as an illness and describing the suffering of those with the condition. This was found across all three sources. Specifically, within this example, there was also critical statements made about the current treatment and management of those with anorexia which provides a justification of looking into the genetics of anorexia nervosaas presenting an alternative model which can explain the limitations of current treatment methods.

There was very little active transformation of the justification of the research across all three sources, although the way in which the significance of the study was described appeared to become more explicitly positive in the press release than the original research paper. These techniques add to the argument that the genetic research and its findings are a good thing. Across all three sources

there was no discussion of the ethical implications of this justification are present.

3.2.4.4.2. Transformation of research findings

The overall pattern in this example appears to be an increase in the use of genetic confidence in the newspaper article as compared to the original research paper. This can be seen by the change of language from a description of the impact of genes on the development of the metabolism which in turn is posited to have an impact on the development of anorexia nervosa, to a simpler description of the research findings which states that they have found genetic predisposition to anorexia nervosa. This change appears to start in the press release and is increased further in the newspaper article.

3.2.4.4.3. Transformation of the implications of the research

There is also an increased use of the genetic optimism theme, particularly focusing on the genetic findings being a good thing. This follows a similar pattern described above in which the implications of the research are less directly stated in the original research paper and instead are accompanied by a level of caution in the language used. Within the press release these implications of the research were more directly spelled out and these were taken as quotes by the journalist for the newspaper article making a clear link between the outcomes of this study and its impacts on the treatment of people with anorexia nervosa.

Finally, there was a reduction in the transparency about sources of funding and the researchers involved in the project from the press release to the newspaper article. This may reduce the ability of readers of the newspaper article to examine the claims about the implications of this piece of genetic research critically as any connections to companies or products are not presented in the newspaper article.

4. DISCUSSION

4.1 Overview

This chapter discusses the quantitative and qualitative data in response to the research questions with reference to the current literature. These findings are drawn together to identify implications for future research and for clinical practice. The quality of the research is evaluated, and limitations of the present study are highlighted.

4.2 Interpreting the Findings

For the purposes of this discussion, the results described above will be explored in relation to the three research questions identified at the beginning of this research.

4.2.1. What Types of Mental Health Research are Reported in British Newspapers?

Overall, the content analysis of newspaper articles discussing mental health research demonstrated that the 29.4% of newspaper articles covered research that examined environmental causes of mental health, followed closely by research that examined the demographics and prevalence of mental health conditions. Research focussed on the biological models of mental health (brain functioning, genetics, medication, and other biological causes such as immunology) made up a total of 17.8% of total newspaper articles, 5.3% were on psychological therapies whilst only 5.2% of articles covered genetic causes of mental health conditions.

4.2.1.1. Comparison with Lewison et al.'s (2010) Study

Lewison et al's (2010) study of coverage by BBC Online and the New Scientist reported that 75% of articles concerned biological research and the proportion of articles reporting on genetic research was larger than found in the present study (9.1% BBC Online and 12.8% in the New Scientist). They reported that only 1% of BBC News online articles and only 1.5% of New Scientist articles were on psychological therapies The present study found an increased presence of articles that covered psychological therapies.

Lewison et al. (2010) found 24.3% of articles in the BBC and 12.8% of articles in the New Scientist suggesting that there was a similarity in the number of articles covering environmental causes of mental health in the present data sample and the sample of the BBC Online articles studied by Lewison et al. (2010). It is notable that the number of environmental articles found within the New Scientist was much lower than in the present study and may be suggestive of the audience and journalists/editors for the New Scientist.

There may be several factors that could explain these differences in results. One possible explanation is the changes to the types of disorders this study examined do not completely compare to those searched by Lewison et al. (2010). The decision in this study was to focus on functional mental health conditions and the previous research included neurological conditions such as dementia in their search. It may be that the increased number of genetic results are reflective of a large interest in research regarding genetics and neurological/neurodevelopmental conditions.

Another possible explanation is that there may be differences in the editorial policies between the kinds of outlets covered by Lewison et al (2010) and the present study. For example, the BBC's TV coverage of mental health has previously been criticised for giving more emphasis to biological research in comparison with psychosocial research (*All in the Brain? | Discursive of Tunbridge Wells*, n.d.; *Open Letter about BBC Coverage of Mental Health - Mad In America*, n.d.). A limitation of the present study is that it did not differentiate between 'broadsheet' newspapers and tabloid (e.g., the Sun) or 'middle brow' newspapers like the Daily Mail and, since it could be argued that BBC News Online and the New Scientist are nearer to broadsheet publications in approach. It is possible that there may be differences between types of

publications though, it could equally be argued that tabloids and middle brow newspapers might be more likely to sensationalise biological and genetic research. Future research could examine whether this might explain some of the differences.

Thirdly, the increase in articles reporting on environmental aetiologies and psychological therapies in this study may suggest a greater interest in the public for explanative models outside of the biological. It may also reflect a difference in the period being examined. Much of the research discussing psychological therapies in this data focussed on the impact of new technologies such as virtual reality which would not have been as accessible during the period examined by Lewison et al. (2010). The present study also included the period of the pandemic and the impact of COVID 19 and lockdowns on mental health – which would be classified in Lewison et al's (2010) 'environmental' category -- were heavily represented in the reviewed newspaper articles studied. This public health crisis may have fomented a shift in public interest into the environmental influences on mental health.

A final potential explanation is that the biological and genetic categories are narrowly defined whereas the environmental category covers virtually all other causes and thus tends to account for a larger proportion of possible causes of mental health problems.

4.2.2. What Themes are Currently Used by British Newspapers to Discuss Mental Health Genetic Research?

To explore the range of different themes used to discuss genetic research both in the newspaper and in peer reviewed journal articles, a DTA was completed. This analysis identified three main themes of genetic research reporting: genetic confidence, genetic optimism, and genetic caution.

4.2.2.1. Genetic Confidence

Genetic confidence was the most frequently found theme found in the articles and research papers reviewed. This was often created by relying on taken-for-granted assumptions that the research had resulted in identifying the gene

related to the mental health condition or assumptions of the role of the identified gene in pathways and mechanisms in the body that lead to development of the condition. Results of research articles were often over-emphasised in newspaper articles by offering numbers and statistics without context. There was also a sense that this taken-for-grantedness extended to other mental health conditions, often stating that there were genetic links between mental health conditions without providing evidence for these claims. Both newspaper articles and research papers often de-emphasised the role of other factors, both within their interactions with genes and as alternative models for the development of mental health conditions. It is interesting that this was a feature as it appears to correspond with Cromby et al.'s (2019) critique of the epigenetic position in that environmental factors are often condensed, and their importance reduced over that of the biological factors.

This theme did have several similarities with the work of Conrad's (2001) genetic optimism frame's first element which was described as a taken-for-granted stance that mental health conditions are heritable and that there are findable genes that will reflect this heritability. At the time of Conrad's (2001) research, the impacts of the Human Genome Project were just being conceptualised and so at this stage, a stance of optimism may have been more appropriate. However, the literature today has increased, with many new analysis techniques being developed and technology changing the way in which scientists examine heritability. Whilst there is plenty of evidence to suggest that the totality of genetic research into mental health conditions has not been conclusive (see refs above), this taken-for-grantedness has needed to continue in order to continue to the "hype and hope" element of Conrad's (2001) frame. It may be that this has transformed into the genetic confidence theme seen here in a way to ensure that this taken-for-grantedness posited in the original genetic optimism frame is not challenged despite the lack of conclusive results.

This theme of genetic confidence also appears to correspond with Carver et al.'s (2008) work on genetic determinism as a frame for genetic health research in the media. Similar rhetoric strategies were found across this research and that of Carver et al. (2008) such as using terms such as "faulty genes" along with reducing the involvement of environmental factors (in the case of bowel cancer) to a small mention at the end of the article.

4.2.2.2. Genetic Optimism

This research was consistent with some of the findings of Conrad's (2001) genetic optimism frame identified within American newspapers.

Overall, the genetic optimism theme was observed less frequently in the current study than in the original work by Conrad (2001). This may be for three reasons. The first may be due to the inclusion of research papers to review which themes are present in peer reviewed journals as well as the UK media. This may have skewed the frequency of observation of the genetic confidence frame in the results. However, even when we examine the themes in newspaper articles separately to the journal papers, there is still an increased presence of the genetic confidence theme over the genetic optimism theme.

Secondly, as noted above the time frame for this research has been marked by changes in advancing scientific technology which means that at the time of Conrad's research, there was not the literature base for genetic psychiatry in the same way as today and so this may have led writers to use optimism rather than confidence when talking about genetic research.

Thirdly, this change in the use of this theme seen may be a result of changing beliefs about how genetics are viewed in the public. A review of public attitudes by LePoire et al. (2019) found that there was a high proportion of positive attitudes towards genetics within medicine on the whole a greater amount of self-reported knowledge about genetics. It may be suggested then that this move towards a framing of genetic confidence in the media is reflective of this wider public shift in attitudes. This is an area in which causality may be circular and is an area of potential future research.

An element of the genetic optimism theme found in almost all newspaper articles was the assumption that genetic findings would be of positive benefit, particularly that they would lead to the future development of treatments. This was not seen explicitly within the research papers and these optimistic ides about treatment were not elaborated upon in the newspaper articles. there was little discussion of how genetic research specifically would support the development of treatment or even what the nature of these treatments would be. This utopian framing was similarly identified by Wilde et al. (2011) in their review of Australian newspapers who also demonstrated that these hopeful

promises of discoveries and future treatments put forward within the newspapers were not delivered upon by modern research. Similarly to Conrad (2001) and Wilde et al. (2011), there was no reference to any ethical concerns or critiques of genetic research across any newspaper articles or research papers. This is of significant concern as demonstrated in the introduction chapter, the history of eugenics in the first half of the twentieth century led to shocking outcomes, whilst, in more recent years a bio-genetic emphasis could be said to have resulted in less investment in psychosocial interventions and research (Bentall & Varese, 2012).

4.2.2.3. Genetic Caution

This research also observed a third theme that was present in a small number of media articles and journal papers: genetic caution. This theme is not the same as the genetic pessimism identified by Wilde et al. (2011) which looks at the framing of genetic research as leading to dystopian outcomes. Instead, this demonstrated a level of restraint in the optimistic claims of the research and on a single occasion, allows for alternative voices to offer different explanations for the development of depression. This may be an example of what Ohlsson (2018) found in their review of the general themes of mental health in Swedish newspapers, termed polemics in a field of contestation. Ohlsson (2018) found some examples which attempted to challenge the taken-for-grantedness of psychiatric expertise by journalists presenting a wider array of different perspectives. This theme of genetic caution demonstrates a positive move away from the use of the confidence and optimistic themes of genetic reporting, but it is still in the minority. One implication of this research may be to consider how we can increase this framing within our media to ensure that a more diverse range of voices are heard when genetic research about mental health conditions is reported in our newspapers.

4.2.3. How are These Particular Themes Constructed Between Researchers and Journalists?

Finally, this research began to explore how these identified themes are transformed across research papers, press releases and newspaper articles.. A single case study of this process across these three sources.

The results suggested that, at the press release stage, findings were framed slightly more exaggerated language than the journal article and this was even more the case in the newspaper article. For example, a journal article's discussion of genetic influences on pathways within the body which might influence the development of a mental health condition were transformed into a simplistic and reductionist statement that the identified gene caused anorexia nervosa. This can be seen as a development of the "hype" aspect of Conrad's (2001) framework in which the research is described as groundbreaking or incredibly significant. This process may be related to the notion of popularisation (Peters, 2013) which suggests that scientists often engaging in simplification of complex biological research concepts into soundbites for public consumption. This may also contribute the development of hype. Weingart (2002) notes the example of popularisation and the commercialisation of University and Institution Public Relations teams as a way for science to sell itself. It may also be that these simpler brief statements about the results of a genetic study also benefits the sales of the newspaper running the article as sensational statements about the discovery of an "anorexia gene" may draw in a wide readership.

A final point of transformation between the research paper and the newspaper article via the press release was in the reporting of the practical implications of the research. These practical implications were not seen within the original research paper, but through the creation of the press realise and then the following newspaper article, the prospective role of this research in the development of novel treatment for anorexia nervosa was highlighted. This appears to be an important factor for developing the "hope" discussed by Conrad which again works as an ongoing justification for the genetic research as well as for newspapers dedicating space to the results.

As this was only a single case study, further research needs to be completed to review the generalisability of these ideas about the transformation of frames in the process of disseminating genetic research.

4.3. Critical Review

4.3.1. Limitations

There are several limitations to this research. Firstly, there were fewer newspaper articles reporting on genetics and mental health than anticipated. The number was further reduced because some articles did not give enough detail about the original research to identify relevant journal articles. As such, the sample of newspaper article and research papers was smaller than the sample reviewed by Conrad (2001). This may mean that the results of this study have a limited generalisability and future researchers could focus on a larger data set, for example, by increasing the period studied beyond the previous five years and including other media sources, such as magazines and other online content (e.g., YouTube, Instagram, Twitter).

A second limitation is the use of the kinds of functional mental health diagnoses found in psychiatric manuals like the DSM as search terms and categories. Given the poor reliability and validity (Freedman et al., 2013) of these categories this is potentially problematic. One way of addressing this might be for researchers to examine what kinds of descriptive terms are used in media reports – for example, terms used within the survivor movement instead of or in addition to diagnostic categories.

4.3.2. Evaluation of Research

The evaluation of this research was conducted utilising the three guiding principles of Spencer and Ritchie (2011) which review the research's contribution, credibility and rigor. Each of these areas are considered below.

4.3.2.1. Contribution

This area of evaluation examines the value and relevance the research evidence to theory, policy, and practice etc. There are a number of models of generalisation that can be applied, and it is believed by the author that the role of such research is to create theoretical generalisability which suggests that there is the ability to generalise qualitative data to theory by ensuring the application of theoretical concepts in analysis (Seale, 1999). Whilst this research does have areas for future development which have been highlighted above, this research has begun to answer the questions that it aimed to. In the process, this study's results are consistent with the conceptual frameworks of Conrad (2001) and Wilde et al. (2011) in a different sample (UK newspapers over American and Australian newspapers) as well as providing an extension by examining the different themes that emerged. This research provides a contribution however to the theories of media frame with regards to reporting of genetic research and begins to hypothesise about the nature of the process of transformation from research paper to newspaper article. It is also hoped that this research will add to the evidence base that explores how mental health professionals should engage with the media as well as deeper discussions about how journalists engage with research and science.

4.3.2.2. Credibility

Credibility ensures that the claims made by the research are defensible and plausible. This refers to the ideas of validity, both methodological and interpretive validity (Seale, 1999). As part of demonstrating credibility, transparency of process and data is important. As such, every concept within the themes and subthemes included in the results are illustrated with extracts taken from the texts analysed. Where possible, these extracts are presented in full to ensure that the context of these extracts are also made clear to the audience. It is also hoped that within this chapter, there has been a clear examination of where the results of this study are consistent with the literature and where they deviate from the current literature. As part of this discussion, I have attempted to provide possible explanations for these differences and offered strengthened arguments for the present interpretation of the findings.

The validity of the research was also held in mind throughout by ensuring that alternative ideas and theories were thought about during the process of refining the themes and subthemes and these were discussed within supervision. This included thinking carefully about the use of language in the descriptions of the themes to ensure they were reflective of the concepts within the texts. An example of this is thinking about the ways in which genetic determinism and genetic essentialism are used within the literature when identifying the theme of genetic confidence. There were also discussions within supervision about whether this theme suggests certainty or confidence and used the ideas of taken-for-grantedness to develop this discussion.

4.3.2.3. Rigour

Rigour can often be used synonymously with reliability. Within qualitative research, reliability is taken to mean consistency, auditability, dependability ad reflexivity.

4.3.2.3.1. Consistency

With regards to consistency, the research undertook an inter-rater reliability assessment which used a proportion of the original searched results and the categories identified from the content analysis to ensure that there was consistency in how the researcher coded data into these categories. This assessment turned up an inter-rater reliability of 91% (please see second rater's results in Appendix E) which suggests a level of consistency in the research.

4.3.2.3.2. Auditability

Merrick (1999) reports the importance of auditability to ensure reliability of research. For this end, the author has included several items within the appendices to ensure transparency of data and of interpretive process. This includes a list of search terms used within the content analysis (Appendix A), a list of newspaper articles and research papers used within the discursive thematic analysis (Appendix C), an annotated example of a newspaper article from the DTA (Appendix F) and mind maps of the three themes that emerged from the analysis (Appendix G). It is also important to highlight the supervision

process as creating an audit of the research as decision making is explored from the standpoint of researcher's values.

4.3.2.3.3. Defensibility

This is also related to the concept of defensibility. It is hoped that this thesis has made its aims clear and the rationale for the methodological choices and epistemological stance convincing as a rationale.

4.3.2.3.4. Reflexivity

The final area of rigour to be considered here is that of reflexivity, both personal and epistemological.

4.3.2.3.4.1. Personal reflexivity

This area was discussed in the methods chapter and a few areas of personal reflexivity were presented. Here this focused on the researcher's own experiences of mental health and how these have been constructed using particular models. It is reasonable to state that I often found it uncomfortable to read such biologically deterministic accounts of mental health as these conflict with my own narratives. It was important for me to recognise these feelings when they began and to ensure that I did not continue my coding of the document as I was concerned that this emotional response might reduce my objectivity. Supervision was important for exploring these and to challenge areas in which I might have allowed my own personal narratives to skew my reading of texts. It was also important for me to reconnect with ideas from others with lived experience who have a variety of personal narratives that include the biological model to various degrees to remind myself that many views about the role of genetics within in the development of mental health can be held by those with mental health conditions.

4.3.2.3.4.2. Epistemological reflexivity

It is also important to consider epistemological reflexivity (Dowling, 2006) which utilises reflection of the various theoretical assumptions and perspective that

can influence the research. This includes examining how the research questions themselves were created and instead how the topics of the research could have been investigated differently. The development of the research question has a particular world view held by the researcher underlying it, that of the dominance of biogenetic research in psychiatry. Therefore, it was surprising to the researcher that there was less available data for analysis than would have previously been estimated. It is also clear that this world view was held in the fact that other forms of mental health research were not examined.

4.4. Implications of the Research

This study's findings suggest several implications of the use of particular genetic themes in the creation of research paper and newspaper articles along with some areas for future research.

4.4.1. Areas for Future Research

This study has begun to explore the relationship between current genetic frames used by newspapers in the UK and to see how these frames are generated in the process of research being written up and disseminated to the public. Whilst this research demonstrates some consistency with Cohen's (2001) and Wilde's (2011) research on genetic optimism frames within the UK newspapers, this also found some novel aspects in the genetic caution framework as well as the way in which genetic confidence was presented across newspapers and research papers. As this is an initial study, a larger sample would be needed to ensure generalisability of these results. This is particularly the case when examining the transformation of themes between the research paper and the news article which have begun to be explored in this thesis. This research could also be extended by using DTA on articles that report of other areas of mental health research such as environmental or psychological aetiologies to examine whether similar "hype and hope" is also developed in these research traditions.

Another area for future research could be the inclusion of a wider range of UK media to assess whether the themes in which genetic research are described

are the same across multiple mediums. This could include magazines, TV programmes, radio, and newer internet content on social media platforms such as YouTube and TikTok. A recent poll by Ofcom (*News Consumption in the UK 2021 - Overview of Research Findings*, n.d.) shows that half of adults in the UK now use social media to get news and so future research will need to include these platforms.

A future extension of this research would be to include interviews with journalists, editors, researchers, and members of the public regarding the influence of these three different themes in the reporting of genetic mental health literature on how they consume and create research/news. There is currently research which examines the views of writers within other forms of media (e.g. television) on how their medium influences stigma about mental health (Henderson, 2018) and such extensions of this research would also add to this evidence base.

4.4.2. Media Guidelines and Training of Journalists

There is current work on creating guidelines for journalists when reporting on science in the media. These include work completed by the Science Media Centre (2012) which gives practical advice on ensure that stories are balanced and accurate along with guidelines from the British Psychological Society (n.d.). These include ensuring that sources should be properly referenced and the ensuring a variety of sources with appropriate expertise. This was an area that was not observed within the studied newspaper articles which often included only information from the researchers and rarely (only one occasion) where alternative sources of information were included. This does not result in a balanced reporting of the science and so the genetic themes of confidence and optimism can be presented without critique.

The Science Media Centre also highlights the need to not ignore serious scientific concerns, and it is the view of the author of this thesis that this should also extend to the ethical concerns of the research results. Again, this was an area that was not present within the media reports studied. Therefore, emphasis needs to be placed on how to support journalists to access alternative sources of information and to think about skilling up journalists and editors to offer

balanced critiques of the work they are covering. In the words of the Science Media Centre, journalists need to “be wary of scientists and press releases over-claiming for studies” (2012). It is unclear if journalists feel appropriately skilled in judging the scientific claims presented to them in the press releases and the influence of “churnalism” may make it so that journalists have limited time to complete due diligence on the press releases they are presented with. Again, this points to wider issues in journalism as a business but also suggests an area for further training alongside journalists and editors on how to read and understand the research with which they are presented.

4.4.3. Alternative Sources of News

An area that has less coverage in terms of guidance is how to support content creators on social media platforms to ensure science is appropriately reported. Unlike journalists, these creators are not often trained on journalistic standards and are not joined within professional bodies. It is unclear how these group may be best reached and how guidance can be monitored to ensure that research into mental health is delivered to the consumers of this content in a balanced and ethical manner.

4.4.4. Role of Clinical Psychologists

Clinical psychologists have a role in supporting the media to accurately represent research on mental health. One area includes supporting the development of training and guidance for journalists and editors when reporting on mental health research. The research presented in in the introductory chapter demonstrated that the dominance of a genetic model of psychiatry does not in fact reduce the impacts of stigma on those with mental health conditions and so it is appropriate for these results to be challenged by others in the mental health space. This also includes supporting service users, mental health activists and those with lived experience to engage with the media to offer alternative and less heard views on the impacts of research to challenge the hype and hope that can be created through the genetic confidence and optimism themes within the newspaper.

Finally, it is important to remember that the British Psychological Society has identified the role of clinical psychologist as scientist-practitioner. This means that there is a duty to engage with scientific research and its reporting in the media. The BPS has produced guidelines on how clinical psychologists should engage with the media however, not a single clinical psychologist was presented in any of the studies. It is hoped that the results of this research will encourage clinical psychologists to reflect on how these genetic themes may compare to their professional values and will encourage clinical psychologists to ensure that they engage with the media to produce alternative views either through publication of their own research or being available for comment. There have been examples of large and successful campaigns of public engagement by psychologists for new reports such as the Understanding Psychosis and Schizophrenia report (e.g. Cooke, 2016). It is hoped that such engagement with the media can become more common and will be seen in a wide range of media that discusses topics of mental health.

4.5. Conclusion

This study aimed to explore the types of mental health research that are presented in the UK newspapers between 2017 and 2022. This included a range of newspapers both local and national. It was found that the majority of research presented in the news during this range was looking at the environmental aetiologies of mental health conditions (29%). The amount of coverage of genetic research was much lower (5.2%).

The study then examined the ways in which genetic research was presented in these newspaper articles and in the original research papers. This analysis found three main themes of genetic confidence, genetic optimism and to a lesser extent genetic caution across the newspaper articles and the research papers. There were differences in how the themes were used across the sources. To examine the transformation process from research paper to newspaper article further, a case study is presented of a single research paper, its corresponding press release and a resulting newspaper article. This show that there are elements of transformation in the themes of genetic confidence

and genetic optimism and that these correspond to the ideas of hype and hope described previously by Conrad (2001).

This research suggests a need for mental health professionals and particular clinical psychologists to engage with the media to support a more balanced reporting of mental health research as well as to provide a challenging view to the increased frequency and possible power of the genetic confidence and optimism themes.

REFERENCES

All in the brain? | *Discursive of Tunbridge Wells*. (n.d.). https://blogs.canterbury.ac.uk/discursive/all-in-the-brain/

Allen, R., & Nairn, R. G. (1997). Media depictions of mental illness: an analysis of the use of dangerousness. *Australian and New Zealand Journal of Psychiatry*, *31*(3), 375–381.

Alper, J. S., & Beckwith, J. R. (2002). *Genetics of human personality: social and ethical implications.*

Angell, B., & Bolden, G. B. (2015). Justifying medication decisions in mental health care: Psychiatrists' accounts for treatment recommendations. *Social Science & Medicine (1982)*, *138*, 44–56. https://doi.org/10.1016/J.SOCSCIMED.2015.04.029

Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B. (2015). "Science capital": A conceptual, methodological, and empirical argument for extending bourdieusian notions of capital beyond the arts. *Journal of Research in Science Teaching*, *52*(7), 922–948.

Atkinson, P., & Silverman, D. (1997). Kundera's Immortality: The interview society and the invention of the self. *Qualitative Inquiry*, *3*(3), 304–325.

Avramopoulos, D. (2010). Genetics of psychiatric disorders methods: molecular approaches. *Psychiatric Clinics*, *33*(1), 1–13.

Bannister, R. (2010). *Social Darwinism: Science and myth in Anglo-American social thought*. Temple University Press.

Bataille, V., Lens, M., & Spector, T. D. (2012). The use of the twin model to investigate the genetics and epigenetics of skin diseases with genomic, transcriptomic and methylation data. *Journal of the European Academy of Dermatology and Venereology*, *26*(9), 1067–1073.

Bateson, P. (2002). William Bateson: a biologist ahead of his time. *Journal of Genetics*, *81*(2), 49–58.

Bauer, M. W., & Bucchi, M. (2007). Journalism. *Science and Society: Science*

Communication between News and Public Relations. New York: Routledge.

Beck, A. T. (2019). A 60-year evolution of cognitive theory and therapy. *Perspectives on Psychological Science*, *14*(1), 16–20.

Bennett, L., Thirlaway, K., & Murray, A. J. (2008). The stigmatising implications of presenting schizophrenia as a genetic disease. *Journal of Genetic Counseling*, *17*(6), 550–559.

Bentall, R. P., & Varese, F. (2012). A level playing field?: Are bio-genetic and psychosocial studies evaluated by the same standards? *Http://Dx.Doi.Org/10.1080/17522439.2012.729856*, *4*(3), 183–190. https://doi.org/10.1080/17522439.2012.729856

Berelson, B. (1952). *Content analysis in communication research.*

Biesecker, B. B. (2001). Goals of genetic counseling. *Clinical Genetics*, *60*(5), 323–330.

Bilić, B., & Georgaca, E. (2007). Representations of “mental illness” in Serbian newspapers: A critical discourse analysis. *Qualitative Research in Psychology*, *4*(1–2), 167–186.

Binder, A. (1993). Constructing racial rhetoric: Media depictions of harm in heavy metal and rap music. *American Sociological Review*, 753–767.

Botelle, R., & Willott, C. (2020). Birth, attitudes and placentophagy: a thematic discourse analysis of discussions on UK parenting forums. *BMC Pregnancy and Childbirth*, *20*(1), 1–10.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

British Psychological Society. (n.d.). *Media ethics*. https://www.bps.org.uk/about-us/communications/media-ethics

Brown, P. O. (1994). Genome scanning methods. *Current Opinion in Genetics & Development*, *4*(3), 366–373. https://doi.org/10.1016/0959-437X(94)90023-X

Carla, W. (2001). *Introducing Qualitative Research in Psychology: Adventures*

in Theory and Method. Buckingham, Philadelphia: Open University Press.

Caruso, J. P., & Sheehan, J. P. (2017). Psychosurgery, ethics, and media: a history of Walter Freeman and the lobotomy. *Neurosurgical Focus*, *43*(3), E6.

Carver, R., Waldahl, R., & Breivik, J. (2008). Frame that gene: A tool for analysing and classifying the communication of genetics to the public. *EMBO Reports*, *9*(10), 943–947.

Centre, S. M. (2012). *10 best practice guidelines for reporting science \& health stories*.

Chase, A. (1980). *The Legacy of Malthus: The Social Costs of the New Scientific Racism. Urbana: U*. Illinois Press.

Cheung, B. Y., Schmalor, A., & Heine, S. J. (2021). The role of genetic essentialism and genetics knowledge in support for eugenics and genetically modified foods. *PloS One*, *16*(9), e0257954.

Clark, R. E. (2004). The classical origins of Pavlov's conditioning. *Integrative Physiological \& Behavioral Science*, *39*(4), 279–294.

Clarke, V. (2005). 'We're all very liberal in our views': Students' talk about lesbian and gay parenting. *Lesbian \& Gay Psychology Review*, *6*(1).

Cocks, G. (2018). *Psychotherapy in the Third Reich*. Routledge.

Collier, A. (1994). *Critical realism: an introduction to Roy Bhaskar's philosophy*.

Conrad, P. (2001). Genetic optimism: Framing genes and mentalillness in the news. *Culture, Medicine and Psychiatry*, *25*(2), 225–247.

Conrad, P., & Markens, S. (2001). Constructing the 'gay gene'in the news: optimism and skepticism in the US and British press. *Health:*, *5*(3), 373–400.

Cooke, A. (2016). Changing society's whole approach to psychosis. *Http://Dx.Doi.Org/10.3109/09638237.2016.1167861*, *25*(4), 287–290. https://doi.org/10.3109/09638237.2016.1167861

Crews-Anderson, T. A. (2007). *Critical thinking and informal logic*. Humanities-Ebooks.

Cromby, J., Chung, E., Papadopoulos, D., & Talbot, C. (2019). Reviewing the epigenetics of schizophrenia. *Journal of Mental Health*, *28*(1), 71–79.

Culpepper, L. (2013). Reducing the burden of difficult-to-treat major depressive disorder: revisiting monoamine oxidase inhibitor therapy. *The Primary Care Companion for CNS Disorders*, *15*(5), 27220.

Dar-Nimrod, I., & Heine, S. J. (2011). Genetic essentialism: on the deceptive determinism of DNA. *Psychological Bulletin*, *137*(5), 800.

Darwin, C., & others. (1859). *On the origin of species by means of natural selection or the preservation of favoured races in the struggle for life.* (Vol. 2). Books, Incorporated, Pub.

Dekavalla, M. (2010). Tax, war and waiting lists: The construction of national identity in newspaper coverage of general elections after devolution. *Discourse \& Society*, *21*(6), 638–654.

Detera-Wadleigh, S. D., de Miguel, C., Berrettini, W. H., DeLisi, L. E., Goldin, L. R., & Gershon, E. S. (1987). Neuropeptide gene polymorphisms in affective disorder and schizophrenia. *Journal of Psychiatric Research*, *21*(4), 581–587.

Dowling, M. (2006). Approaches to reflexivity in qualitative research. *Nurse Researcher*, *13*(3).

Downe-Wamboldt, B. (1992). Content analysis: method, applications, and issues. *Health Care for Women International*, *13*(3), 313–321.

Dunwoody, S., & Ryan, M. (1985). Scientific barriers to the popularization of science in the mass media. *Journal of Communication*, *35*(1), 26–42.

Dyck, A. J. (1997). Eugenics in historical and ethical perspective. In *Genetic ethics: Do the ends justify the genes?* (p. 29).

Edwards, D., & Potter, J. (1992). The chancellor's memory: Rhetoric and truth in discursive remembering. *Applied Cognitive Psychology*, *6*(3), 187–215.

Falkai, P., Schmitt, A., & Andreasen, N. (2018). Forty years of structural brain imaging in mental disorders: is it clinically useful or not? *Dialogues in Clinical Neuroscience*, *20*(3), 179. https://doi.org/10.31887/DCNS.2018.20.3/PFALKAI

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, *5*(1), 80–92.

Fiedorowicz, J. G., & Swartz, K. L. (2004). The role of monoamine oxidase inhibitors in current psychiatric practice. *Journal of Psychiatric Practice*, *10*(4), 239.

for Business, D., & Strategy, I. (2020). *Public attitudes to science 2019*.

Francis, C., Pirkis, J., Francis, C., Pirkis, J., Blood, R. W., Dunt, D., Burgess, P., Morley, B., Stewart, A., & Putnis, P. (2004). The portrayal of mental health and illness in Australian non-fiction media. *Australian \& New Zealand Journal of Psychiatry*, *38*(7), 541–546.

Freedman, R., Lewis, D. A., Michels, R., Pine, D. S., Schultz, S. K., Tamminga, C. A., Gabbard, G. O., Gau, S. S.-F., Javitt, D. C., Oquendo, M. A., & others. (2013). *The initial field trials of DSM-5: new blooms and old thorns*. Am Psychiatric Assoc.

Freeman, W., Watts, J. W., & Hunt, T. C. (1942). *Psychosurgery: Intelligence, emotion, and social behavior following prefrontal lobotomy for mental disorders.*

Freud, S. (1953). Fragment of an analysis of a case of hysteria (1905 [1901]). In *The Standard Edition of the Complete Psychological Works of Sigmund Freud, Volume VII (1901-1905): A Case of Hysteria, Three Essays on Sexuality and Other Works* (pp. 1–122).

Galton, F. (1883). *Inquiries into human faculty and its development*. Macmillan.

Gans, H. J. (1979). Deciding what's news: story suitability. *Society*, *16*(3), 65–77.

Ghaemi, S. N. (2013). Taking disease seriously in DSM. *World Psychiatry*, *12*(3), 210.

Ghisoni, M., Wilson, C. A., Morgan, K., Edwards, B., Simon, N., Langley, E., Rees, H., Wells, A., Tyson, P. J., Thomas, P., & others. (2017). Priority setting in research: user led mental health research. *Research Involvement and Engagement*, *3*(1), 1–17.

Goffman, E. (1961). *Asylums: Essays on the social situation of mental patients and other inmates*. AldineTransaction.

Goldacre, B. (2010). *Bad science: Quacks, hacks, and big pharma flacks*. McClelland \& Stewart.

Gottesman, I. I. (1991). *Schizophrenia genesis: The origins of madness.* WH Freeman/Times Books/Henry Holt \& Co.

Gunter, B., Kinderlerer, J., & Beyleveld, D. (1999). The media and public understanding of biotechnology: A survey of scientists and journalists. *Science Communication*, *20*(4), 373–394.

Gusella, J. F., Wexler, N. S., Conneally, P. M., Naylor, S. L., Anderson, M. A., Tanzi, R. E., Watkins, P. C., Ottina, K., Wallace, M. R., Sakaguchi, A. Y., Young, A. B., Shoulson, I., Bonilla, E., & Martin, J. B. (1983). A polymorphic DNA marker genetically linked to Huntington's disease. *Nature*, *306*(5940), 234–238. https://doi.org/10.1038/306234a0

Hallam, A. (2002). Media influences on mental health policy: long-term effects of the Clunis and Silcock cases. *International Review of Psychiatry*, *14*(1), 26–33.

Harper, D. J. (1995). Discourse analysis and'mental health'. *Journal of Mental Health*, *4*(4), 347–358.

Harrington, A. (2019). *Mind fixers: Psychiatry's troubled search for the biology of mental illness*. WW Norton \& Company.

Hatfield, C., & Dening, T. (2013). Functional mental illness. *Mental Health and Care Homes*, 191–204. https://doi.org/10.1093/MED/9780199593637.003.0016

Hawkins, M., & Hawkins, M. (1997). *Social Darwinism in European and American thought, 1860-1945: Nature as model and nature as threat*. Cambridge university press.

Henderson, L. (2018). Popular television and public mental health: Creating media entertainment from mental distress. *Critical Public Health*, *28*(1), 106–117.

Hildersley, R., Potts, L., Anderson, C., & Henderson, C. (2020). Improvement

for most, but not all: changes in newspaper coverage of mental illness from 2008 to 2019 in England. *Epidemiology and Psychiatric Sciences*, *29*.

Huang, B., & Priebe, S. (2003). Media coverage of mental health care in the UK, USA and Australia. *Psychiatric Bulletin*, *27*(9), 331–333.

Insel, T. R., & Lehner, T. (2007). A new era in psychiatric genetics? *Biological Psychiatry*, *61*(9), 1017.

Jackson, D., & Moloney, K. (2016). Inside churnalism: PR, journalism and power relationships in flux. *Journalism Studies*, *17*(6), 763–780.

Jarvis, G. E., Bhat, V., Jurcik, T., Spigonardo, V., & Whitley, R. (2015). Transatlantic variation in the attributed etiology of psychosis. *International Journal of Social Psychiatry*, *61*(6), 577–582.

Jiménez, J. P., Botto, A., Herrera, L., Leighton, C., Rossi, J. L., Quevedo, Y., Silva, J. R., Mart\'\inez, F., Assar, R., Salazar, L. A., & others. (2018). Psychotherapy and genetic neuroscience: an emerging dialog. *Frontiers in Genetics*, *9*, 257.

Johannsen, W. (1909). *Elemente der exakten Erblichkeitslehre*. Fischer.

Jones, R., & Wilsdon, J. (2018). The Biomedical Bubble: Why UK research and innovation needs a greater diversity of priorities, politics, places and people. In *Nesta* (Issue July, pp. 1–76). http://eprints.whiterose.ac.uk/133525/

Joseph, J. (2002). Twin studies in psychiatry and psychology: science or pseudoscience? *Psychiatric Quarterly*, *73*(1), 71–82.

Joseph, J. (2006). *The missing gene: Psychiatry, heredity, and the fruitless search for genes*. Algora Publishing.

Joseph, J. (2010). Genetic research in psychiatry and psychology: A critical overview. *Handbook of Developmental Science, Behavior, and Genetics*, 557–625.

Kandel, E. R. (1998). A new intellectual framework for psychiatry. *American Journal of Psychiatry*, *155*(4), 457–469.

Kendler, K. S. (2005). Psychiatric genetics: a methodologic critique. *American*

Journal of Psychiatry, *162*(1), 3–11.

Kendler, K. S. (2006). Reflections on the relationship between psychiatric genetics and psychiatric nosology. *American Journal of Psychiatry*, *163*(7), 1138–1146.

Kendler, K. S. (2021). The nature of hereditary influences on insanity from research on asylum records in Western Europe in the mid-19th century. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, *186*(5), 270–278.

Kidder, L. H., & Fine, M. (1987). Qualitative and quantitative methods: When stories converge. *New Directions for Program Evaluation*, *1987*(35), 57–75.

Kingdon, D. (2020). Why hasn't neuroscience delivered for psychiatry? *BJPsych Bulletin*, *44*(3), 107–109.

Kingdon, D., & Young, A. H. (2007). Research into putative biological mechanisms of mental disorders has been of no value to clinical psychiatry. *The British Journal of Psychiatry*, *191*(4), 285–290.

Kleinheksel, A. J., Rockich-Winston, N., Tawfik, H., & Wyatt, T. R. (2020). Demystifying content analysis. *American Journal of Pharmaceutical Education*, *84*(1).

Krippendorff, K. (1980). *Validity in content analysis*.

Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. Sage publications.

Leff, J. (2008). Climate change in psychiatry: Periodic fluctuations or terminal trend. *Society and Psychosis*, 11–22.

LePoire, E., Basu, B., Walker, L., & Bowen, D. J. (2019). What do people think about genetics? A systematic review. *Journal of Community Genetics*, *10*(2), 171. https://doi.org/10.1007/S12687-018-0394-0

Leutwyler, K. (2001). First Gene for Schizophrenia Discovered. *Scientific American*, *20*.

Lewison, G., Roe, P., Wentworth, A., & Szmukler, G. (2012). The reporting of mental disorders research in British media. *Psychological Medicine*, *42*(2),

435.

Lombroso, C. (2006). Criminal Man. 1876-97. *Trans. Mary Gibson and Nicole Hahn Rafter. Durham, NC: Duke UP*.

Loomer, H. P., Saunders, J. C., & Kline, N. S. (1957). A clinical and pharmacodynamic evaluation of iproniazid as a psychic energizer. *Psychiatric Research Reports*.

Luty, J. (2014). Psychiatry and the dark side: eugenics, Nazi and Soviet psychiatry. *Advances in Psychiatric Treatment*, *20*(1), 52–60.

Mahgoub, M., & Monteggia, L. M. (2013). Epigenetics and psychiatry. *Neurotherapeutics*, *10*(4), 734–741.

Manseau, M. W. (2014). Economic inequality and poverty as social determinants of mental health. *Psychiatric Annals*, *44*(1), 32–38.

Marx, K. (1858). The increase of lunacy in Great Britain. *New York Daily Tribune*.

Mautner, G. (2008). Analyzing newspapers, magazines and other print media. *Qualitative Discourse Analysis in the Social Sciences*, 30–53.

Mendel, G. (1866). Versuche uber pflanzen-hybriden. *Verhandlungen Des Naturforschenden Vereins in Brunn Fur*, *4*, 3–47.

Merrick, E. (1999). An Exploration of Quality. *Using Qualitative Methods in Psychology*, 25.

MITCHELL, R. S. (1955). Fatal toxic encephalitis occurring during iproniazid therapy in pulmonary tuberculosis. *Annals of Internal Medicine*, *42*(2), 417–424.

MMR: Learning Lessons A report on the meeting hosted by the Science Media Centre on 2 nd. (2002). www.ScienceMediaCentre.org

Moncrieff, J., & Crawford, M. J. (2001). British psychiatry in the 20th century—observations from a psychiatric journal. *Social Science \& Medicine*, *53*(3), 349–356.

Moncrieff, J., & Kirsch, I. (2005). Efficacy of antidepressants in adults. *Bmj*, *331*(7509), 155–157.

Morel, B. A. (1860). Traitsé des Maladies Mentales. *American Journal of Psychiatry*, *17*(2), 199–211.

Mottier, V. (2008). Eugenics, politics and the state: social democracy and the Swiss 'gardening state.' *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, *39*(2), 263–269.

Munro, M. (2018). House price inflation in the news: a critical discourse analysis of newspaper coverage in the UK. *Housing Studies*, *33*(7), 1085–1105.

News Consumption in the UK 2021 - Overview of research findings. (n.d.).

Nightingale, D., & Cromby, J. (1999). *Social constructionist psychology: A critical analysis of theory and practice*. McGraw-Hill Education (UK).

Nurnberger Jr, J. I., Austin, J., Berrettini, W. H., Besterman, A. D., DeLisi, L. E., Grice, D. E., Kennedy, J. L., Moreno-De-Luca, D., Potash, J. B., Ross, D. A., & others. (2018). What should a psychiatrist know about genetics? Review and recommendations from the residency education committee of the International Society of Psychiatric Genetics. *The Journal of Clinical Psychiatry*, *79*(1), 22411.

Ohlsson, R. (2018). Public discourse on mental health and psychiatry: Representations in Swedish newspapers. *Health*, *22*(3), 298–314.

Open Letter about BBC Coverage of Mental Health - Mad In America. (n.d.). https://www.madinamerica.com/2016/02/open-letter-about-bbc-coverage-of-mental-health/

Owens, C., Ley, A., & Aitken, P. (2008). Do different stakeholder groups share mental health research priorities? A four-arm Delphi study. *Health Expectations*, *11*(4), 418–431.

Pariante, C. M. (2016). Neuroscience, mental health and the immune system: overcoming the brain-mind-body trichotomy. *Epidemiology and Psychiatric Sciences*, *25*(2), 101–105.

Pearson, T. A., & Manolio, T. A. (2008). How to interpret a genome-wide association study. *Jama*, *299*(11), 1335–1344.

Peedicayil, J. (2014). A Brief History of Epigenetics in Psychiatry. *Epigenetics in*

Psychiatry, 45–50. https://doi.org/10.1016/B978-0-12-417114-5.00003-6

Peters, H. P. (2013). Gap between science and media revisited: Scientists as public communicators. *Proceedings of the National Academy of Sciences*, *110*(Supplement 3), 14102–14109.

Phelan, J. C. (2005). Geneticization of deviant behavior and consequences for stigma: The case of mental illness. *Journal of Health and Social Behavior*, *46*(4), 307–322.

Picard, R. G., & Yeo, M. (2011). Medical and health news and information in the UK media: The current state of knowledge. *Reuters Institute for the Study of Journalism. Https://Bit. Ly/32lbTaq*.

Pilgrim, D. (2019). Critical Realism for Psychologists. In *Critical Realism for Psychologists*. Routledge. https://doi.org/10.4324/9780429274497

Pincus, H. A., Henderson, B., Blackwood, D., & Dial, T. (1993). Trends in research in two general psychiatric journals in 1969--1990: research on research. *The American Journal of Psychiatry*.

Potter, J., & Wetherell, M. (1987). *Discourse and social psychology: Beyond attitudes and behaviour*. Sage.

Pray, L. (2008). Discovery of DNA structure and function: Watson and Crick. *Nature Education*, *1*(1).

Priebe, S., Burns, T., & Craig, T. K. J. (2013). The future of academic psychiatry may be social. *The British Journal of Psychiatry*, *202*(5), 319–320.

Propping, P. (2005). The biography of psychiatric genetics: From early achievements to historical burden, from an anxious society to critical geneticists. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, *136*(1), 2–7.

Purcell, C., Hilton, S., & McDaid, L. (2014). The stigmatisation of abortion: a qualitative analysis of print media in Great Britain in 2010. *Culture, Health \& Sexuality*, *16*(9), 1141–1155.

Read, J., Fosse, R., Moskowitz, A., & Perry, B. (2014). The traumagenic neurodevelopmental model of psychosis revisited. *Neuropsychiatry*, *4*(1), 65–79.

Reed, R. (2001). (Un-) Professional discourse? Journalists' and scientists' stories about science in the media. *Journalism*, *2*(3), 279–298.

Reese, S. D. (2007). The framing project: A bridging model for media research revisited. *Journal of Communication*, *57*(1), 148–154.

Richardson, J. E. (2017). *Analysing newspapers: An approach from critical discourse analysis*. Bloomsbury Publishing.

Rose, H., & Rose, S. (2010). *Alas poor Darwin: Arguments against evolutionary psychology*. Random House.

Rose, N. (2018). *Our psychiatric future*. John Wiley \& Sons.

Rowe, R., Tilbury, F., Rapley, M., & O'Ferrall, I. (2003). 'About a year before the breakdown I was having symptoms': Sadness, pathology and the Australian newspaper media. *Sociology of Health \& Illness*, *25*(6), 680–696.

Saldaña, J. (2021). *The coding manual for qualitative researchers*. sage.

Sandler, M. (1990). Monoamine oxidase inhibitors in depression: history and mythology. *Journal of Psychopharmacology*, *4*(3), 136–139.

Schnittker, J. (2008). An uncertain revolution: Why the rise of a genetic model of mental illness has not increased tolerance. *Social Science \& Medicine*, *67*(9), 1370–1381.

Schomerus, G., Matschinger, H., & Angermeyer, M. (2014). Causal beliefs of the public and social acceptance of persons with mental illness: a comparative analysis of schizophrenia, depression and alcohol dependence. *Psychological Medicine*, *44*(2), 303–314.

Seale, C. (1999). Quality in qualitative research. *Qualitative Inquiry*, *5*(4), 465–478. https://doi.org/10.1177/107780049900500402

Searle, G. (1999). Stigma 1, Psychiatrists 0. *Psychiatric Bulletin*, *23*(7), 430.

Sieff, E. (2003). Media frames of mental illnesses: The potential impact of negative frames. *Journal of Mental Health*, *12*(3), 259–269.

Silverman, D. (1997). The logics of qualitative research. *Context and Method in Qualitative Research*, 12–25.

Singh, I. (2012). Human development, nature and nurture: Working beyond the divide. *BioSocieties*, *7*(3), 308–321.

Smoller, J. W. (2014). Psychiatric genetics and the future of personalized treatment. *Depression and Anxiety*, *31*(11), 893.

Spencer, L., & Ritchie, J. (2011). In pursuit of quality. *Qualitative Research Methods in Mental Health and Psychotherapy: A Guide for Students and Practitioners*, 225–242.

Spenrath, M. A., Clarke, M. E., & Kutcher, S. (2011). The science of brain and biological development: Implications for mental health research, practice and policy. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *20*(4), 298.

Stemler, S. (2000). An overview of content analysis. *Practical Assessment, Research, and Evaluation*, *7*(1), 17.

Stern, A. M., Novak, N. L., Lira, N., O'Connor, K., Harlow, S., & Kardia, S. (2017). California's sterilization survivors: an estimate and call for redress. *American Journal of Public Health*, *107*(1), 50–54.

Szasz, T. S. (1960). The myth of mental illness. *American Psychologist*, *15*(2), 113.

Taylor, G. W., & Ussher, J. M. (2001). Making sense of S\&M: A discourse analytic account. *Sexualities*, *4*(3), 293–314.

Teo, P. (2000). Racism in the news: A critical discourse analysis of news reporting in two Australian newspapers. *Discourse \& Society*, *11*(1), 7–49.

Tierney, A. J. (2000). Egas Moniz and the origins of psychosurgery: a review commemorating the 50th anniversary of Moniz's Nobel Prize. *Journal of the History of the Neurosciences*, *9*(1), 22–36.

Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., Van Os, J., & Bentall, R. P. (2012). Childhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective-and cross-sectional cohort studies. *Schizophrenia Bulletin*, *38*(4), 661–671.

Vigeland, M. D. (2021). Linkage Analysis. *Pedigree Analysis in R*, 135–154.

https://doi.org/10.1016/B978-0-12-824430-2.00009-0

Vigeland, M. D., Brown, P. O., Gusella, J. F., Wexler, N. S., Conneally, P. M., Naylor, S. L., Anderson, M. A., Tanzi, R. E., Watkins, P. C., Ottina, K., Wallace, M. R., Sakaguchi, A. Y., Young, A. B., Shoulson, I., Bonilla, E., Martin, J. B., Peedicayil, J., Hatfield, C., Dening, T., … Cooke, A. (2002). What has serotonin to do with depression? *EMBO Reports*, *195*(2), 179. https://doi.org/10.1007/S12687-018-0394-0

Viswanath, K., Blake, K. D., Meissner, H. I., Saiontz, N. G., Mull, C., Freeman, C. S., Hesse, B., & Croyle, R. T. (2008). Occupational practices and the making of health news: A national survey of US health and medical science journalists. *Journal of Health Communication*, *13*(8), 759–777.

Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review*, *20*(2), 158.

Weingart, P. (2002). The moment of truth for science: The consequences of the 'knowledge society' for society and science. *EMBO Reports*, *3*(8), 703. https://doi.org/10.1093/EMBO-REPORTS/KVF165

Weitkamp, E. (2003). British newspapers privilege health and medicine topics over other science news. *Public Relations Review*, *29*(3), 321–333.

Wertz, D. C. (1998). Eugenics is alive and well: a survey of genetic professionals around the world. *Science in Context*, *11*(3–4), 493–510.

White, M. D., & Marsh, E. E. (2006). Content analysis: A flexible methodology. *Library Trends*, *55*(1), 22–45.

Wilde, A., Bonfiglioli, C., Meiser, B., Mitchell, P. B., & Schofield, P. R. (2011). Portrayal of psychiatric genetics in Australian print news media, 1996-2009. *Medical Journal of Australia*, *195*(7), 401–404. https://doi.org/10.5694/MJA10.10167

Wykes, T., Bell, A., Carr, S., Coldham, T., Gilbody, S., Hotopf, M., Johnson, S., Kabir, T., Pinfold, V., Sweeney, A., & others. (2021). Shared goals for mental health research: What, why and when for the 2020s. *Journal of Mental Health*, 1–9.

Zuckerman, D. (2003). Hype in health reporting:"checkbook science" buys

distortion of medical news. *International Journal of Health Services*, *33*(2), 383–389.

APPENDICES

Appendix A

List of search terms used in content analysis

- Addiction
- Affective Disorder
- Agoraphobia
- Anorexia Nervosa
- Antisocial Personality Disorder
- Anxiety
- Bipolar Disorder
- Borderline Personality Disorder
- Bulimia
- Delusional Disorder
- Depression
- Dissociative
- Hallucination
- Hypochondria
- Mania
- Obsessive Compulsive Disorder
- Panic Disorder
- Paranoia
- PTSD
- Psychosis
- Psychosexual
- Schizoid
- Schizophrenia

Appendix B

Breakdown of coded results of content analysis by search term

Search Term	Code	Number of articles (percentage)
Addiction		
Total coded articles: 111		
	Environmental Causes	20 (18%)
	Demographics/Prevalence	50 (45%)
	Treatment: Other	16 (14%)
	Brain Function	10 (9%)
	Treatment: Psychotherapy	5 (5%)
	Genetic Causes	1 (1%)
	Treatment: Medication	7 (6%)
	Other Biological Causes	1 (1%)
	Personality Causes	1 (1%)
Affective Disorder		
Total coded articles: 117		
	Environmental Causes	21 (18%)
	Demographics/Prevalence	27 (23%)
	Treatment: Other	34 (29%)

	Brain Function	7 (6%)
	Treatment: Psychotherapy	6 (5%)
	Genetic Causes	10 (9%)
	Treatment: Medication	8 (7%)
	Personality Causes	4 (3%)
Agoraphobia Total coded articles: 1		
	Treatment: Psychotherapy	1 (100%)
Anorexia Nervosa Total coded articles: 47		
	Environmental Causes	14 (30%)
	Demographics/Prevalence	19 (40%)
	Treatment: Other	2 (4%)
	Brain Function	1 (2%)
	Treatment: Psychotherapy	4 (9%)
	Genetic Causes	6 (13%)
	Treatment: Medication	1 (2%)

Antisocial Personality Disorder		
Total coded articles: 6		
	Environmental Causes	2 (33%)
	Demographics/Prevalence	2 (33%)
	Genetic Causes	2 (33%)
Anxiety		
Total coded articles: 158		
	Environmental Causes	56 (35%)
	Demographics/Prevalence	43 (27%)
	Treatment: Other	28 (18%)
	Brain Function	13 (8%)
	Treatment: Psychotherapy	11 (7%)
	Treatment: Medication	4 (3%)
	Other Biological Causes	1 (1%)
	Personality Causes	2 (1%)
Bipolar Disorder		
Total coded articles: 35		
	Environmental Causes	11 (31%)

	Demographics/Prevalence	9 (26%)
	Treatment: Other	4 (11%)
	Brain Function	1 (3%)
	Genetic Causes	2 (6%)
	Treatment: Medication	7 (20%)
	Other Biological Causes	1 (3%)
Borderline Personality Disorder Total coded articles: 4		
	Environmental Causes	1 (25%)
	Demographics/Prevalence	2 (50%)
	Treatment: Psychotherapy	1 (25%)
Bulimia Total coded articles: 21		
	Environmental Causes	4 (19%)
	Demographics/Prevalence	14 (67%)
	Treatment: Other	1 (5%)
	Brain Function	0

	Treatment: Psychotherapy	1 (5%)
	Treatment: Medication	1 (5%)
Delusional Disorder		
Total coded articles: 9		
	Environmental Causes	4 (44%)
	Demographics/Prevalence	1 (11%)
	Genetic Causes	4 (44%)
Depression		
Total coded articles: 245		
	Environmental Causes	84 (34%)
	Demographics/Prevalence	49 (20%)
	Treatment: Other	56 (23%)
	Brain Function	18 (7%)
	Treatment: Psychotherapy	9 (4%)
	Genetic Causes	8 (3%)
	Treatment: Medication	13 (5%)
	Other Biological Causes	5 (2%)
	Personality Causes	3 (1%)

Hallucination

Total coded articles: 36

Environmental Causes	15 (42%)
Demographics/Prevalence	2 (6%)
Treatment: Other	6 (17%)
Brain Function	7 (19%)
Treatment: Psychotherapy	1 (3%)
Genetic Causes	3 (8%)
Treatment: Medication	1 (3%)
Personality Causes	1 (3%)

Hypochondria

Total articles coded: 1

Environmental Causes	1 (100%)

Mania

Total articles coded: 2

Environmental Causes	2 (100%)

OCD

Total articles coded: 19

Environmental Causes	5 (26%)
Demographics/Prevalence	5 (26%)

	Treatment: Other	1 (5%)
	Genetic Causes	3 (16%)
	Treatment: Medication	5 (26%)

Panic Disorder

Total coded articles: 6

	Environmental Causes	2 (33%)
	Demographics/Prevalence	1 (17%)
	Brain Function	1 (17%)
	Treatment: Psychotherapy	1 (17%)
	Treatment: Medication	1 (17%)

Paranoia

Total coded articles: 22

	Environmental Causes	15 (68%)
	Demographics/Prevalence	2 (9%)
	Treatment: Other	4 (18%)
	Personality Causes	1 (5%)

Phobia

Total coded articles: 26

	Environmental Causes	3 (12%)

	Demographics/Prevalence	5 (19%)
	Treatment: Other	9 (35%)
	Treatment: Psychotherapy	8 (31%)
	Treatment: Medication	1 (4%)

Psychosexual

Total coded articles: 7

	Environmental Causes	2 (29%)
	Treatment: Medication	3 (43%)
	Other Biological Causes	2 (29%)

Psychosis

Total coded articles: 49

	Environmental Causes	22 (45%)
	Demographics/Prevalence	9 (18%)
	Treatment: Other	9 (18%)
	Brain Function	2 (4%)
	Treatment: Psychotherapy	5 (10%)
	Other Biological Causes	2 (4%)

PTSD

Total coded articles:

139

Environmental Causes	50 (36%)
Demographics/Prevalence	35 (25%)
Treatment: Other	31 (22%)
Brain Function	10 (7%)
Treatment: Psychotherapy	7 (5%)
Genetic Causes	2 (1%)
Treatment: Medication	2 (1%)
Other Biological Causes	2 (1%)

Schizophrenia

Total coded articles:

68

Environmental Causes	23 (34%)
Demographics/Prevalence	6 (9%)
Treatment: Other	11 (16%)
Brain Function	8 (12%)
Treatment: Psychotherapy	1 (1%)

Genetic Causes	19 (28%)

Appendix C

List of Newspaper Articles and Research Papers Used in Discursive Thematic Analysis

Newspaper Articles:

Addiction genes inserted into humans' 'dark DNA' by ancient viruses, study finds; Human genome 'littered' with viral DNA but problem drug users three times more likely to carry genetic fragments in regions which control reward centres and addictive behaviour

The Independent, September 24, 2018

Anorexia may originate in the body, not just the mind, groundbreaking study says; 'Failure to consider the role of metabolism may have contributed to the poor track record among health professionals in treating this illness'

The Independent, July 15, 2019

Anorexia might not be all in brain, says study linking metabolic abnormalities

The Evening Standard (London), July 15, 2019

Metabolic differences as well as psychiatric issues affect anorexia - report

Birmingham Evening Mail, July 16, 2019

Genetic defect link to anorexia

Daily Post (North Wales), May 13, 2017

University's breakthrough in search for schizophrenia genetic risk factors; THE BIG ISSUE Kathie McInnes reports on a study that looks at disruption to brain development seen in a number of psychiatric disorders

Stoke The Sentinel, January 24, 2022

Psychotic episodes may not be uncommon; Most would assume that psychotic episodes are only experienced by those with mental health conditions like schizophrenia. But Sophie Legge, James Walters and Stanley Zammit, from Cardiff University, claim they are more common than people think...

The Western Mail, October 7, 2019

Gene gives mental health hope

South Wales Echo, January 15, 2020

Breakthrough in understanding schizophrenia

The Western Mail, February 27, 2018

Depression could be linked to single gene, say Dutch scientists; Millions of people suffer from depression, but the genetic link remains unclear

The Independent (United Kingdom), April 5, 2017

Defying body clock is 'linked to depression'

Shropshire Star, June 8, 2021

Scottish scientists find 80 genes that can trigger depression

The National (Scotland), April 17, 2018

Scientists link genes to depression in study of more than two million people

The National (Scotland), February 5, 2019

Anorexia 'has physical roots and not just psychological'; People genetically predisposed to disorder, study finds

The Independent - Daily Edition, July 16, 2019

Women more than twice as likely to suffer from PTSD as men - and scientists are trying to figure out why; The mental illness also affects women differently to men. Marlene Cimons investigates

The Independent (United Kingdom), October 20, 2019

Child abuse leaves molecular 'scars' in DNA of victims' sperm, new study suggests; 'We already know there are a lot of behavioural mechanisms by which trauma has negative effects on the next generation...This is another possible pathway'

The Independent (United Kingdom), October 2, 2018

Scientists find link between depression and schizophrenia; There is currently no test for diagnosing depression

The Independent (United Kingdom), January 9, 2017

Scottish universities make breakthrough discovery on schizophrenia

The National (Scotland), July 19, 2017

What time you wake up linked to risk of mental health issues, finds major study; Your DNA may be to blame for your inability to wake up in the morning

The Independent (United Kingdom), January 30, 2019

Research Papers:

Karamitros, T., Hurst, T., Marchi, E., Karamichali, E., Georgopoulou, U., Mentis, A., ... & Magiorkinis, G. (2018). Human endogenous retrovirus-K HML-2 integration within RASGRF2 is associated with intravenous drug abuse and modulates transcription in a cell-line model. *Proceedings of the National Academy of Sciences*, *115*(41), 10434-10439.

Karamitros, T., Hurst, T., Marchi, E., Karamichali, E., Georgopoulou, U., Mentis, A., ... & Magiorkinis, G. (2018). Human endogenous retrovirus-K HML-2 integration within RASGRF2 is associated with intravenous drug abuse and modulates transcription in a cell-line model. *Proceedings of the National Academy of Sciences*, *115*(41), 10434-10439.

Sanders, B., D'Andrea, D., Collins, M. O., Rees, E., Steward, T. G., Zhu, Y., ... & Shin, E. (2022). Transcriptional programs regulating neuronal differentiation are disrupted in DLG2 knockout human embryonic stem cells and enriched for schizophrenia and related disorders risk variants. *Nature communications*, *13*(1), 1-21.

Legge, S. E., Jones, H. J., Kendall, K. M., Pardiñas, A. F., Menzies, G., Bracher-Smith, M., ... & Walters, J. T. (2019). Association of genetic liability to psychotic experiences with neuropsychotic disorders and traits. *JAMA psychiatry*, *76*(12), 1256-1265.

Rees, E., Han, J., Morgan, J., Carrera, N., Escott-Price, V., Pocklington, A. J., ... & Owen, M. J. (2020). De novo mutations identified by exome sequencing implicate rare missense variants in SLC6A1 in schizophrenia. *Nature neuroscience*, *23*(2), 179-184.

Pardiñas, A. F., Holmans, P., Pocklington, A. J., Escott-Price, V., Ripke, S., Carrera, N., ... & Walters, J. T. (2018). Common schizophrenia alleles are enriched in mutation-intolerant genes and in regions under strong background selection. *Nature genetics*, *50*(3), 381-389.

Amin, N., Belonogova, N. M., Jovanova, O., Brouwer, R. W., van Rooij, J. G., van den Hout, M. C., ... & van Duijn, C. M. (2017). Nonsynonymous variation in NKPD1 increases depressive symptoms in European populations. *Biological Psychiatry*, *81*(8), 702-707.

O'Loughlin, J., Casanova, F., Jones, S. E., Hagenaars, S. P., Beaumont, R. N., Freathy, R. M., ... & Tyrrell, J. (2021). Using Mendelian Randomisation methods to understand whether diurnal preference is causally related to mental health. *Molecular psychiatry*, 1-12.

Howard, D. M., Adams, M. J., Shirali, M., Clarke, T. K., Marioni, R. E., Davies, G., ... & McIntosh, A. M. (2018). Genome-wide association study of depression phenotypes in UK Biobank identifies variants in excitatory synaptic pathways. *Nature communications*, *9*(1), 1-10.

Howard, D. M., Adams, M. J., Clarke, T. K., Hafferty, J. D., Gibson, J., Shirali, M., ... & McIntosh, A. M. (2019). Genome-wide meta-analysis of depression identifies 102 independent variants and highlights the importance of the prefrontal brain regions. *Nature neuroscience*, *22*(3), 343-352.

Duncan, L. E., Ratanatharathorn, A., Aiello, A. E., Almli, L. M., Amstadter, A. B., Ashley-Koch, A. E., ... & Koenen, K. C. (2018). Largest GWAS of PTSD (N= 20 070) yields genetic overlap with schizophrenia and sex differences in heritability. *Molecular psychiatry*, *23*(3), 666-673.

Roberts, A. L., Gladish, N., Gatev, E., Jones, M. J., Chen, Y., MacIsaac, J. L., ... & Kobor, M. S. (2018). Exposure to childhood abuse is associated with human sperm DNA methylation. *Translational Psychiatry*, *8*(1), 1-11.

Whalley, H. C., Adams, M. J., Hall, L. S., Clarke, T. K., Fernandez-Pujals, A. M., Gibson, J., ... & McIntosh, A. M. (2016). Dissection of major depressive disorder using polygenic risk scores for schizophrenia in two independent cohorts. *Translational psychiatry*, *6*(11), e938-e938.

Yalla, K., Elliott, C., Day, J. P., Findlay, J., Barratt, S., Hughes, Z. A., ... & Baillie, G. S. (2018). FBXW7 regulates DISC1 stability via the ubiquitin-proteosome system. *Molecular psychiatry*, *23*(5), 1278-1286.

Appendix D
Copy of newspaper article, press release and journal article used for case study

Newspaper Article

Anorexia may originate in the body, not just the mind Interesting split between the 'mind' and 'body' here. Simplification of the nuances between biology and psychology**, groundbreaking** Hyperbolic language to promote study**study says; 'Failure to consider the role of metabolism may have contributed to the poor track record among health professionals in treating this illness'**

The Independent (United Kingdom)

July 15, 2019 Monday 4:39 PM GMT

Section: HEALTH; Version:2

Length: 773 words

Byline: Alex Matthews-King

Body

Anorexia may not be a purely psychological illness Use of medical language taken from the paper to underpin the medical/biological model here.Taken-for-grantedness of this assumption, according to a new study which suggests for the first time sufferers' metabolism may play an equally important role.

An international team of researchers found people who develop anorexia are genetically predisposed to have an increased metabolic rate, less body fat and higher physical activity. Very confident statement, that this has been proven and these factors can be clearly linked to anorexia nervosa via genetics.

It had been assumed that these physical differences were a consequence of people with anorexia starving themselves.

But the new evidence suggests they may in fact be genetic differences in the way the body uses energy which make people more vulnerable Vulnerable/risk - these words are often unclearly defined and so can be misleading. When scientific risk and general definitions of risk are conflated...to developing it in the first place.

This may explain why existing therapy struggles to treat the serious and life-threatening condition, and point the way to potential drug treatments in future This definitive statement was absent in article and so has been made in the process of transforming scientific papers for public consumption.... 'it will be a good thing', the authors said.

"A failure to consider the role of metabolism may have contributed to the poor track record among health professionals in treating this illness," This statement is also stronger than that in the original paper and creating a clear split between the importance of this new research (it will be a good thing) and the current practice which is failing Professor Cynthia Bulik, one of the study's co-lead authors from the University of North Carolina Medical School.

"Until now, our focus has been on the psychological aspects of anorexia nervosa such as the patients' drive for thinness," she added.

Anorexia has the highest mortality rate of any psychiatric illness and affects between 1-2 per cent of women and 0.2-0.4 per cent of men.

Around 20 per cent of patients will go on to develop the most serious form of the condition and may need to be intensively fed in hospital, though many rapidly lose weight again after discharge. Incredibly negative descriptions - maybe to provide the backdrop for the hope that this new research is said to have for treatment?

It is typically diagnosed where individuals have a distorted view of their own bodies, dangerously low weight and a fear of gaining more.

The research, published in the journal NatureGenetics, used genetic data from more than 16,992 cases of anorexia and 55,525 health controls from 17 countries in North America, Europe and Australasia.

They then compared seven million genes across each individual in the study and looked at which variations were more commonly found in people with anorexia.

"Our analyses indicate that the metabolic factors may play nearly or just as strong a role as purely psychiatric effects," Acknowledgement of other factors in the aetiology of anorexia nervosa but simplified and not given thorough discussion so any nuance is lost said Dr Gerome Breen, one of the joint lead authors of the study from King's College London.

"People with anorexia have a set of, what look like, 'healthy' genetic correlations. They appear to share genetics with people who have low body-mass index (BMI), people at lower risk of type 2 diabetes, at lower risk of insulin resistance," he told The Independent.

"They also seem to have this correlation with increased physical activity levels and good cholesterol - HDL (high density lipoprotein) cholesterol."

These traits suggest that people with anorexia may be using energy from food more quickly, or storing less of it as fat, Dr Breen said.

They also overlapped, but were independent from, those genes already known to influence body mass index (BMI) - which is one of the key traits used to diagnose the condition.

There were also genes implicated in other psychiatric disorders, including obsessive-compulsive disorder (OCD), depression and schizophrenia. Again, this is not elaborated and works only when we have the assumption that psychiatric conditions are genetic in nature. What do these conditions have to do with

metabolism/anorexia nervosa? Is there an overlap purely in the genes found or their expression rates or in the postulated role of these genes in the metabolic system?

This could suggest that it is the combination of these psychological risk factors What psychological risk factors? They have not been named? Are they not important to discuss and think about when evaluating the treatments for anorexia? which turns these superficially healthy metabolic factors into a serious illness.

"For a long time anorexia hasn't had any new treatments, it's been very difficult to develop them," Dr Breen told The Independent.

"We have hopes to collaborate with people working at the other end of the spectrum, in obesity, to work on the pharmacological implications of this - but that will take quite a long time." hedging

For now the authors argue that anorexia should be considered a hybrid "metabolic-psychiatric" disorder, and this needs to be factored into treatment.

"This is ground-breaking research that significantly increases our understanding of the genetic origins of this serious illness," said Andrew Radford, chief executive of eating disorders charity Beat. Use of an alternative source for comment, but there is no examples of those with anorexia or those that are currently working in these "failing" treatment services There is also no counter voice so only a single narrative is being presented with this alternative source being used to bolster that narrative

"We strongly encourage researchers to examine the results of this study and consider how it can contribute to the development of new treatments so we can end the pain and suffering of eating disorders."

If you have been affected by any of the issues mentioned in this article, you can contact the following organisations for support:

Mind.org.uk

Beateatingdisorders.org.uk

Press Release

UNC Study Finds Anorexia Nervosa is Both Metabolic and Psychiatric

UNC School of Medicine researchers identify anorexia nervosa genetic variants, redefine Hyperbole – it is a good thing what we have found, adds to the research/knowledge base *disorder as metabolic and psychiatric*

The large-scale Positive language about study but not hyperbolic, closer to language of research study than newspaper *genome-wide association study, led by* ***UNC School of Medicine's Cynthia M. Bulik****, PhD, FAED, founding director of the UNC Center of Excellence for Eating Disorders, and Gerome Breen, PhD, of King's College London suggests that the origins of the eating disorder include a combination of metabolic and psychiatric components.* Cautious language. Acknowledgement of other factors

Play Video

UNC School of Medicine's Dr. Cynthia Bulik discusses anorexia nervosa genetics study. (Video: UNC School of Medicine)

CHAPEL HILL, N.C.--(BUSINESS WIRE)--A new large-scale genome-wide association study **published in** *Nature Genetics* has identified eight genetic variants significantly associated with anorexia nervosa; and the research shows that **the origins** Origins - give prestige to findings, genetic certainty implied. **of this serious disorder appear to be both metabolic and psychiatric**.

"A failure to consider the role of metabolism may have contributed to the poor track record among health professionals in treating this illness" Negative language about illness/other knowledge about the condition

Tweet this

Anorexia nervosa is a life-impairing illness characterized by dangerously low body weight, an intense fear of gaining weight, and a lack of recognition of the seriousness of the low body weight. Anorexia nervosa has the highest mortality rate of any psychiatric illness, according to the National Center of Excellence for Eating Disorders.

"Until now, our focus has been on the psychological aspects of anorexia nervosa such as patients' drive for thinness. Our findings strongly encourage us to also shine the torch on the role of metabolism to help understand why individuals with anorexia frequently drop back to dangerously low weights, even after therapeutic renourishment," Explanation of why this is a good thing which focuses on real world implications over and above the addition to the knowledge base seen within the research study said principal investigator ***Cynthia M. Bulik,*** PhD, FAED, founding director of the UNC Center of Excellence for Eating Disorders and Distinguished Professor in the Department of Psychiatry in the UNC School of Medicine.

“A failure to consider the role of metabolism may have contributed to the poor track record among health professionals in treating this illness,” Bulik explained.

For the study, Bulik and a multinational group of more than 100 researchers combined data collected by the Anorexia Nervosa Genetics Initiative (ANGI) and the Eating Disorders Working Group of the Psychiatric Genomics Consortium (PGC-ED). The resulting data set included 16,992 anorexia nervosa cases and 55,525 controls of European ancestry from 17 countries across North America, Europe, and Australasia. Selling of the specialness of the research -highlighting the largenes of the study, the number of researchers, the prestige of the programme, the multi-national nature This is also seen in the section explaining the medical school and its credentials for inclusion in the newspapers article

The Anorexia Nervosa Genetics Initiative (ANGI) is an initiative of The Klarman Family Foundation. ANGI was **led by Dr. Bulik at the University of North Carolina at Chapel Hill** with collaborators from Karolinska Institutet, Stockholm, Sweden (Dr. Mikael Landén), Aarhus University, Aarhus, Denmark (Dr. Preben Bo Mortensen), and Berghofer Queensland Institute for Medical Research, Brisbane, Australia (Dr. Nick Martin) with assistance from the University of Otago, Christchurch New Zealand (Drs. Martin Kennedy and Jenny Jordan).

Other findings of the study include:

The genetic basis of anorexia nervosa overlaps with other psychiatric disorders such as obsessive-compulsive disorder, depression, anxiety, and schizophrenia. Flippant remarks about the genetic nature of other disorders – the creating of a genetic certainty narrative. This appears to have come straight from the researchers and not the newspaper – how are the newspapers going to crtitically examine this if they are not science writers.This language is also more definitive and less cautious than in the research paper

Genetic factors associated with anorexia nervosa also influence physical activity, which could help explain the tendency for people with anorexia nervosa to be highly active.

Intriguingly, the genetic basis of anorexia nervosa overlaps with metabolic (including glycemic), lipid (fats), and anthropometric (body measurement) traits, and the study shows that this is not due to genetic effects that influence BMI.

Dr. Gerome Breen of King’s College London, who co-led the study said, “Metabolic abnormalities seen in patients with anorexia nervosa are most often attributed to starvation, but this study shows they may also contribute to the development of the disorder. These results suggest that genetic studies of eating disorders may yield powerful new clues about their causes and may change how we approach and treat anorexia.” Explicit links to the importance of why the research is a good thing replicated exactly in the newspaper.

The study concludes that anorexia nervosa may be a ‘metabo-psychiatric disorder’ and that it will be important to consider both metabolic and psychological risk factors when exploring new avenues for treating this potentially lethal illness.

Researchers from over 100 institutions worldwide participated in the study.

ANGI contributed 13,363 cases to the GWAS. Drs. Bulik and Breen co-chair the Eating Disorders Working Group of the Psychiatric Genomics Consortium (PGC-ED), which contributed the second largest number of samples and is expanding these studies to include other eating disorders as well.

Funding was provided by **The Klarman Family Foundation**, the U.S. National Institute of Mental Health, the UK National Institute for Health Research, and the Foundation of Hope, Raleigh, NC. Explicit discussion of funding for research which is not reported in the newspaper article. Transparency is lost in the transformative process. Interestingly so is the details about the researchers involved and the institutions. This makes it much more challenging to critically examine how the research came to be from the newspaper article alone. Appears that the researchers gave this information in their press release.

About UNC School of Medicine

The UNC School of Medicine (SOM) is the state's largest medical school, graduating approximately 180 new physicians each year. It is consistently ranked among the top medical schools in the US, including 1st overall for primary care by US News & World Report, and 5th for research among public universities. More than half of the school's 1,700 faculty members served as principal investigators on active research awards in 2018. Two UNC SOM faculty members have earned Nobel Prize awards.

VIDEO: A video of Dr. Bulik discussing the study is attached to the Businesswire press release for use in part or in whole. It is also available on YouTube for embedding.

Please credit video to **UNC School of Medicine**.

Journal Article

Genome-wide Association Study Identifies Eight Risk Loci and Implicates Metabo-Psychiatric Origins for Anorexia Nervosa

*Correspondence and requests for materials should be addressed to C.M.B. or G.B. cbulik@med.unc.edu, cynthia_bulik@med.unc.edu. *Author contributions C.M.B. and P.F.S. conceived and designed the study. L.T., C.M.B., and G.B. performed overall study coordination. C.M.B. was lead PI of ANGI. P.F.S. was Co-Investigator of ANGI. N.G.M., M.L., and P.B.M. were site PIs of ANGI. H.J.W., Z.Y., J.R.I.C., C.H., J.B., H.A.G., S.Y., V.M.L., M.M., P.G-R. and S.E.M. performed the statistical analyses. H.J.W., Z.Y., C.H., J.R.I.C., H.A.G., J.B., A.H., P.G-R., P.F.S., G.B. and C.M.B. comprised the writing group. C.M.B. and G.B. were PGC-ED co-chairs. S.R. provided statistical consultation. A.H. assisted with data interpretation. A.W.B., C.M.B., J.J., M.K., K.M.K., P.L., G.M., C.N., R.P., L.T., and T.D.W. collected and managed the ANGI samples at sites and assisted with site-specific study co-ordination. A.W.B., J.M.B., H.B., S.C., K.A.H., L.J.H., C.J., A.S.K., W.K., J.M., C.M.O., J.F.P., N.L.P., M.S., T.W., D.C.W., and D.B.W. provided ANGI controls and extra samples. L.E.D provided data expertise. S.G., J.G., A.K.H., A.J., K.M.K., J.T.L., R.P., and L.P. contributed to the ANGI study. S.G., J.G., K.K., J.T.L., M.M., S.M., and L.P. were ANGI site analysts. K.B.H. and K.L.P. provided additional analysis for some secondary analyses. G.W.M., T.D.W., A.B., P.L., and C.N. were ANGI investigators. J.J. and M.K. assisted with ANGI recruitment in NZ. C.M.B., G.B., and P.F.S. supervised the study. H.J.W., C.M.B., Z.Y., C.H., G.B., J.R.I.C., H.A.G., S.Y., J.B., P.F.S., and P.G. wrote the manuscript. PGC-ED members and other individuals contributed to sample acquisition and made individual data from subjects available: R.A.H.A., L.A. T.A., O.A.A., J.H.B., A.W.B., W.H.B., A.B., I.B., C.B., J.M.B., H.B., G.B., K. B., C.M.B., R.B., M.C., S.C., M.C., J.R.I.C., R.D.C., P.C., S.C., S.C., J.C., U.N.D., O.S.P.D, M.D, G.D., D.D., J.E.D., D.M.D., D.D., C.D., M.D., E.D.M., K.E., S.E., G.E., T.E., X.E., A.F., A.F., F.F., M.M.F., K.F., M.F., L.F., A.J.F., M.F., S.G., I.G., J.G., F.G., S.G., P.G., M.G.M., J.G., S.G., K.A.H., K.H., J.H., J.H., S.G.H., A.K.H., S.H., B.H., W.H., A.H., L.J.H., J.I.H., H.I., H.I., V.J., S.J., C.J., J.J., A.J., A.J., G.K., D.K., A.S.K., J.K,. L.K., A.K., M.J.H.K., W.K., J.L.K., M.K., A.K., K.K., Y.K., L.K., G.S.K., M.C.L, M.L., S.L., R.D.L., P.L., L.L., B.L., J.L., J.L., P.M., M.M., K.M., S.M., C.M., N.G.M., M.M., S.M., P.M., A.M., I.M., N.M., J.M., A.M.M., P.M., P.M., M.A.M., B.N., M.N., C.N., I.N., C.M.O., J.K.O., R.A.O., L.P., A.P., J.P., H.P., N.L.P., J.F.P., D.P., R.R., A.R., N.R., T.R., V.R., S.R., F.R., M.R., A.R., D.R., F.R., P.S., S.W.S., U.S., A.S., J.S., L.S., P.E.S., M.C.T.S.L., A.S., S.S., M.S., P.F.S., B.Ś., J.P.S., I.T., E.T., A.T., F.T., J.T., A.T., M.T., K.T., A.A.V, E.F.V., T.D.W., G.W., E.W., H.J.W., T.W., D.C.W., E.W., D.B.W., G.S., S.Z., and S.Z.*

All authors critically reviewed the manuscript.

A These authors contributed equally to this work

B The members of this consortium are listed in the Supplementary Note

C These authors jointly directed this project Competing interests Explicit statement of competing interests of the authors including links to pharmaceutical companies and clinical genetic societies. *The authors report the*

following potential competing interests. O.A.A. received a speaker's honorarium from Lundbeck. G.B. received grant funding and consultancy fees in preclinical genetics from Eli Lilly, consultancy fees from Otsuka and has received honoraria from Illumina. C.M.B. is a grant recipient from Shire Pharmaceuticals and served on Shire Scientific Advisory Board; she receives author royalties from Pearson. D.D. served as a speaker and on advisory boards, and has received consultancy fees for participation in research from various pharmaceutical industry companies including: AstraZeneca, Boehringer, Bristol Myers Squibb, Eli Lilly, Genesis Pharma, GlaxoSmithKline, Janssen, Lundbeck, Organon, Sanofi, UniPharma, and Wyeth; he has received unrestricted grants from Lilly and AstraZeneca as director of the Sleep Research Unit of Eginition Hospital (National and Kapodistrian University of Athens, Greece). J.I.H. has received grant support from Shire and Sunovion, and has received consulting fees from DiaMentis, Shire, and Sunovion. A.S.K. is a member of the Shire Canadian BED Advisory Board and is on the steering committee for the Shire B/ educated Educational Symposium: June 15-16, 2018. J.L.K. served as an unpaid member of the scientific advisory board of AssurexHealth Inc. M.L. declares that, over the past 36 months, he has received lecture honoraria from Lundbeck and served as scientific consultant for EPID Research Oy. No other equity ownership, profit-sharing agreements, royalties, or patent. P.F.S. is on the Lundbeck advisory committee and is a Lundbeck grant recipient; he has served on the scientific advisory board for Pfizer, has received a consultation fee from Element Genomics, and a speaker reimbursement fee from Roche. J.T. has received an honorarium for participation in an EAP meeting and has received royalties from several books from Routledge, Wiley, and Oxford University press. T.W. has acted as a lecturer and scientific advisor to H. Lundbeck A/S. All other authors have no conflicts of interest to disclose. URLs. GCTA, http://cnsgenomics.com/software/gcta; GSMR, http://cnsgenomics.com/software/gsmr; LDSC, https://github.com/ bulik/ldsc; MAGMA, http://ctg.cncr.nl/software/magma. HHS Public Access Author manuscript Nat Genet. Author manuscript; available in PMC 2020 February 01. Published in final edited form as: Nat Genet. 2019 August ; 51(8): 1207–1214. doi:10.1038/s41588-019-0439-2. Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Appendix E

Inter-rater reliability completed for content analysis by a second trainee clinical psychologist.

The two articles that were coded differently have been highlighted

Code and Description	
Environmental Causes – research that reports the causes of mental health conditions include environmental aspects such as toxins and pollution, illegal substance use, poverty, diet etc	2. Children exposed to poverty and trauma more likely to offend as adults - study 916. More people signed off sick with mental health problems during lockdown, analysis reveals 4. Doctors reveal surge in psychosis linked to cannabis; Hospitalisations up 74% since use decriminalised The eye has been taken off the ball with cannabis. We do need to worry about young people- Professor Jonathan Chick 72. Changes in brain structure after Covid-19 described in new research paper 403. Worries over head injuries among police
Demographics/Prevalence – research that examines how often mental health disorders in communities and who is most likely to experience them	11. Anorexia 'is on the rise' among teens and children 5. Worcester researcher finds people with BPD and Bipolar more likely to commit suicide
Treatment: Other – research that explores a wide range of alternative treatments for mental health conditions (e.g., exercise, diet, use of psychedelics)	70. Ayahuasca: Hallucinogenic drug used by indigenous Amazon tribes could help treat eating disorders, study finds; Participants reported a reduction in symptoms and a shift in attitude toward their bodies 5. A new study has unexpectedly shown an ingredient in cannabis could be useful for treating psychosis; A key problem in caring

	for patients with psychosis is that they are often reluctant to take antipsychotic drugs because of concerns about side effects- but cannabis-based treatments could change this
Brain Function – direct research involving studies of brain function, often reporting fMRI results	217. Edinburgh University brain 'map' helps show how memories are made
Treatment: Psychotherapy – research that explores the use of various psychological or therapeutic methods to treat mental health disorders (e.g., mindfulness, CBT)	46. Internet therapy reduces symptoms of depression, study claims; Depression is the most common mental health problem worldwide 189. Mindfulness: What is it and how can it improve mental health? Studies claim it can help curb symptoms of anxiety and depression
Genetic Causes – research that reports the causes of mental health conditions as due to genetics/heritability	121 Addiction genes inserted into humans' 'dark DNA' by ancient viruses, study finds; Human genome 'littered' with viral DNA but problem drug users three times more likely to carry genetic fragments in regions which control reward centres and addictive behaviour 31. Gene gives mental health hope 3. University's breakthrough in search for schizophrenia genetic risk factors; THE BIG ISSUE Kathie McInnes reports on a study that looks at disruption to brain development seen in a number of psychiatric disorders
Treatment: Medication - research that explores the uses of licenced mental health medication (e.g., antipsychotics)	28. Drug could treat both bipolar and epilepsy

	418. Number of antidepressant subscriptions in England rises sevenfold in 25 years
Other Biological Causes – research that reports the causes of mental health conditions as related to hormonal/metabolic/immune systems within the individual (without directly linking this to either the brain or an individual's genes)	542. Fat cells may explain why stress causes health problems, study finds; 'This was a completely unexpected finding,' say Yale biologists who carried out study 3. Study links sleep loss to bipolar relapses 135. Obesity link to depression 'caused by dietary fats' 62. Insulin level link to depression
Personality Causes – research that reports the causes of mental health conditions as related to individual personality factors (e.g., neuroticism)	44. Conscientious extroverts are less at risk of depression and anxiety, claims study; A specific combination of personality traits may protect you against mood disorders 250. Creative people really do see the world differently; How we respond to life around us depends on certain key aspects of personality

Appendix F
Example of annotated newspaper article

A gene exists and can be named as the disorder gene

Addiction genes inserted into humans' 'dark DNA' by ancient viruses, study finds; Human genome 'littered' with viral DNA but problem drug users three times more likely to carry genetic fragments in regions which control reward centres and addictive behaviour

Negative language, dark= evil or hidden
Littered = dirty, unwanted

The Independent (United Kingdom)

September 24, 2018 Monday 8:02 PM GMT

Section: HEALTH; Version:2

Length: 531 words

Byline: Alex Matthews-King

Susceptibility, risk = is this cautious?

Both expressing novel idea that this research can show, but taking a step back from the definitiveness of "addiction gene"

Now the gene affects "addiction-related behaviours"

Body

DNA implanted in the "dark parts" of the human genome by ancient virus infections may help to explain why some people are more susceptible to drug addiction, a study suggests.

Researchers from Oxford University and the University of Athens found changes in parts of the DNA which are thought to have little impact on human functions, could actually affect a suite of addiction-related behaviours.

Reliance on dopamine theory – taken-for-grantedness of other bio psychiatric models

The culprit is a fragment of viral DNA, dubbed HK2, tha near to genes which underpin the brain's reward syste increase the risk of addiction by interfering with the neurotransmitter, dopamine, which reinforces pleasure seeking behaviours.

Among the general population between 5 and 10 per cent of people carry the HK2 fragment in this reward centre region, but

genetic analysis of two groups of intravenous drug users form UK and Greece found they were up to 3.6 times more likely to have this change.

The researchers say that combination of DNA fragment and location manipulates the workings of dopamine-driven addic behaviours and is likely to be responsible for at least some of people's addictive behaviour.

"Most people think these ancient viruses are harmless," said I Gkikas Magiorkinis, from the University of Athens who led th study published in the journa

"Now we have strong proof that human endogenous retroviruses can be pathogenic [cause disease]."

The human genome is littered with fragments of DNA that we inserted by retroviruses, a group of viruses which are able to write their genetic material into a host.

Many of these infections occurred in early humans or close ancestors and are now "endogenous" and are carried by most all humans, usually causing little to no effect as they occur in t regions long thought of as junk DNA.

"Looking into this 'dark' part of the genome will unlock more genomic secrets, "Dr Magiorkinis added.

Two other diseases are caused by retroviruses, HIV and the Human T-lymphotropic, and most people are infected directly by the virus or inherit it from a parent.

Because these viruses often lead to fatal disease, Aids, it makes it less likely that those infected wil them on.

In HK2 the infections dates back to some of our earliest ancestors and is replicated in many of our genomes without effect, but still with the potential to cause serious harm when added to other factors that can lead to people becoming addicts.

"We know of clear biological roles for a small number of human endogenous retroviruses," said Professor Aris Katzourakis, from the University of Oxford, who co-led the study.

De-emphasis of other explanations, over stating the role of genetics:

So what is responsible of the rest of the addictive behaviours?

Confident in the proof this study has demonstrated

Disease narrative

Genetic knowledge as secret – quest to find the truth, this is why the research is important and by continuing this type of research we will find answers – optimism (Conrad)

What are these other factors, why are there no other explanations or space for thinking about the role of these other factors

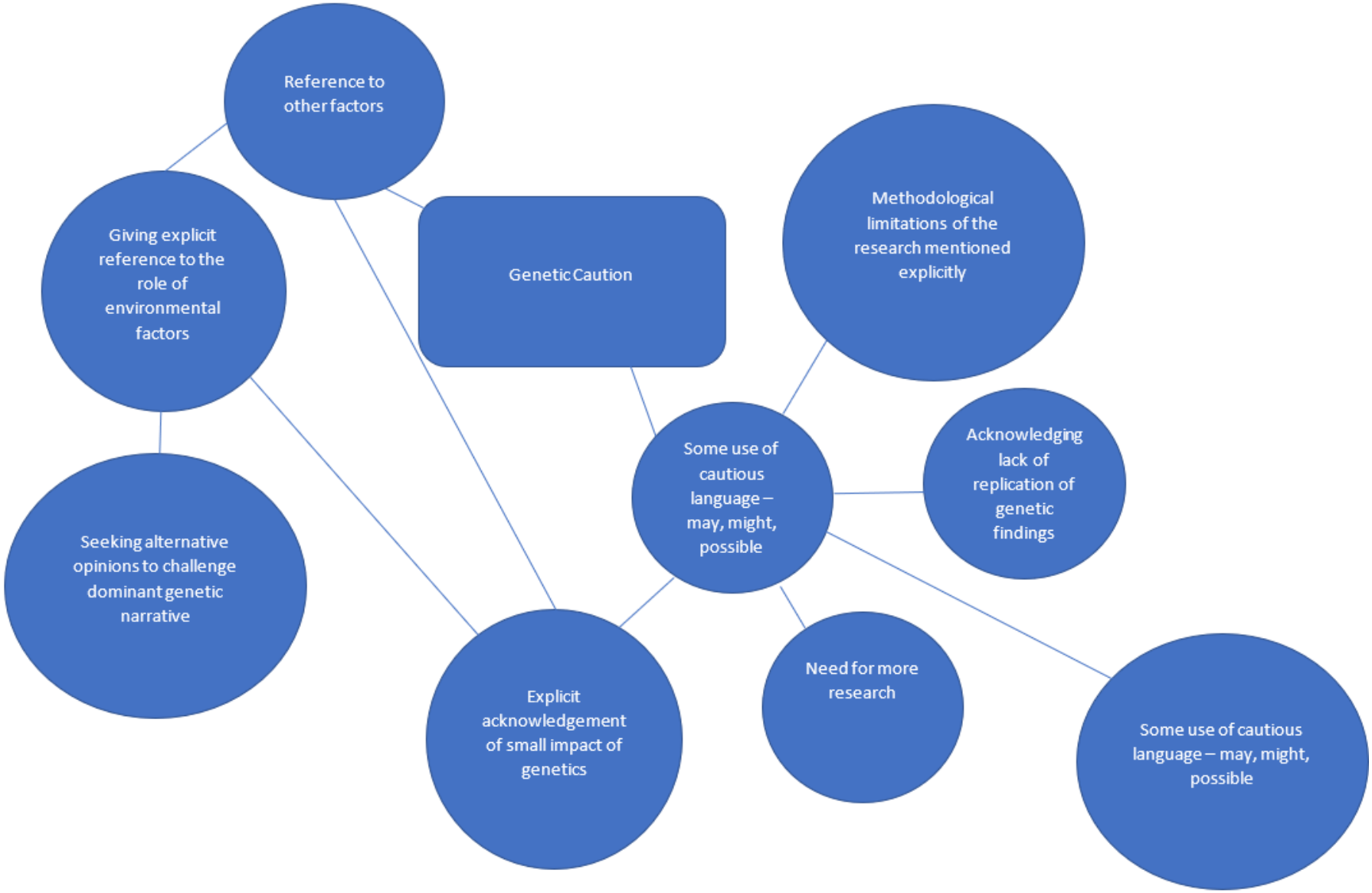
"However, there has never before been strong evidence in support of a role in human biology of an endogenous retrovirus that is unfixed, in other words not shared by all individuals in the population.

"Our study shows for the first time that rare variants of HK2 can affect a complex human trait."

Appendix G
Maps of the three main themes.


Rarity in the population
Large number of genes identified
Overstating of importance
Linked with wording that denotes precision
"pinpointing" – denoting precision and accuracy with the science
Flippant reference to other mental health conditions
Genetic determinism/confidence/certainty ?
A gene exists/it has been found
Disorders described as genetic hereditary
Taken-for-grantedness of genetic model for all mental health
Playing down other factors
Gene named after the disorder
"root", "cause"
Certainty about the role of pathways implicated in the "found gene"
No references to other studies to support this
No space to explain the role of alternative models


No explanation of how this treatment will come about or what it will look like
Discussion of treatment in the news
Very little about implications for research in original paper
Research for knowledge's sake – the role of current research being to add to the knowledge base
It will be a good thing
Hope for those with the condition
Using positive language about the study – groundbreaking, innovative
Genetic optimism
Developing hope that this research is on the road to developing answers
Adds to the narrative of this research being an unquestioned good as the study is so positive and the disorder is so bad
Negative language about DNA/MH condition
A gene will be found
Finding secret information
Quest narrative
Shedding light
Some use of cautious language – may, might, possible
Absence of ethics in discussion


Reference to other factors
Giving explicit reference to the role of environmental factors
Genetic Caution
Methodological limitations of the research mentioned explicitly
Some use of cautious language – may, might, possible
Acknowledging lack of replication of genetic findings
Seeking alternative opinions to challenge dominant genetic narrative
Explicit acknowledgement of small impact of genetics
Need for more research
Some use of cautious language – may, might, possible