

POPES, PAPERS & PUBLICS:
MEDIA REPRESENTATIONS AND PUBLIC PERCEPTIONS
OF CATHOLICISM AND EVOLUTION IN ENGLAND

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Abstract

The majority of social studies of science and religion have been conducted in the USA, and tend to focus on perceived 'problematic groups' such as Evangelical creationists, potentially skewing our perception of how science and religion may relate in other societies. Furthermore, Catholicism is a religion held in a paradoxical position, with scholarly discourse not deeming it a 'problematic group' regarding evolution, yet the Church is often represented as particularly anti-science in public discourse. Accordingly, this thesis aims to empirically investigate the relationship between Catholicism and evolution in England. It achieves this in two ways. Firstly, through an ethnographic content analysis of public discourse, exploring how large-circulation English newspapers have represented recent papal statements on evolution by John Paul II, Benedict XVI, and Francis (1996-2017). I find some contradictory media interpretations of popes' statements on evolution, highlighting the contingent nature of representations of science and religion in public discourse. Secondly, through analysing public attitudes, via a thematic analysis of 31 semi-structured interviews with Catholics in England. While the majority had 'no problem' with evolution, 5 expressed opposition to evolution, this however was not based on Biblical literalism. The implications are discussed, particularly regarding the use of evolution-related survey measures.

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Table of Contents

INTRODUCTION	1
AIMS AND RESEARCH QUESTIONS	2
SCIENCE AND RELIGION IN SOCIETY	4
CATHOLICS AND EVOLUTION IN ENGLAND.....	9
RESEARCH DESIGN	13
SUMMARY	15
CHAPTER 1: STUDYING RELIGIOUS ATTITUDES TOWARDS EVOLUTION	16
1.1 INTRODUCTION	16
1.2 SCIENCE AND RELIGION: A CONCEPTUAL MORASS	25
1.2.1 <i>Historical ‘conflict thesis’ and complexity</i>	25
1.2.2 <i>Contemporary conflict</i>	32
1.2.3 <i>Sociological ‘conflict narrative’ and secularisation</i>	35
1.3 SCIENCE AND THE PUBLIC: KNOWLEDGE AND ATTITUDES	41
1.3.1 <i>A pre-history of science in public</i>	43
1.3.2 <i>The public understanding of science: Deficit to context</i>	49
1.4 WHAT DO RELIGIOUS PEOPLE THINK ABOUT EVOLUTION?.....	57
1.4.1 <i>Quantitative studies of religious attitudes towards evolution</i>	58
1.4.2 <i>Qualitative studies of religious attitudes towards evolution</i>	69
1.5 CONCLUSION	75
CHAPTER 2: HISTORICAL PERSPECTIVES ON CATHOLICISM AND EVOLUTION.....	77
2.1 INTRODUCTION	77
2.2 EVOLUTION	78
2.2.1 <i>A (brief) history of the idea</i>	78
2.2.2 <i>Receptions of evolution</i>	85
2.2.3 <i>Historical communication and receptions of Darwinism in Catholic laity groups</i>	88
2.3 RECEPTIONS OF EVOLUTION IN THE CATHOLIC CHURCH (1859-1950)	92
2.3.1 <i>Galileo’s legacy</i>	93
2.3.2 <i>Modernism and Americanism</i>	95
2.3.3 <i>Council of Cologne</i>	99
2.3.4 <i>Evolution and the Vatican</i>	100
2.4 RECENT PAPAL STATEMENTS ON EVOLUTION (1996-PRESENT).....	109
2.4.1 <i>John Paul II: “More than a hypothesis”</i>	109
2.4.2 <i>Benedict XVI</i>	114
2.4.3 <i>Francis</i>	120
2.5 CONCLUSION	122
CHAPTER 3: METHODOLOGY	126
3.1 INTRODUCTION	126
3.2 RESEARCH DESIGN	126
3.2.1 <i>Research rationale</i>	126
3.2.2 <i>Aims and research questions</i>	129
3.2.3 <i>How the methods have evolved: Qualitative research paradigm</i>	131

3.2.4 Interviews vs. ethnography: Naturalistic or contrived?	134
3.3 MEDIA ANALYSIS	137
3.3.1 Publications and timeframe	139
3.3.2 Search terms.....	141
3.3.3 Process of analysis.....	142
3.4 INTERVIEW ANALYSIS.....	144
3.4.1 Developing and piloting the interview schedule	144
3.4.2 Ethics	145
3.4.3 Sampling and saturation	146
3.4.4 Recruitment	147
3.4.5 Transcription.....	149
3.4.6 Thematic analysis.....	149
3.4.7 Boundaries.....	151
3.4.8 Overview of participants	152
3.5 POSITIONALITY AND REFLEXIVITY	159
3.5.1 The researcher and the research.....	160
3.5.2 Untangling epistemological and ontological concerns	164
3.6 CONCLUSION	169
CHAPTER 4: ENGLISH NEWSPAPER REPRESENTATIONS OF PAPAL STATEMENTS ON EVOLUTION (1996-2017)	170
4.1 INTRODUCTION	170
4.2 OVERVIEW OF DATASET	173
4.3 JOHN PAUL II (1996-2005)	179
4.3.1 News coverage of John Paul II's comments	180
4.3.2 Conflict and Galileo	184
4.3.3 "Even the Pope" and creationism.....	189
4.4 BENEDICT XVI (2005-2013)	192
4.4.1 Preparing for a shift?.....	192
4.4.2 Creation and Evolution: "We cannot bring 10,000 generations into the laboratory" ...	196
4.4.3 News coverage of Benedict XVI's comments	199
4.4.4 Meeting with the Clergy of Belluno-Feltre and Treviso: "This antithesis is absurd"	204
4.4.5 Subsequent references to Benedict XVI's views	206
4.4.6 Schönborn and Coyne revisited	208
4.5 FRANCIS (2013-2017)	209
4.5.1 News coverage of Francis's comments	210
4.5.2 The Independent's positioning of Francis vs. Benedict	214
4.6 CONCLUSION	218
CHAPTER 5: CATHOLIC PUBLICS' (NON-)OPPOSITION TO EVOLUTION	223
5.1 INTRODUCTION	223
5.2 OVERVIEW OF METHOD AND PARTICIPANTS	227
5.3 OPPOSITION AND NON-OPPOSITION TO EVOLUTION.....	228
5.3.1 No problem.....	228
5.3.2 Justifications for opposition	233
5.3.3 No alternative view	238
5.4 CONCEPTIONS AND KNOWLEDGE OF EVOLUTION.....	241
5.4.1 Knowledge of evolution.....	242
5.4.2 Just a theory	245
5.4.3 Big Bang and anthropocentrism.....	247
5.5 CONCLUSION	250

CHAPTER 6: GOD, GENES AND GENESIS	253
6.1 INTRODUCTION	253
6.2 GENESIS AND EVOLUTION.....	257
6.2.1 <i>Scripture and tradition</i>	257
6.2.2 <i>Genesis as symbolic</i>	258
6.2.3 <i>Conflict and compatibility</i>	260
6.2.4 <i>Literalistic-rejection model</i>	262
6.3 GOD AND EVOLUTION	265
6.3.1 <i>God vs. chance and randomness</i>	265
6.3.2 <i>God's ineffable role</i>	267
6.4 CONCLUSION	272
CONCLUSION	276
INTRODUCTION	276
PUBLIC DISCOURSE	278
<i>Top-level findings</i>	278
<i>Recommendations and future research directions</i>	280
PUBLIC ATTITUDES	284
<i>Top-level findings</i>	284
<i>Recommendations and future research directions</i>	290
CODA	295
LIST OF REFERENCES	299
APPENDIX I: INTERVIEW SCHEDULE.....	327
APPENDIX II: ETHICS APPROVAL PROPOSAL FORM	332
APPENDIX III: ETHICS CERTIFICATE	338
APPENDIX IV: PARTICIPANT INFORMATION SHEET	339
APPENDIX V: CONSENT FORM.....	341
APPENDIX VI: PARTICIPANT DEMOGRAPHICS	342

List of Illustrations

FIGURE 1.1 PUBLIC ACCEPTANCE OF EVOLUTION IN 34 COUNTRIES, 2005. FROM MILLER ET AL. (2006)	21
FIGURE 1.2 RESULTS FROM EIGHT LIKERT-SCALE ITEMS ABOUT EVOLUTION. BLACK=STRONGLY AGREE OR AGREE; GREY=NEITHER AGREE NOR DISAGREE; WHITE=DISAGREE OR STRONGLY DISAGREE. (UNSWORTH AND VOAS, 2017: 7)	67
FIGURE 2.1 REPRESENTATION OF KEY CONCEPTS OF DARWINISM (CENTRE FIELD), THE MODERN SYNTHESIS (INTERMEDIATE FIELD), AND THE EXTENDED SYNTHESIS (OUTER FIELD). THE SCHEME DEPICTS THE BROAD STEPS IN THE EXPANSION OF EVOLUTIONARY THEORY (PIGLIUCCI AND MÜLLER, 2010)	84
FIGURE 4.1 NUMBER OF ARTICLES IN SELECTED ENGLISH NEWSPAPERS WHICH MENTION PAPAL COMMENTS ON EVOLUTION.	174
FIGURE 4.2 INITIAL NEWS COVERAGE AND SUBSEQUENT ARTICLES REFERRING TO PAPAL COMMENTS ON EVOLUTION.	175

List of Tables

TABLE 1.1 PARADIGMS, PROBLEMS AND PROPOSALS IN PUS (REPRODUCED FROM BAUER ET AL., 2007: 80) .	50
TABLE 3.1 PHASES OF THEMATIC ANALYSIS (ADAPTED FROM BRAUN AND CLARKE, 2006).....	151
TABLE 3.2 AGE AND GENDER OF PARTICIPANTS.	156
TABLE 3.3 NUMBER OF PARTICIPANTS BY LOCATION.	157
TABLE 4.1 NUMBER OF ARTICLES BY PUBLICATIONS.: ONLINE, PRINT, AND TOTAL.	173
TABLE 4.2 ARTICLES COMPRISING INITIAL NEWS REPORTING ON PAPAL STATEMENTS.	176
TABLE 4.3 ARTICLE TYPES IN THE DATASET.	178
TABLE 4.4 INITIAL NEWS REPORTING ON JOHN PAUL II.	181
TABLE 4.5 ARTICLES CONTAINING “EVEN THE POPE” PHRASE.....	189
TABLE 4.6 INITIAL NEWS REPORTING ON BENEDICT XVI WITH ID EVALUATION.	200
TABLE 4.7 INITIAL NEWS REPORTING ON FRANCIS.....	211

List of Abbreviations

ECA – Ethnographic content analysis

PAS – Pontifical Academy of Sciences

PUS – Public understanding of science

SSSR – Social study of science and religion

STS – Science and technology studies

TA – Thematic analysis

Introduction

The majority of research investigating the contemporary relationship between religion and evolutionary science has focussed on the Protestant religious context of the United States (US) (e.g. Hill, 2014a; Guhin, 2016; Ecklund and Scheitle, 2018). This is understandable, given the longstanding history of debates around religion and evolution in the US (Numbers, 2006). However, without empirically investigating the relationship between religion and evolution in other locations, and other religious contexts, we risk perceiving the relationship between religion and science through a US Protestant template. This thesis investigates the contemporary relationship between Catholicism and evolution in England, and is therefore one of the first empirical and social studies investigating non-US, non-Protestant Christian views of evolution. Given the dearth of contemporary social studies of Catholic attitudes to evolution, and in seeking to give as comprehensive view as possible, I have situated Catholic public attitudes in both historical and contemporary media contexts.

This is a somewhat tumultuous time for the Catholic Church, with factions seemingly coalescing around one of the ‘two popes’—progressives around Francis and conservatives around Benedict (Stanford, 2019). There have been recent attempts by high-profile conservative Catholics, including President Trump’s former Chief Strategist, Steve Bannon, to publicly question Francis’s authority to represent the ‘Catholic view’ on topics such as the refugee crisis, the environment, and global political cooperation (Engel and Warner, 2019). Yet, who gets to decide the true ‘Catholic view’ on these topics? Similarly, with regard to evolution, we may ask: what is the ‘Catholic view’? To whom do we look to find it? Do we

look to official pronouncements by popes and the Vatican? Or to the media producers who communicate papal views to us? Or, indeed, do we look to Catholic individuals themselves?

Accordingly, in this thesis, Chapter 1 first outlines the conceptual issues in contemporary social studies of religion and science, and explores the extant research on religious attitudes towards evolution. Next, Chapter 2 charts the historical relations between Catholicism and evolution after the publication of Charles Darwin's *On the Origin of Species* in 1859. Chapter 3 discusses the methodology of the study. In Chapter 4, I analyse an instance of public discourse on Catholicism and evolution, namely English newspaper representations of recent papal statements on evolution. Finally, in Chapters 5 and 6, I explore the results of an in-depth, qualitative study of Catholic publics' attitudes towards evolution. In this way, I seek to produce a contextual analysis of the contemporary relationship between Catholicism and evolution in England.

Aims and research questions

This thesis aims to empirically investigate the relationship between Catholicism and evolution in England. It achieves this in two ways:

- Through analysing public discourse¹, by exploring how English newspapers have represented popes' recent statements on evolution;

¹ I follow Kaden et al. (2017; 2019: 75) by denoting public discourse relating to science and religion as: "popular media coverage of issues relating to science and belief and the publications of [...] 'professionals' in the field of science and religion whose vocation it is to develop, distribute, defend and critique systems of explanation that relate science to different forms of ultimate belief."

- Through analysing public attitudes, by exploring individual Catholics' perceptions and attitudes towards evolution, and the relationship between evolution and their faith.

The study has two specific research questions, one for the analysis of public discourse and one for the analysis of public attitudes:

- 1) How have papal statements on evolution been represented in large-circulation English newspapers?
- 2) In what ways do Catholic individuals in England perceive evolutionary science in relation to their faith and worldview?

A number of research objectives relate to these research questions:

1) *Public discourse*

- 1.1 To map the historical context leading to contemporary papal statements on evolution;
- 1.2 To analyse initial news coverage for each of John Paul's, Benedict's, and Francis' evolution comments;
- 1.3 To analyse subsequent coverage to see how subsequent references to these papal comments are used.

2) *Public attitudes*

- 2.1 To analyse Catholic individuals' perceptions and attitudes towards evolution;

- 2.2 To analyse how Catholic individuals conceptualise evolution;
- 2.3 To situate these understanding in the larger literature on religious attitudes towards evolution, especially quantitative measures;
- 2.4 To explore how, if at all, dominant media coverage/narratives are informing or interacting with individual perceptions.

Both analyses of public discourse and individual attitudes are informed by the review of historical literature on Catholicism and evolution, which helps to situate the study in its proper historical context. Combining these approaches, I build historical context, media representations, and individuals' perceptions into an integrated view of the relationship between evolutionary science and Catholicism in England. However, in so doing we must first take note of various conceptual issues which may hinder investigations of science and religion in society.

Science and religion in society

How *do* religion and science relate to one another? That is a question which has preoccupied thinkers for centuries. Philosophy and theology would seem to be the proper homes for answers, and indeed, various professional and popular authors have expounded their views from these disciplines. Depending on ideological presuppositions, answers range from proclamations of conflict to compatibility (e.g. Dawkins, 2006; Collins, 2008; Dennett and Plantinga, 2011), with some authors delineating other possible relationships, such as independence and dialogue (e.g. Gould, 1999; Barbour, 2000).

Over the last decade, however, a small but growing field has attempted to explore the relationship between science and religion socially. These new efforts do not focus solely on the epistemological truth claims of both science and religion, instead investigating their relationship as it manifests in the lived experience of different members of society (Evans and Evans, 2008; Baker, 2012). The first task when investigating science and religion from a social perspective must be to ask a further question: what do we mean by 'science' and what do we mean by 'religion'? These two concepts are not easy to define. Indeed, in their respective fields of study, both sociologists of religion and sociologists of science have been reluctant to offer all-encompassing definitions of these categories (Gülker, 2019: 106). So, if simply defining religion and science is problematic, what hope do we have in determining their relation? I argue the first step in clarification must be a distancing from abstract conceptions of 'science' and 'religion', to more specific objects of study. Taking 'religion' as an example, we may choose a specific religious practice, a belief, or indeed an affiliation. If we choose a specific religious belief or identity which is opposed to a specific aspect of science, such as Young Earth Creationism² (YEC), then conflict is embedded in the study from the outset, thus representing a limited and potentially problematic framing of the research. This is not to say studying YEC is not worthwhile, on the contrary it, is necessary, however the issue is solely focussing on these anti-evolution groups and extrapolating to other

² Young earth creationists reject the scientific view that life on earth evolved over billions of years, and instead believe life was created instantaneously by God generally within the last 6,000 years (Ruse, 2018). The debate is somewhat confused by the use of the term 'creationism' by those who do actually agree with evolution, such as Pope Benedict XVI's (2007) comments that an antithesis between creationism and evolutionism is absurd. In this sense, 'creationism' is used to denote that the universe has a creator, not to deny evolution has happened. However, in this thesis, unless otherwise caveated, I use 'creationism' to refer to a broad class of beliefs which reject evolutionary explanations, in favour of specific acts of creation, with young earth creationism meaning special creation within the last ~6000 years.

religious groups more generally. Therefore, in this move from the abstract to the concrete, we must remain aware that the choices of the researcher can influence the type of relationship between science and religion we find. If we choose religious affiliation to a particular denomination instead of 'religion' in the abstract, then which denomination should we investigate? If we only focus on areas of known conflict and controversy, then studies will largely find conflict and controversy. This could potentially then skew our view of the complex and myriad relationships science and religion may have across different societies.

In previous social studies of science and religion, there has been a tendency to focus on controversies and groups that are viewed as problematic. This is most manifest in the more extensive literature on creationist movements in the USA (e.g. Barker, 1979; Toumey, 1994). While undoubtedly a necessary endeavour, if the main terrain illuminated in academic research is the culturally specific topography of the USA, does this not skew our views of how science and religion may relate in other societies and other religious contexts? More recent work has begun to explore societal relations between religion and science beyond specific anti-science groups, and beyond the US context, however the literature is still in its infancy.³

Thus, we arrive at my decision to investigate the contemporary relationship between Catholicism and evolution in England. While in popular media, the Catholic Church is often presented as having an antipathetic relationship with science (e.g. Stanford, 1996; Moss,

³ See Jones et al. (2019) for a notable move in this direction.

2006; Withnall, 2014), in academic literature on religious attitudes towards evolution, Catholics are not generally held to be a problematic group. For example, in one of the most cited articles on religious attitudes towards evolution, Miller et al. assert that while the evolution of humans is unacceptable to biblical literalists: “Catholics and mainstream Protestants generally accept variations of a theological view known as theistic evolution which views evolution as the means by which God brought about humans, as well as other organisms” (Miller et al., 2006: 765). However, in order to fully illuminate the types of interactions between science and religion in various societies, it is *as* important to investigate these perceived non-problematic groups as it is to examine the contrary. If we do not investigate a wide range of science-religion interactions, we run the risk of employing a conflict framing from the outset. Furthermore, without investigating these perceived non-problem groups, we cannot answer many necessary questions. For example, while the majority of Catholics may accept some form of theistic evolution, how do these individuals see this evolution interacting with their religious beliefs? Demonstrating the variety of views found in a single Christian denomination also helps resist essentialism, and treating a denomination as a monolithic group. What of those Catholics who do not accept evolution, is their evolution opposition similar or different to other religious groups in other national contexts? Are those English Catholics who might be opposed to evolution doing so for similar reasons as US Evangelical Protestants? Without studies into diverse religious groups, in various national contexts, we cannot answer such questions.

The above issues are discussed in more detail in ***Chapter 1 – Studying Religious Attitudes towards Evolution***, where I first outline the conceptual issues involved in studying

religious attitudes towards evolution. I begin by addressing one of the key narratives in the study of science and religion – the conflict thesis, which originated in the 19th century and has been for some time the predominate historiographical position in the study of science and religion (Draper, 1874; White, 1896). Proponents of the conflict thesis suggest that science and religion have been locked in inevitable battle throughout the history of human thought. Contemporary historians have roundly debunked this idea, rejecting any meta-narrative of past relations between these two domains (Brooke 1991; Numbers, 2009; Harrison, 2015). These more recent and more nuanced historical analyses stress the complexity of past science-religion relations, and advocate a contextual approach to scholarship.

This thesis is situated in the area of the public understanding of science, and therefore in Chapter 1 I detail the discipline's trajectory from deficit to contextualist approaches. The chapter concludes by critically reviewing both quantitative and qualitative studies of religious attitudes towards evolution, highlighting potential methodological issues and exploring the implications for this thesis. Most notable of these is the problematic (mis)use of surveys to investigate public attitudes towards evolution. Given that most research into religious attitudes towards evolution has been conducted in the US, it is unsurprising that most surveys, which seek to analyse the attitudes towards evolution elsewhere, employ terms, such as YEC that originated in US public discourse. However, are the terms of US public discourse the most appropriate to categorise the English population, or indeed publics elsewhere? Scholars such as Elsdon-Baker (2015a) have critiqued the restrictive nature of these survey categories, and argue that through them conflict is

sometimes embedded into the survey design itself. Accordingly, in this thesis, I employ an exploratory, qualitative approach to generate new insights into how a non-US, non-Protestant religious group views evolution.

Catholics and evolution in England

As introduced above, Catholicism is a religious tradition that is regarded in a rather paradoxical way. On the one hand, in academic literature, Catholics are not seen to be problematic regarding attitudes towards evolution or science in general; but on the other hand, in public discourse, the Catholic Church is often described as being anti-science. Indeed, the Catholic Church was the main target of Draper's (1874) foundational text forwarding the historical conflict thesis. As will be discussed in ***Chapter 2 - Historical Perspectives on Catholicism and Evolution*** the Church's treatment of Galileo is often held up as an exemplar of the conflict between science and religion at large. In this chapter, I explore historical scholarship on past relations between Catholicism and evolutionary science. I first set out a brief history of evolution itself, before exploring elite Catholic responses to evolution from 1859-1950. Finally, I explore and contextualise popes' recent public comments on evolution. This context is essential for understanding the subsequent media analysis.

A clear example of a conflict perception in public discourse is around Pope Francis' positive statements about evolution in 2014. Addressing the Pontifical Academy of Sciences on 27th October, Francis affirmed his belief in biological evolution and its compatibility with

the doctrine of creation. His comments sparked media reaction around the world. In the US, journalists at *MSNBC* claimed the Pope's remarks were a "significant rhetorical break with Catholic tradition" and *NBC News* claimed Francis made a "theological break from his predecessor Benedict XVI, a strong exponent of creationism" (Berger, 2014; Jamieson et al., 2014). In England, a writer at *The Independent* newspaper declared that "the Pope made comments which experts said put an end to the 'pseudo theories' of creationism and intelligent design⁴ that some argue were encouraged by his predecessor, Benedict XVI." Again, highlighting the image of the Church as anti-science, the article claimed the Church "has long had a reputation for being anti-science – most famously when Galileo faced the inquisition and was forced to retract his 'heretic' theory that the Earth revolved around the Sun" (Withnall, 2014). Conversely, other journalists at the time remarked that the Pope's position was not new for the Church, and criticised the general media response, observing how publications had "ramped up the Pope's words and took them out of context" (Dias, 2014). The content of this widespread media coverage suggests that some media producers held a perception of the Catholic Church as being anti-science or anti-evolution. What had led to these media perceptions? Had previous popes' statements influenced their formation?

⁴ Intelligent design was developed in the 1990s, predominantly in the US. It was intended as a non-religious refutation of evolution by natural selection, mainly through the claim that some biological systems (such as the eye) were too complex to have evolved in stages, an argument known as irreducible complexity. Intelligent design proponents argued that as evolution cannot account for the complexity of biological systems, an Intelligent Designer (not necessarily a God) must have instead created organisms more or less in their present form. In a 2005 trial, *Kitzmiller v. Dover Area School District*, a US federal court ruled that intelligent design was indistinguishable from other forms of religious creationism, and therefore could not be taught in science classrooms (Glick, 2017).

Regarding its stance on evolution, the Church has a complicated history. Although the Church has never denounced nor condemned evolutionary science, sceptical attitudes have existed in the Vatican. After Charles Darwin published *On the Origin of Species* in 1859 it took nearly 100 years for the Church to publicly comment on the issue. In a 1950 encyclical, *Humani Generis*, Pope Pius XII explained that the Catholic Church did not forbid research and discussion to take place with regard to evolution, but warned against those who “rashly transgress this liberty of discussion, when they act as if the origin of the human body from pre-existing and living matter were already completely certain and proved by the facts” (Pius XII, 1950: 36). Between Pius in 1950 and Francis in 2014, two more popes publicly commented on the topic. In 1996 John Paul II remarked that evolution was “more than a hypothesis.” He also recognised a plurality of philosophical foundations on which evolution is based—materialistic, spiritualistic, etc.—and argued that some of these positions are incompatible with the truth of ‘man’. For John Paul, there was an “ontological leap” for humans, notably the injection of the immortal soul. His remarks also sparked significant reaction, with *The Quarterly Review of Biology* dedicating a special issue in 1997, inviting scientists, ethicists, and philosophers to reflect on John Paul’s remarks. Among the commentators was evolutionary biologist and prominent atheist, Richard Dawkins, who claimed: “The sudden injection of an immortal soul in the timeline is an antievolutionary intrusion into the domain of science” (Dawkins, 1997: 398).

Benedict XVI’s comments on evolution are the most difficult to unpack, but also the most important to. The above reactions to Francis’ comments refer to Benedict being a supporter of intelligent design or creationism. However, did Benedict in fact reject

evolutionary science? Thus, were his views in opposition to those of John Paul and Francis? The only way to understand this issue is to analyse both the nature of Benedict's comments themselves, and the media coverage surrounding them. I lay out my exploration of this episode of Catholicism and evolution in public discourse in **Chapter 4 – English Newspaper Representations of Papal Statements on Evolution (1996-2017)**. Here I explore the results of a media analysis of newspapers representations of popes' statements on evolution. I investigate each of John Paul II, Benedict XVI, and Francis' statements in turn, contextualising the newspaper representations with events outside the corpus analysed.

Despite these papal pronouncements, the Church has never set a prescriptive position on evolution for its followers. Furthermore, we cannot assume that Vatican attitudes towards evolution are shared amongst the laity. As no qualitative studies specifically assessing contemporary Catholic attitudes toward evolution exist, whether Catholic individuals' attitudes diverge or correspond with contemporary papal statements remains unanswered. **Chapter 5 – Catholic Publics' (Non-)Opposition to Evolution** is the first of two interview analysis chapters in this thesis. Here I outline the two broad groups of Catholic orientations towards evolution, which I term: opposition and non-opposition toward evolution. After exploring the views of these two groups I proceed to look at how these Catholics are conceptualising evolution, and their knowledge of evolutionary science. I discuss the view that evolution is 'just a theory', anthropocentric views of evolution, and the conflation of biological evolution with the Big Bang. **Chapter 6 – God, Genes and Genesis** is the second of the two interview analysis chapters. Here I investigate the relationship between Catholic participants' views on evolution and their religious beliefs. I look at how

participants' views of Genesis are related (or indeed are not related) to their views on evolution. I also explore participants' views of God's role in relation to the process of evolution, and reflect on implications of the findings for the study of religious attitudes towards evolution, especially the use of surveys.

Research design

As introduced, this thesis has two main research aims: analysing newspaper representation of papal statements on evolution; and investigating Catholic publics' attitudes on evolution. While the entire thesis is situated in the qualitative research paradigm (Silverman, 2000; Braun and Clarke, 2013), I employ two research methods, one for the analysis of public discourse and one for the analysis of public attitudes:

Ethnographic content analysis (ECA) of newspaper coverage

To study English newspapers' representations of recent papal comments on evolution, I first developed search terms ("pope w/100 evolution!") which would allow me to identify the appropriate articles from the LexisNexis database, which discuss John Paul, Benedict, and Francis' views on evolution (1996-2017). I chose to include only high-circulation publication, thus omitted local newspaper reporting, as the national newspapers were deemed to be more influential than smaller publications. To analyse the articles, I first uploaded them into NVivo qualitative analysis software, and then employed a version of qualitative media analysis, Ethnographic Content Analysis (ECA). ECA, developed by Altheide and Schneider (2013), differs from a quantitative content analysis in its use of textual,

contextual, and narrative data and analysis, as well as (some) numerical data. The main aim of an ECA is capturing themes, definitions, meanings, processes, and types. Here, detailed readings and an inductive coding approach utilising constant comparison is used to construct themes from the data which have relevance to the research question (Altheide and Schneider, 2013: 44-45).

Thematic analysis of semi-structured interviews

To investigate Catholic individuals' attitudes towards evolution, I conducted 31 semi-structured interviews with Catholics in England. In the interviews, I used a schedule—a set of questions I had developed after reviewing the relevant literature—however the interview's semi-structured nature allowed other relevant topics to be discussed if they emerged. These interviews were then transcribed verbatim and uploaded into NVivo qualitative analysis software. I then conducted a thematic analysis as described by Braun and Clarke (2006). The inductive approach to thematic analysis I employed involved thoroughly familiarising myself with the data and coding relevant themes. The recursive process developed more themes over time, seeking to identify patterned content in the data, which related to my research questions.

A full description of the methods, and underpinning research philosophy, can be found in **Chapter 3 – Methodology**. Here I discuss the research design and development, including a reflexive section where I consider my own positioning in relation to the research. I discuss in more depth the procedures of both the media analysis and the interview analysis, explaining the qualitative, thematic approaches used for both. These are situated in a broader reflection on my philosophical positions regarding the research.

Summary

When investigating religious attitudes towards evolution, which religious denomination we choose is an important consideration. With most extant research focussing on the US Protestant context, the picture in the academic literature is skewed. The present thesis presents one of the first studies of non-US, non-Protestant Christian attitudes towards evolution—Catholics in England. Beyond which religion we look to, how we collect our data is also important. Traditionally, much research into religious attitudes towards evolution has employed a quantitative methodology. The survey measures often employed force individuals into pre-defined belief positions, which may not match the actual beliefs of the populations being studied. The present thesis employs an inductive, qualitative methodology, to better assess the lived experience of Catholic individuals. Finally, investigating religious publics' attitudes towards evolution cannot be conducted without attention being paid to the historical and contemporary contexts of these attitudes. Therefore, not only must we pay close attention to the historical relations between the religion and the science we seek to study, we must also investigate both contemporary public attitudes and public discourse on the matter. Without analysing public discourse surrounding the area of science and the denomination of religion in question, we omit the crucial cultural milieu in which these attitudes are situated.

Chapter 1: Studying religious attitudes towards evolution

1.1 Introduction

The social study of science and religion (SSSR) is a relatively new and complex area of study.¹ SSSR scholars must draw on diverse academic disciplines and areas of research to answer questions surrounding the relations between science and religion in societies. The most relevant academic subjects for this thesis are the history of science and religion, the sociology of science and religion, and the public understanding of science. Therefore, in this chapter, I critically review these literatures, noting the theoretical, conceptual, and substantive contributions gleaned from each. To illustrate the complex and conceptually beset nature of SSSR research, and the need to draw upon various academic disciplines and areas, I begin by introducing a short exploration of the perceived danger of the rise of the Intelligent Design movement in the United States of America (USA) in the mid-2000s.

On 19th November, 2004, the Dover Area School District Board of Education, in Pennsylvania, USA, announced that teachers were required to read a statement to ninth-grade biology students. The statement questioned the veracity of evolution, stating “the Theory is not a fact”, and proposed that “Intelligent Design is an explanation of the origin of life that differs from Darwin’s view.” (Kitzmiller v. Dover, 2005). Eleven parents, so shocked by the policy, took the school board to court. The ensuing trial was an inversion of the

¹ I use the term SSSR whilst acknowledging others, such as Jones et al. (2019), are talking of a similar and overlapping area when describing “science, belief and society”.

famous 1925 Scopes Monkey Trial, where Tennessean biology teacher John Scopes was taken to court for teaching evolution. Now, however, the plaintiffs were the parents, who sought to overturn the forced promotion of Intelligent Design to their children.

On 20th December, 2005, after a well-publicised trial, the United States District Judge John E. Jones III ruled against the school board, deciding Intelligent Design (ID) was a religious view, a mere relabelling of creationism, and not a scientific theory (Kitzmiller v. Dover, 2005). Furthermore, the inability for ID to be uncoupled from its creationist and religious roots meant that its promotion in a science classroom violated the Establishment Clause of the First Amendment to the United States Constitution.² Judge Jones III concluded his ruling by stressing the potential compatibility between evolution and religious belief:

Both Defendants and many of the leading proponents of ID make a bedrock assumption which is utterly false. Their presupposition is that evolutionary theory is antithetical to a belief in the existence of a supreme being and to religion in general. Repeatedly in this trial, Plaintiffs' scientific experts testified that the theory of evolution represents good science, is overwhelmingly accepted by the scientific community, and that it in no way conflicts with, nor does it deny, the existence of a divine creator. (Kitzmiller v. Dover, 2005: 136).

This ruling nods to a previous creationist trial, *McLean v. Arkansas* (1982), in which the judge ruled against the balanced treatment of "Creation-Science" and "Evolution-Science" in the classroom. In that ruling, Judge William Overton noted the "contrived dualism" of the creationist approach: that one must either accept the literal interpretation of Genesis or else believe in the godless system of evolution. Such binary thinking about science and religion has historical precedent. As will be discussed in this chapter, the conflict thesis, the notion that science and religion have been, and are, necessarily contradictory

² The Establishment Clause reads: "Congress shall make no law respecting an establishment of religion..." (U.S. Const. amend. I, cl. 1.).

ways of viewing the world, first became widespread in the 19th-century. Today, this dualistic framing has been embedded into some methodologies of SSSR. Scholars such as Elsdon-Baker (2015a; 2018) have critiqued these approaches, arguing that this binary, conflict framing of public opinion polls—such as the necessary linkage of evolution and atheism—has generated problematic results on public attitudes towards evolution.

Reflecting the important cultural influence the USA has on the United Kingdom (UK), within a month of the *Kitzmiller v. Dover* (2005) trial the national public service broadcaster, the BBC aired a documentary on the rise of the ID movement. In *Horizon: A War on Science*, a host of experts, mainly scientists, indignantly explain the facts of the matter, and decry the dangerous non-science of ID. Central among the voices was prominent atheist and scientist, Richard Dawkins, then the University of Oxford's Professor for the Public Understanding of Science. The documentary also featured the Catholic Church. As a night-time shot of the Vatican appears on screen the narrator, referring to a controversial *The New York Times* op-ed promoting ID written by a prominent Catholic cardinal, ominously states: "The stakes couldn't be higher. The conflict has spread to the world's largest Christian congregation, the Roman Catholic Church." According to the documentary, Cardinal Schönborn, a close friend to future Pope Benedict, had been prompted to write the piece by a member of the US proponents of ID, the Discovery Institute. Based in Seattle, Washington, the Discovery Institute were the organisation that originally laid out the intellectual basis for ID, and had also been in contact with members of the Dover school board in the years before the 2005 trial.³

³ For more on Schönborn's *The New York Times* op-ed see Chapter 4.

Alongside the documentary, the BBC commissioned Ipsos MORI to conduct a poll on attitudes towards evolution, Creationism, and ID in the UK. The results were met with shock and reprehension by journalists and commentators alike. The BBC published the results in an article on their website entitled: “Britons unconvinced on Evolution”, which went on to explain “just under half of Britons accept the theory of evolution as the best description for the development of life,” and “more than 40% believe that creationism or [ID] should be taught in school science lessons” (BBC, 2006). *The Guardian* also reported on the poll, claiming: “[f]our out of 10 say science classes should include intelligent design.” The author quoted Richard Dawkins’s analysis of the situation: “If somebody professes disbelief in evolution, it is highly probable that they know nothing about it,” he added “[t]hese ignorant people would probably welcome enlightenment. It is up to scientists to get out of their labs, from time to time, and enlighten.” Here then, in Dawkins’ view, attitudes are a problem of understanding, and the remedy to understanding is to give people more knowledge (Randerson, 2006).

However, how the public’s attitudes towards evolution had been measured in the UK poll was problematic. Participants were offered three exclusive options by the polling company Ipsos MORI:

- The ‘evolution theory’ says that humankind has developed over millions of years from less advanced forms of life. God had no part in this process;
- The ‘creationism theory’ says that God created humankind pretty much in his/her present form at one time within the last 10,000 years;
- And the ‘intelligent design’ theory says that certain features of living things are best explained by the intervention of a supernatural being, e.g. God. (From Elsdon-Baker, 2015a: 426)

You may note the conspicuous absence of a “theistic evolution”⁴ option which would allow people of faith to also hold a pro-evolutionary position. For one to accept “evolutionary theory” in the *War on Science* poll, one must admit that “God had no part in this process”. While that may be an acceptable position for some theists, it is likely an unacceptable box to tick for others. The problematic framing and construction of survey realities, critiqued by scholars such as Elsdon-Baker (2015a), will be discussed in more detail later in this chapter.

We may be tempted to dismiss the Ipsos MORI poll as a marketing exercise, produced simply to promote the *War on Science* documentary. Likewise, we may be tempted to attribute Dawkins’ suggested recommendation of getting scientists to ‘enlighten’ the public to his unfamiliarity with the academic area of public understanding of science. As will be discussed below, scholars researching the public understanding of science have long debunked this “deficit model”—the belief that increasing public science knowledge will improve public attitudes towards science (e.g. Wynne, 1995; Bauer et al., 2007). However, this problematic approach to polling and the associated deficit model recommendations continued to be used by some within the academy. The year after Judge Jones III’s ruling, Miller et al. (2006) published a comparative cross-national study of public acceptance of evolution in the esteemed journal *Science*, which, with over 800 Google Scholar citations to date, is one of the most cited studies on this subject. In the paper the authors display a table

⁴ In this thesis I use Davis’ (2018) definition of “theistic evolution”: “the belief that God used the process of evolution to create living things, including humans.” This is a broad definition, which encapsulates other more specific belief positions, such as God-guided evolution and God-initiated evolution.

showing the apparent differing acceptance of evolution across 34 countries (Figure 1.1), with the USA ranking second to bottom.

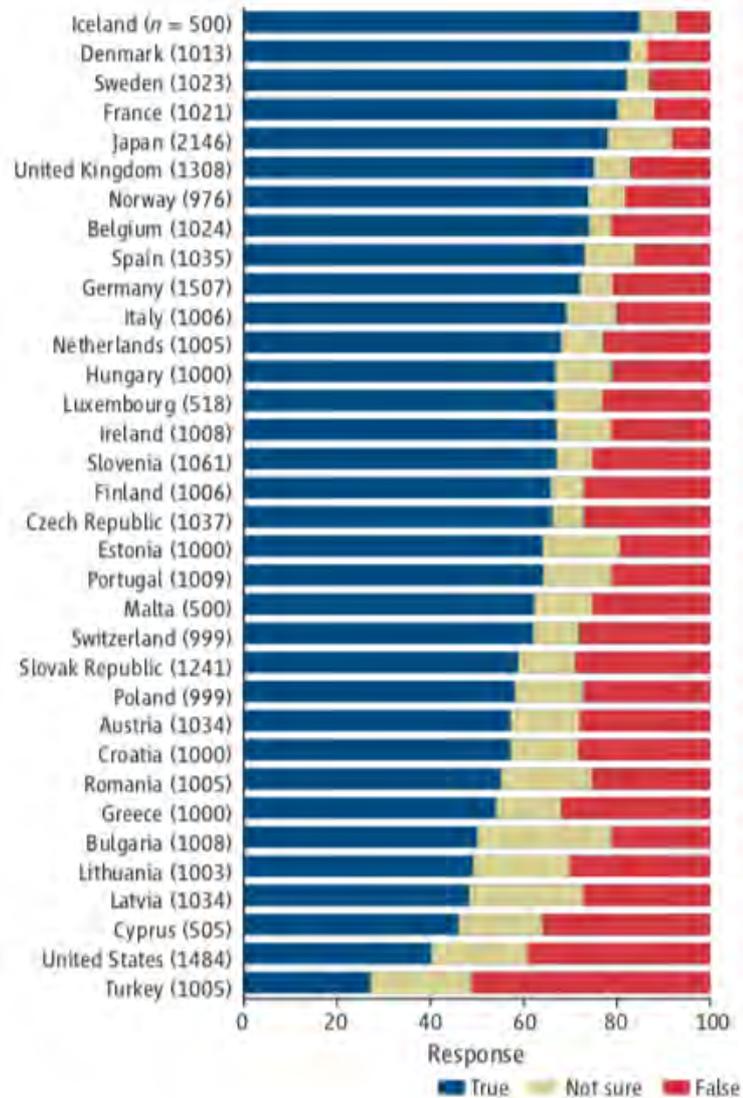


Figure 1.1 Public acceptance of evolution in 34 countries, 2005. From Miller et al. (2006)

Although the authors present their results as the “public acceptance of evolution”, the question they used was: “Human beings, as we know them, developed from earlier species of animals.” As will be discussed in this chapter, empirical studies show that using questions specifically about human evolution and then drawing conclusions about evolution in general can be problematic. Human evolution does seem to be a contentious area, among

religious and non-religious publics alike (Elsdon-Baker et al., 2017). Miller et al. (2006: 765) further lamented that: “Only Turkish adults were less likely to accept the concept of evolution than American adults.” As Carlisle et al. (2019: 153-154) have argued, Miller et al. (2006) did not sufficiently place their findings in their political and social context, went on to promote religious stereotypes in the press, and made sweeping generalisations claiming that both Protestantism in the US and Islam in Turkey were fundamentalist faiths.

Like Dawkins, Miller et al. (2006: 766) also saw the problem as one of education, a knowledge gap that needed to be filled, claiming: “substantial numbers of American adults are confused about some of the core ideas related to 20th- and 21st- century biology” and arguing that “[b]asic concepts of evolution should be taught in middle school, high school, and college life sciences courses and the growing number of adults who are uncertain about these ideas suggests that current science instruction is not effective.” (Miller et al., 2006: 776). This raises another contentious issue covered in this thesis, the link between knowledge and attitudes towards science. For Miller et al. (2006), the solution to perceived negative attitudes is to educate. However, as will be discussed, developments in research on the public understanding of science over the past 30 years have led scholars to view this deficit model of science-public interaction with caution.

It is vital to understand the context of how debates in the USA influence and frame UK public discourse, as is highlighted by this case study drawing on a North America school dispute, a UK documentary, and a poll into ID/creationism. Here, a dispute in a different societal context was picked up by UK media, and resulted in subsequent surveys, which went on to inform the public discourse on the topic in the UK. If the surveys present a static

and purportedly complete picture, which is then taken as fact, that baseline becomes the basis for subsequent cultural dialogue. Intriguingly, SSSR scholars themselves can feedback into public discourse on science and religion, thus influencing our very object of study. This further suggests that we must be both reflexive and rigorous when constructing polling of public attitudes towards evolution.

The cultural and socio-political influence that the USA has in the world not only influences the news agenda in different countries, but also the social scientific research agenda and accompanying methodologies. The Kitzmiller vs. Dover (2005) trial had repercussions here in the UK, with subsequent news reporting noting that “Creationism debate moves to Britain” (Walker, 2006). The relationship between science and religion in the USA influences what we study about the relationship between science and religion in the UK, and I argue this has led to a narrowed focus on perceived ‘problematic groups’. This means that the academic investigation of science and religion in society has itself often contained a skew towards conflict. When considering questions about science and religion we must also remember other dimensions that go beyond the epistemic, such as political influences or concerns (e.g. Myrick and Comfort, forthcoming). Furthermore, the lack of clear demarcation between ID, creationism, and even evolution, must be noted. How do we define these concepts, or indeed how are they defined and perceived by religious publics? With inevitable blurred boundaries to such concepts, can we construct survey measures which properly distinguish them? In any case, do publics themselves simply identify with such labels of public discourse? Recent academic work which has explored what UK and Canadian publics think about labels such as ‘creationism’, ‘intelligent design’, ‘Darwinism’, suggests otherwise (see Kaden et al. 2019).

As our brief examination of the Miller et al. (2006) study highlights, sometimes researchers are too ready to propose a simplistic connection between knowledge and attitudes towards science. If the problem is defined as ignorance of evolution leading to negative attitudes, then the solution is simply to tell publics more about it. As will be explored in this chapter, studies in science communication and the public understanding of science have shown this approach to be naïve, nonetheless Miller et al.'s (2006) call for this response is in and of itself instructive. As will be discussed, the popularisation and communication of science has always been linked to political and institutional agendas. Finally, the phraseology of “contrived dualism”, or the necessary conflict between science and religion, is an important consideration for this thesis. This simplistic notion of how religion and science can interrelate not only has historical roots, but has also been embedded into some social science research methodologies, resulting in an overly simplistic conception of the relationship between science and religion. I expand on these points over the course of this chapter, beginning by exploring the historical conflict thesis and showing how more recent scholarship has revised models of past interactions between science and religion. I will also explore how the conflict narrative was embedded at the birth of sociology, and the implications for how we study science and religion today. I then turn to the birth of studies on the popularisation of science, and the movements and developments which led to the formation of the field of the public understanding of science. Finally, I will explore studies that seek to ascertain religious attitudes towards evolution, both qualitatively and quantitatively.

1.2 Science and religion: A conceptual morass

Studying science and religion requires the navigation of problematic conceptual issues. Both historical and sociological investigations have been, and in some cases, continue to be, plagued by long-standing assumptions embedded in their respective traditions. In historical work the main issue has been the conflict thesis, a historiographic approach, which takes as axiomatic that science and religion have been locked in conflict since their distinct conceptions. Only in the last few decades have historians begun to unpick this presupposition and display the complexity of interactions that science and religion have shared in the past. For sociology, the epistemological conflict narrative, like the historical conflict thesis, either views science and religion as epistemologically incompatible, or that science leads to the decline of religion through modernisation and secularisation. Like the re-evaluation of the conflict thesis by historians, sociologists have recently begun to re-visit and revise the epistemological conflict narrative, not assuming conflicts between science and religion necessarily have epistemic causes. Both the historical conflict thesis and sociological conflict narrative are intertwined and it could be argued that they are essentially the same thing, both born from common historical cultural discourses and intellectual antecedents. Nevertheless, the presupposition of conflict between science and religion presents issues for scholars working in SSSR today. Accordingly, in this section I detail the conceptual morass of studying science and religion in society.

1.2.1 Historical 'conflict thesis' and complexity

The 'conflict thesis' was popularised in the late 19th century with the publication of the English-born American scientist John W. Draper's *A History of the Conflict between*

Religion and Science (1874), and American historian Andrew D. White's *A History of the Warfare of Science with Theology in Christendom* (1896). Both authors presented historical studies on the conflict between religion and science. The 'military metaphor' they employed became the de facto historiographic method for studies of science and religion until the 1970s (Lightman, 2012: 157).

Both works, however, emerged from a very specific context of social shifts in intellectual power, authority and prestige, in Victorian Britain (Turner, 1978). Furthermore, the growth of professionalising scientific specialisms during this period was also accompanied by an almost complete disappearance of clerical presence in the sciences. This shift is demonstrated by the changing governance of the British Association for the Advancement of Science, where the number of Anglican clergy presiding over areas of science fell from 41 between 1831 and 1865, to just 3 between 1866 and 1900 (Brooke, 1990: 764). It was in this context that T.H. Huxley made his famous and much quoted statement about science and religion, in an anonymous review of Darwin's *On the Origin of Species* for the *Westminster Review* in 1860:

It is true that if philosophers have suffered their cause has been amply avenged. Extinguished theologians lie about the cradle of every science as the strangled snakes beside that of Hercules; and history records that whenever science and orthodoxy have been fairly opposed, the latter has been forced to retire from the lists, bleeding and crushed if not annihilated; scotched, if not slain. (Quoted in Huxley, 1896: 52)

Draper and White's works crystallised this social context and rhetorical style in historical analyses of the relationship between science and religion, and projected the concept of conflict onto historical (even pre-Christian) events. White, for example, projected the conflict back to Ancient Greece, using the Stoic Cleanthes' rejection of the impious

heliostatic astronomy of Aristarchus as an exemplar of the conflict thesis's historical roots (White, 1896: 120-121). As Brooke (1990: 764-765) points out, though, it may well have been because of the exceptional nature of this case, rather than it being an exemplar of a science-religion interaction, that it was recorded in the first place.

In the preface to his work, Draper gives a particularly succinct formulation of the conflict thesis, stating that the history of science is: "not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditional faith and human interests on the other" (Draper, 1875: vi). Draper's main objection, however, was not to the "moderate" Greek or Protestant strands of Christianity, but the "extremists" within the Catholic Church (Elsdon-Baker and Mason-Wilkes, 2019: 5). Draper asserted that "Roman Christianity and Science are recognized by their respective adherents as being absolutely incompatible; they cannot exist together" (Draper, 1874: 363). Like Lightman (2012), historians of science Freiburger and Numbers (2009: 637) observe that this view dominated the historiography of science and religion for almost a century and has only seen a decline since the 1990s.

To understand how conflict has dominated historical narratives on the relationship between Catholicism and science, we need look no further than discussions of Galileo's treatment by the Church in both academic and popular histories.⁵ In contrast to the conflict perspective of the relationship between the Catholic Church and science, scholars such as

⁵ The Galileo affair will be discussed in Chapter 2, but for a detailed historiography of the Galileo affair also see Finocchiaro (2001).

Heilbron has commented how the Church “gave more financial and social support to the study of astronomy for over six centuries, from the recovery of ancient learning during the late Middle Ages into the Enlightenment, than any other, and, probably, all other, institutions” (Heilbron, 1999: 3). Highlighting that the Church has not been anti-science in all places, and at all times, throughout history.

Historian of science and religion Geoffrey Cantor refers to Draper and White’s conception of the conflict thesis as the ‘strong version’, where science and religion have been embroiled in necessary conflict due to their essential differences (Cantor, 2010: 285). Further, Russell suggests that there are four distinct issues of contention between science and religion around which the real or imagined conflict generally focuses: epistemological, methodological, ethical, and social power (Russell, 2002: 4-7). When critiquing the conflict thesis, however, historians of science and religion generally do not dispute that science and religion, or at least proponents of these spheres, have indeed and not infrequently been locked in confrontation, particularly in educational contexts. However, rather than denying conflicts have occurred, the contention is that presupposing warfare inadequately explains the complex historical interactions between religion and science (Brooke, 1990: 765). Thus, the conflict thesis is an inadequate framework to understand the historiography of Western science. It ignores other possible and evident relationships between religion and science, such as instances of harmony, and it obscures the diversity of opinions within both religion and science.

In opposition to the conflict thesis is the harmony thesis, whereby science and religion are said to have co-existed peacefully, or that religion directly contributes to science.

A well-known proponent of this second contrasting view was the sociologist Robert K. Merton, who argued that Puritanism directly contributed to the founding of modern science by providing a useful system of values (Merton 1936; 1938). As Lindberg and Numbers point out, Merton's broad definition of 'Puritanism' included the common attitude and mode of life of Anglicans, Calvinists, Independents, Anabaptists, Quakers, and millenarians in 17th century England—essentially everybody but Catholics (Lindberg and Numbers, 1986: 5). It would seem that even for a proponent of partial harmony between science and religion the Catholic Church did not qualify.

Finocchiaro (2001: 114) suggests that both the conflict and harmony theses are hasty generalizations, while others such as Cantor (2010: 286), argue that the conflict thesis represents a Whig history,⁶ where present day categories are projected onto the past, in an inappropriate attempt to understand it. Historians of science and religion have distanced themselves from the presentism of Whig history, instead favouring a contextualist approach, which seeks to understand historical actors embedded in their own historical milieus (Wilson, 2002: 17).

Historian of science John Hedley Brooke formalised this more nuanced approach in his influential book *Science and Religion: Some Historical Perspectives*, where he argued grand traditional narratives in the history of science and religion are not sustained by historical evidence (Brooke, 1991). This approach was subsequently coined the 'complexity thesis' by Ronald Numbers (2010: 262). The complexity thesis allows historians to widen

⁶ The term "Whig history" was first coined by historian Herbert Butterfield in *The Whig Interpretation of History* (1931). Butterfield criticised Whig historians for reading into the past a teleological procession of stages, through which the goal of the present is realised.

their investigations of science and religion, unrestrained by simplistic master narratives. Its focus on detailed contextual accounts, and avoidance of presentism, enables the actions and opinions of historical actors to be understood in the contexts of their time. However, Brooke's approach does leave an interesting issue for historians of science and religion: how to understand the vast complexities of the past relationship between these two worldviews in any meaningful sense? Here, Numbers argues we can use "mid-scale patterns" to simplify historical complexity (Numbers, 2010: 262). This approach is adopted by Blancke in his investigation of the Catholic Church's responses to evolution. The mid-scale pattern that emerges from the historical evidence, according to Blancke, is that: "in the end and somewhat hesitantly and conditionally, the Vatican gradually became more receptive of evolutionary sciences" (Blancke, 2013:3). This claim will be explored in the next chapter.

In *The Territories of Science and Religion*, historian Peter Harrison shows further the need to understand the historical relationship between religion and science in the appropriate historical context, and warns of projecting our contemporary conceptions backwards through time. According to Harrison, our modern conceptions of religion and science only arose in the 17th and 19th centuries respectively. While this approach at first seems to provide further evidence for the complexity thesis, it also presents an interesting divergence from the historiographic methods of the last 25 years (Harrison, 2015: 141).

In a paper given to the Canadian Society for the History and Philosophy of Science, Lightman raised the interesting question of whether Harrison's shifting territories argument represents a reversion back to the master narratives warned of by Brooke (Cantor and Brooke, 1998: 22), and asked whether Harrison sees his argument as aligning with the now

regnant complexity thesis (Lightman, 2016). Whether we conceive Harrison's *Territories* as presenting a master narrative or not, the implications of his analysis introduce more complexity to past relationships between science and religion. If their respective territories have shifted substantially over time, and our conceptions of these terms are relatively recent constructions, even though the premise is simple, the conclusions when followed would lead to an even more complex study of the relationship between science and religion through various historical eras. In response to Lightman, Harrison stated that his thesis attempts to provide an explanation for historical complexity, which arises, in part, from the projection of our contemporary categories onto past events (Harrison, 2016).

Harrison also writes in defence of master narratives in his response; noting how even though the conflict thesis is deeply problematic, it has fuelled the work of historians of science and religion for the past three decades. Harrison's hope is that the conflict thesis, and the work of debunking it, might now come to an end, and a new phase of historical science and religion research may begin (Harrison, 2016). Perhaps the obvious pathway forward is in the further investigation of how these territories of science and religion have shifted over time, why they were constructed this way, and how these boundary movements lead to a multiplicity of relationships between religion and science across different contexts. The present thesis aims to utilise the perspectives of Brooke and Harrison, leaving behind simplistic notions of necessary conflict and harmony, moving toward a more nuanced investigation of the contingent relationships between religion and science, specifically in this instance Catholicism and evolution.

Harrison's (2015) *Territories* also informs us that when investigating the relationship between religion and science, we must take care with categorisations. *Which* sciences and *which* religions do we mean? Even though Harrison uses historical examples, this is also relevant to investigations of contemporary attitudes toward science and religion. Just as these categories have shifted throughout history, we cannot presume that today there are two static categories of religion and science shared by all. Echoing the words of philosopher of science Stuart Glennan we must ask: "Whose science and whose religion?" (Glennan, 2009: 797). What forms do they take? Are we being sufficiently reflexive to fully capture their differences in our data collection? Therefore, when investigating and commenting we must remember we are talking about a multitude of constructed *relationships*, rather than the singular.

1.2.2 Contemporary conflict

Despite the move by historians of science away from the conflict thesis and simplistic master narratives to a more contextualist approach, Aechtner's analysis of contemporary anthropology textbooks shows the conflict thesis persists in other disciplines. Aechtner found that depictions of the Scientific Revolution and the Enlightenment, and religious responses to heliocentrism and Darwin's theory of evolution in introductory anthropology texts, still perpetuate simplistic science-religion conflict myths, which have long been discredited by historians (Aechtner, 2015: 209-211).

Beyond the educational setting, the conflict thesis continues to have wide appeal in public discourse on science and religion, with, in Cantor's view, authors and commentators such as Richard Dawkins forwarding the 'strong version' of conflict (Cantor, 2010: 285). The

continued prevalence of the conflict thesis in educational and public spaces shows it still has significance today, over a century after Draper and White's influential texts were first published.

Today, there is a wealth of literature, both academic and popular, presenting theorisations on the supposed 'proper' relationship(s) between religion and science, be it conflict or otherwise (e.g. Barbour, 1990; Gould, 1997; Polkinghorne, 1998; Dawkins, 2006). Contemporary social studies of science and religion, and by extension this thesis, are not concerned with the truth claims of these treatises, but rather with the various ways science and religion relate in society. Therefore, while one could use Barbour's classic taxonomy of relationships between religion and science—conflict, independence, dialogue, and integration—in a research protocol, it would only be to assess the prevalence of such perceptions across a population, rather than for their philosophical validity (Barbour, 1966; 1974; 1990; 2000). Although this approach also arguably has its own conceptual issues, in that it imposes concepts from professional discourse onto publics (see Elsdon-Baker and Mason-Wilkes, 2019: 6-9).⁷

Baker (2012) employs Barbour's taxonomy, seeking to investigate the prevalence of beliefs of generalised conflict or compatibility between science and religion in the USA. Baker's work, based on data from the Baylor Religion Survey 2007 (Wave II), noted that any perceived relationship between religion and science is socially constructed, and that these

⁷ Following Kaden et al. (2017; 2019: 75) I use the term 'professionals' in the field of science and religion to mean individuals: "whose vocation it is to develop, distribute, defend and critique systems of explanation that relate science to different forms of ultimate belief." A clear example of a science and religion professional being Richard Dawkins (e.g. Dawkins, 2006).

perceptions are dependent upon how an individual has interacted with, understood, and (re)constructed each magisterium (see also Berger and Luckmann, 1966; Latour and Woolgar, [1979] 1986; Searle, 1997; Hacking, 1999). Using Barbour's (1966; 1974; 2000) general taxonomy of positions, Baker (2012) labelled the two distinct groups who perceive conflict in his study as 'scientific materialists' and 'biblical literalists'. Only 17% of respondents agreed that religion and science were incompatible, but this was a dichotomous group, split between people with views of incompatibility who favoured science ('scientific materialists') and others who favoured religion ('biblical literalists'). Baker goes on to state that "[s]uch perceptions are pragmatic, heuristic, and vary depending on how individuals engage both institutions, rather than being indicative of an inherent relationship between the two" (Baker, 2012: 341).

In the American context, where the overwhelming majority of scholarly work in this area has taken place, assessments of conflict perceptions have mostly been studied within academic (specifically scientific) and student populations (e.g. Leuba, 1934; Stark, 1963; Larson and Witham, 1998; Ecklund and Scheitle, 2007; Scheitle, 2011). Scheitle's (2011) study of American undergraduates found that the majority of students did not perceive a conflict between religion and science. Similar to the findings of Baker (2012), Scheitle's analysis of longitudinal data, generated from the Spirituality in Higher Education Project, found two distinct groups with views of magisterium incompatibility: one 'pro-science', and the other 'pro-religion'.⁸

⁸ For a detailed review of surveys of conflict and compatibility see Hill (2019).

The public attitudes analysis in this project aims to go beyond the study of general perceptions of conflict and compatibility between religion and science, to the more specific question of Catholic attitudes towards evolution. The analysis will be grounded in the lived-experience of participants, rather than categorised by notions of ‘proper’ science-religion relationships. However, to understand social scientific work in the area, it is first important to chart the development of the sociological study of science and religion; noting as we go the conceptual issues which may affect our analysis.

1.2.3 Sociological ‘conflict narrative’ and secularisation

In their influential paper, Evans and Evans (2008: 88) remark that the field of religion and science is perhaps “one of the muddiest in all sociology.” The source of this muddiness, according to Evans and Evans (2008: 88), is the entrenched academic assumption that religion and science are always in conflict due to their “competing truth claims about the world”: the epistemological conflict narrative. Furthermore, as sociology was founded as a scientific alternative to religion, it can be difficult for sociologists to analyse the relationship between religion and science dispassionately (Evans and Evans, 2008: 88). As Jones et al. observe: “[I]t is hard for sociologists to jettison the underlying idea that science is something they *do*, while religion is something they [...] *study*” (Jones et al., 2019: xxi).

Just as the conflict thesis dominated historical analyses of the relationship between religion and science, only to be discredited in the last thirty years (Brooke, 1991; Numbers, 1985; 2010), the epistemological conflict narrative was formed at the foundation of sociology, and is embedded in some sociological definitions of religion and science. This

history leaves conflict between religion and science as an unexamined theoretical assumption within a lot of, but not all, sociological analyses (Evans and Evans, 2008: 89-90).

Auguste Comte (1798-1857), who popularised the term 'sociology', believed his new science of society would replace the current religions of the time (Wernick, 2005: 128-134). He proposed a "law of the three stages", which stated that each branch of human knowledge goes through three progressive phases: (1) the Theological, or fictitious; (2) the Metaphysical, or abstract; and (3) the Scientific, or positive (Comte, 1853). His new science of society would therefore replace religion as a way of human understanding and organisation, setting up a conflict between scientific and religious knowledge in the quest for societal organisation.

The other founding figures of sociology—Durkheim, Weber, and Marx—were also deeply concerned with the implications of the decline of religion in society (Jones et al., 2019: xxviii). As Elsdon-Baker and Mason-Wilkes argue, all three sociologists' social theories saw societal progress as in some way inevitable, and modernity and religion as opposed (Elsdon-Baker and Mason-Wilkes, 2019: 13-14). Furthermore, within the discipline are embedded Enlightenment assumptions about the positive relations between science, modernity, and progress. This has influenced the contemporary movement of the public understanding of science, where lack of scientific knowledge is often seen as an indicator of a lack of societal progress (Elsdon-Baker and Mason-Wilkes, 2019: 13-14). I will return in more detail to research on the public understanding of science in the next section.

While religion was of primary concern for the founders of sociology, the sociology of religion has become a marginal sub-field (Catto, 2015). The sub-field itself has had an

overwhelming focus on secularisation, whether or not the process has happened, and how religious practice has changed in contemporary societies (Davis, 2013).⁹ Where once, taking from the founding assumptions of the opposition between modernity and religion, secularisation was a widely held belief, there have been recent developments that see religious decline not as an inevitable process. Rather, secularisation happens in differing ways in different contexts, and while we may see a decline in religious affiliation in Western Europe, there are places in the world seeing a religious revival, while new ways of being religious, such as “believing without belonging” are emerging (Davis, 1994). These critiques of the classic secularisation thesis, where religion and modernity are necessarily opposed, and therefore religion need not be investigated, has thus led to a renewed interest in studying religious practice. For studies of science and religion, this means that we need to resist the conflict narrative and axiomatically utilising science as an explanation of religious decline, instead investigating the ways science and religion actually interact in contemporary societies. There are still lingering issues however, such as how we define religion itself.

Definitions of religion in sociology have traditionally come in functional or substantive forms (Berger, 1967: 175-77). The functional definition relates to any cultural

⁹ Sociologist Peter L. Berger, one of the leading advocates of the ‘secularisation thesis’ in the 1960s, defined secularisation as: “the process by which sectors of society and culture are removed from the domination of religious institutions and symbols” (Berger, 1967: 107). The key idea of the secularisation thesis was that modernisation necessarily leads to a decline in religion, both for society and for individuals (Berger, 1999: 2). However, over time, Berger reversed his views on secularisation, “My point is that the assumption that we live in a secularized world is false. The world today, with some exceptions to which I will come presently, is as furiously religious as it ever was, and in some places more so than ever. This means that a whole body of literature by historians and social scientists loosely labelled “secularization theory” is essentially mistaken” (Berger, 1999: 2). Clearly this is just the view of a single sociologist working in the field, but does to some extent mirror a broader paradigm shift within the sociology of religion. For a detailed review of the changing debates about secularisation in the sociology of religion, see Davis (2013).

system, and therefore can relate very broadly to any system of meaning, such as Marxist, secular humanism, or modern science. As observed by Evans and Evans (2008: 90), functional definitions of religion are rarely used in empirical analyses. The more common substantive definitions of religion tend to split the world into the sacred and the profane, with religion rationalising irrationalities, being concerned with the supernatural, and ultimately everything that is not science (O'Toole, 1984: 142; Johnstone, 1997: 13; Verhey, 1995). In this way, a science-religion conflict has been embedded in the methodology of sociology itself. We can see this in some public understanding of science literature, where religiosity variables are constructed using anti-science measures like creationist views, when looking into other areas of science (e.g. Allum et al., 2014).

Evans and Evans (2008) argue that the sociological study of science and religion must extend beyond competing truth claims and challenge the assumptions built into earlier sociological discourse. They categorise studies of the relationship between religion and science into two broad groups: *symbolic epistemological* studies, which discuss religion and science as systems of ideas, beliefs, or discourses, and tend to focus on conflicting truth claims; and *social-institutional* studies, which are concerned with the institutions that propagate these ideas, beliefs, or discourses. Today religion is concerned with much more than truth, both individually and institutionally, although many previous studies have aimed to investigate some form of epistemological conflict (Evans and Evans, 2008: 90). More recently Evans (2018) has argued that contemporary conflicts are not about knowledge at all, but rather are moral contentions.

According to Evans and Evans (2008: 97), many of the most promising studies in the sociology of science and religion look at social-institutional relationships, where “truth or falsity of religion or science is bracketed, and contests for authority or the power to determine truth between science and religion are recast as power-inflected discursive struggles.” Examples cited of this type of study are Gieryn (1983) and Gieryn et al., (1985), who investigated how scientists gained cultural authority by drawing boundaries around science, to separate it from ‘non-science’. Another example given of the social-institutional approach is Evans’s own (2002) study, investigating the struggle between theologians and scientists over authority on the ethics of genetic engineering, Evans bracketed the truth claims of science and religion, instead investigating the struggle for resources and power to make ethical statements about genetic engineering. In this case, it is argued that the scientists nurtured the profession of bioethics, which furthered the scientists’ interests and wrestled the ethical authority from the theologians (Evans and Evans, 2008: 97-98).

While Evans and Evans (2008) show that the relationship is far more complex than competing truth claims, we must leave the notion of perceived competing truth claims an open empirical question. It is clear that some religious people’s lived experience is that of epistemological conflict, albeit a conflict often driven by social-institutional forces. For example, Hildering et al. (discussed in more detail below) interviewed ten Dutch protestant creationists and found that evolution was “identified as being in conflict with the biblical message of creation” (Hildering et al., 2012: 993). Their study is self-selective for epistemological conflict, as it only studies the beliefs of those who reject evolution, but if we are to reframe the entire relationship beyond an epistemological frame, we must be careful not to ignore the lived experiences of those who do perceive epistemic conflict.

Nonetheless, these instances should be viewed in light of Merton's analysis of historic accounts of potential conflict, and his reminder to avoid "the short leap from such empirical episodes of conflict to a belief in the logical and historical necessity for such conflict" (Merton, 1970 [1938]: 308).

Evans and Evans suggest that: "future sociologists who examine the relationship between religion and science not assume the epistemological conflict model, but rather leave the source of contestation as an empirical question" (Evans and Evans, 2008: 101). This is an important proposition for this thesis; when investigating Catholic attitudes toward evolution, we must leave open notions of both conflict and complementarity, and also not assume that any instances of conflict are due to the idea that the "different methods for making truth claims lead science and religion to reach different conclusions about the natural world" (Evans, 2011: 708). In this way, we can proceed to more nuanced investigations of the relationships between religion and science. This approach has been successfully deployed in recent works, such as Jones et al. (2019) and Moran (2019), which reject a simplistic epistemic framing of the issue.

In this section, we have seen how the historical conflict thesis—the proposition that science and religion have inevitably clashed historically—has been debunked by historians over the last few decades. Historians of science and religion today adopt the notion of complexity for science and religion's historical relations, which better explains the heterogeneity of past events. We have also explored the complex conceptual issues in the sociological study of science and religion. The once perceived inevitability of secularisation, the decline of religion, has been revised by contemporary sociologists who note the variety

of developments of religious practices seen in contemporary societies. We have also seen how the epistemological conflict narrative can hinder sociological investigations of science and religion, and how in recent years studies have sought non-epistemic explanations for episodes of conflict between science and religion. In relation to this thesis I heed the advice of Elsdon-Baker and Mason-Wilkes, who argue: “[d]rawing on the groundwork undertaken by eminent historians of science, we need to likewise move away from an assumption of implicit conflict between science and religion and towards a complexity thesis for the social study of science and religion” (Elsdon-Baker and Mason-Wilkes, 2019: 19). Therefore, in this thesis I am seeking to better understand the complex relations between science and religion by not focussing on a presumed ‘problematic group’ such as Evangelicals. Instead, I study and analyse the complexity of the relationship between Catholics and evolution, without inadvertently magnifying conflict perceptions over all other possible positions by solely focussing on self-professed Catholic creationists.

1.3 Science and the public: Knowledge and attitudes

To achieve one aim of the present study—to investigate Catholic attitudes towards evolution in England—not only must I ensure proper attention is paid to the history and sociology of science and religion, but it is also necessary to draw upon the field of the public understanding of science. Discussions of the contemporary field of study into the public understanding of science often begin with the 1985 Bodmer Report. However, this ignores the much longer history between the two categories of “science” and “public”. Indeed, these

categories are historically constituted, and have been, and continue to be, constantly negotiated through boundary work (Shapin, 1990). To add to the complexity, it is necessary to engage in some boundary work of my own. There are various areas, fields, disciplines, and sub-disciplines which seek to understand science and its relation to the public. Science communication, the public understanding of science, science and society, and science and technology studies, among others, all in their own way seek to understand or actively facilitate the processes of interaction between the sciences and publics. How the stories of these fields are told, and who is telling it, can change our conception of them.

In this thesis, I will refer to the area of “public understanding of science” (or PUS), following the linguistic tradition of Bauer, who sees PUS as an area of: “social research that investigates, using empirical methods, what the public’s understanding of science might be and how this might vary across time and context” (Bauer, 2009: 111). Beyond analyses of public attitudes and understanding, PUS also investigates science in the media, popular science, and other communication efforts. As a field it has experienced several paradigms and normative commitments over 30 plus years (Bauer et al., 2007). I refer to the field as PUS while acknowledging that some scholars are talking of a similar area when they describe “science communication” (e.g. Trench and Bucchi, 2010). In this thesis, I distinguish science communication from PUS, by denoting science communication as an area more focussed on the transfer of information between science and publics. To confuse matters more, science communication is also an area of practice as well as a field of research, which seeks to understand how that practice operates, its commitments, and impacts. As people do not live in a vacuum, the practice of science communication, both historically and today, and the actualities of public understanding and attitudes towards science are inherently linked.

Although, as will be discussed below, this link should not be seen as a one-way diffusion of knowledge from expert scientists, through problematic mediators, to an ignorant public. Neither should we be tempted by the idea that simply increasing public science knowledge will inevitably lead to more ‘positive attitudes’—whatever they may be.

In this section I first discuss the historical antecedents of the contemporary field of PUS. As we are dealing with different areas of study, I borrow from Cassidy (2004: 18) the useful phrase “science in public”, which usefully incorporates studies of popular science, science communication, science and media, and the public understanding of science in a single term. This area has a longer history than is usually explained. Indeed, one cannot properly understand the contemporary field of PUS, and the impetus of its inception, without understanding the shifting historical and political landscapes in which it was fashioned. After briefly charting this history, I then turn to the development of PUS as a research agenda, noting the shifting normative commitments of each paradigm. This is in reality a telling of what the public and science are, how they are viewed, and how they view or should view each other.

1.3.1 A pre-history of science in public

Given its central position in some histories of PUS (e.g. Bennett and Jennings, 2011) it is easy to assume that there was no interest in what the public thought about science prior to the Royal Society’s famous 1985 “Public Understanding of Science” report. The Bodmer Report, as it became known, called for an increase of public knowledge of science to rectify perceived negative attitudes, which it was feared could damage both the institution and society. In this section I show that concerns about the relations between science and the

public have a much longer history. Indeed, without this historical context it is difficult to understand why the Bodmer Report was commissioned in the first place. The critical analysis of this history, and the subsequent development of PUS, can be said to involve a number of problematisations of the very categories of “public”, “media”, “communication”, “understanding”, and “science” itself (Shapin, 1990; Silverstone, 1990; Wynne, 1992a; Collins and Pinch, 1993; Irwin, 1995; Bucchi, 2008).

The popularisation of science also has a longer history than the late-20th century boom of the science communication industry. As an example, the Society for the Diffusion of Useful Knowledge was founded in 1826, with the aim of undermining political radicalism by supplying rational information in cheap publications. The intellectual founder, Henry Brougham, stated in an introduction to one series that science: “elevates the faculties above low pursuits, purifies and refines the passions, and helps our reason to assuage their violence” (Brougham, 1827: 2). Although, apparently, some working-class readers saw a different interpretation of the endeavour, with one claiming Brougham sought to “stop our mouths with *kangaroos*” (Secord, 2003: 46-48).¹⁰

However, it can be tempting to take present day categories and project them backwards through time, as is often done in discussions of science and religion (as introduced earlier). The seemingly solid nature of our contemporary categories can lead us to perceive them as rigid natural kinds. However, this view ignores the historical construction of these categories, and the purposes for which these boundaries were drawn.

¹⁰ The Society for the Diffusion of Useful Knowledge’s *Penny Cyclopædia* did contain an exhaustive account of “Marsupialia”, reaching nearly nineteen pages (Dawson, 2012: 650).

Here I take from Shapin's (1990) articulation of this argument in his critique of what he terms the "canonical account" of historical relations between science and the public. Later, I will return to associated accounts of science in public in contemporary scholarship, namely the "deficit model" of PUS. In the "canonical account" of historical relations between science and the public, science was once poorly demarcated from what was not science, and the proceedings of science were influenced by public concerns. This negatively impacted the nature of knowledge produced. Science, over time, shed the influence of the public in its affairs, and with them shed their negative influence on the production of reliable and objective knowledge. Therefore, according to the "canonical account", the past three centuries can be read as an inverting of relations between science and public: where once science was interfered with by the public and other institutions, now science has autonomy, controls the relations it has with the public, and can exert its own influence on societal affairs (Shapin, 1990: 992).¹¹ Despite containing some descriptive truth, this canonical account is inadequate in its explanatory utility. As Shapin (1990: 992) argues, science *has* won a degree of autonomy since the 17th century, and science *has* enjoyed a significant shift in political power, away from non-scientists and public institutions. However, the danger is to conflate description and explanation under the guise of a historical process of "professionalization". Instead of reading out of this history some teleological process through which modern relations between science and the public are unveiled, we are better served to investigate the conscious (and often contested) efforts of individuals in the past to construct the categories of "science" and "public". Indeed, when considered in this way, the

¹¹ In the last few decades, however, scholars have argued for increased public participation in scientific governance through what has become known as 'deliberative democracy', and developed models for how this normative commitment can be achieved (Irwin, 2008: 200).

constitution of “science” and “public” are not inevitable or natural developments, but the result of historical successes of individuals working for specific purposes.

Historically, where science was neither sufficiently institutionalised nor recognised as valuable, scientists have sought public recognition of their legitimacy. A clear example can be found in the work of Merton (1938), who contended that in 17th-century England, natural philosophers argued for the legitimacy of emergent science by stressing its compatibility with dominant Puritan values. It was argued, therefore, that the pursuit of natural knowledge was not dangerous to religion, indeed the pursuit of natural knowledge could be seen as a reading of God’s work in nature.¹²

A further example of this legitimisation process, is how scientists between the 17th and 19th centuries asserted public legitimacy through utilising natural theology—where the study of nature could enrich religious perspectives, giving it a wide appeal. As Shapin argues, however, this left a legacy of certain orientations within scientific culture, such as teleology (Shapin, 1990: 999). It was only through the (concerted) movement of the Scientific Naturalists between the 1860s and the 1880s that natural theology, and views such as teleology, began to be excised from what was defined as science.¹³ With the newly secularised nature of the Scientific Naturalists, however, the public were offered fresh utilitarian benefits from the endeavours of science, on the condition they respected its autonomy. Shapin argues that if, however, there was public interference with science, then

¹² Merton’s thesis isn’t without its critics (see Brooke, 1990), however I use it here as one example of scientists’ communication with the public having legitimising pretexts.

¹³ See Lightman and Dawson (2014) for a detailed discussion of scientific naturalism in Victorian Britain.

the objective nature of the knowledge would be lost, and with it the promised public benefits (Shapin, 1990: 1000).

Shapin's (1990) sketch of the canonical account, his subsequent critique, and the instances of boundary drawing between the public and science, reminds us that everywhere we discuss science in public we must also talk of individual and institutional interests and the politics of the society in question. Historians of science have investigated in detail the links between science and the public in the Victorian era, demonstrating interactions between science and the public shaped the formation of Victorian science itself (Secord, 2003; Fyfe, 2004; Lightman, 2009). These works also stress the role of popular engagement in the professionalization of science.

It was often assumed that as science had become largely professionalised by the early 20th century, scientists' withdrew from public spaces into their "well-funded ivory tower" (Bowler, 2009: 2). However, Bowler's (2009) study of early 20th-century popular science has shown that in this period a significant proportion of scientists in Britain were still writing for non-specialist audiences. Therefore, the apparent withdrawal of scientists from public spaces, which was referred to in 1985 in the Bodmer Report, was not the immediate result of the professionalization of science. Indeed, it must have happened post-WWII, if it ever happened at all.

Gregory and Lock (2008: 1252-1253) argue that after successful interactions with society and government during WWII, science in Britain was both celebrated and well-funded. Although we do continue to see the contestations of how science should relate to society on display in the aftermath of WWII. Ideologues on the political left and right were

united in honouring science, but differed in their visions of how science and society should interrelate. For the Left, society should control the direction and outputs of science, which would then be collectively owned. For the Right, however, scientists sought autonomy from any external governance, seeing interference as restricting science's ability to optimally function (Gregory and Lock, 2008: 1252-1253).

From the 1960s to the 1970s, a shift in the governance of science occurred. In the 1960s the scientific community itself mediated government funding of science, this model had at least some democratic control. However, in the 1970s, coinciding with Margaret Thatcher becoming Minister for Science, science became increasingly organised in a free-market, corporate model (Gregory and Locke, 2008: 1253). It was in this political context that a number of scientists came together to address what they feared was a breakdown in relations between science and the public. Thus, the Royal Society commissioned the Bodmer Report.

The problem as defined by the report was that science and the public were suffering from a breakdown in relations, and this was due to the public's lack of knowledge about science. The report called for scientists to improve and increase their communication efforts, and urged more science coverage in the media. Furthermore, the authors urged political decision makers to seek more advice on science, and that businesspersons needed to increase their understanding of science to maximise the competitiveness of the UK economy (Bodmer, 1985: 31). Surveys of the public's knowledge of science were then issued, and the lack of knowledge found was then interpreted as corroborating the Bodmer Report's

recommendation: to communicate more science to the public (Gregory and Locke, 2008: 1254).

In 1985, the Committee on the Public Understanding of Science (COPUS) was launched by the British Association for the Advancement of Science, the Royal Institution and the Royal Society. COPUS funded a series of initiatives, not only to popularise science, but also to increase the public's scientific literacy. It was hoped that this newly envisioned scientifically literate public would be more enthusiastic about scientific research, more supportive of new technological developments, and presumably more enthusiastic about funding science (Sturgis and Allum, 2004: 55).

1.3.2 The public understanding of science: Deficit to context

Now we have briefly charted the background to the development of PUS as an area of research, I will turn to the subsequent development of the field itself, noting the shifting paradigms and normative commitments of each. This story can broadly be told as a move from a deficit model of science-public interaction, introduced above and expanded on below, towards a more contextualist approach, where factors beyond the epistemic are seen to most influence public attitudes.

1.3.2.1 *Paradigms and development*

Multidisciplinary studies of the public understanding of science (PUS), and the related field of science communication, aim to investigate the interrelationship between science and the public. PUS has undergone many changes, with Bauer et al. arguing it can be divided into three paradigms: *science literacy* (1960s onwards), *public understanding of science* (1985 onwards), and *science and society* (1990s onwards) (Bauer et al., 2007: 79-80).

According to their analysis the key feature of each paradigm is the attribution of a particular ‘deficit’ to the public (see Table 1.1). These purported deficits, were then to be overcome by various forms of action, for example through education in the *science literacy* paradigm, or public participation in scientific decision making in the *science and society* paradigm.

Table 1.1 Paradigms, problems and proposals in PUS (Reproduced from Bauer et al., 2007: 80)

Period	Attribution Problems	Proposals Research
Science Literacy	Public deficit	Literacy measures
1960s onwards	Knowledge	Education
Public Understanding	Public deficit	Knowledge–attitude
After 1985	Attitudes	Attitude change
	Education	Image marketing
Science and Society	Trust deficit	Participation
1990s–present	Expert deficit	Deliberation
	Notions of public	‘Angels’ mediators
	Crisis of confidence	Impact evaluation

It should be noted that these paradigms overlap, and do not neatly succeed each other. In Bauer’s (2009) view, this is not representative of progress, but of the multiplication of discourses. The ‘protagonists’ of each paradigm, however, use the rhetoric of progress to dismiss the previous. *Public understanding* researchers, who chase attitude deficits, have left behind the ‘old’ *science literacy* deficit. *Science and society* practitioners profess to have left the old deficit models behind, whilst still seeking to investigate their own deficit, one of trust

(Bauer et al., 2007: 86). Despite Bauer et al.'s caveats it could be argued that their prescriptive approach is ahistorical and does not take account of the heterogeneity of approaches of communicating science to the public across the 20th century. For example, as early as the 1940s British broadcasters were discussing the utility of a science and society approach to aid the dissemination of scientific knowledge (Hall, forthcoming). Still, what we are left with is a perceived deficit—of knowledge, attitude, or trust—on the part of publics, which it is thought must be plugged or filled with some new form of education, engagement, or deliberation.

In an analysis of the 50 most influential papers in a key PUS journal, *Public Understanding of Science*, Smallman (2014) attempts to empirically chart the development of the field. Though it could be argued that solely studying only the highly influential papers, in one journal, ignores large parts of PUS literature and research, this attempt to map the development of the field's arguments and theory serves a useful purpose here. Smallman (2014: 10) describes how there have been mainstay topics in PUS from 1992-2010—specifically media coverage, surveys, and models of public understanding. Although there has been a shift in the focus of these topics, studies of media coverage of science, for example, have moved from more general studies of the patterns and structure of the media, to a more recent focus on specific case studies, such as climate change and genetics (Smallman, 2014: 5). Secondly, over time there has been a move to consider PUS media studies within their wider societal context and social discourse—with the inclusion of terms such as “public perceptions” and “political discourse” in later studies. Thirdly, studies of media coverage have developed from a largely North American focus, from 1992 to 1994, to more international studies from 2000 onwards (Smallman, 2014: 7). The media analysis in

the present thesis aligns with these developments, being a contextualised case-study approach, investigating papal statements about evolution in English newspapers specifically.

The focus of surveys in PUS has also shifted over time. Smallman notes how between 1995 and 1999 typical words in relation to survey work were: 'item', 'attitude', 'literacy', 'dimension', 'understand' and 'measure'. However, between 2003-2010 words such as 'deficit', 'contextualist', 'model', 'relationship', 'critique' and 'hypothesis' are more prominent (Smallman, 2014: 7). This thesis aims to synthesize the 'mainstay topics' of PUS research, by combining media analysis and attitudes research. Though instead of using quantitative surveys, I employ a qualitative interview method to explore individuals' lived experiences of the relationship between their religious beliefs and attitudes towards evolution. As will be discussed in more detail in the final section of this chapter, using inductive, qualitative methods is important for social studies of science and religion, especially when measuring public attitudes to evolution. As has been critiqued by Elsdon-Baker (2015a), some quantitative survey questions in this area are problematically framed, and may not adequately allow individuals' views to emerge in data collection. Thus, using interviews allows the generation of more detailed, exploratory data.

1.3.2.2 Deficit to context

While there are different types of deficits which have been focused on in PUS research, a main focus in this thesis will be the knowledge deficit model. Indeed, when PUS scholars talk about "the deficit model" without any qualifier it is most frequently the knowledge deficit model to which they refer. As discussed earlier, the authors of the Bodmer Report (1985: 31) crystallised this notion, arguing that increasing the public understanding of

science would lead to improved attitudes, personal wellbeing, and support for science.

Therefore, scientists had to improve their communication of science and its benefits to the public. As the authors argued:

Given the importance of public understanding of science and the extent to which scientists must be democratically accountable to those who support their training and research through public taxation, it is clearly a part of each scientist's professional responsibility to promote the public understanding of science. (Bodmer, 1985: 34)

Sturgis and Allum (2004) state that the Bodmer Report only assumed that the public did not understand science, or had a lack of knowledge, and it was this lack on the part of the public that had led to negative attitudes. This assumption became known as the 'deficit model' (Ziman, 1991; Wynne, 1991; Layton et al., 1993; Sturgis and Allum, 2004). Simply stated, the deficit model assumes that "the more you know, the more you love it" (Bauer, 2009: 8). In this conception, negative attitudes toward science are perceived to be the result of ignorance, and the way to overcome these negative attitudes is through knowledge and education.

The deficit model, and the notion that the public have irrational fears of science due to a lack of understanding, has been criticised on a number of grounds resulting in a scholarly distancing from it (Sturgis and Allum, 2004: 57).¹⁴ This move was in part influenced by scholars in the neighbouring discipline of science and technology studies (STS). A key text here is Wynne's (1992b) classic explication of the way expert knowledge and lay knowledge interacted during the Chernobyl fallout in Cumbria. Wynne demonstrated that laypeople were able to deeply reflect on their social relationships towards scientific experts, and on

¹⁴ Though the deficit model still finds popular appeal among some scientists and science communication practitioners (see Simis et al. 2016).

the epistemological status of their own 'local' knowledge in relation to scientific expertise. Furthermore, lay knowledge shouldn't be seen as an inferior version of expert knowledge, but instead as qualitatively different. Therefore, expert knowledge is to be seen as but one ingredient of lay knowledge, mixed in with other elements such as value judgements, trust in the scientific institutions, and the person's perception of their ability to put scientific knowledge to practical use (Bucchi, 2008: 60). Thus, context is important.

Risk scholars have also contributed to critical analysis of the deficit model. Douglas and Wildavsky (1982) demonstrated the role of social relations in technological risk perception, with the public selecting risks depending on the social norms of their cultural environment, rather than knowledge of objective hazards. Further divergence from the deficit model can also be seen in the work of Slovic and Peters (1998), who show technological risk perception to be associated with worldviews, such as environmentalism, rather than being determined by scientific knowledge alone.

Beyond these scholars, others have criticized the knowledge measures used in attitude studies, typical of deficit model approaches. Peters (2000) argues results from such surveys depend on which aspects of scientific knowledge are selected in the survey design. For example, Peters criticized the knowledge indicators used in the 1993 Eurobarometer survey as "culturally determined idealisations". The resultant indicators are therefore a biased indication of scientific understanding, which are dependent on respondents' national and cultural location (Sturgis and Allum, 2004: 57).

Wynne (1995: 362) labels his approach the "constructivist strand of PUS", which problematizes both science and the public. Other scholars such as Sturgis and Allum (2004:

69), however, have labelled it as the “contextualist approach” to PUS, where scientific knowledge is seen not as an abstract collection of ‘facts’ but as sets of understandings within various social contexts. This labelling is, in part, due to Sturgis and Allum’s (2004) and other’s (e.g. Bauer et al. 2007) resistance to the linkage of deficit approaches to survey methods. In this view, surveys are seen to promote the deficit model, and qualitative methods are seen as critical in their approach. For Bauer et al (2007: 79) this essentialist connection must be severed; liberating the research agenda by contextualizing survey research, finding cultural indicators, integrating datasets and conducting longitudinal analysis, and utilising other data streams. As discussed in Chapter 4, the present thesis does utilise some notion of constructionism, yet I follow the tradition of calling this type of research the contextualist, or critical, approach to PUS.

Despite the many criticisms of the deficit model, Sturgis and Allum (2004: 57) argue that it should not be scrapped entirely. A meta-analysis of 193 surveys in 40 different countries found an overall small positive correlation between scientific knowledge and attitudes toward science, although these correlations differed depending on the particular scientific topic analysed (Allum et al., 2008). This does seem to indicate knowledge has some role in determining attitudes, but it undoubtedly goes beyond a simple conception of: the more you know, the more you love it.

As introduced in the conceptual issues section above, Elsdon-Baker and Mason-Wilkes (2019: 13-14) make an interesting observation about the deficit model in relation to science and religion. They argue that if we take some founding assumptions about the relations between science, modernity, and progress, and similar assumptions about the

inverse relationship between religion and modernity, then measures of scientific literacy, and (reducing) religiosity, could be viewed as proxy measures of a societal progress. Elsdon-Baker and Mason-Wilkes (2019: 13-14) argue that these assumptions are problematic for several reasons. They do not take into account contextual scholarship on how publics interact with science, nor the diverse relations of religion and modern societies (see Davies, 2013).

Simis et al. (2016: 401) contend that while multiple empirical analyses have shown that public attitudes to science are more complex than the deficit model suggests (e.g. Sturgis and Allum, 2004; Davies, 2008; Nisbet and Scheufele, 2009; Brossard et al., 2009; Yeo et al., 2015), the deficit model still persists among scientists and practitioners in the public communication of science. Reasons for this persistence, according to Simis et al. (2016: 410) are: the juxtaposition between how scientists are trained and how the public processes information; institutional structures that continue to support the deficit model—for example scientists with less positive attitudes toward the social sciences are more likely to adhere to the deficit model; scientists' conception of 'the public'; and the attractiveness of the deficit model for policy making. We see this preservation and continued promotion of the deficit model in the examples given in the introduction to this chapter, where both Miller et al. (2006) and Richard Dawkins called for greater efforts to enlighten and educate the public about evolution, in response to surveys of apparent low acceptance.

In this thesis, whether knowledge of evolution corresponds with more positive attitudes towards evolution is left as an open empirical question. The interviews explore individuals' understandings and perceptions of evolution and science in general. From this, I

can then assess how knowledge about evolution relates to attitudes about it, thus testing the assumptions of the deficit model. As this study does not posit that knowledge is the sole influencer of attitude, it follows in the more critical contextualist tradition in PUS where other social and institutional forces are relevant in shaping attitudes.

In this section, I have demonstrated that questions of how the public and science interact have a much longer history than the Bodmer Report. Indeed, interactions and boundary drawing between scientists and the public in Victorian Britain shaped the very nature of science itself. In the mid- to late- 20th century, concerns over negative public attitudes and appreciation of science led to the calls for increasing public understanding of science. The paradigm of the deficit model, where greater knowledge leads to improved attitudes, has subsequently been critiqued by the PUS community though it still finds popular appeal among some scientists and communicators. In PUS, however, there has been a turn to a critical or contextualist perspective, where other factors in addition to scientific knowledge are seen to be important in shaping attitudes towards science.

1.4 What do religious people think about evolution?

Having given an overview of the conceptual issues that afflict many investigations of science and religion, and reviewed the developments of efforts to investigate (and sometimes improve) the public understanding of science, I now turn to studies which have sought to analyse religious attitudes towards evolution. I separate studies into two methodological traditions, quantitative and qualitative, and aim to show shortcomings and

strengths in the current literature. Given the focus of this thesis, the reader will note the lack of specific studies on Catholicism. This is not an omission, but rather reflects the lack of attention given to Catholicism in the literature. As suggested earlier, this may well be because of a focus on ‘problematic groups’ in research into science and religion. Below I discuss the implication of research frames generated from studying groups who are perceived to be problematic, and their subsequent application to other religious traditions, such as Catholicism.

1.4.1 Quantitative studies of religious attitudes towards evolution

Most studies investigating attitudes towards evolution utilise a quantitative methodology, and have often relied on epistemic explanatory factors of attitudes (Elsdon-Baker, 2018; Elsdon-Baker and Mason-Wilkes, 2019: 12; Hill, 2019: 46). Furthermore, it is only these quantitative studies that are reported on in the media, prompting such headlines as “Pope Francis may believe in evolution, but 42 percent of Americans do not” in *The Washington Post* (McCoy, 2014). Therefore, as the results of quantitative studies are reported by the media, and can set the agenda for public discourse on religion and evolution, it is necessary to critically review how the results of these studies are generated.

In a recent review paper, Hill shows that most evolution-related polling falls into two categories: (1) direct questions about belief in human evolution; or (2) questions that attempt to have respondents self-categorise as evolutionists or creationists (Hill, 2019: 31). As I contend in this section, both these types of study, where either human evolution is the focus, or predefined categories of belief are offered by the researcher, are problematic in terms of understanding how religious publics interact with evolution. These methods

construct a somewhat definitive view of public attitudes towards evolution, and ignore other factors, such as an individual's identity and moral salience, which may also influence how individuals perceive evolution (Moran, 2019; Guhin, 2016).

One of the earliest and longest-running surveys which has sought to investigate public attitudes towards evolution is Gallup's Values and Beliefs survey. Beginning in 1982, Gallup has asked individuals in the USA a simple three-part question about human origins: "Which of the following statements comes closest to your views on the origin and development of human beings?" With three positions into which participants must self-categorise:

- (1) God created human beings pretty much in their present form at one time within the last 10,000 years or so;
- (2) Human beings have developed over millions of years from less advanced forms of life, but God guided this process;
- (3) Human beings have developed over millions of years from less advanced forms of life, but God had no part in this process. (Newport, 2014)

A major issue with this type of measure is that it focusses solely on human evolution, arguably the most contentious area of biological evolution. For example, in recent polling work in the UK and Canada, a large-scale cross-cultural survey found that questions over human origins and consciousness play a part in uncertainty towards aspects of evolution across religious, spiritual and non-religious groups (Eldson-Baker et al., 2017). Therefore, specifically assessing attitudes towards human evolution and drawing conclusions about attitudes toward evolution in general is a problematic extrapolation.

While the longitudinal Gallup poll has demonstrated steady levels of Young-Earth Creationism (YEC) in the US (based on the particular formation of their three-part question), there are no comparable longitudinal studies in the UK. As Unsworth and Voas (2017: 2-3)

explain, depending on the wording of the question, in the UK levels of 'creationism' have been claimed between 9% and 22% (YouGov, 2013; IpsosMORI, 2006). Whilst 'acceptance' of evolution has been measured between 38% and 79% (Elsdon-Baker, 2015a; Eurobarometer, 2005). Are acceptance and rejection of evolution such wildly unstable attitudes in society that they can change so much in a 10-year period? Or does the way in which the questions are formed and analysed dramatically affect the apparent prevalence of acceptance and rejection? One common feature of much of this polling work is that surveys force individuals' views into predefined categories. These categories are then used to argue about levels of 'acceptance' and 'rejection' of evolution, often in an uncritical way. Elsdon-Baker (2015a) examines the role of this issue framing in studies of public attitudes towards evolution, concluding that in effect we are "creating creationists", and suggests we must allow more subtle belief positions to emerge through the use of additional categories, such as various forms of human exclusionism.

Elsdon-Baker's (2015a) critique draws on the work of philosopher Ian Hacking. Hacking (1986) aims to show that between the somewhat rigid camps of nominalism and realism lies an interesting principle. The 'dynamic nominalism' perspective suggests that numerous kinds of human beings and human acts come into existence "hand in hand" with the creation of the categories that label them. Hacking (1986: 166) argues that dynamic nominalism makes little sense when applied to things rather than people, stating that "[w]hat happens to tuberculosis bacilli depends on whether or not we poison them with BCG vaccine, but it does not depend upon how we describe them." The possibilities for the bacillus are dictated by nature. For humans, though, the possibilities of actions depend largely on the possibility of descriptions. Therefore, if new descriptions come into being, new

possibilities for acting also come into being, and people can then act in the ways which we have described.

Although Hacking notes there is no general story of dynamic nominalism, or principle that describes all cases of “making up people”, he offers a partial framework based on a two-vector approach. One vector is labelling from above, a community of experts create a label, a ‘reality’, which some people make their own. Different from this is the vector of the autonomous behaviour of the labelled person, which presses from below, creating a reality which every expert must face. The general outline of dynamic nominalism, as detailed by Hacking (1986), has clear implications for research into acceptance of evolution and specifically for categorising ‘creationism’ and ‘creationists’. One obvious implication of “making up people” stems from prescriptive categorisations, which necessarily arise from large-scale survey work. As we create surveys with the general aim of describing patterns in society, what is the extent of the interplay between these bottom-up and top-down vectors?

Elsdon-Baker (2015a) produces a thorough expansion of this point, showing that through the use of restrictive, binary questioning we perpetuate preconceived categories of incompatibility between religion and science, rather than allowing subtler belief positions to emerge from the data. Many previous surveys, which have received considerable media attention, have used restrictive questions that require those who accept evolution to reject God, and vice versa. In this sense, we perpetuate a contrived dualism and in Elsdon-Baker’s (2015a) words we “create creationists”. This restrictive, binary framing is clearly shown in the *Horizon: War on Science* poll (2006) (mentioned in the introduction to this chapter) where respondents were asked which statement best describes their view on the origin and

development of life.¹⁵ Through these statements the survey carves the respondents into three distinct camps, with little option for more nuanced beliefs. In this survey, to accept ‘evolution theory’ one must accept that God has no part in the process.

It is possible, then, that through the use of restrictive categories we are missing other important belief positions into which some individuals may self-categorise. Elsdon-Baker (2015a) sets out three of these broad conceptual categories, which have been missed in prior large-scale survey work on religion and evolution:

- *Spiritual Human Exclusionist Evolutionist accounts.* Versions of human exclusionism that allow for humans’ physical form to be subject to both macro- and micro-evolution, but that allow for a form of special spiritual creation, for example, an insertion of higher level cognitive functioning or a human ‘soul’ by a higher power, deity or God.
- *Theistic or Deistic Human Exclusionist Evolutionary accounts.* Versions of human exclusionism that allow for a form of special creation for humans’ physical form, but also allow for micro-evolution within human history.
- *Creationist Human Exclusionist accounts.* A conceptualization of humans having been inserted into a larger scale process of evolution, which includes all life forms except humans, whereby humans are subject to a form of special creation, but not subject to either macro- or micro-evolution (Elsdon-Baker, 2015a: 14).

These categories are useful in their ability to more accurately describe the potential positions of a larger section of the population. Embedding these categories in new waves of quantitative surveys, may allow researchers to better understand a wider range of public opinions on the matter. However, I contend that while offering a larger range of positions

¹⁵ As introduced earlier, these statements were: “The ‘evolution theory’ says that humankind has developed over millions of years from less advanced forms of life. God had no part in this process; The ‘creationism theory’ says that God created humankind pretty much in his/her present form at one time within the last 10,000 years; And the ‘intelligent design’ theory says that certain features of living things are best explained by the intervention of a supernatural being, e.g. God.” (From *Horizon: A War on Science* poll, as quoted in Elsdon-Baker (2015a: 5))

may well capture some previously missed beliefs, the approach may have its limitations for others who don't hold formalised positions. I will now expand on this point below with reference to recent work which has sought to include more subtle categories of evolution-religion interaction.

North-American sociologists Ecklund and Scheitle (2018: 74-79) developed a new approach for investigating public attitudes towards evolution, which includes more belief categories. In a large study of the American religious population, participants were asked to choose from six narratives of the origin and development of life, rather than the traditional three-part measure. Their new categories were: young-earth creationism, recent human creation, God-guided evolution, Intelligent Design, God-initiated evolution, and naturalistic evolution. Unlike previous surveys, the researchers also allowed participants to select more than one narrative. For each narrative chosen, participants also had to state whether the narrative was "probably true" or "definitely true". Interestingly, 57.5% of respondents said none of the narratives were "definitely true". Furthermore, the majority of individuals in every religious group selected more than one narrative on the origin of life. While it could be argued that this is due to an insufficient number of options, Ecklund and Scheitle interpret the selection of multiple narratives as an indicator that individuals are not sure enough about their position to commit to one perspective. A similar conclusion was reached through the large-scale Theos poll in the UK, which found that attitudes towards evolution were often "confused and contradictory" (Lawes, 2009).

In Britain, Unsworth and Voas (2017) have also attempted to better survey public attitudes towards evolution; moving away from self-categorising positions, to the

deployment of multiple measures related to questions around religion and evolution. Their survey includes 8 separate questions, responded to on a 5-point Likert scale. Participants were asked:

For each of the following statements, please say whether you Strongly Agree, Agree, Neither Agree nor Disagree, Disagree or Strongly Disagree:

- (1) The world was created in six 24-hour days;
- (2) Plants and animals have developed over time from simpler life forms;
- (3) Humans have developed over time from simpler, non-human life forms;
- (4) The whole human race is descended from Adam and Eve;
- (5) There is strong, reliable evidence to support the theory of evolution;
- (6) The earth is young – less than 10,000 years old;
- (7) The earth is billions of years old;
- (8) Life is too complex to have evolved solely by natural processes.

(Unsworth and Voas, 2017: 8)

Also of note in Unsworth and Voas's study, is their decision to include in addition to the nationally representative sample, an oversample of 5 religious affiliations: Anglicans, Catholics, Muslims, Pentecostal Christians, and Independent Evangelicals. Allowing a more representative view of the differences between religious groups in Britain. Their results reveal that public attitudes towards evolution are complex and cannot be adequately measured with a single dichotomous survey item.

A clear example of the utility of this disambiguation is the difference in levels of YEC found between the Ipsos MORI *War on Science* poll and Unsworth and Voas's (2017) work. Ipsos MORI, utilising the 3-part blunt measure, suggested 22% of the British population were YEC. That is, they agreed with the proposition: "The 'creationism theory' says that God created humankind pretty much in his/her present form at one time within the last 10,000 years." Unsworth and Voas (2017: 9) however, through cross tabulation of their separate young earth and human evolution questions, find that only 2% of the British population

subscribe to the idea of a young earth that is less than 10,000 years old *and also* reject human evolution. A marked difference of 20%, even given the 11-year gap between the studies.

Furthermore, 3.8% of the whole sample in Unsworth and Voas's (2017) study accepted a human exceptionalism view (accepting plant and animal evolution, but rejecting human evolution). The figure was 12.6% for Independent Evangelicals, 6.3% for Catholics, and 2% for the non-religious. Suggesting that there are indeed people who hold human exclusionist perspectives, who had been missed by previous surveys as suggested by Elsdon-Baker (2015a). Interestingly, like Unsworth and Voas (2017), Elsdon-Baker et al. (2017: 16) found that evolutionary explanations for the origins of human beings were difficult for both religious and non-religious respondents, although religion had an amplifying effect. In their study, 18% of non-religious/spiritual and 37% of religious/spiritual respondents agreed (somewhat agree, agree, or strongly agree) with the statement: "Animals evolve over time but evolutionary science cannot explain the origins of human beings" (Elsdon-Baker et al., 2017: 18). The differences found between these two 2017 studies highlights how using different survey instruments on the same issue can deliver different results.

Due to the inclusion of a Catholic oversample (n=978), Unsworth and Voas's (2017) study gives us the most up-to-date and comprehensive study of Catholic attitudes towards evolution in Britain. The full results of their 8 Likert items introduced above, and how the Catholic population differs from the whole sample and other denominations, can be seen in Figure 2.2 below. Most interesting here, is that only 6% of Catholics in the sample disagreed with the statement: "There is strong, reliable evidence to support the theory of evolution."

This indicates less opposition towards evolution among British Catholics, compared with British Evangelicals (47.3%) and Muslims (30.2%). However, with only 3.4% of Anglicans in the study disagreeing with the same statement, the same figure as the non-religious population, shows more opposition to evolution among British Catholics than Anglican Christians based on this measure. The study also demonstrates the danger of treating “Christians” as a monolithic group, with differing belief positions being adopted at different levels by Anglicans, Catholics, Pentecostals, and Evangelicals, specifically in regard to the question of Adam and Eve (Figure 1.2). Yet, this type of approach cannot inform us about the idiosyncrasies behind these belief positions. This is where exploratory, interview methods can contribute to the emerging literature of SSSR.

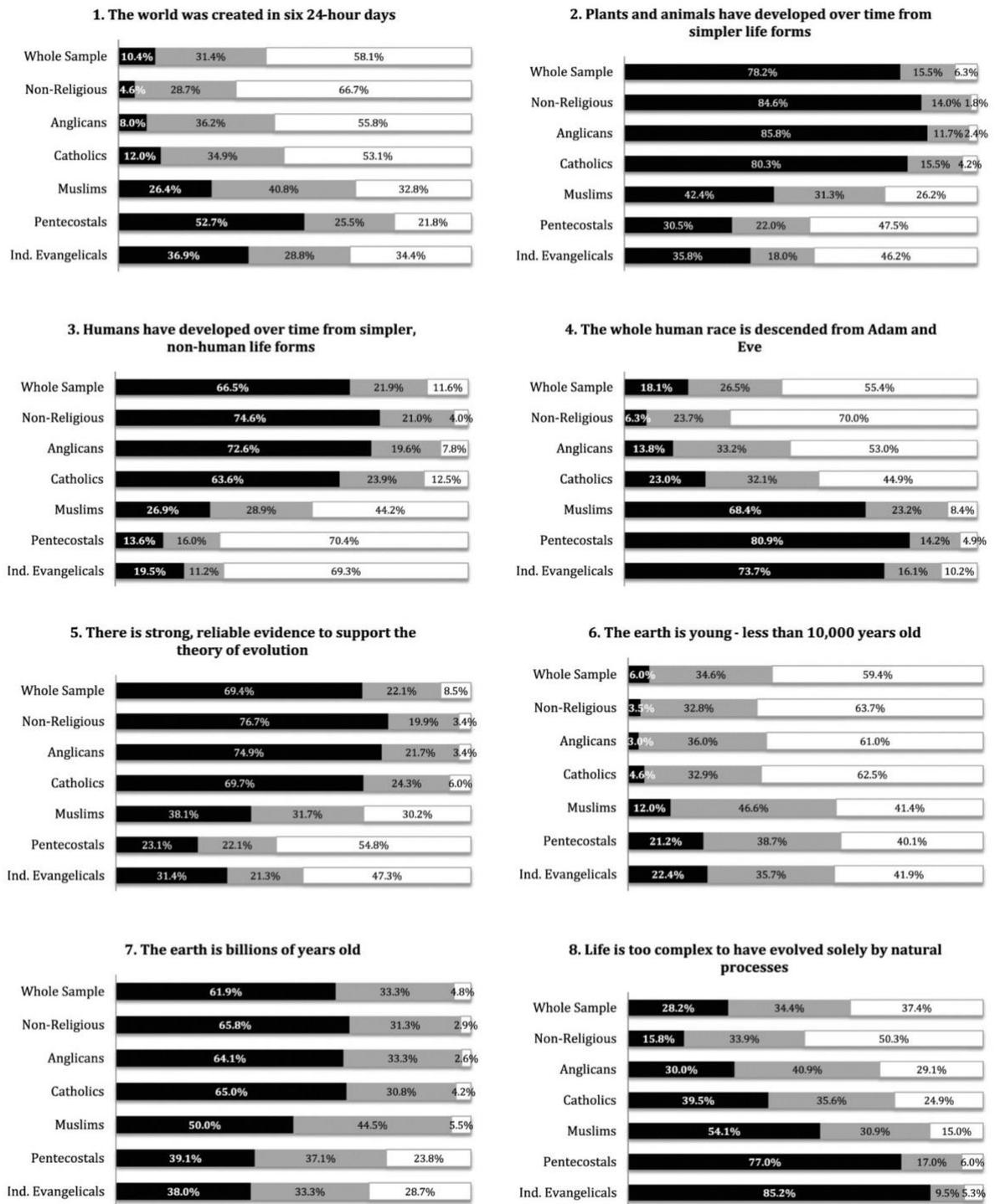


Figure 1.2 Results from eight Likert-scale items about evolution. Black=Strongly Agree or Agree; Grey=Neither Agree Nor Disagree; White=Disagree or Strongly Disagree. (Unsworth and Voas, 2017: 7)

In the USA, Hill (2014a) employed a similar strategy to Unsworth and Voas (2017) by disaggregating packaged belief positions. Instead of the well-used strategy of using a measure designed to categorise individuals as creationists, theistic evolutionists or atheistic evolutionists, Hill employed a number of disaggregated measures about evolution, God's involvement in the emergence of humans, the historicity of Adam and Eve, belief in 24-hour day periods of creation, and geological time, before constructing the categories of YEC, theistic and atheistic evolution. From analysing these measures, Hill (2014a) concluded that fewer people in his US sample fit definitively into the categories of YEC, theistic evolution, and atheistic evolution, than when compared to simple Gallup-style blunt measures. In Gallup-polling, between 40 and 47% of the US population select the YEC option; between 31 and 40% select the theistic evolution position; and between 9 and 19% select the atheistic evolution, as the closest to their view (Hill, 2014a: 6). In Hill's study using disaggregated measures, 37% were creationists, 16% theistic evolutionists, and 9% atheistic evolutionists. When considering if the individuals were "very certain" or "absolutely certain" about these beliefs, the numbers fell to 29%, 8%, and 6%, respectively. Hill concludes that the differences were: "almost certainly due to Gallup respondents being forced to choose from limited options, even when many are unsure of what they believe or maintain beliefs that do not fit into the options available" (Hill, 2014a: 1).

Above I have described how quantitative studies of public attitudes towards science have developed from the very blunt measures in the Gallup poll, to newer methods, which allow a more subtle understanding of the public's views on evolution. In these more nuanced, newer studies, we see that attitudes towards evolution are sometimes held tentatively (Ecklund and Sheitle, 2018), and can be contradictory and confused (Lawes,

2009). Here, even though he was discussing views of science and religion more broadly, I find Hill's recent recommendation particularly instructive:

The reason for this is that most people are not logically consistent and coherent in their world views – religious conservatives included. This is not because the public is stupid; most simply do not have the time or incentive to develop coherent world views. Yet, the vast majority of what is 'out there' is elite dialogue about these topics. Books, web sites and blogs all represent aspects of elite discourse. Elites often assume that the public is as invested in creating coherent and intellectually defensible positions as they are, but this is simply not true. Turning to social context and group identity will be far more important in understanding why the public adopts certain beliefs and narratives about science and religion. (Hill, 2019: 47)

Thus, one of our mistakes as researchers may well be in the expectation of coherent positions from the public regarding their religious (or non-religious) beliefs and evolution. Following Elsdon-Baker's (2015a) creating creationists critique, I would argue that more work must be done to assess the 'bottom-up' push (Hacking, 1986) of people's beliefs and lived experiences through the development of methodologies, which allow people's beliefs (or indeed lack thereof) to emerge through data rather than be framed in its collection. I do not posit that this is simply an inadequacy of quantitative work; as will be discussed below some qualitative work has also been framed problematically, and restricts the types of voices heard.

1.4.2 Qualitative studies of religious attitudes towards evolution

As has been discussed, the dominant discourses on science and religion have been largely cultivated in the USA, and this has arguably influenced academic research agendas. Therefore, research has (in some ways justifiably) tended to focus on apparent 'problematic groups', namely Evangelical Protestant creationist groups. In the US, there has been a long tradition of studying creationism and creationist movements (e.g. Toumey, 1994; Long,

2011). More recently, work in this area has begun to look at issues such as moral salience for those who reject evolution (Guhin, 2016), and the importance of moral beliefs in evolution debates (Evans, 2011). There has also been a recent increase in studies looking at the ‘problem’ of Muslim perceptions of evolution. However, as with the critiques seen in PUS, much of this work focusses on epistemic factors, and ignores contextual factors which may also feed into perceptions.¹⁶

To date, there have been no dedicated qualitative studies examining Catholic communities’ attitudes towards evolution. This may be because they are not seen as a ‘problem group’, as many quantitative surveys show them at higher rates of acceptance of evolution than groups such as Evangelicals and Muslims, in both the US and the UK (Hill, 2019; Unsworth and Voas, 2017).¹⁷ However, I would argue that to understand how evolution and religion are interacting in society, we must move beyond solely investigating ‘problem groups’, justifiably labelled or not. As without insights from communities which have not been traditionally labelled problematic, at least in academic discourse if not in popular culture, then our picture of the relationship between science and religion in society will remain problematically skewed. Recent attempts have been made in this direction, with some seeking to expand our investigative gaze beyond how religious identity *negatively* affects attitudes towards evolution, to how non-religious identities may *positively* influence attitudes towards evolution (Jones, Unpublished manuscript). More work is needed to critique this normative position, where religion is a *de facto* detractor from positive

¹⁶ See Carlisle et al. (2019) for a thorough review of the emergent literature on Muslim attitudes towards evolution.

¹⁷ This is not to say that Catholics have escaped the labelling of anti-science. Historically, their treatment of Galileo is used as a prime exemplar of the conflict thesis. See Chapter 3.

perceptions of evolution and science, and to further investigate how non-religious identities may contribute to more positive perceptions of evolution and science more generally.

Beyond large-scale quantitative surveys, qualitative approaches also have conceptual issues to consider. Hildering et al. (2012) interviewed ten Dutch Protestant Christians and attempted to understand their rejection of evolution through three public understanding of science paradigms: knowledge deficit, attitude deficit and trust deficit. Even though trust and knowledge deficits were found in some participants, none of the paradigms proved sufficient to fully explain participant's rejection of evolution. The researchers found the main reason for rejecting evolution was an *a priori* decision by some participants to trust the Bible over science. Furthermore, all respondents claimed that evolution does not meet the standards of good science, and therefore is as unscientific as creationism. Nonetheless, all participants had positive attitudes to science in general. The researchers suggest this overall positive attitude was maintained by participants by their exclusion of evolutionary science from science in general (Hildering et al., 2012: 988). Hildering et al. conclude that debates which seek to discuss the validity of evolution with religious individuals who oppose it, will have little success. This is in-keeping with critiques of the deficit model in the public understanding of science, as discussed below (Hildering et al., 2012: 997).

The aim of Hildering et al.'s (2012) study was to analyse those who reject evolution using public understanding of science paradigms. Although this is a useful contribution to understanding certain religious rejections of evolution, it is another study, which focusses solely on epistemological conflict, rather than potential complementarity, or an exploration of multiple relationships between religion and science. This type of literature is described by

Evans and Evans (2008: 91) as “symbolic incompatible epistemological conflict literature”, where religion and science are seen as making competing truth claims about the world. By focussing on those who perceive conflict, studies such as this may well inadvertently help propagate the conflict narrative. Therefore, a broader approach is needed when investigating attitudes towards evolution.

Through the application of qualitative approaches to a wider range of religious individuals, not solely selecting a sample who reject evolution outright (and in doing so may well be an outlier group), we could better attain views, and therefore categories using Hacking’s (1986) ‘bottom-up’ push. These studies, and their limitations, have informed my thesis’ methodological design. Using a qualitative methodology, but interviewing a broader sample not restricted to those who reject evolution, will allow the exploration of a range of perspectives of the epistemological relationship between religion and science, without necessitating conflict perceptions, but also without ignoring them. In this sense, I am studying the symbolic epistemological *relationship*, with no need to focus solely on conflict.

Recent attempts which seek to investigate religious attitudes towards evolution have adopted the contextual perspective called for by critical scholars of PUS. For example, Moran’s (2019) investigation of Muslim attitudes toward evolution in the UK, which unlike previous studies (discussed in Carlisle, 2019), employs a contextualist perspective by utilising the perspectives and implications of social identity affecting Muslim perceptions of evolution in the UK. This type of work is much needed, employing perspectives beyond the epistemological to explain differences in religious perceptions of evolution. Despite this, however, Moran (2019) utilises a categorisation based on acceptance and rejection of

evolution in his analysis of orientations towards evolution. Acceptance and rejection of evolution plays an important part in public discourse on evolution and religion, however there may be other ways to categorise their relationship beyond these hard-fixed binary categories.

Elsdon-Baker and Mason-Wilkes suggest that the call for more qualitative work in the area is in part a call to move away from the use of abstract typologies of professional and scholarly discourse, towards the investigation of lived experiences.

It is an unfortunate legacy of debates in this field to date that quantitative research has tended to operationalize these abstract categories in survey instruments, thus applying categorical labels that individuals may not readily identify with [...] Drawing on qualitative findings would, in turn, allow future quantitative researchers seeking to examine societal trends to build a more informed approach to any forms of classification or categorization that are inherently implied by this kind of data collection. Furthermore, rather excitingly, it may also lead to entirely different modes or directions for future quantitative data collection. (Elsdon-Baker and Mason-Wilkes, 2019: 9)

There have also been recent attempts to investigate the differences between professional discourse on science and religion, and how issues are understood by the public (e.g. Kaden et al., 2017). Using data from a recent large-scale qualitative study, consisting of 123 interviews and 16 focus groups, Kaden et al. (2019) investigated how science-religion labels from popular discourse (such as: 'creationism', 'intelligent design', 'Darwinism' and 'New Atheism') were identified with among religious and non-religious publics and scientists in the UK and Canada. As has been discussed above, apparently neat terms such as 'creationism' often feature in quantitative research, however little work has been conducted to investigate what people think of these labels, and how (if at all) they identify with them. Kaden et al. (2019: 64) found that publics' awareness of labels such as: 'Darwinist', 'creationist', 'evolutionist', 'theistic evolutionist', was limited; arguing:

In our research, while people did not typically 'fit' or identify with science and belief labels, some participants did use them to position themselves: labels sometimes functioned as discursive resources in the construction, remaking and articulation of personal identity, and this includes contesting common assumptions about what (religious and secular) communities hold to be true (Kaden et al., 2019: 57).

Furthermore, the researchers found that participants also rejected labels of public discourse, even when their stated beliefs appeared to correspond to such labels—often because of a separation of participants' epistemic beliefs, and the broader political or social motivations of groups in public discourse, which promotes those labels (Kaden et al., 2019: 64). Due to the political social interests of groups prominent in popular discourse, such as New Atheism or the ID movement, there is a danger that when we impose these labels as researchers onto publics, that we are doing the political work of these groups in our social scientific research. However, the problem with any systematic investigation of beliefs is that we need some form of categorisation to say anything meaningful about our data. In this regard, Kaden et al. (2019: 74-75) suggest two proposals: firstly, the development of different labels, which are less reliant on the terms of public debate, such as YEC and ID. Secondly, researchers should pay more attention to how publics use labels, and, in particular, the creative ways in which they may be engaged with, or distanced from them.

These proposals inform the theoretical orientation of this thesis. As I have already argued, I wish to employ an inductive strategy of the 'bottom-up' push of individual's lived experience when it comes to their views on evolution. I therefore aim to articulate a categorisation of these individuals which fits their lived experience, and resists the terms of popular discourse, which can both distort how we see our participants' views, and unwittingly forward the agendas of organisations which have stakes in these debates.

1.5 Conclusion

Contemporary studies of science and religion in society are beset by conceptual issues. In this chapter I have discussed how the conflict thesis, the once-dominant historiographic approach to historical studies of science and religion, has been critiqued by recent historians. Furthermore, I have discussed how the related conflict narrative and the secularisation thesis—the belief that modernisation, including the expanding of scientific knowledge and practice, would necessarily lead to the decline of religion—is being challenged by contemporary sociologists. However, despite the distancing from these paradigms and perspectives in recent years, there are well-cited studies which operationalise a “contrived dualism” between science and religion in the measure of public attitudes towards evolution. By embedding a conflict framing of the possible positions one can hold in regard to evolution, these simplistic quantitative surveys may well have skewed and simplified our view of how religion and evolution can relate in societies. Furthermore, it is these surveys, which are exclusively presented in mainstream media coverage of the matter, consequently informing public discourse on science and religion. More recently, there have been commendable attempts to disambiguate various propositions, which are grouped into classical belief positions about creation and evolution, providing fruitful ways forward for quantitative study.

The groups we choose to study in SSSR is also an important consideration. If we continue to only study controversies and perceived problem groups, then we will perpetuate very particular science-religion relations in the academic literature. In this thesis, I investigate Catholic attitudes towards evolution in England, exploring the views of a

previously understudied group. However, using survey measures which mirror professional or scholarly discourse on attitudes to evolution, often transposed from US-based debates, may not be the optimum way to measure public attitudes in the UK. More exploratory, qualitative work is needed in this area, and indeed is growing, with more recent studies employing critical contextualist PUS approaches, which seek explanations beyond the epistemic. We must also ensure that when investigating public attitudes towards evolution, we don't simply impose labels from professional or scholarly discourse onto our participants. In this thesis, I seek to classify my participants' views in a way which reflects their lived experience, and which does not necessarily reflect professional discourse on religion, creation and evolution.

As I have stressed, the present thesis aims to utilise the perspectives of notable historians in science and religion, leaving behind simplistic notions of necessary conflict and harmony, moving toward a more nuanced investigation of the contingent relationships between religion and science, specifically Catholicism and evolution. To enable a nuanced analysis, it is paramount to investigate the historical context of the contemporary debate. Therefore, in the next chapter, I will turn to the literature exploring the historical relations between Catholicism and evolution. As well as critically reviewing historical studies of the reception of evolution in the Catholic Church, and recent papal statements on evolution, I give an overview of the developments of evolutionary science itself. This historical context is necessary in order to properly situate the subsequent analyses of public discourse and public attitudes.

Chapter 2: Historical perspectives on Catholicism and Evolution

2.1 Introduction

To understand how recent papal statements on evolution have been represented in the media, and to contextualise contemporary Catholic attitudes towards evolution, it is necessary to explore the historical context of debates around Catholicism and evolution. It is therefore important to review the literature on the historical receptions of evolution, and the historical relations between evolutionary thought and the Catholic Church. In this chapter I first present an overview of the history of the idea of evolution, before surveying how it was received in broader society. I then review the literature specifically relating to the Catholic Church's reception of evolution from 1859 to the second half of the twentieth century. Finally, I outline contemporary papal statements on evolution, beginning with John Paul II's 1996 address, and ending with Francis's address in 2014.

It was not until 1950 that the Catholic Church officially stated a position on evolution. In the encyclical *Humani generis*, Pope Pius XII stressed that the Catholic Church did not prohibit discussions about evolution, which he deemed to be a serious hypothesis. Yet, why did it take almost 100 years after the publication of Charles Darwin's *On the Origin of Species* for the Catholic Church to address evolution publicly? What had been the Catholic Church's internal position on evolution during these silent years? Are the statements of modern

popes similar or different to Pius' comments in 1950? Over the following review of historical literature, I aim to provide context to these questions.

2.2 Evolution

2.2.1 A (brief) history of the idea

To understand the reception of evolution by the Catholic Church and individuals, it is first necessary to understand what evolution is. As a concept, evolution has a long history, and today the term is used in many ways. While contemporary biologists almost universally accept that evolution has happened, there are still active debates within the scientific community regarding various evolution-related questions, such as gradualism vs. punctuated equilibrium, at what level selection happens, and, indeed, if selection is evolution's primary driver (Pigliucci and Müller, 2010). Given this complexity, it is prudent to begin with a general definition:

evolution, *n.* 8. a. *Biology.* The transformation of animals, plants, and other living organisms into different forms by the accumulation of changes over successive generations; the transmutation of species (cf. transmutation *n.* 3f); the origination or transformation *of* an organism, organ, physiological process, biological molecule, etc., by such a series of changes. (OED, 2019)

Evolution and Darwin have become synonymous. However, transformist thought predates Darwin's conception of natural selection. Ideas of biological change have been around since at least the times of ancient Greece (Pigliucci and Müller, 2010: 5). For example, the pre-Socratic Greek philosopher, Anaximander of Miletus (c.610 BC – 546 BC), forwarded a notion of biological change and spontaneous generation, although whether

Anaximander should be considered an 'evolutionist' by today's conception of the term is debatable (Gregory, 2016: 34-36). Some authors also argue the works of Greek philosopher Empedocles (c. 490 BC – 430 BC), and the Roman atomistic poet Lucretius (c.99 – 55 BC), include notions of evolution (Sedley, 2003). Others, such as Campbell (2003: 8), contend that Lucretius can be classed as both an evolutionist and anti-evolutionist, since he both insists on a fixity of species, but also accounts for the emergence of modern humans from a "bestial" form which he nevertheless still considered to be human.¹

The influence of these early proto-evolutionists on subsequent thought is insignificant when compared to the form-based thinking of Plato (c. 428 – 348 BC) and the teleology of his student Aristotle (c. 384 – 322 BC). Prominent evolutionary biologist Ernst Mayr labelled Plato as "the great antihero of evolutionism" (Mayr, 1982: 304). According to Mayr, this was because of the harmful effect on biological enquiry that four of his dogmas had over the next two thousand years. These dogmas included: essentialism, an animate and harmonious universe, the shunning of spontaneous generation in favour of a creative power or demiurge, and the concept of a non-corporeal soul (Mayr, 1982: 305).

Unlike Plato, Aristotle did undertake biological observations, and much of his later work can be considered "anti-Platonic" (Sedley, 2009: 167). Aristotle devised an early classificatory system based on his teleological conception of natural efficiency, which grouped living things into various categories based on functional similarities (Boylan, 2005). Although, like Plato, Aristotle did not advocate biological change. His taxonomic work and

¹ Although, calling anyone who lived before modern evolutionary thought an 'evolutionist' or 'anti-evolutionist' is of course anachronistic, in that it imposes a contemporary category onto past events.

biological observations, however, led Darwin himself to remark in a famous 1882 letter to his friend William Ogle, who had recently translated Aristotle's *The Parts of Animals*: "Linnaeus and Cuvier have been my two gods, though in very different ways, but they were mere school-boys to old Aristotle" (Gotthelf, 1999: 3).

Despite these classical considerations of the subject, it was not until the late 18th and early-19th centuries that transmutationist thinking received concerted scientific attention. In 1809, French naturalist Jean-Baptiste Lamarck published his *Philosophie Zoologique*, recognised as the first major attempt to develop a comprehensive theory whereby organisms developed from primitive ancestors (Bowler, 2009: 86). Lamarck proposed that the transmutation of organisms occurred through the inheritance of acquired characteristics, particularly through the use and disuse of organs (Elsdon-Baker, 2007: 15). Gillespie (1959) noted that while post-Darwinian thought proposed a tree metaphor for the process of evolution, Lamarck had employed a progressive ladder metaphor. This, and other differences, led Barthélemy-Maudaule (1982) to conclude Lamarck should be seen as a precursor, rather than a contributor to modern evolution. Bowler (2009: 87) however, contends that even if we are not to consider Lamarck a modern evolutionary thinker, the influence of his widely-debated ideas may have shaped later evolutionary thought in significant ways. Certainly, today, some of his views are still debated by evolutionary biologists, who seek to integrate his ideas with those of Darwin (see Jablonka and Lamb, 2007). Furthermore, his ideas about the use and disuse of organs play into popular and folk conceptions of what evolution is—such as thinking our appendices or little toes are evolving

out due to disuse, or that our thumbs will get bigger over the next few generations because of the use of touchscreen phones.

In the early- to mid-19th century, Charles Darwin and Alfred Russel Wallace were busily and separately formulating the foundations of evolutionary thought as recognised by evolutionary scientists today.² Interestingly, both had been influenced to some extent by the work of Thomas Malthus (Sober, 2014: 14). In *An Essay on the Principle of Population*, Malthus forwarded the idea that an unchecked population grows geometrically, and sustenance for that population grows arithmetically. This principle, Malthus argued leads to a “struggle for existence” (Malthus, 1798: 4-14). Darwin broadened Malthus’s anthropocentric formulation of the struggle for existence in his 1859 *On the Origin of Species*:

I should premise that I use the term Struggle for Existence in a large and metaphorical sense, including dependence of one being on another, and including (which is more important) not only the life of the individual, but success in leaving progeny. [...] Hence, as more individuals are produced than can possibly survive, there must in every case be a struggle for existence, either one individual with another of the same species, or with the individuals of distinct species, or with the physical conditions of life. It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms. (Darwin, 1859: 62-63).

After many years observing artificial selection of plants and animals by humans, Darwin proposed his theory of ‘natural selection’. For Darwin, natural selection was intricately tied to the struggle for existence:

Owing to this struggle for life, any variation, however slight and from whatever cause proceeding, if it be in any degree profitable to an individual of any species, in its infinitely complex relations to other organic beings and to external nature, will tend to the preservation of that individual, and will generally be inherited by its offspring. The offspring, also, will thus have a better chance of surviving, for, of the many individuals of any species which are periodically born, but a small number can survive. I have called this principle, by which each slight variation, if useful, is

² For a discussion of the differences between Darwin and Wallace’s conceptions of evolution, and their comparative receptions in context, see Hull (2005).

preserved, by the term of Natural Selection, in order to mark its relation to man's power of selection. (Darwin, 1859: 61)

With his broadened conception of the struggle for existence, and the mechanism of natural selection, Darwin had proposed a theory which could explain the great varieties of species on the planet through natural processes.

As will be discussed below, while the Vatican seems to have exhibited a general scepticism toward evolution at the end of the 19th century, there were a few Catholic scientists and theologians who accepted evolution and even began utilising it in their own work. Famously, the Catholic biologist and friend of Darwin, St. George Jackson Mivart (1827-1900) initially accepted Darwin's evolution by natural selection, but later became one of Darwin's fiercest critics (Haight, 2013: 485). In *On the Genesis of Species*, Mivart (1871) laid out his criticisms of Darwin's work, most notably the issue of the gradual development of complex structures such as the eye. Interestingly, Mivart's critique influenced later creationist, specifically Intelligent Design (ID), thinking, with ID proponent Michael Behe labelling the argument "irreducible complexity" (Behe, 1996: 22). Darwin took Mivart's critique so seriously that he devoted an entire new chapter in the sixth edition of *On the Origin* (1872) to respond point-by-point to Mivart's critique.

Bowler (1988: 15) argues that it was not Darwin's form of evolution which initially took hold in the late-19th century, but a form of developmentalism, which was incompatible with Darwin's ideas of natural selection. Herbert Spencer's ideas on the cosmic progressive nature of evolution also proved popular in the late-19th century, and directly competed with Darwin's non-directional and non-progressive evolutionary perspective (Lightman, 2010: 5-13). Julian Huxley later termed this period—where evolution was accepted scientifically, but

the mechanism of natural selection was dismissed—“the eclipse of Darwinism” (Huxley, 1942: 22).

Mathematical-scientific developments between 1918 and 1950 brought the eclipse of Darwinism to a close, with a move towards consensus positions regarding evolutionary thought. The Modern Synthesis—as it was termed, again by Julian Huxley (1943)—emerged out of a number of population statistical approaches which fused Mendelian genetics and Darwinian natural selection (e.g. Fisher, 1918; Dobzhansky, 1937; Mayr, 1942; Simpson, 1944). Today, that organisms evolve is an accepted scientific observation; however, debates still take place on the mechanisms of this change. For example, there are disputes between those who associate with neo-Darwinism and neo-Lamarckism, which may not be helped by the ambiguity of some terms used in the debates, or indeed the issues of group identity in associating with these labels (Elsdon-Baker, 2015b).

Today, there are also scientists calling for an ‘Extended Synthesis’, which goes beyond the statistical correlations of the Modern Synthesis (Pigliucci and Müller, 2010: 12). This has been enabled due to the emergence of huge datasets in genetics, inheritance, and development, among other areas. Due to the previous lack of such data, the Modern Synthesis black-boxed mechanistic aspects of evolution, therefore relying on gene-centric, population-level statistical correlations. However, the availability of new data has allowed causal-mechanistic theory of phenotypic evolution. For Pigliucci and Müller (2010: 14) overcoming three main restrictions of the Modern Synthesis—gradualism, externalism, and gene centrism—are the hallmarks of what they term the Extended Synthesis (Figure 2.1).

Although naming current trends in evolutionary biology as the ‘Extended Synthesis’, is not without its critics (e.g. Tanghe et al., 2018).

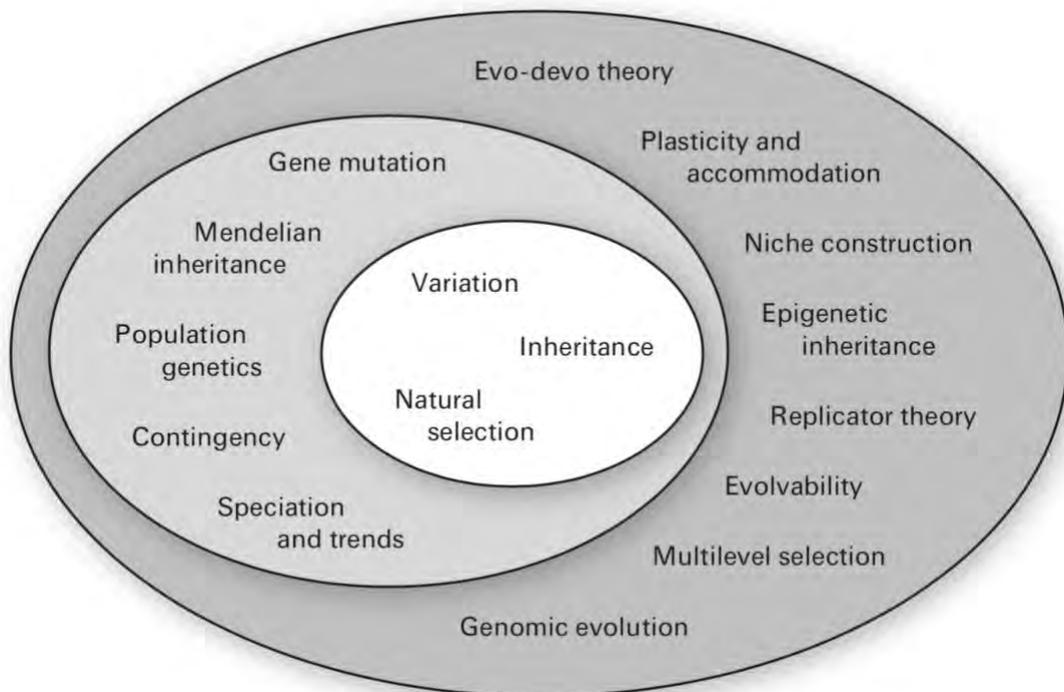


Figure 2.1 Representation of key concepts of Darwinism (centre field), the Modern Synthesis (intermediate field), and the Extended Synthesis (outer field). The scheme depicts the broad steps in the expansion of evolutionary theory (Pigliucci and Müller, 2010)

As this short overview of evolutionary thought has shown, ‘evolution’ has not been a static concept from the 1859 publication of *On the Origin* onwards. We must be careful when assessing the Catholic Church’s response, or lack thereof, to evolution in the late 19th, early and mid-20th centuries, as the very concept and scientific consensus around ‘evolution’ was changing in these periods. Likewise, when investigating public attitudes today, we must be careful to assess how individuals are conceiving of evolution. As an example, Hilderling et al. (2012: 993) found a great variety in the understandings and conceptions of evolution among Dutch Protestant creationists. Some outlined the mechanism of natural selection,

whilst others proposed a form of progressivism, where organisms evolve from “small to big”. All participants in their study rejected ‘evolution’, but they were rejecting different forms of evolution. It is important for this thesis, and other contemporary studies of attitudes, to understand what form or definition of evolution we are assessing attitudes toward.

Given evolution’s long history, and its contentious and varied contemporary forms, terminological exactitude is required. Therefore, in this thesis the words ‘evolution’, ‘evolutionary theory’ and ‘evolutionary science’, will be used to denote the broad class of scientific ideas which forward the notion that organisms change over time. The word ‘Darwinism’ will be used in cases that specifically deal with Darwin’s conception of evolution by natural selection. Using ‘Darwinism’ to refer to all conceptions of evolution would misrepresent the ideas which individuals are basing their attitudes upon, as it specifically refers to one interpretation of the adaptive mechanism which drives evolution, and is therefore too specific to incorporate all individuals’ interpretations of evolution. In relation to this thesis, it is important to investigate what form of evolution the public conceives of, and what their attitudes towards that form of evolution are.

2.2.2 Receptions of evolution

To understand how evolution was received by senior figures within the Catholic Church and Catholic individuals, it is important to understand how it was received in wider society. Fleming and Goodall (2002: 262) argue that while there is a large body of literature on the reception of Darwinism in the Victorian era, the notion that Darwin’s ideas were “fundamentally threatening” and represented a “traumatic paradigm shift” was widely unchallenged within the historiography for many decades. It is only in recent decades that

this narrative has begun to be unpicked alongside other efforts at deconstructing an embedded conflict approach within historical analysis of science and religion. According to Fleming and Goodall (2002: 259) the culture-shock myth which started in the early stages of the Darwin debates, resurged in the last two decades of the twentieth century (e.g. in Dawkins, 1999; and Dennett, 1995).

Bowler suggests that “the impact of Darwin’s theory on science, let alone on Western culture as a whole, was a good deal more complex than we used to imagine” (Bowler, 1996: 11). However, Fleming and Goodall argue that Bowler’s (and others’) analysis still follows the “simple dramaturgy of the theorist with his ‘dangerous secret’ agonizing over the prospect of releasing it” (Fleming and Goodall, 2002: 262). To summarise Fleming and Goodall’s (2002) conclusions, to understand whether evolution did represent a culture-shock to all Victorian society, it is important to understand how it was received in different places and by different sections of society, and the reasons for the potential differences in these receptions. In response to several critics, Bowler provided an updated account of his work, stating: “My conclusion is, then, that there was a Darwinian revolution in the nineteenth century, even if its impact was not as dramatic as had once been imagined” (Bowler, 2005: 30). Suffice to say there is an active debate within the history of science about the reception of Darwin’s ideas in Victorian Britain, and the episode continues to be explored as part of the process of unpacking the conflict thesis.³

³ See Bowler (2005) for a discussion and overview of historiographic positions about the impact and reception of Darwin’s ideas in late-19th and early-20th century.

The first statistical study to investigate the reception of Darwin's theory was Alvar Ellegård's (1958a) *Darwin and the general reader: the reception of Darwin's theory of evolution in the British periodical press, 1859-1872*. Ellegård studied 115 British newspapers, magazines, and journals for the 12-year period after the publication of the *Origin of Species*. Hull (2005: 149) notes the trends found in the work: that evolution was accepted, but not other parts of Darwin's work such as the role of 'chance' in variations, and there was also a general scepticism in regard to natural selection.⁴

Ellegård (1958b: 379) saw his approach as the 'social history of ideas', situated between the history of ideas and sociology. For example, while many historians have commented on the infamous debate between Thomas Huxley and Samuel Wilberforce, Ellegård (1958b: 380) remarks that not a single daily London newspaper reported on it. It is this question of the distribution of ideas within a community which Ellegård intended to explore. Whereas when studying contemporary populations we can make use of questionnaires to gauge public opinion, Ellegård observes "we cannot submit questionnaires to our great-grandfathers" (Ellegård, 1958b: 381). To overcome this, Ellegård's (1958b: 384-385) approach, sought to ascertain the opinions of all the various contemporary periodicals, their public appeal and circulation, and draw from this a detailed picture of public opinion. While the media analysis section of the present thesis share's some common aims with Ellegård's, it does not share the same conception of possible conclusions. Instead of using a media analysis to demonstrate the penetration of ideas in various social strata, I aim to show

⁴ Although, it should be noted that Ellegård's analysis has been criticised for not taking into account the changing periodical formats of the time. See: Dawson et al. (2004: 1-15). Also see Lightman (2011) for a discussion of the public controversy about evolution in the Victorian periodical press.

the themes of coverage and common assumptions in English newspaper coverage of papal comments on evolution. A further elaboration on the aims of the media analysis can be found in Chapter 3.

The reception of Darwinian evolution in the late-19th century among scientists and wider society is still an actively debated topic among historians. In recent decades, historians have begun to unpick the idea that Darwin presented an instantaneous, traumatic paradigm shift in Victorian society. However, some scholars argue that even if previous work overstated the immediacy of the impact of Darwin's work on society, somewhat of a 'Pandora's box' was still opened, even if it took a number of generations to be realised (Bowler, 2005: 30-31). In the next section, I turn to the literature relating to the reception of evolution among Catholic laity groups.

2.2.3 Historical communication and receptions of Darwinism in Catholic laity groups

Building on the work of John Hedley Brooke (1991), Blancke (2013: 2) notes grand narratives of the history of evolution and Catholicism are not supported by historical evidence. Like other areas of the history of science and religion, the conflict thesis does not present an adequate picture of the historical relations between Catholicism and evolution. Blancke (2013: 2) suggests that local factors are likely to play a significant role in Catholic responses to evolution, as they have in the diversity of Protestant reactions (e.g. Livingstone, 1999). While Livingstone's analysis of Protestant receptions of Darwinism in Princeton, Belfast, and Edinburgh in the 1870s focussed on the impact of local factors at the communal level, Blancke (2013) aimed to investigate the influence of local factors at the national level for Catholic communities. In each approach, the dependence on contextual factors—such as

the manner in which evolution was communicated—influencing the relationship between science and religion renders grand historical narratives obsolete (Blancke, 2013: 2).

It has been argued that the way evolution was communicated had an impact on its reception (see Lightman, 2012). For example, John Tyndall's famous Belfast address, delivered to the British Association for the Advancement of Science in 1874, which highlighted purported anti-religious implications of Darwinism, contributed to religious opposition in Ireland in both the Calvinist and Catholic communities (Blancke, 2013: 9).⁵ Livingstone (1999: 16) summarises his work on the comparative reception of evolution amongst the Protestant communities of Belfast, Edinburgh and Princeton, by stating: "the theory of evolution was absorbed in Edinburgh, repudiated in Belfast and tolerated in Princeton." Of the places Livingstone studied, the greatest opposition to evolution was in Belfast, particularly due to the method through which it was communicated by Tyndall. The work of Lightman (2012: 160) also emphasizes the effect of the Belfast address on religious groups, explaining how Protestants and Catholics joined together branding Tyndall a materialist and an atheist.

Fleming and Goodall (2002: 265) contend that if religious individuals in Belfast felt threatened by scientific materialism, this was more likely due to Tyndall's hegemonic proclamations rather than with anything inherently threatening in the ideas he had adopted from Darwin. However, Lightman (2012: 160) explores in detail Tyndall's remarks, noting

⁵ Though the focus here is on Tyndall, for a detailed discussion of the various popularisers of evolution—Darwin himself, The Darwinians, Spencerians and neo-Lamarckians, Spiritualists and religious evolutionists, and Christian evolutionists—see: Lightman (2010).

that he forwarded a “higher materialism” and distanced himself from a more “vulgar materialism”.⁶ Nevertheless, Tyndall’s Belfast Address was met with a religious backlash in Ireland, and therefore so too was Darwin’s evolution.

Compared to the literature investigating Catholic elites’ receptions of evolution (discussed below), there are few historical studies which investigate the reception of evolution among Catholic laity. Notable here are O’Leary’s studies of Irish Catholics between 1889 and 1950, and De Bont’s work examining Belgian Catholics in the mid-19th century. O’Leary (2009: 15-16) argues how the strong ties between Darwinism and anti-Catholicism in Tyndall’s address, led to negative responses towards evolution among Irish Catholics. These attitudes persisted even after Pope Pius XII released *Humani generis* in 1950, which first publicly highlighted the potential compatibility between evolution and the Catholic faith (O’Leary, 2009: 15-16).

According to O’leary’s analysis (2009: 22), in Ireland Darwinism was associated with irreligious and unorthodox ideologies, such as materialism, communism, secularism and *laissez-faire* capitalism, which hindered its acceptance. O’Leary’s study of the acceptance of evolution in Ireland between 1889 and 1950 highlights the importance of analysing debates about the public acceptance of evolution in context, rather than just exploring the competing truth claims of religion and science. In contrast to the reception of evolution in Ireland, Raf De Bont (2007; 2008) notes how a kind of spiritual evolution had already been

⁶ For an overview of the development of Tyndall’s religious beliefs, and how they have been presented, see: Cantor (2015). For an overview of Tyndall’s ‘higher materialism’ see Lightman (2012).

introduced in Belgium by Jean d’Omalius Halloy by the mid-19th century. According to De Bont, this meant that there was no fierce rejection of evolution in Belgium, with many Belgian Catholics remaining largely silent on the issue (De Bont, 2007: 114; 2008: 43).⁷

Recent historical research highlights that communicators in the past had an influence on the reception of evolution in various locations. This historical evidence reinforces my assertion in Chapter 1, that we must not only study public attitudes, but also public discourse on the topic. Might contemporary public attitudes towards evolution also be influenced by the communicators of today? We see that Tyndall’s communication of evolution, and links to materialism and anti-Catholicism, instigated anti-evolution sentiment in certain religious groups at the end of the 19th century. Has the rise of ‘New Atheist’ literature today, which highlights anti-religious and materialistic forms of evolution, also swayed public attitudes on evolution among religious groups? Contemporary sociologists observe that the relationship between religion and science is affected by historical, locational, and social-institutional context (Evans and Evans, 2008). Therefore, when investigating public attitudes towards evolution, attention must be given to social and cultural factors, which may be influential. Such insight can be ascertained through empirical research, investigating what people believe about evolution, and why they believe it. We can, unlike historians (as Ellegård lamented), submit questions to our subjects of study. Without such empirical studies, we cannot be sure, for example, that the presentation of evolution with an explicit anti-religious framing, such as the popular writings of Richard

⁷ For detailed discussions of evolution’s acceptance in other religious groups and locations in the late 19th and early 20th centuries, see: Cantor and Swetlitz (2006); Moore (1979); Livingstone (1987); Glick (1988); Numbers and Stenhouse (1999).

Dawkins (e.g. Dawkins, 2006), directly leads to religious groups developing an aversion toward evolutionary theory more broadly.

2.3 Receptions of evolution in the Catholic Church (1859-1950)

As this thesis aims to investigate contemporary Catholic individuals' attitudes towards evolution, alongside public discourse on Catholicism and evolution through analysing media representations of papal statements, it is important to review the historical context of the Catholic Church's reactions to evolution. In this way, contemporary Catholic attitudes toward evolution, and media coverage of papal statements on evolution, can be situated in their historical context. As discussed earlier, it wasn't until 1950 that the Catholic Church publicly commented on evolution. Therefore, the question remains: what attitudes existed within the Church before Pius XII's inaugural comment?

Before continuing to histories of the Church, some considerations should be noted when investigating Catholicism and evolution. Firstly, even though the Catholic Church is an institution with a clear hierarchical power structure, it is made up of individuals. These individuals have their own attitudes and opinions, which aren't necessarily representative of the official position of the institution. Secondly, one could view the laity of the Catholic Church as the lowest rungs of the power ladder, whose opinions and attitudes trickle down from the papal heights above. However, adopting this approach would homogenise a large and varied population of individuals. The laity have their own attitudes and opinions,

influenced by various identities, and contingent upon local and national factors. Taking the transubstantiation as an example, the Church teaches that during the Eucharist the sacramental bread and wine become the body and blood of Christ, rather than being mere symbols of the body and blood of Christ (Catholic Church, 2012). Recent data from the US, however, shows that only 31% of US Catholics believe “the bread and wine actually become the body and blood of Jesus”, with 69% saying they are “symbols of the body and blood of Christ” (Smith, 2019). Therefore, investigating the Vatican’s attitudes cannot act as a proxy for individual Catholics’ thoughts, neither historically nor today.

In this section I first detail the lasting influence of the so-called ‘Galileo Affair’ on discussions of Catholicism and evolution, and science and religion more broadly. Then I sketch the theological environment around the time Darwin’s theory of evolution was first proposed. Here, debates on Modernism and Americanism influenced the way evolution was received. Next, I discuss the literature related to the Vatican’s treatment of pro-evolutionary writings, the handling of which is the best evidence we have to deduce Vatican attitudes towards evolution after the publication of *On the Origin* in 1859 up to *Humani generis* in 1950. Finally, I overview the content of *Humani generis* itself, the first instance of Vatican public comment on evolution.

2.3.1 Galileo’s legacy

The life of Galileo Galilei has fuelled much discussion over the relationship between religion and science. Galileo defended Copernicus’ idea of heliocentrism over the then predominant geocentric view, after which he was forced to retract his views and placed under house arrest (Finocchiaro, 2009). Finocchiaro observes that because the Galileo affair:

“involved a conflict between one of the founders of modern science and one of the world’s great religions, it has traditionally been seen as an example of the conflict between science and religion, or at least science and Christianity, or science and Roman Catholicism” (Finocchiaro, 2001: 161).

As contemporary scholars have suggested, the Galileo Affair may well have had more to do with the correct interpretation of the Bible, rather than solely the truth of scientific claims (e.g. McGrath, 1999: 12). Nevertheless, the legacy of Galileo’s trial and treatment has been described as the “greatest scandal in Christendom” (Paul, 1979: 158); and scholars have argued that: “the Galileo affair is but a wrinkle in the centuries-long ecclesiastical patronage of astronomy” (Heilbron, 1999; Shank, 2000: 574). However, as Finocchiaro (2001: 131) argues in his historiography of the Galileo affair, historians (e.g. Draper, White, Drake, Feyerabend, Morpurgo-Tagliabue, and Whewel) tend to bring their own assumptions about the relationship between religion and science to their studies and interpretations of the trial. Though the history of the Church and astronomy is not central to this thesis, the history of this affair informs this work by helping us to understand whether the Church’s treatment of Galileo affected their subsequent reactions toward evolution.

Artigas et al. (2006: 281) claim that the Galileo Affair had a lasting legacy on the Vatican’s future responses to new scientific theories. Galileo’s *Dialogo* (1633) was placed on the *Index Librorum Prohibitorum*, the Vatican’s list of prohibited books, and Galileo was placed under house arrest (Artigas et al., 2006: 282). In the 19th century, the Galileo Affair was often referred to in anti-Catholic polemics (e.g. Draper, 1874: 20-24). As discussed below, the Church’s reservation to publicly respond to Darwin’s theory in the 19th century

can be seen as influenced by the prior treatment of Galileo, for example when proposing to condemn Raffaello Caverni's pro-evolution book, *New Studies of Philosophy: Lectures to a Young Student* (1887), the Congregation of the Index stated the book should be condemned, as this would carry an indirect condemnation of Darwinism. However, the Congregation also noted the probable clamour in opposition to this, and how the case of Galileo would be held up as an example (Artigas et al., 2006: 47).

O'Leary (2006: 47) also interprets the effect of Galileo's legacy in this way, arguing the Vatican opted to abstain from creating an official statement on evolution, considering the legacy of the Galileo affair. Furthermore, in the 19th century, due to the legacy of Galileo, it has been claimed that the Church lost credibility within the scientific community. Paul (1979: 2-3) argues that in France, for example, the Church felt an acute need to recover the intellectual community, with scientists a particular focus. Therefore, the lack of a Vatican response to evolution during the 19th century must be viewed in light of the legacy of the perceived harsh treatment of Galileo in the 17th century, and the Church's attempts to distance itself from its own past.

2.3.2 Modernism and Americanism

To help us understand the Church's reaction, or lack thereof, toward evolution, especially in the late-19th century, we must acknowledge the social and intellectual context of the time. In the mid- to late-19th century, there was a growing movement dubbed 'Americanism', born out of the attempts by liberal Catholics to help the growing immigrant population integrate into American life (Appleby, 1999: 178). Proponents of Americanism argued for the separation of church and state, and focussed on individual choice when

dealing with religious questions (O’Leary, 2006: 102). With this focus on individualism, Americanism was perceived by the Church as a danger to Catholic doctrine (O’Leary, 2006: 102; Artigas et al., 2006: 159). Whilst originating in the United States, Americanism started to spread to Europe in the 1880s (Brundell, 2001: 93). Traditionalists in Rome and the USA were worried about its development, especially when the movement became popular in France, a country which was highly secular following the 1789 revolution (Blancke, 2013: 8).

In the mid- to late-19th century, the Catholic Church also saw the beginning of what is now referred to as the ‘Modernist crisis’ (Brundell, 2001: 82). Although Catholic Modernism cannot be represented by a single intellectual movement or set of opinions, it has been described as a “series of loosely coordinated initiatives that sought to bring Catholicism into a more positive relationship with modernity on intellectual, social, and political fronts” (Talar, 2010: 426). It has also been described as a group of intellectuals who “adopted a critical and skeptical attitude toward the traditional doctrines of their church” (O’Leary, 2006: 114), and in reference to those who used “methods of historical research and the natural sciences to bear on the interpretation of the Bible and Catholic dogma” (Blancke, 2013: 7). These definitions reflect the respective interests of their authors. For example, Talar, a historical theologian, is concerned here with broader intellectual and social movements of the church; while Blancke’s definition aligns with his background in the history of science.

Despite the heterogeneity of Modernism, we can summarise some commonalities. In Modernist thought, there was a general focus on post-Kantian philosophy and historical criticism. Kant’s focus on the subjectivity of human knowledge questioned objective

knowledge of all forms, and newly emerging historical methods questioned the authority of historical texts, including religious books (Talar, 2010: 427-430). For example, authors such as Alfred Loisy and George Tyrell, who are most often cited as Modernists, stated that biblical texts contained traces of the contexts from which they originated, and believed Christian dogmas were subject to 'evolution' over time (De Bont, 2005: 462). Talar (2010: 429) suggests that because of these new methods of knowing, Modernism was perceived not as an attack any particular dogma, but as an attack on the very nature of dogma itself.

The Modernist approach directly contradicted Pope Leo XIII's (1878-1903) attempts to realign Catholic thought with the teachings of Thomas Aquinas. In part this was an attempt to unite religion and modern science (Blancke 2013: 7). However, in 'neo-Thomism', as the Pope's attempts became known, scientific findings were placed within the rigid structure of Catholic dogma, whilst in the Modernist approach it was the dogma itself which 'evolved' (Paul, 1988: 421).

Although early histories of the movement represent the Modernists as a uniform, organized group, more recent works question whether the large variety of opinions encompassed within Modernism warrant a single category.⁸ Some scholars denounce the term 'Modernism' altogether because it implies a non-existent cohesion (Thompson, 2008: 34). Therefore, while the term is useful for us to categorise a loose collective of individuals

⁸ See Talar's (2010) *The 'Synthesis of All Heresies': Roman Catholic Modernism* for a historiography of modernism, detailing the 'three waves' of studies into the subject.

who shared some common ideas about how the Church should develop, we should not conclude there was a collective, concerted Modernist movement.

Despite the difficulties in categorizing the Modernists, what is clear is that in the mid- to late-19th century the Church was dealing with a set of intellectual developments, which it perceived to be fundamentally dangerous. Klumpenhouwer (2011: 6) argues that in this period evolution came to be incorporated under the aegis of Modernism. Although, it is important to note that the Church made no explicit condemnation of evolution in its anti-Modernist encyclical *Lamentabili Sane (Syllabus of Errors)* (1907). Pius X (1903-1914) did, however, condemn a number of supposedly Modernist thoughts which alluded to evolution, including the notion that: “Scientific progress demands that the concepts of Christian doctrine concerning God, creation, revelation, the Person of the Incarnate Word, and Redemption be readjusted” (Pius X, 1907). This statement relates to what the Catholic Church perceived as the proper interpretation of the bible.

The *Syllabus of Errors* was followed by a further damning condemnation of Modernism by Pope Pius X in his 1907 encyclical *Pascendi Dominici Gregis* (Feeding the Lord’s Flock). It labelled modernism the “synthesis of all heresies” and detailed a comprehensive strategy for dealing with the Modernist threat, including the restriction and retraction of Modernist publications (Pius X, 1907: 51-52). Blancke (2013: 7) suggests that *Pascendi* includes passages intended to target evolution, but as they are indirect the messages did not have the desired effect. Indeed, Catholic intellectuals at Louvain University, Belgium, continued their work on the compatibility of evolution and Catholic dogma after *Pascendi’s* publication (De Bont, 2008).

While being aware of the historical context of the Modernists allows us to understand potential scepticism toward evolution among Catholic elites, it does not necessarily help us with respect to lay Catholic publics. It remains to be seen if the history of Modernism, and its association with progressive doctrine and evolution, still influences contemporary Catholic attitudes toward evolution. In short: today, are pro-evolution Catholics modernists, while those with anti-evolution stances traditionalists? Would individuals identify with these terms, or if not how do they conceive of their Catholic identities? Alternatively, are there other influences on Catholic attitudes toward evolution today, beyond these more formal theological traditions? In this thesis, through interviews with Catholic individuals in England, I attempt to explore the relationship between Catholics attitudes to evolution and their theological beliefs.

2.3.3 Council of Cologne

Many histories discussing Catholicism and evolution mention the 1862 decree of the Council of Cologne, which declared that the evolution of humans was contrary to scripture (e.g. O'Leary, 2006: 47; Artigas et al., 2006: 21-23). The decree was scrutinised and recognised by the Vatican, but as the decree was issued by the Council of Cologne, its authority was limited to that specific jurisdiction. Artigas et al. (2006: 23) argue that while this decree may initially seem like an outright rejection of evolution, it did actually present opportunities for Catholics seeking harmony between evolutionary theory and Catholic doctrine. The Council specifically denied that the body of Adam evolved by "spontaneous change". Therefore, this could be interpreted, not as a rejection of evolution outright, but as a rejection of evolution without divine intervention.

Reading across these histories, we can interpret the decree more broadly still, the Council's message could be read as a rejection of evolution only when specifically relating to the origin of humans, and not the evolution of other animal and plants species, known as human exclusionism (See Chapter 1). Blancke (2013: 6) summarises from a review of secondary literature, that the council's conclusions on evolution, especially in relation to biblical interpretations of the book of Genesis, foreshadowed the position of later Vatican policy.

Thus, while a Catholic authority did speak out against evolution in 1862, this should not be taken as a condemnation of evolution by the Vatican for the universal Church. Rather, the decree must be discussed in its proper jurisdictional context.⁹ The Council of Cologne lacked the hierarchical power to issue such a universal statement, so it should not be interpreted as holding such weight.

2.3.4 Evolution and the Vatican

As there were no official Vatican statements on evolution until 1950, the most detailed picture we can build of senior Vatican figures' thoughts and actions regarding evolution is by investigating how the hierarchy treated pro-evolution Catholic writing. This is an important approach, as when the church disagrees with a movement, or perceives an idea as a threat to its authority and orthodoxy—as in the case of Modernism—the Church can use its considerable power and resources to control that threat.¹⁰

⁹ This is not always done, however, e.g in the thesis of Donnelly (2006: 73).

¹⁰ The use of denunciation as a form of ecclesiastical control in the Catholic Church, and its communities, was prevalent in the period (see Lease, 1996).

Using this approach in *Negotiating Darwin*, Artigas et al. (2006) aim to identify the Church's ideological and operational stance on Darwinian ideas between 1877 and 1902 (Artigas et al., 2006: 5). In doing so, they deal with six cases of pro-evolution writing and the treatment of the authors—Raffaello Caverni (1837–1900), Dalmace Leroy (1828–1905), John Zahm (1851–1921), Geremia Bonomelli (1831–1914), John Hedley (1837–1915), and St. George Mivart (1827–1900)—by the Congregation of the Holy Office and the Congregation of the Index of Prohibited Books. The differences between these cases illustrates the range of responses from the Vatican when dealing with pro-evolution writing in the period (Artigas et al., 2006: 15).

Throughout most of these cases we see the contested influence of the Roman Jesuit journal *La Civiltà Cattolica*. Brundell (2001) argues that the publication's traditionalist influence went right to the very top in Rome. First published in 1850, *La Civiltà Cattolica* was encouraged by Pope Pius IX (1846–78) in his call for intellectuals to assist him in his fight against modernity (Brundell, 2001: 82). From 1860, *La Civiltà Cattolica* published regular anti-evolution articles, critiques of pro-evolution writing, and the public retractions of authors of censured pro-evolution works (Blancke, 2013: 5). Before each issue, a copy was sent to the Vatican's Secretary of State for approval, to ensure they were in accord with the teachings of the Church on faith and morality (Artigas, et al., 2006: 27).

Artigas et al. (2006: 121) however reject Brundell's claims about the extent of the influence of *La Civiltà Cattolica* in Rome, identifying errors in Brundell's analysis. Furthermore, Artigas et al. (2006: 5) suggest that the Vatican's responses cannot be determined by the influence of any one particular group. Brundell (2008) countered that his

depictions of the role of *La Civiltà Cattolica* had been more nuanced than had been presented by Artigas et al. (2006). Nonetheless, the influence of a single journal on public perceptions of the Catholic Church's position on evolution informs this thesis. If one highly influential journal could affect large swathes of public opinion about the attitudes of the Church in the past, is this still applicable today? If our newspapers describe the Catholic Church as anti-evolution, rightly or wrongly, how might this influence the perceptions of the public? As I have argued, attention must be paid to public discourse as well as public attitudes in the study of science and religion.

What conclusions can be drawn from the Vatican's handling of pro-evolution writers at the end of the 19th century? Firstly, Artigas et al. (2006: 279-281) argue that the length of deliberations provides evidence that there was no official anti-evolution policy at the time. If there was, the cases would have been dismissed outright. That some consultors found no issues with pro-evolution books, and others were ardent critics, shows that various attitudes toward evolution existed within the walls of the Vatican. Secondly, the Church made no proactive decisions in seeking out pro-evolution writing to assess; they were limited to dealing with work that had already been denounced by others (Artigas et al., 2006: 273). The actions of the Church, however, do point toward a general scepticism toward evolution in the period, especially in its purely materialistic form.

We can conceive of the Vatican's response to pro-evolution books as a 'pragmatic policy' of pressured retractions (Artigas et al., 2006: 279-281). There was a perception that materialistic forms of evolution posed a threat to certain doctrines, such as the soul and original sin, concepts which were to be returned to by Pope Pius XII in 1950. Furthermore,

evolution posed a threat to the literal interpretation of the Bible, which while not a necessarily central feature of Catholic theology, was being discussed at the time in light of new Modernist historical methods. For example, the implications of 'liberal' interpretations of Genesis posed a threat to the account of God's special intervention in the creation of the body of Adam.

Artigas et al. (2006: 279-281) conclude that perhaps the Church preferred the more pragmatic means of retraction rather than outright condemnation, as this was sufficient to slow the spread of evolutionary ideas, without compromising the Church. Especially if a critical article in *La Civiltà Cattolica* was viewed as authoritative theology, and was influential in Catholic intellectual circles. Overall, Artigas et al. (2006: 5) state their investigation cannot be reduced to any single simple thesis, this being in keeping with the complexities other scholars have encountered when investigating the historic relationship between science and religion.

In *Catholicism and Science*, Catholic theologians Hess and Allen (2008) attempt to chart the interactions of the Catholic Church with science over 2000 years. On evolution, they state that we should not expect to find a monolithic Catholic reaction, either among the papacy, bishops, or the laity (Hess and Allen, 2008: 73). The present thesis aims to follow in this approach, appreciating the need to not oversimplify the Vatican's nor Catholic individuals' positions by aggregating them into a single view. Still, Hess and Allen (2008: 73) reflect that individuals within the Vatican did show scepticism over the concept of evolution. Like Artigas et al. (2006), they highlight the political struggles of the Church at the time, specifically the perceived threat of Modernism, and the resultant moves by the Church to

reassert its authority. Furthermore, they observe that evolution as a ‘Catholic problem’ had less to do with biblical literalism, than it did with theological adherence to rigid neo-Thomism (Hess and Allen, 2008: 73-88).

The conclusions of Artigas et al. (2006), that initial Catholic opposition gave way to steady acceptance, are also reached by O’Leary (2006) in *Roman Catholicism and Modern Science: A History*. As Freiburger and Numbers (2009: 637) note, while O’Leary’s works interpretive approach is to its benefit, in comparison to Hess and Allen’s (2008) *Catholicism and Science* more descriptive account, it is a case of unfortunate timing that O’Leary’s work could not benefit from Artigas et al.’s (2006) detailed archival work which was published in the same year.

Other histories use a different approach, yet still find similar results of initial opposition. One such work by Fr. Michael Chaberek, a Polish Dominican and a proponent of ID, broadly corroborates the historical accounts of scholars such as Artigas et al. (2006) and O’Leary (2006), but brings a different interpretation to events. Chaberek (2015) has said he did not want to diminish the initial scepticism by the Church, as he perceives others have done, but instead present the ‘true’ history, including initial resistance to evolution and current ‘confusion’ in the Church. So, while Chaberek (2015) agrees with Artigas et al. (2006), O’Leary (2006), Hess and Allen (2008) and Blancke (2013) on the slow acceptance of evolution by the Church, he interprets this process as a distancing from ‘true’ Catholic teaching. In contrast to Chaberek (2015), the present thesis benefits from not taking any particular interpretive theological stance when investigating Catholicism and evolution. It

will not compare what Catholics think about evolution or theology, with some notion of what they *should* think about evolution or theology.

While there has been increasing amounts of scholarly work conducted on the Vatican's response to evolution in the mid- to late-19th century, there has been less scholarly work conducted on the early- to mid-20th century period. This is in part due to the Vatican archives for this period still remaining largely embargoed. Raf De Bont (2005: 459) observes that between 1902 and 1950 little is known about Vatican policy towards evolution. The one document which comes closest to peripherally addressing evolution was issued by the Pontifical Biblical Commission in 1909. The Commission had been established in 1902 to ensure the proper interpretation of Biblical scripture, defending Church orthodoxy under the "gaze of the Supreme Pontiff" (Leo XIII, 1902: 2). Their report, *De characteribus historicis trium priorum capitulum Geneseos*, (Concerning the historical nature of the first three chapters of Genesis), published on June 30, 1909, stated that: "the unity of the human race, the creation of man by God, and the conception of the first woman from that man, had to be interpreted as being the historical truth" (as quoted in De Bont, 2005: 459). Brundell (2001: 94) observes that while some saw the Commission's report as a sign of growing traditionalism in Rome, others have argued that the Commission did not suggest a purely literal interpretation of Genesis, and displayed no repugnance toward evolution. As the published materials of Rome at the time were open to multiple interpretations, they alone are not sufficient for ascertaining Rome's policy toward evolution in the early 20th century (De Bont, 2005: 459).

Instead De Bont (2005) seeks to understand the Church's attitude toward evolution between 1902 and 1950 by investigating how the Vatican responded to Henry de Dorlodot's

work promoting theistic evolution. In 1918, Dorlodot—a Belgian theologian, professor of geology, and priest—published *Darwinism and Catholic Thought*, a book forwarding a version of theistic evolution and a reconciliation of evolutionary theory with Catholic theology (De Bont, 2005: 457). According to De Bont some Catholics saw this as an indication that they were free to explore evolutionary ideas. For example, *The Universe*, a popular British Catholic newspaper, saw Dorlodot’s book as “the first glow of that new orientation to which we have been looking forward to so earnestly” (as quoted in De Bont, 2005: 469). After multiple interactions with the Vatican, who pressured Dorlodot to retract his work as they had with previous authors, the whole affair ended in a status quo. Dorlodot never withdrew his book, but never wrote a second volume or lectured on evolution again. De Bont (2005: 475) suggests the Vatican perhaps did not take the Dorlodot affair any further, as the only step left after Dorlodot’s refusal to give in to the policy of intimidation and retract his work, was to publicly reject evolution. Something the Church had avoided for decades. The influence of modernist-traditionalist tensions is evident here. However, De Bont argues that it was in this period that the generation of anti-Modernists was nearing an end, and “the period of the anti-modernist witch hunt seemed to be over” (De Bont, 2005: 475). Therefore, the Dorlodot affair can be seen as a pivotal moment in Church history, exemplifying how the authority’s attitudes changed in regard to evolution in the early-20th century, although many Catholic authors still maintained a resistance to evolutionary ideas (De Bont, 2005: 457; O’Leary, 2006: 126-128). Similarly, Bowler (2009; 324) suggests that this softening of the Church’s position occurred at the time authors such as Dorlodot and Ernest Messenger—echoing the earlier work of Mivart—were noting that the Church Fathers did not interpret Genesis literally on this issue.

In 1943 Pope Pius XII released the encyclical *Divino Afflante Spiritu* (Inspired By the Divine Spirit), which permitted Catholic scholars to use Modernist literary and historical-critical approaches to biblical texts (Haught, 2013: 488). These were the same methods which had been shunned and prohibited in the anti-Modernist decades of the late-19th and early-20th century. Reflecting the linkage between the Vatican's softening attitudes towards Modernism and growing acceptance of evolution towards the mid-20th century, Pius also addressed evolution 7 years later. In his 1950 encyclical, *Humani generis* (Of Mankind), Pius became the first pope to publicly address evolution:

[...] the Teaching Authority of the Church does not forbid that, in conformity with the present state of human sciences and sacred theology, research and discussions, on the part of men experienced in both fields, take place with regard to the doctrine of evolution, in as far as it inquires into the origin of the human body as coming from pre-existent and living matter... Some however, rashly transgress this liberty of discussion, when they act as if the origin of the human body from pre-existing and living matter were already completely certain and proved by the facts. (Pius XII, 1950)

While in 1950 Pius professed the Church's openness to evolution, he deemed it to be an unproven hypothesis and urged the need to remember the special creation of human intelligence and the soul. Furthermore, he stated all humanity must be descended from a literal Adam (monogenism), rather than separate groups of individuals (polygenism). This was because, in Pius's view, it was in no way apparent how polygenism could be compatible with the doctrine of original sin, which he thought to have been committed by an individual Adam, and passed down through the generations. Brundell (2001: 94-95) explains how in 1966, Pope Paul VI asked theologians to find a more modern presentation of original sin, which would better satisfy the demands of faith and reason for contemporary Catholics, leaving open the possibility of finding an interpretation of the doctrine of original sin which potentially incorporated polygenism.

In this section I have attempted to give historical context to more recent statements by popes on evolution, which I will explore in the following section. I have shown that in 1862, the Council of Cologne declared evolution as contrary to scripture, however this statement cannot be seen as a proclamation for the universal Church, as the Council lacked the authority to make such a statement. As the Vatican was silent on evolution until 1950, historians have sought to investigate the workings of offices which dealt with the writings of pro-evolution Catholic authors. As Artigas et al. (2006) argue in their detailed work covering the end of the nineteenth century, it cannot be ascertained that the Vatican had a strict policy of condemnation against evolutionary writers, instead there was perhaps a 'pragmatic policy' of pressured retractions to stem the flow of evolutionary ideas. These congregations were weary of beginning a new Galileo Affair, which was still being used in anti-Catholic polemics at the time.

Similarly, in the early 20th century, the same sceptical attitudes can be attributed to individuals within the Church (De Bont, 2005). What is clear is that there were attempts to pressure Catholic authors who proposed a theistic evolutionary account of origins to retract their work, especially when these works considered the human body. It is reasonable to conclude from the historical evidence that the senior hierarchy of the Catholic Church were sceptical of evolution in the years after Darwin published *On the Origin of Species*, although it was never explicitly condemned. This scepticism was not necessarily due to literal interpretations of Genesis, more so the broader theological paradigms which were actively fighting in the Church. Over time, this scepticism diminished, and the Church became more open to evolutionary ideas. This culminated in the first papal public comment on evolution

in 1950, where Pius XII pronounced in *Humani generis* that the Church did not restrict research and discussions about the evolution of the human body, but these should not extend to the evolution of the soul. Following Pius XII's pronouncement on evolution in 1950, it was to be another 46 years before another official papal statement received considerable attention. In the next section I reflect on the content and reception of papal statements from 1996 to the present day.

2.4 Recent papal statements on evolution (1996-Present)

In this section I first overview John Paul II's 1996 comments, which characterised evolution as "more than a hypothesis" (John Paul II, 1996). As I will show, his comments have received considerable media and scholarly attention. Then, I discuss Benedict's multiple comments on evolution, both before and during his papacy. Finally, I explore Francis's 2014 address to the Pontifical Academy of Science, where he argued: "The evolution of nature does not contrast with the notion of creation" (Francis, 2014).

2.4.1 John Paul II: "More than a hypothesis"

On 22nd October, 1996, nearly 50 years after Pius's *Humani generis* in 1950, Pope John Paul II publicly addressed the topic of evolution describing it as "more than a hypothesis." In his address, he recalled the words of *Humani generis*, which marked the first occasion of papal public comment. In *Humani generis*, Pius had stated the Church did not forbid research or discussion of the evolution of the human body, but at the time deemed it

a “hypothesis” with “some sort of scientific foundation.” John Paul II’s speech, however, published in French on 22nd October, 1996, recognised evolution as “more than a hypothesis,” noting that evidence in many fields had converged on the scientific theory (John Paul II, 1996).

As Brundell (2001: 95) argues: “views that were officially censured at the end of the nineteenth century were officially adopted at the end of the twentieth by the highest teaching authority in the Catholic Church.” Considering subsequent historical work based on the Vatican’s records (e.g. Artigas et al., 2006; O’Leary, 2006; Chaberek, 2015), we can see this as an accurate account. Positions which forwarded the compatibility between evolution and Catholic theology were met with a scepticism by the Church in the late 19th century, who used a ‘pragmatic policy’ when dealing with such writings (Artigas et al., 2006); however, many of these same positions were adopted by John Paul II in the late 20th century.

How were John Paul’s statements received by scholars and commentators? In a widely cited response to the pope’s statement, evolutionary biologist Stephen J. Gould (1997: 2-3) noted his initial puzzlement, both at the Pope’s statement about evolution and the media response to it.¹¹ In Gould’s view, the Church had never opposed evolution, so why

¹¹ Gould (1997) also proposed his famous Non-Overlapping Magisteria (NOMA) hypothesis in his response to John Paul’s comments on evolution. While this thesis is not directly concerned with prescriptively stating what the ‘proper’ philosophical or theological relationship between religion and science may be, it is worth briefly reflecting on Gould’s NOMA hypothesis. In NOMA, Gould presents religion and science as distinct entities, which do “interdigitate” at their boundaries. Gould (1997: 8) notes, however, this is no mere diplomatic stance, instead it is a principled position on moral and intellectual grounds. Gould (1997: 8) continues: “If religion can no longer dictate the nature of factual conclusions properly under the magisterium of science, then scientists cannot claim higher insight into moral truth from any superior knowledge of the world’s empirical constitution.” However, as discussed in

was such a statement needed? On rereading Pius XII's view in *Humani generis*, however, Gould declares he realised why the Pope's statements seemed new, and worthy of the headlines. In Gould's words:

Official Catholic opinion on evolution has moved from 'say it ain't so, but we can deal with it if we have to' (Pius's grudging view of 1950) to John Paul's entirely welcoming 'it has been proven true; we always celebrate nature's factuality, and we look forward to interesting discussions of theological implications.' (Gould, 1997: 7)

Gould (1997: 2) also reflected on his views of 'scientific creationism' (specifically young earth creationism) stating he thinks it to be a distinctly American, Protestant problem, which arises through some denominations' strict literalist reading of the Bible; something, he adds, which makes little sense in the Catholic tradition of reading metaphor and allegory in their sacred texts. Here the work of Numbers (2006) shows, in fact, creationism is not solely an American phenomenon.¹² I will explore the relation of biblical interpretations to attitudes on evolution for Catholics in England in Chapter 6.

Like Gould, Eugenie Scott¹³ also welcomed Pope John Paul II's statements on evolution, and criticised the media backlash (Scott, 1997: 405). Scott, being concerned with the perceived rise of creationism, saw the Pope's endorsement of evolution as a positive

Chapters 1 and 3, as this thesis aims to investigate the lived-experience of Catholic individuals, 'proper', preformed, philosophical relationships between religion and science must be bracketed. Instead, my approach is to allow the views of individuals to emerge through the data collection.

¹² For an overview of creationism in Europe, see: Blancke et al.'s (2013) *Creationism in Europe: Facts, Gaps, and Prospects*.

¹³ Between 1986 to 2014 Scott served as the Executive Director of the National Center for Science Education, a US not-for-profit which aims to promote and defend science education, combatting issues such as creationism and climate change denial. Scott has played an active role in opposing attempts to teach creationism and ID in science classrooms of the USA, as well as conducting research into public attitudes towards evolution.

step. Indeed, the perception of a rise in creationism may well have had an influence on John Paul II in making these statements; as an attempt to distance the Church from a largely non-Catholic phenomenon. As always, it is important to understand the context within which events took place. As an educator, for Scott (1997) the relationship between science and religion is more than philosophical, it is a matter of the public understanding of evolution which she sees as an important part of contemporary education.

John Paul's "more than a hypothesis" phrase, however, became the centre of a small controversy of its own. On 30th October, the Vatican's *L'Osservatore Romano* published the first English translation of the French speech, which read (emphasis added here): "Today, more than a half-century after the appearance of that encyclical, some new findings lead us toward the recognition of *more than one hypothesis* within the theory of evolution." Some US news sources initially took this purported translation error to mean there was more than one hypothesis about the theory of evolution, not that the Pope now saw evolution's epistemological status as more than a *mere* hypothesis. The translation dispute was settled on 19th November 1996, when the editor of the English version of *L'Osservatore Romano*, Father Robert Dempsey, said the "more than a hypothesis" translation was the more accurate version of the Pope's words (Scott, 1997). I show in Chapter 4, that English newspapers did not report the translation error, highlighting different cultural orientations towards science and religion in the US and England.

Still, reading John Paul's address we can see why some individuals believed the "more than one hypothesis" to be the correct translation. Later in the statement, John Paul discussed not only the various mechanisms posited for evolutionary change, but also

stressed that there are various philosophical foundations on which evolution is based:

“Hence the existence of materialist, reductionist, spiritualist interpretations” (John Paul II,

1996). This recognition of the diversity of philosophical formations of evolution is an

important conceptual point. John Paul, Benedict, and Francis, all in their own way state a

belief in some form of evolution, while setting out certain provisos. These are related to a

special conception of humanity, but also relate to the separation of evolution as a scientific

theory from evolution as part of an all-encompassing atheistic or materialistic worldview.

Popes, when speaking on evolution, have argued in these broader philosophical and

theological terms. However, as I discuss in Chapter 4, some press reporting has tended to

focus on the popes’ comments on evolution’s natural scientific validity—mirroring a

simplistic notion of evolution as something one can ‘accept’ or ‘reject’. I further explore the

problems with this dualistic thinking in the following chapters.

For John Paul, the special status of humans is linked to these broader philosophical

and theological conceptions of evolution. John Paul argued that for humans there is an

“ontological leap”, a discontinuity due to humanity’s intellect and eternal soul. He warned

that: “theories of evolution which, because of the philosophies which inspire them, regard

the spirit [*l’esprit*] either as emerging from the forces of living matter, or as a simple

epiphenomenon of that matter, are incompatible with the truth about man” (John Paul II,

1996). Furthermore, he argued that science and its observational and experimental methods

could not assess the experience of metaphysical knowledge, self-consciousness, moral

conscience, liberty, or aesthetic and religious experience. For John Paul (1996), some

conception of evolution may be “more than a hypothesis”, but he warned that there are

some questions that science cannot answer. These, he believed, are best left to philosophy and theology.

In his 1996 address the Pope chose not to fight science on scientific grounds, rather drawing a boundary around what it is possible to say scientifically. He argued that philosophy and theology are the disciplines in which these larger questions of morality, self-consciousness and ultimate meaning must be answered. Evolutionary biologist, Richard Dawkins, vehemently resisted this boundary drawing, arguing in *The Quarterly Review of Biology* that the Pope's position on the soul was "fundamentally anti-evolutionary" (Dawkins, 1997: 398). For Dawkins, religion posed questions about the world, and these were therefore scientific questions. This two-way boundary drawing is a vivid example of the jostling for power between representatives of religion and science. Dawkins and John Paul aren't the only two people who attempt to draw these boundaries, however they are indicative of the larger processes of demarcation and contestation, which occur in debates around science and religion.

2.4.2 Benedict XVI

While Pope Benedict had in fact commented on the subject many times before his papacy began, he did not receive any press attention for his comments on evolution until 2007. It is therefore the content and response to his 2007 remarks which are examined in the media analysis in Chapter 4. Here, though, I give an overview of his other remarks on evolution, so that his 2007 comments and the subsequent media reporting can be properly understood.

During his 2005 installation speech, Benedict said: “Only when we meet the living God in Christ do we know what life is. We are not some casual and meaningless product of evolution. Each of us is the result of a thought of God. Each of us is willed, each of us is loved, each of us is necessary.” Although, pre-pontificate, as a professional theologian, Benedict repeatedly called for more attention to be paid to the story of creation, a topic he believed had become marginalised by theologians and the faithful alike. Given this context, it is unsurprising to see him reflect on the topic of evolution over many years, in a number of books, and in his work for the Vatican’s Congregation for the Doctrine of the Faith, of which he was President from 1981-2005. Illustrative is the following section of Benedict’s 1990 book, *In the Beginning: A Catholic Understanding of the Story of Creation and the Fall*:

What response shall we make to this view [evolution]? It is the affair of the natural sciences to explain how the tree of life in particular continues to grow, and how new branches shoot out from it. This is not a matter for faith. ... More reflective spirits have long been aware that there is no either-or here. We cannot say: 'creation or evolution', inasmuch as these two things respond to two different realities. The story of the dust of the earth and the breath of God, which we just heard, does not in fact explain how human persons come to be but rather what they are. It explains their inmost origin and casts light on the project that they are. And, vice versa, the theory of evolution seeks to understand and describe biological developments. But in so doing it cannot explain where the 'project' of human persons comes from, nor their inner origin, nor their particular nature. To that extent we are faced here with two complementary - rather than mutually exclusive - realities. (Ratzinger, 1990)

In a lecture in 1999, Benedict (then Ratzinger) did seemingly question a concept he termed “macro-evolution”, although it is uncertain that this “macro-evolution” is the same concept used by creationist and ID critiques of evolutionary science.¹⁴ Reading the broader

¹⁴ Creationist organisations such as the Institute for Creation Research define a strict boundary between ‘microevolution’, the variation in a single type of animal such as the variety of beak shape among the finches of the Galapagos Islands, and ‘macroevolution’, the changing of one species to another. While most agree that microevolution has occurred, they argue there is no evidence for macroevolution and that the accumulation of microevolutionary changes cannot cause macroevolutionary change, i.e. speciation (Morris, 1996). While the term ‘macroevolution’ is sometimes used in scientific discourse, it is not normally a stand-in for the term speciation, and the classic rebuttal of the creationist micro-macro

passage, which is reprinted in the 2003 book *Truth and Tolerance*, it seems that what Benedict was particularly drawing attention to was what he termed evolution as a “*philosophia universalis*,” a universal philosophy: “which claims to constitute a universal explanation of reality and is unwilling to allow the continuing existence of any other level of thinking” (Ratzinger, 2003: 144-145).

As Benedict is a theologian, his comments on evolution are rarely concise, instead they tend to be reflective and discursive. It is therefore difficult to summarise his views on evolution, however Allen (2006) attempts to summarise them in the following way:

- (1) Whatever the findings of the natural sciences, they will not contradict Christian faith, since ultimately the truth is one.
- (2) As a scientific matter, the evidence for "micro-evolution" seems beyond doubt; the case for "macro-evolution" is less persuasive.
- (3) Evolution has become a kind of "first philosophy" for enlightened thinkers, ruling out the possibility that life has any ultimate meaning. Here Christianity must draw the line.
- (4) On the moral level, the widespread acceptance of evolution as a "first philosophy" is dangerous. (Allen, 2006)

This is a fair summary, although I believe Benedict’s use of “macro-evolution” is linked more to his conception of evolution as an overarching worldview, rather than how it is used in creationist or ID critiques of speciation. That is, rather than his scepticism being about speciation, his scepticism of evolution seems to be in regard to evolution as an overarching materialistic worldview, which represents the only plane of thinking about

split is to simply state that macroevolution is what happens when microevolutionary changes accumulate. However, there is active debate about the relationship between micro and macroevolution in science, although not in the same terms as the creationist debate. See Erwin (2001) for a discussion of the origin and usage of the term ‘macroevolution’ in science, and the relationship between micro- and macroevolution in scientific discourse.

reality. Particularly taking account of later comments where Benedict claimed: “there are so many scientific proofs in favour of evolution which appears to be a reality we can see and which enriches our knowledge of life” (Benedict XVI, 2007). Like John Paul’s call for attention to be paid to the various philosophical conceptions of evolution, Benedict’s concern seems to have been with the propagation of a worldview, which necessarily excludes other modes of thinking—i.e. evolution as an atheistic/materialistic universal philosophy, which attempts to explain everything, including morality, to the exclusion of God. With these broader conceptions of the issue at hand, it is hard to see how a simplified discourse of ‘acceptance’ and ‘rejection’ of evolution could be appropriate here. We are dealing with differing conceptions of evolution, not the acceptance or rejection of a static concept. However, of particular note, is that nowhere in Benedict’s musings has he ever explicitly backed ID.

In a summary of the last 150 years of evolutionary thought in *Nature*, Mark Pagel asserts that: “Even the Pope [Benedict] now accepts the reality of evolution among individuals of a single species, but he and many others with religious beliefs draw the line at speciation” (Pagel, 2009: 810). Pagel does not state which of Benedict’s comments he is referring to here. It may well be his 1999 comments on “macro evolution”. However, I argue that two further comments subsequently made by Benedict suggest that he does not have an issue with speciation, rather, it is with overly materialistic or atheistic conceptions of evolution.

Firstly, Benedict’s comments made on the 24th July, 2007, at a meeting with the Clergy of the Dioceses of Belluno-Feltre and Treviso. Here Benedict stated that an antithesis between evolution and creation is ‘absurd’:

Currently, I see in Germany, but also in the United States, a somewhat fierce debate raging between so-called 'creationism' and evolutionism, presented as though they were mutually exclusive alternatives ... This antithesis is absurd because, on the one hand, there are so many scientific proofs in favour of evolution which appears to be a reality ... But on the other, the doctrine of evolution does not answer every query. (Benedict XVI, 2007)

The queries which he was referring to were: "Where does everything come from? And how did everything start which ultimately led to man?" This was in a speech answering a question on meaning in life, where Benedict also argued that: "were God not to exist and were he not also the Creator of my life, life would actually be a mere cog in evolution, nothing more; it would have no meaning in itself." Here, again, we see a rejection of materialistic conceptions of evolution, due to their perceived lack of ultimate meaning.

Secondly, at the end of Benedict's papacy in 2013, he addressed a letter to a well-known Italian atheist and mathematician Prof. Piergiorgio Odifreddi. The letter was a response to Odifreddi's 2011 book *Dear Pope, I'm Writing to You*, in which Odifreddi critiqued Benedict's theological works. Odifreddi referred to theology as "science fiction", with Benedict responding that with such an attitude, he was surprised that Odifreddi considered his work worth reviewing. Benedict's comments to Odifreddi, should further evidence that he should not be considered a proponent of ID. In response to the book, Benedict rebuts several charges laid by Odifreddi, including the charge that theology is "science fiction." Benedict also made what may be his final public comment on evolution, telling Odifreddi:

[A]llow me to be more concise with regard to evolution. First I would like to point out that no serious theologian will dispute that the entire "tree of life" is in a living internal relationship, which the word evolution fittingly describes. Likewise, no serious theologian will be of the opinion that God, the Creator, repeatedly at intermediate levels had to intervene almost manually in the process of development. In this sense, many attacks on theology regarding evolution are unfounded. However, it would be useful for the advancement of knowledge if those

who represent the natural sciences would also show themselves more openly aware of the issues and if they would say more clearly what questions still remain open. (Benedict, 2013)

In response to Odifreddi's labelling of theology as "science fiction", Benedict remarked that science fiction happens in many sciences, and that this occurs "in the best sense." That is: "they are visions and anticipations, by which we seek to attain a true knowledge, but in fact, they are only imaginations whereby we seek to draw near to the reality." Benedict suggested the theory of evolution has a "great style" of science fiction: referring specifically to Dawkins's *The Selfish Gene* and sections of Jacques Monod's *Chance and Necessity*. It's not clear what exactly Benedict is referring to here, but from his quoting of Monod, he alludes to the use of storytelling, narrative and metaphor in the service of the conceptualizing scientific work and in the communication of this science.¹⁵

Despite these many previous words on evolution, newspaper coverage of Benedict focuses on one book, published in 2007, entitled *Creation and Evolution*. In the book Benedict argues: "that it is not a question of deciding either for a creationism that is closed off from science as a matter of principle, or else a theory of evolution that has its own gaps yet overplays its hand and is unwilling to look at the questions that go beyond the methodological possibilities of the natural sciences" (Benedict XVI, 2008: 161-162). Rather, for Benedict, the real issue was the interplay and conversation between these various ways of knowing. He argued that the theory of evolution implied questions which must be assigned to philosophy, as they are beyond the scope of the natural sciences. Benedict's comments in this book were interpreted in numerous ways by the press, both in the UK and

¹⁵ Interestingly, the question of the place of narrative in science has received scholarly attention by historians and philosophers of science. See Morgan and Wise (2017) *Narrative in Science* for a special issue dedicated to questions relating to the use of narrative in science, historically and today.

abroad. With some outlets suggesting that Benedict's remarks "endorse 'intelligent design'" (Owen, 2007). As the media coverage of *Creation and Evolution* is a central focus of my media analysis, I will discuss the book's content and the context in which it was produced in more detail, alongside English newspaper representations of it in Chapter 4.

2.4.3 Francis

In 2014, Pope Francis passed comment on evolution in an address to the Pontifical Academy of Sciences (PAS). In the address, Francis warned of the pitfalls of simply imagining God as a magician. Instead Francis argued that creation was an ongoing process:

[God] created beings and allowed them to develop according to the internal laws that he gave to each one, so that they were able to develop and to arrive at their fullness of being ... And so creation continued for centuries and centuries, millennia and millennia, until it became which we know today, precisely because God is not a demiurge or a magician, but the creator who gives being to all things ... The evolution of nature does not contrast with the notion of creation, as evolution presupposes the creation of beings that evolve. (Francis, 2014)

Like previous popes, Francis also added caveats for humans. Particularly important for Francis was the freedom and autonomy God bestowed on humans and their special place as the stewards of nature. In Francis' view, God had made man the "steward of Creation, even that he rule over Creation, that he develop it until the end of time" (Francis, 2014). He also called upon scientists, especially Christian scientists, to eliminate risks to the environment, be they natural or manmade.

This theme of environmental stewardship foreshadowed Francis's 2015 encyclical *Laudato si'*, where he stressed the importance of taking action on climate change to protect the Earth. Interestingly, Francis mentioned evolution in passing in *Laudato si'*: "the speed with which human activity has developed contrasts with the naturally slow pace of biological

evolution” (Francis, 2015). It is notable that this statement received no press coverage, nor indeed much scholarly attention, as this represents the first time since *Humani generis* that a pope has commented on evolution in an encyclical, which are among the most authoritative documents in the Church. This passing comment on evolution in *Laudato si'* (2015) was overshadowed by *Laudato si'*'s main message of human responsibility for climate change, which dominated headlines around the world (e.g. Green, 2015; *The Guardian*, 2015).

Still, Francis's 2014 comments on evolution to the PAS sparked media reaction around the world. In the US, journalists at *MSNBC* claimed the Pope's remarks were a “significant rhetorical break with Catholic tradition” and *NBC News* claimed Francis made a “theological break from his predecessor Benedict XVI, a strong exponent of creationism” (Berger, 2014; Jamieson et al., 2014).

In the UK, a writer at *The Independent* declared that “the Pope made comments which experts said put an end to the ‘pseudo theories’ of creationism and intelligent design that some argue were encouraged by his predecessor, Benedict XVI.” Again, highlighting the image of the Church as anti-science, the article claimed the Church “has long had a reputation for being anti-science – most famously when Galileo faced the inquisition and was forced to retract his ‘heretic’ theory that the Earth revolved around the Sun” (Withnall, 2014). Conversely, other journalists at the time remarked that the Pope's position was not new for the Church, and criticised the general media response, observing how publications had “ramped up the Pope's words and took them out of context” (Dias, 2014). The content of this widespread media coverage suggests that some media producers held a perception of the Catholic Church as being anti-science or anti-evolution. However, to date, no studies

have empirically investigated the content of this coverage. I therefore outline the first study of newspaper representation of recent papal statements on evolution in Chapter 4.

2.5 Conclusion

Evolution, or the transmutation of species, as a concept, has a much longer history than Darwin. However, it wasn't until Darwin's formulation of the mechanism of natural selection, and his compilation of empirical data, that a feasible process by which species might change was forwarded. In the years after *On the Origin of Species* was published, Darwin's conception of natural selection experienced somewhat of an eclipse, but this came to an end with the Modern Synthesis of the early to mid-20th century. Today, evolution is an accepted scientific observation, however there are still active debates about the mechanisms which drive evolution. In recent years, there have been calls for an Extended Synthesis, which attempts to update the Modern Synthesis with more recent evidence from a number of fields. Though these claims are contested by other scientists who argue the Modern Synthesis itself is enough to incorporate the new evidence. Therefore, when studying public attitudes towards evolution we must remember that evolution is a broad and often fluid term, the mechanisms of which are still (rightly) subject to ongoing reconsideration, re-examination and research within the scientific community. It is important when studying public attitudes to understand what exactly people mean when they talk of 'evolution'. Popular usage and understanding may well have less to do with current scientific understandings of the term, and instead may relate to an assortment of

historical positions and folk understandings of evolution, such as the Lamarckian notion that as we do not use our appendix it will get smaller and eventually disappear. Although, the only way to understand in-depth how people conceive of evolution is to conduct qualitative studies of public attitudes, as I aim to in this thesis.

In this chapter I have also attempted to give historical context to more recent statements by popes on evolution. As the Vatican did not speak publicly about evolution until 1950, historians have sought to investigate the workings of Vatican congregations which dealt with pro-evolution writing. As Artigas et al. (2006) observe in their detailed work covering the end of the 19th century, it cannot be ascertained that the Vatican had a strict policy of condemnation against evolutionary writers, instead they argue there was perhaps a 'pragmatic policy' of pressured retractions to stem the flow of evolutionary ideas. These councils were weary of beginning a new Galileo Affair, which was still being used in anti-Catholic polemics at the time.

Similarly, in the early 20th century, the same sceptical attitudes can be attributed to individuals within the Church (De Bont, 2005). What is clear, is that there were attempts to pressure Catholic authors who proposed a theistic evolutionary account of origins to retract their work, especially when these works contemplated the evolution of humans. It is reasonable to conclude from the historical evidence that the senior hierarchy of the Catholic Church were sceptical of evolution in the years after Darwin published *On the Origin of Species*, although it was never explicitly condemned. This scepticism was less related to literal interpretations of Genesis, rather it reflected a battle between broader theological paradigms, which were actively fighting in the Church. Over time, this scepticism diminished,

and the Church became more open to evolutionary ideas. This culminated in the first Public comment on evolution in 1950, where Pius XII pronounced in *Humani generis* that the Church did not restrict research and discussions about the evolution of the human body, but these should not extend to the evolution of the soul.

With John Paul II, Benedict XVI, and Francis, we see that the popes have begun to publicly support forms of theistic evolution, while at the same time maintaining warnings about its materialistic form. Given the statements of these popes, who adopted positions accepting evolution that were not given by the Church a century before, we can conclude, in line with Blancke (2013: 3), that the Church has become gradually more receptive to evolution over time.

Despite this, parts of the media have responded to these popes in a reactionary way, hinting they perceive the Catholic Church, and perhaps by extension Catholic individuals, as being anti-evolution, or even anti-science. Again, this highlights the need to study instances of public discourse in the social study of science and religion. Currently, no empirical studies exist which analyse representations of these papal statements in the media. This thesis aims to fill this gap in the literature.

While there have been historical investigations into Catholic elites, analyses of Catholic individuals' attitudes are much less common. Though successive popes have publicly accepted evolution, they have set out no prescriptive position on evolution for Catholic individuals. Therefore, we may ask: do Catholics today share modern popes' views of evolution? In the following Chapter I outline the methodology that I will use to investigate

this question, remembering the lessons from historical work; namely a focus on fine context and a scepticism of simplification.

Chapter 3: Methodology

3.1 Introduction

This thesis contains two principal types of empirical analyses. The first, investigates English newspaper representations of papal statements on evolution from 1996 to 2017. The second explores contemporary Catholic individuals' perceptions of evolution, and how they perceive evolutionary theory as interacting with their religious beliefs (if at all). In this methods chapter I first outline the thesis' general research rationale, aims and objectives, and outline how the methods originally envisaged have been adjusted during the PhD project. Then, I detail the specific method of the media analysis, including details of the publications studied, and the process of analysis. Next, I overview the method utilised in the interview analysis, including the process of recruitment and details of the participants in the study. I finish with a section on reflexivity that covers the overall research process, and ontological and epistemological concerns.

3.2 Research design

3.2.1 Research rationale

In offering guidance on the key features of good qualitative projects, Gough et al. (2003: 4) propose that research questions in qualitative research should have *originality* and *social relevance*. On the question of *originality* in research, Braun and Clarke (2013: 44) state

the aim is to generate knowledge, which is new because of a different context, approach, topic or sample to previous studies. As discussed in Chapter 1, much of the limited existing research on the relationship between religion and evolutionary science takes place in a US context, mostly using a quantitative survey-based method (e.g. Stark, 1963; Ecklund and Parks, 2009; Evans, 2011). While large-scale surveys help us to see general patterns of opinion and belief across a society, they cannot detail individual's constructions of meaning, belief, perceptions and opinions about evolution in any depth. Although, as discussed in Chapter 1, some studies using a qualitative approach do exist, they are fewer than the already scarce quantitative studies in this area. Regarding Catholics specifically, there are some large-scale quantitative studies which include Catholics as a sub-sample (e.g. Francis and Greer, 1999; Unsworth and Voas, 2017), however no research projects have been specifically dedicated to Catholic individuals' beliefs in relation to evolution.

The present thesis aims to investigate Catholic individuals' attitudes and perceptions of evolutionary science and its interactions with their religious beliefs. Utilising the qualitative research paradigm, and a semi-structured interview method, I aim to investigate in depth the topic of Catholic individuals' perceptions of evolutionary science, and their attitudes about them. Therefore, the present thesis' aims to fulfil all four of Braun and Clarke's (2013: 44) criteria for originality—a new context (England), approach (qualitative), topic (Catholicism and evolution), and sample (Catholics).

On the question of *social relevance* of the research, it may at first seem a harder charge to answer. With so many clearly purposive social research avenues, with explicit links

to policy implementation, why choose to study Catholicism and evolution? The following rationale is offered to justify the present research's social relevance.

Beyond the immediate practical applicability of research, social relevance can also refer to “critiquing taken-for-granted social norms” (Braun and Clarke, 2013: 51). Over the last two decades, discussions on the incompatibility of science and religion have become commonplace; although, as introduced in Chapter 2, the origins of these discourses are much older. Engaging with these public discourses may lead one to conclude that if you are religious, you cannot accept science.¹ Especially when according to some scientists, such as the particle physicist Vic Stenger, they are “diametrically opposed” ways of seeing the world (Stenger, 2011).

There are two main issues with this, firstly, this type of theorising by professionals completely ignores the lived experiences of individuals. It is not empirical. Take for example Stenger, who states those who accept both science and religion: “have compartmentalized their brains into two sections that don't talk to each other” (Stenger, 2011). This does not consider the experiences and perceptions of religious individuals. Do they compartmentalize? Do they synthesise? No research conducted to date can be marshalled in support of Stenger's statement; therefore, this type of theorising ignores the experiences of those it attempts to evaluate.²

¹ According to Elsdon-Baker et al.'s (2017b: 3) study, 60% of UK adults think that religious members of the public will find it very difficult, difficult or somewhat difficult to “accept information about evolutionary science, in reference to their own personal beliefs or way of seeing the world”.

² Of interest here is the psychological work of Legare et al. (2012), who argue there is considerable evidence that individuals use both natural and supernatural explanations to interpret the same events,

Secondly, claiming science and religion must be incompatible is exclusionary. To accept science, the reasoning goes, you must renounce your faith. Or, if you do accept science, and keep your faith, then the two cannot be working together harmoniously in your perception of the world. Hence, discourses which focus on the opposition of science and religion may play a part in excluding religious publics from engaging with science. This is an important problem for science communication and its practitioners, whose aim is to engage diverse publics with science. Therefore, the social relevance in this research is in the empirical grounding of discussions around Catholicism and evolution.

Therefore, it is not only important to study the attitudes of religious publics themselves, but it is also necessary to investigate the types of narrative about religious groups and science in public discourse. In this way, we can explore both the societal expectations of these religious groups regarding science, and what members of those religious communities themselves think on the issue. In this thesis, I examine a facet of the public discourse elements of this by studying English newspaper representations of recent papal statements on evolution.

3.2.2 Aims and research questions

This thesis aims to empirically investigate the relationship between Catholicism and evolution in England. It achieves this in two ways:

such as evolution or illness, and that there are multiple ways in which both kinds of explanations coexist in individuals' minds.

- Through analysing public discourse³, by exploring how English newspapers have represented popes' recent statements on evolution;
- Through analysing public attitudes, by exploring individual Catholic's perceptions and attitudes towards evolution, and the relationship between evolution and their faith.

The study has two specific research questions, one for the analysis of public discourse and one for the analysis of public attitudes:

- 1) How have papal statements on evolution been represented in large-circulation English newspapers?
- 2) In what ways do Catholic individuals in England perceive evolutionary science in relation to their faith and worldview?

A number of research objectives relate to these research questions:

1) *Public discourse*

1.1 To map the historical context leading to contemporary papal statements on evolution;

1.2 To analyse initial news coverage for each of John Paul's, Benedict's, and Francis' evolution comments;

³ I follow Kaden et al. (2017; 2019: 75) by denoting public discourse relating to science and religion as: "popular media coverage of issues relating to science and belief and the publications of [...] 'professionals' in the field of science and religion whose vocation it is to develop, distribute, defend and critique systems of explanation that relate science to different forms of ultimate belief."

1.3 To analyse subsequent coverage to see how subsequent references to these papal comments are used.

2) *Public attitudes*

2.1 To analyse Catholic individuals' perceptions and attitudes towards evolution;

2.2 To analyse how Catholic individuals conceptualise evolution;

2.3 To situate these understanding in the larger literature on religious attitudes towards evolution, especially quantitative measures;

2.4 To explore how, if at all, dominant media coverage/narratives are informing or interacting with individual perceptions.

While the broad aim of the research, to investigate Catholicism and evolution, has remained the same throughout, my approach to the topic has progressed. I will now reflect on these developments.

3.2.3 How the methods have evolved: Qualitative research paradigm

In its original conception, this study was planned to be mixed methods. Initially, I proposed a quantitative content analysis of media articles covering papal statements about evolution, a set of qualitative interviews generating in-depth data on individual Catholic's beliefs, and from this, a larger quantitative survey to assess the prevalence of those beliefs over a more nationally representative sample. Given time constraints, and after reflecting on the most appropriate way forward for the aims of the study, the project has changed in several ways. Most notably, I chose to drop quantitative methods from the project, and

situate the study fully within the qualitative research paradigm. This is not because I believe quantitative methods have nothing to add to such endeavours, but in this instance qualitative methods are better suited to my research aims. This shift has had the following impact.

Firstly, I chose to carry out a qualitative media analysis, rather than a quantitative content analysis. Content analysis in its quantitative form has its beginnings in a positivist epistemology, cherishing notions of objectivity and replicability (Altheide and Schneider, 2013: 24). The main aim is to catalogue frequencies of occurrences of words and phrases, so objective statistical inferences can be made about the symbolic content of the corpus (Neuman, 1997: 273). This deductive framework, however, can lead to important information being omitted from the analysis.

Neuman describes how qualitative media analysis is “not highly respected among positivist researchers” (Neuman, 1997: 273). Though, others such as Newbold et al. (2002: 84) argue instead that quantitative content analysis cannot capture important context within which meaning emerges from a media text. Furthermore, researchers in the qualitative research paradigm reject the notion of an objective researcher being possible or even desirable, and reject natural science as the best model for social research (Silverman, 2000: 8).

Qualitative media analyses focus on meaning, in-depth readings of the corpus, and can extend to include media, audience, and contextual factors beyond the text (Macnamara, 2005: 5). This is important in the present study, where I will be including contextual

information beyond the corpus, which would not be as easily incorporated into a strict content analysis. Also, as I wish to explore the nuances in the corpus, this is best done inductively from the bottom-up; a qualitative media analysis enables me to achieve this. Furthermore, research in the qualitative paradigm sees researcher interpretation as a benefit, rather than a 'bias' as in content analysis. The researcher plays an active and interpretive part in the analysis, and the construction of meaning around the data while answering the research question. However, to beneficially acknowledge subjectivity in the research process, careful consideration and research design is required. This is achieved through reflexivity (Braun and Clarke, 2013: 36-37).

Reflexivity can be said to come in two types, functional and personal (Wilkinson, 1988). While functional reflexivity considers how research tools and processes are influencing the research, personal reflexivity considers how the researcher as an individual is influencing the production of knowledge in the research (Braun and Clarke, 2013: 37). It was through the process of functional reflexivity that I decided to move away from quantitative methods within this project, concluding that the qualitative approach better suited my exploratory approach and research aims. For personal reflexivity, it is important to carefully contemplate how your values, history, and assumptions as an individual are influencing the work. This influence is not necessarily a negative one, but it should necessarily be thoughtfully considered. I include an account of my reflexive practice in the final section of this chapter.

I also opted to focus solely on qualitative methods for the public attitudes section of this research. In part this is due to time constraints, and because there are no existing in-

depth studies of Catholic attitudes toward evolution. Qualitative research is focussed on inductive, hypothesis-generating research (Braun and Clarke: 2013: 6), therefore I aim to use interviews to generate rich data on various ways Catholics perceive science and religion to interact in their worldviews. Deploying set survey items to the population would generate some meaningful data, but it would lack detail in documenting the way in which science and religion feature in the lived-experience of individuals, as we lack the appropriate information to construct such survey items specifically for Catholics. Furthermore, as discussed in Chapter 1, it is some of these 'blunt measures' which I aim to critique in this study using data from previously unexamined Catholic publics. Therefore, I have opted for an exploratory, inductive, qualitative attitudinal study to generate detailed data, rather than a quantitative survey, which may well be statistically representative, but may have used categorisations that are not salient for Catholics.⁴

3.2.4 Interviews vs. ethnography: Naturalistic or contrived?

Interviews have become the *de facto* data generation method in qualitative research (Silverman, 2013: 35-39). While interviews are a useful method to generate data, they are not best suited to every research question, and regularly studies offer no rationale or justification for their use. Researchers often ignore other methods, and only contrast the benefits of open-ended interviews with fixed-choice interviews or surveys (Silverman 2013: 134). To justify my use of interviews, I will contrast the method with ethnography.

⁴ See Elsdon-Baker (2015) for a critique of issue framing in large surveys, and the forced categorisation of individuals' views of religion and science which can stem from poorly constructed surveys.

While an ethnographic approach could lead to interesting data on a range of research topics concerning Catholicism and evolution, the method is not appropriate for my research question, which seeks to explore a range of perceptions and attitudes toward evolution amongst those who identify as Catholic. If, to pose a hypothetical research proposal, I was to investigate how the Pontifical Academy of Sciences discusses, synthesises, and negotiates science and religion matters in their proceedings and laboratories, an ethnographic method would be best suited. Or, if I wished to understand how the topic of science and religion is preached from the pulpit, I would use an ethnographic method and embed in various congregations to better understand how these conversations take place in a 'natural' setting.⁵ However, as this research is in the PUS tradition, and I wish explore the opinions of a range of individuals, interviews provide the best method to accomplish this.

Ethnographic approaches are however seen as producing more 'naturalistic' data, where the researcher has less influence on the generation of data. There has been considerable debate on the topic of naturalistic versus contrived data in qualitative research, with these two types of data being represented as bipolar (Speer, 2002; Potter, 2002). However, it is unhelpful to conceive of naturalistic and contrived data as two distinct poles, the methods should instead be seen as a continuum of researcher influence on data generation (Silverman, 2013: 49-51).

⁵ This would, however, be an extremely time consuming task given the accounts of my interview participants, none of which could recall a single instance of the topic of science and religion being raised by a priest in Church.

Even with ‘naturalistic’ data, there is still researcher influence. For example, the media articles included in this project are highly naturalistic data, as I was not involved in their generation. However, the media articles used were selected based on specific search terms, were taken from certain newspapers, and between certain dates. Therefore, even though I was not personally involved in generating the data items themselves, I’ve had an active role developing the criteria through which items are selected. In the analysis of those articles themselves, I obviously play an active role in constructing meaning from the data. Though, again, this should not necessarily be seen as a negative (see Braun and Clarke, 2013: 36).

Data generated from interviews is more at the contrived end of the spectrum compared to media articles. The researcher and participant are actively engaged in co-constructing the knowledge produced during the interview process. As Rapley has argued: “Interviews are, by their very nature, social encounters where speakers collaborate in producing retrospective (and prospective) *accounts* or *versions* of their past (or future) actions, experiences, feelings and thoughts” (Rapley, 2004: 16). Therefore, they should be analysed in reference to the context in which they were produced.

This does not mean, however, that all insights from interviews are forever bound to the context of their creation. For example, as Goodman (2008) has shown in discursive analysis, the notion of ‘generalizability’ can still apply in qualitative research. That is, insights can be ‘transferable’ beyond the specific context of knowledge production.⁶ I too hope to

⁶ Goodman (2008) uses examples of common discursive strategies used to justify prejudice to explore the notion of generalisability in qualitative research. Where across a number of diverse studies—gay

produce some transferable insights from my interview analysis. For example, the inadequacy of ‘blunt’ or binary survey measures (examined in Chapter 1) to encapsulate heterogeneous beliefs.

Therefore, while a polarity between ‘natural’ and ‘contrived’ data is perhaps unhelpful, we must remain conscious of the contexts within which our data is produced. Silverman (2013: 55) suggests it is usually a good idea to begin a research project with more naturalistic data. My research follows this recommendation, beginning with more naturalistic data from media articles, and progressing to less naturalistic data in the form of semi-structured interviews.

3.3 Media analysis

To study newspaper representations of recent papal comments on evolution, I employ a version of qualitative media analysis, Ethnographic Content Analysis (ECA). ECA, developed by Altheide and Schneider (2013), differs from a quantitative content analysis in its use of textual, contextual, and narrative data and analysis, as well as (some) numerical data. The “ethnographic” in ECA refers to a methodological orientation, viewing documents as products of social interaction, which can be studied for meaning with a focus on immersion in the material, reflexivity, context, and discovery. While a protocol which

parenting, asylum seekers, and immigrants’ rights—he found the common discursive strategy of using “existing prejudice to justify further prejudice.”

generates numerical data may be developed in the later stages of analysis, ECA is inductive and recursive, and therefore unlike quantitative content analysis does not solely force data into pre-defined categories (Altheide and Schneider, 2013: 23-37).

The protocol serves as a basic data collection and reduction instrument, with some pre-coded categories such as publication, date, and headline. It can also include some inductively generated categories once the researcher is familiar with the data. Unlike quantitative content analysis, however, these basic numerical data are not the focus of the study. Instead, this numerical data supplements the main aim of capturing themes, definitions, meanings, process, and types—the qualitative analysis. Here, detailed readings and an inductive coding approach utilising constant comparison is used to construct themes from the data which have relevance to the research question (Altheide and Schneider, 2013: 44-45).

As stated, the aim of qualitative media analysis is to investigate the meanings, emphasis and themes in communicative content. Researchers conducting ECA employ a progressive theoretical sampling strategy to ensure the study includes all relevant content to answer the research question. This can mean using sources beyond one medium of communication, such as TV, radio, and newspapers. The appropriate scope of content to include may not be apparent at the beginning of the study, therefore researchers must be reflexive while developing an understanding of the research topic (Altheide and Schneider, 2013: 55-56). In the present study, I initially intended to only analyse print newspaper articles, which covered or referred to papal comments on evolution. However, after an initial analysis I discovered that many articles in the latter end of the date range only appeared on

newspapers' online platforms. I therefore expanded the scope of the analysis to include the online outputs of relevant newspapers, allowing me to access more content relevant to the study.

Expanding the study to include online content, however, brought other considerations and limitations. While the LexisNexis database used in this study contained full coverage of the print versions in the date range, it only contained complete records of online content from certain dates within the entire range. LexisNexis has full coverage of the online platforms of *The Times* (*thetimes.co.uk*) from May 2011; of *The Daily Telegraph* (*telegraph.co.uk*) from March 2006; and of the *Daily Mail* (*MailOnline*) from March 2012. This represents one limitation of the study, as not all online content can be analysed across the period studied. However, access to some of the online content from these publications was deemed better than access to none. As is discussed below, the majority of coverage of papal statements on evolution moves online from 2010, so without including online content, a major period under study would have been omitted.

3.3.1 Publications and timeframe

This thesis focusses on England, with subsequent parts exploring the perceptions of Catholic individuals in England, therefore the media analysis focussed on English national newspapers. This geographical restriction on the publications studied also ensured that the total number of articles in the sample was manageable.

I wished to study media representations of recent papal statements on evolution; therefore, dates were selected from October 1996 to March 2017. This included articles in

response to John Paul II, Benedict XVI, and Francis's public comments about evolution. Extending the analysis to Pius XII's 1950 statement was deemed unfeasible given the timescale and scope of this study.

A preliminary search was conducted on English publications in the LexisNexis news database's "Major World Newspapers" category using the developed search terms (see below). To ascertain the most relevant widely-read newspapers, the titles were then filtered by circulation number, removing those that had a daily circulation of less than 200,000 in 2006 (the median year in the timeframe studied).⁷ The final publications included in the study were: *The Independent*, *The Times*, *The Guardian*, *The Daily Telegraph*, *Daily Mail*, and *The Observer*.

Sunday and daily counterparts of newspapers were both grouped under the same publication. As *The Independent* and *The Guardian*'s online content is indexed in LexisNexis together with their print content under the same publication headings, no extra searches were necessary for these publications. However, *The Times* (*thetimes.co.uk*), *The Daily Telegraph* (*telegraph.co.uk*), and the *Daily Mail* (*MailOnline*) were indexed under a separate online publication listing. For each of these, I applied the search terms and the appropriate date range, and retrieved the appropriate articles. Although, as discussed above, these publications only have full online coverage in the database from certain dates.

The absence of tabloid press titles (e.g. *The Sun* and *The Mirror*) was due to the absence of coverage of the topic in those publications, when using the search terms, as per

⁷ Circulation figures used from the Audit Bureau of Circulations, UK (ABC, 2006).

below. Restricting the number of articles to major publications by circulation in England kept the corpus to a manageable number (n=83), therefore no further sampling method was necessary.

3.3.2 Search terms

As the aim was to analyse media coverage of papal comments on evolution, be this during the initial news coverage or where references had been made in other articles, the search term “pope” was used rather than the broader term “Catholic”.

The word “evolution” is used in many non-biological contexts (e.g. institutional development or progress), therefore I initially trialled various modifiers to allow the capture of only relevant articles, without needing to manually filter an excessively large corpus. However, after trialling several modifiers—“Darwin!”, “theory”, and “biolog!”⁸—to more specifically capture the relevant articles, I deemed these to be too restrictive as they excluded some articles which were known to be relevant to the study.

I then combined the “pope” and “evolution” terms with a “w/n” indicator, meaning the words appeared within *n* amount of words from each other in the text, rather than “AND” which means the two terms can appear anywhere in the article. I chose the “w/n” indicator rather than “AND” as I wished to capture those articles which referenced popes’ views on evolution, and the relevant articles keep the statement and the author of the

⁸ LexisNexis Academic uses Boolean indicators (OR, AND, etc.) and wildcard characters to refine searches. An asterisk (*) replaces one letter in a word, and an exclamation mark (!) is a truncation to allow the searches of multiple endings to a word. (E.g. The term ‘Darwin!’ could search for Darwin, Darwinian, or Darwin’s.) (LexisNexis, 2019)

statement in close proximity. Using a “w/n” modifier reduced a large amount of manual filtering.

After piloting several numbers, “w/100” was chosen as the most appropriate connector for selecting the relevant content, with “w/100” signifying the two terms (“pope” and “evolution”) would appear within 100 words of each other in the article. Even though this combination still returned some irrelevant articles (i.e. evolution used non-biologically) these instances were manually filtered using the criterion: does the article refer to a pope’s views about evolution?

Therefore, the search terms: “pope w/100 evolution!” were used on the LexisNexis database, returning n=384 results from the relevant publications. Following manually filtering for articles specifically citing popes’ comments on evolution, the final sample was n=83.

3.3.3 Process of analysis

Before I conducted the analysis, I read the history of papal statements on evolution and science more generally, and other events which may have influenced media reporting. These included other high-level Vatican official public comments. This allowed me to situate the media articles in their proper context during the analysis, and to explain this context in the write-up.

I then began familiarising myself with the dataset; through reading and re-reading whilst noting interesting commonalities, and coding common emergent themes (Braun and

Clarke, 2013). As per ECA, I constructed an initial protocol to collect basic classificatory information for display in a spreadsheet (Altheide and Schneider, 2013), this included: publication (daily and Sunday editions grouped into a single category), date, author (where available), page (where available/appropriate), word count, article type, online/print, and whether the pope's comments were the focus of the article. With this data, I could then separate the initial news reporting on the popes' statements (Article type: news; Pope focus: yes), from other subsequent articles which make reference to these popes' statements.

The unit of analysis was the entire article. However, as there was a clear difference between the focus of initial news articles covering a papal comment on evolution, and subsequent reporting which makes reference to these earlier comments, I had to analyse subsequent articles differently. For these articles, while the unit of analysis remained the entire article, I focussed the analysis on how a reference to a popes' views was used in the article to contextualise other issues or to forward other arguments.

While not explicitly a framing study, I do utilise the notion of framing in part of the analysis. In a meta-content analysis of framing studies, Matthes (2009: 354) concludes that Entman's (1993, 2004) definition of framing is the most influential in mass communications literature:

To frame is to select some aspects of a perceived reality and make them more salient in a communicating context, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described. (Entman, 1993: 52, emphasis in original)

Multiple other definitions of framing exist. Another well-cited example is Gitlin's definition of frames as "principles of selection, emphasis, and presentation composed of

little tacit theories about what exists, what happens, and what matters” (Gitlin, 1980: 6). In the analysis, I used the concept of framing to aid in the analysis of the representation of papal statements on evolution. Frames were developed inductively with reference to Gitlin’s (1980) and Entman’s (1993) definitions of what constitutes a frame.

3.4 Interview analysis

3.4.1 Developing and piloting the interview schedule

The interviews in this study were ‘semi-structured’, meaning the researcher asks participants a series of predetermined, but open-ended questions (Given, 2008: 810). The interview schedule—the set of questions used in the interview—acts as a guide to topics to be discussed, but the interview is flexible and can cover new areas of relevant discussion if they arise.

The schedule was adapted from previous work conducted by Catto, Jones and Kaden on the *Science and Religion: Exploring the Spectrum* project. This more general schedule was tailored to the topic of Catholicism and evolution, using insights from both the literature review and the media analysis. Beyond this tailoring, stimulus materials were also added—excerpts from Pope Francis’s 2014 statement and a media response to it from my media analysis data set—to stimulate discussion on the role of the Pope, the Church, and the media (Edwards and Holland, 2013: 37). Once designed, the schedule was piloted in a focus

group to assess how participants understood the questions, and necessary amendments were made. The final schedule can be found in the Appendix I.

3.4.2 Ethics

As my research began at Newman University, before transferring to the University of Birmingham, the Newman University Research Ethics Committee approved the research on 27th September, 2017. While the ethics proposal included information on both the media and interview analyses, the main ethical countermeasures relate to the interviews and safeguarding interview participants. I therefore discuss these practices here.

Outlined in the ethics approval submission was the concept of informed consent; whereby participants must have enough information to make an informed decision when giving their consent to take part in the research. Informed consent was achieved through the inclusion of detailed information in the participant information sheet, which was sent prior to each interview, so the participant could understand the aims of the research and how the data generated in the interviews would be used. The participants were also given the opportunity to ask questions both before and after the interview. Participants were informed they could withdraw from the interview at any time before or during the interview, or within up to 30 days after the interview had taken place, without giving a reason. Before each interview began, participants were given time to re-read the participant information sheet, were informed of the ethics process, and were asked to sign the consent form if they still wished to take part.

Confidentiality and anonymity are also two important parts of research ethics (Braun and Clarke, 2013). Participants were informed that excerpts from the interview may be reproduced in the final thesis, future publications and presentations, but that these excerpts would appear anonymised. Furthermore, the audio and text transcripts would be kept under password protection and only myself and a professional transcriber would have access to the raw data. The Appendices contain full reproductions of all ethics-related forms, including Ethics Approval Proposal Form (Appendix II), Ethics Certificate (Appendix III), Participant Information Sheet (Appendix IV), and Consent Form (Appendix V).

3.4.3 Sampling and saturation

Due to the lack of existing research on Catholic attitudes towards evolution, this study is necessarily exploratory in nature. As I aimed to explore a diverse range of perceptions, the sole requirement for a participant to take part in an interview was that the individual identified as Catholic. However, beyond this, I purposively sampled to ensure generational, educational, gender and geographical variation among participants (Patton, 2002: 230).

In quantitative research, random sampling is used to produce generalizable results, which apply to the wider population (Braun and Clarke, 2013: 56). However, in qualitative research sampling is purposive, focussed on generating insight and in-depth understanding of the topic studied (Patton, 2002: 230). Therefore, by ensuring generational, educational, gender and geographic variation, I did not seek to use these variables to generalise my results to other individuals of those categories. Instead, the aim of purposively sampling

people from a range of demographic variables is to increase the types of information collected (Sandelowski, 1995: 180).

I initially planned to continue interviewing until I reached saturation—when new data collection reveals no new information (Sandelowski, 1995). However, it became clear that due to the great diversity of opinions and the exploratory nature of the study, saturation would not be possible in the timeframe of a thesis. The final number of interviewees was $n=31$. Braun and Clarke (2013: 55) suggest sample sizes in research that seeks patterns across interview data normally consist of between 15-30 interviews, therefore the present study represents an adequate sample for this type of research.

3.4.4 Recruitment

For the initial pilot focus group to test the interview schedule, a mass email was sent to all students and staff at Newman University (where this project began) asking for focus group participants on the topic of science and religion. I purposefully did not use the term “evolution” in any initial recruitment emails, rather I used the broader “science and religion” so that I avoided attracting only people for whom evolution was a salient subject. The initial focus group participants were offered a £20 gift voucher incentive for their participation. However, no incentives were offered for participation in the main interviews, due to concerns over ethics, coercion, and the impact on the data generated.⁹

⁹ The ethics and impacts of incentives in qualitative research have been discussed by authors such as Head (2009).

For the main interview sample, I initially contacted individuals who had expressed interest in the *Science and Religion: Exploring the Spectrum* (SRES) project by completing a pre-screen questionnaire, and who had consented to being included in the project's participant pool. I identified individuals who had not participated in previous SRES studies, were based in England, and who identified as Catholic. These individuals were then invited to participate in the research by email. If interested, I asked individuals to reply for more information. If an individual replied to the initial recruitment email, my second email included the Participant Information Sheet (Appendix IV) giving more information on the study, I also asked if the individual had any questions relating to the research, and (if they were happy to proceed) began organising a date and time for the interview. If recruitment was successful, and once interview had been conducted, the individual was then asked if they knew further qualifying individuals who may like to participate. In this way, the sample snowballed from initial participants to a larger group.

As the SRES participant pool only generated a few participants, and wanting to recruit as diverse a sample as possible, I also identified various Catholic groups and gatekeepers to Catholic communities. Beyond gatekeepers sharing the information in their personal networks, I researched email addresses for parishes and other Catholic community groups around the country. Once identified, a message with accompanying recruitment email was sent to these groups for distribution among their members. Similarly to the process laid out about when an individual responded expressing interest in participating in the study, I emailed out the Participant Information Sheet and organised a date for the

interview. Once an interview was conducted, I asked if the participants knew any other people who may be interested in taking part.

3.4.5 Transcription

The interviews were transcribed using the orthographic (verbatim) method, which focusses on the spoken words and other sounds in the interview (Braun and Clarke, 2013: 162). Jeffersonian style, a method common in discursive and conversational analysis, was not used, as the linguistic detail was not needed for the aims of this study. The orthographic transcription method includes: the identity of the speaker, non-verbal sounds such as laughs and 'errs', pausing, overlapping and inaudible speech (Braun and Clarke, 2013: 165). Line numbers were also included in the transcripts for ease of orientation in analysis.

3.4.6 Thematic analysis

Thematic analysis is a foundational method for identifying, analysing and reporting patterns within data. An initial conception of thematic analysis can be found in the historian of science Gerald Holton's work (see Merton, 1975). Though widely used in qualitative research, it is often not acknowledged as an explicit method. In 2006, Braun and Clarke sought to clarify this by writing a methods paper explicitly detailing the process by which thematic analysis is usually carried out (Braun and Clarke, 2006: 4-6).

In Braun and Clarke's (2006: 80) foundational review of thematic analysis (TA), they suggest qualitative methods can be divided among two groups—one tied to epistemological or theoretical backgrounds, and one independent of them. As Braun and Clarke outline, in the first group are studies in conversation analysis (e.g., Hutchby and Wooffitt, 1998),

interpretive phenomenological analysis (e.g., Smith and Osborn, 2003), grounded theory (e.g. Strauss and Corbin, 1998), discourse analysis (e.g. Willig, 2003), and narrative analysis (e.g. Murray, 2003). In the second group of qualitative studies, are methods which are essentially independent of specific theory and epistemology (Braun and Clarke, 2006: 80-81). TA falls into this camp, with one of its benefits being its theoretical flexibility, and its compatibility with both essentialist and constructivist paradigms.

TA can be applied to almost any type of qualitative data, from researcher led interviews to secondary media sources (Clarke and Braun, 2006: 4). Summarizing the flexibility and wide applicability of TA to various research interests, Clarke and Braun explain:

(a) it works with a wide range of research questions, from those about people's experiences or understandings to those about the representation and construction of particular phenomena in particular contexts; b) it can be used to analyse different types of data, from secondary sources such as media to transcripts of focus groups or interviews; c) it works with large or small data-sets; and d) it can be applied to produce data-driven or theory-driven analyses. (Clarke and Braun, 2013: 121)

Table 3.1 describes the six-step process, which I have used to carry out the TA for my thesis. Here, the focus is on reading, coding using constant comparison, collating codes, developing themes, and finally analysing these themes in reference to the research question.

Table 3.1 Phases of Thematic Analysis (adapted from Braun and Clarke, 2006)

Steps of TA	Description of the process
1. Familiarising yourself with your data:	Transcribing data (if necessary), reading and re- reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic map of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Though this six-step plan acts as a guide, it should not be seen as a prescriptive or linear procedure. TA is a recursive process, moving back and forth between the phases as the analysis develops, with the aim of exploring patterns across the data (Braun and Clarke, 2006: 16).

3.4.7 Boundaries

For part of my argument in the interview analysis, I draw upon the theoretical concept of boundaries. Boundaries have served as a major theoretical framework in social sciences over the last few decades, and can be defined in many ways (Lamont, 2001; Bryson,

2016). In the present thesis, I refer to symbolic boundaries as described by Lamont and Molnar (2002: 168):

Symbolic boundaries are conceptual distinctions made by social actors to categorize objects, people, practices, and even time and space. They are tools by which individuals and groups struggle over and come to agree upon definitions of reality. Examining them allows us to capture the dynamic dimensions of social relations, as groups compete in the production, diffusion, and institutionalization of alternative systems and principles of classifications. Symbolic boundaries also separate people into groups and generate feelings of similarity and group membership. (Lamont and Molnar, 2002: 168)

3.4.8 Overview of participants

The interview data in this thesis comes from 31 semi-structured interviews with self-identifying Catholics, conducted between October 2017 and April 2018. The shortest interview lasted 31:30 and the longest lasted 2:40:13. The mean interview duration was 1:03:29, which is in line with other similar studies in this field (e.g. Ecklund and Scheitle, 2018). In this section, I give an overview of the participants in the study.

3.4.8.1 Catholic population of England (Scotland, and Wales)

Before outlining my study's sample, it is necessary to outline the makeup of England's Catholic population. Here I take primarily from the 36th British Social Attitudes (BSA) survey report (Curtice et al., 2019), and Stephen Bullivant's (2016) report on British Catholicism. It should be noted, however, that the BSA survey covers England, Wales, and Scotland, and Bullivant's report, both England and Wales. Although some of these statistics contain Welsh and Scottish Catholics, I aim to sketch a broad profile of Catholicism in Britain, in which to situate my own sample of English Catholics.

According to the BSA survey sample (England, Scotland, and Wales) self-identification as 'Roman Catholic' has declined proportionally by around 30% in total from 10% in 1983 to 7% of the total population in 2018. While this shows a decline in those identifying as Catholic, the magnitude is not as drastic as for the Church of England, who have dropped proportionally by 70% in total from 40% to 12% of the total population over the same period (Curtice et al., 2019: 21). Bullivant (2016: 9) estimates that as 8.3% of people surveyed in England and Wales identified as Catholic, the total figure of adult (18+) Catholics in England and Wales in 2014 was around 3.8 million. This is not a small population of individuals, so again, it is surprising that their views of evolution have thus far not received dedicated academic study.

Regarding the demographics of the Catholic population, of English and Welsh Catholics in 2014, 40.9% identified as male and 59.1% identified as female (compared with 48.2% and 51.8% respectively for the general population). However, Catholic gender disparities mirror the broader Christian population of which 41.4% are males and 58.6% females (Bullivant, 2016: 9). As for age, Bullivant observes that:

Roughly speaking, around a quarter of adult Catholics are between the ages of 18 to 35; around half between the ages of 35 to 64; and around a quarter aged 65 or over. Viewed next to the population as a whole, the Catholic numbers for the youngest two age categories are comparatively low. That said, 35 to 44 year olds are overrepresented within the Catholic community. From the age of 45 upwards, the Catholic percentages broadly mirror those of the general population. (Bullivant, 2016: 9)

While the gender split of the English and Welsh Catholic population mirrors the broader Christian population, Catholics are notably younger than the broader Christian population in Britain. According to Bullivant (2016: 9), half of all Christians are over 55, while

for Catholics only a third are over 55. Finally, on the race/ethnicity profile of English and Welsh Catholics, 6.3% of the sample identified as black and 3.3% as Asian, compared with 3.5% and 7.2% respectively for the general population. Furthermore, 87.4% of Catholics identify as white, compared with 87% of the general population. However, as Bullivant (2016: 10) explains, the categories used in the survey masks the diversity “of national and ethnic background within the White Catholic population: Irish, Polish, Italian, Spanish, Lithuanian etc.”, all which may show differences between the white Catholic and white general population (Bullivant, 2016: 10).

Every 10 years (1998, 2008, 2018), the BSA survey includes a module of questions on religious beliefs. Unfortunately, however, the 2018 dataset at time of writing has not yet been released. So here I sketch a short overview of British Catholic beliefs using the 2008 data,¹⁰ acknowledging that over the last 11 years these percentages may well have changed. According to 2008 BSA data of those identifying as ‘Roman Catholics’ (n=211), 59.3% were absolutely sure they believed in God, 25.5% were somewhat sure, 11.5% were not quite sure, 2% were not sure at all, and 1.8% were sure they did not believe in God. In regard to God’s involvement with humans—“There is a God who concerns Himself with every human being personally”—56% agreed and 14.2% disagreed (n=147). More personally, in response to the statement “Do you think that God is directly involved in your affairs?” 56.6% answered yes and 42.9% answered no (n=204; percentages don’t add up to 100 due to other options being available). Finally, when asked “Do you believe in heaven?”, 77.3% answered yes and 22.7% answered no (n=149). While these findings are from 2008 they still highlight

¹⁰ British Social Attitudes datasets are available at: <http://www.britsocat.com>.

that within Catholicism in Britain there is a clear diversity of religious beliefs, again warning us against treating Catholicism, or any religion, monolithically.

Self-reported religious service attendance measures on surveys are known to be problematic, as the results are not supported by observations of actual religious service attendance (Marler and Hadaway, 1999). Still, self-reported religious service attendance measures on surveys can inform us of the strength of religious identity among respondents, or the social desirability of being perceived as observant, as those who hold a strong self-image of being religious tend to report attending services more often. Thus, despite concerns of the utility of self-reported attendance questions for informing us on actual attendance, these measures can be a good measure of religiosity (Brenner, 2011). Of the BSA's 2019 sample, 23% of Catholics reported weekly religious service attendance, this being lower than non-Christian religious individuals (40%), yet higher than Anglicans (9%) (Curtice et al., 2019: 25).

Moving from specific religious beliefs and practice to social views, again to warn against seeing Catholics as solely a traditional, conservative, homogeneous population, it is interesting that 59% of British Catholics in the BSA sample agree with same-sex civil partnerships. Whilst, this is lower than the figure for those who profess no religion (73%), it is notably higher than acceptance of same-sex civil partnerships among those who belong to non-Christian religions (34%) (Curtice et al., 2019: 118). To counter another common stereotype, 82% of Catholics think pre-marital sex is "rarely wrong" or "not wrong at all", the exact same figure as Anglicans, although less than those with no religion (93%) (Curtice et al., 2019: 121).

3.4.8.2 Age, gender and location of participants

Above I have provided a short overview of the Catholic population of Britain, I now turn to the composition of my own sample of Catholics. To ensure the anonymity of participants in this study, throughout the analysis I refer to participants' ages in their decade brackets (Table 3.2).

Table 3.2 Age and gender of participants.

Gender	Age bracket							Total
	20-29	30-39	40-49	50-59	60-69	70-79	80-89	
Female	4	0	4	4	2	1	1	16
Male	2	0	0	7	2	2	2	15
Grand Total	6	0	4	11	4	3	3	31

As can be seen in Table 3.2, there was a near even split between female (n=16) and male (n=15) participants, and the most common age bracket was 50-59 (n=11). While representative sampling is not a focus of this type of qualitative study, I aimed to include participants from all age groups and an even distribution of genders. Comparing the age of my sample to Bullivant's (2016: 9) report on the age profiles of Catholics in England and Wales, shows that while I do have a skew to an older age group (21 out of 30 participants being over 50), the lack of younger representation somewhat mirrors the broader Catholic population, of whom only 24% of are under 35 (Bullivant, 2016: 9). Lastly, as can be seen in Table 3.2, I was not able to recruit any participants from the 30-39 age range. This omission is perhaps somewhat related to the broader demographics of Catholicism in England, however it does represent a limitation of the sample.

My sampling strategy did not focus on one location, instead I aimed to interview Catholic individuals from around the country. However, snowball sampling proved more

effective in some locations than in others. Table 3.3 displays the locations of participants in the study, with the most common area for participants to live being Birmingham (n=16). This is unsurprising, given it was the location of my university, and the location of many of the religious networks to which I had access. Nonetheless, I also recruited participants from the South West, the North West, and South East of England. A complete breakdown of participant demographics can be found in Appendix VI.

Table 3.3 Number of participants by location.

Row Labels	Participants
Birmingham	16
Cheltenham	7
Hereford	2
London	2
Bristol	2
Sheffield	1
Crewe	1
Grand Total	31

While my sample represents a range of demographics, we must be aware that the relatively older age of participants may affect the data generated. For example, participants who went through secondary education before 1988 may not have been taught evolution at school, as evolution only became compulsory with the introduction of the National Curriculum in 1988 (Mead et al., 2017: 3). Thus, a younger sample of Catholics may well have had more to say on the matter, given they certainly received formal education on the topic. That being said, all but three of my sample had been through, or were currently going through, higher education. With the majority of participants having or currently completing a university degree, my sample represents those of higher educational attainment, and this

may also impact on the data generated. Though, as stated previously, this does not diminish the results in this type of exploratory, qualitative research, rather one must be aware of the effects of the sample on the data generated, and thus the claims which can be made from it.

3.4.8.3 Religiosity of participants

Above I have shown the Catholic population of Britain is not a monolith, with varying beliefs, Church attendance and social views. My own sample is no different. While I do not have space here to detail all the varying ways one can be Catholic (this would be for another project entirely), in this section I give an overview of the diversity of religiosity in my sample.

All of my participants expressed a belief in God, however, mirroring the broader British Catholic population above, there were differing certainties of belief conceptions of God among my participants. For example, Rebecca (60s, retired education management) expressed a very personal view of a God who answers individuals' prayers and intervenes in the world. However, Malcolm (80s, retired scientist) held a view of a more distant God, as he was unable to believe in an intervening God due to the problem of evil and natural disasters. Similarly, there were diverse views on the nature of the soul, with some (Wilfred, 50s, university lecturer) arguing it is impossible to know what a soul is, and others (e.g. Gregory, 70s, retired engineer) arguing all living things have souls, yet humans have a particularly special version.

There was a diversity in self-reported religious services attendance, from those saying they do attend, though not as much as they would like, to those who attended Church multiple days a week. Again, showing the diversity of opinions, there were

individuals who thought that the introduction of English language Mass post-Vatican II represented a positive direction for the Church, whilst others viewed this linguistic shift away from Latin as the exemplar of contemporary Catholicism's betrayal of tradition. Somewhat mirroring attitudes to the language of Mass, there were differing views on Francis's papacy. Some, more liberal individuals viewed Francis as a much needed modern figurehead of the Church, whose progressive views more aligned with their own. However, others thought the reign of Francis was bringing about a great time of upheaval and potential existential threat to Catholicism. As one participant (John, 70s, retired engineer) ominously remarked to me on finishing the interview: "There's a schism coming...."

This short overview is clearly not exhaustive, and is solely intended to demonstrate that the data in this study did not come from a religiously or theologically homogeneous sample of Catholics. Like the broader Catholic population of Britain, my sample of English Catholics show a diversity of religiosity. Furthermore, my sample included a broad range of age and gender demographics, however as discussed above, the sample tended to be more highly educated than the general population, which it must be acknowledged may have some impact on the data collected.

3.5 Positionality and reflexivity

As has been discussed above, reflexivity plays an important role in qualitative research, aiding the researcher in positioning themselves towards their work. Indeed, the

practice of reflexivity is a major strategy for quality control in qualitative research (Berger, 2013). Reflexivity allows the researcher to acknowledge how their history, experiences, identities, and attitudes, influence the research process and the co-construction of accounts in the interview interaction (Stenner, 1993; Finlay, 2002). It is appropriate, then, to include a reflexive practice section about my position within and towards my work, and how this may have affected this thesis's constitution.

A common mode of thinking about this position is the seemingly rigid duality between insider and outsider researcher. However, this binary masks the multiple positions a researcher can occupy regarding the subject matter, and the participants through which they aim to access it. As Dwyer and Buckle (2009) have argued, it is more productive to think of the "space between", rather than a false dualism of insider or outsider researcher. To illuminate this point, it is necessary to give a short autobiography.

3.5.1 The researcher and the research

To understand my position within and towards the work, I will explore my own identities which may bear on its constitution. First, to discuss my (non)religious identity. My mother is an Italian Catholic, and my father identifies as an atheist, although he was raised in a culturally Anglican home. As most people raised in a demi-Italian household know, Italian is the culturally dominant allele of the gene. Therefore, I attended Catholic Church with the family (tailing off into my teens), attended Roman Catholic primary and secondary schools, was baptised, and willingly completed my First Holy Communion and Confirmation. Sometime, around 17, after decreasing service attendance, I stopped identifying as religious and thus became a Catholic disaffiliate. Here I joined the ranks of just over a third of all

English and Welsh cradle Catholics who now identify as having no religion (Bullivant, 2016: 11). Though, not all non-religious identities are the same, and at this time I started reading New Atheist literature—the works of Dawkins, Harris, Hitchens, and Dennett—and strongly identified with science. Nowadays, my atheist identity is far less fervent than it once was, indeed the research process itself has to some extent moderated this. I currently identify as an agnostic atheist, choosing either word or a combination depending on who's present. To clarify what I mean by 'agnostic atheist', I am an agnostic epistemologically, regarding the question of the possibility of knowledge of God. I believe that it cannot be known if there is or is not a God, therefore I am agnostic to it. I am an atheist ontologically, as I choose to reject theistic ontological assumptions—i.e. I do not believe a God exists. I do not know there is no God, I do not assert there is no God, as I don't think it is possible to know, however, I reject a theistic ontological conception of the universe. I find my position to align with the philosopher John Gray's general definition: "an atheist is anyone with no use for the idea of a divine mind that has fashioned the world" (Gray, 2018: 2).

My non-religious identity is not the only salient identity in this research. As Elsdon-Baker and Mason-Wilkes (2019: 15-16) argue, in this area we are involved not only in the study of religion, but of science as well. It is therefore important to expand on my current and past positionings towards science. I don't have much memory of science classes from primary school, but certainly by the time I was in secondary school I was considered a "science-y" type. It was the subject I enjoyed the most and enjoyed the most success at. At this point I knew I wanted a future working in science, the question was only which area to choose? I went on to do science and technology based A-Levels and finally settled on

studying biological sciences, specialising in genetics, for my undergraduate. Fearing life on the lab bench (and pipette-itive strain injury) I decided to study a science communication master's degree. At this point I began practicing science communication, editing the science and technology section of the student newspaper, and for a while I was a science presenter, at primary school assemblies, local festivals and afterschool clubs. This is all to say, I have a strong identification with science. However, as time has passed, and I have studied more PUS and STS literature, I do not hold an uncritically positive attitude towards science. This critical aspect of my views has particularly developed during the PhD process itself, especially through working as part of the SRES¹¹ team at Newman University and the University of Birmingham. Nonetheless, it must be said, that I still retain the self-image of a (somewhat) science-y person.

In relation to evolution, I believe some form of evolution has happened, probably some unknown mixture of Darwinian natural selection and Lamarckian acquisition. I have no solid preference on the 'levels of selection' question.¹² My evolutionism and my atheism are also entwined. Evolution gives me a narrative for how, in the absence of a God, endless forms most beautiful and wonderful emerged from so simple beginnings—I think there truly is grandeur in this view of life. I do not, however, believe that because evolution *is*, God *is*

¹¹ The Science and Religion: Exploring the Spectrum project (SRES) ran from Feb 2015 – December 2017 and was funded by Templeton Religion Trust (grant number: TRT0082; Principal Investigator: Professor Fern Elsdon-Baker). The project investigated perceptions of religious belief and evolution in the UK and Canada. I worked as a part-time Research Associate on the project between 2016 – 2018.

¹² The 'levels of selection' question relates to debates about at which level of the biological hierarchy natural selection acts. It could act at the level of the gene, the individual, the group, the community, the species etc. While the debate can be traced back to Darwin himself, the modern debate began in the 1960s (Okasha, 2010). For a quick introduction to the levels of selection question, see Okasha, 2010. For a book length study of the scientific and philosophical dimensions to the levels of selection question, see Okasha, 2006.

not. Such an argument is reductive, one does not negate the other. Hence I can see why and how theistic individuals can subscribe to an evolutionary model of life's development.

The question becomes, then, how to reflect as an insider or outsider? Traditionally this would be done along the boundary lines of the community one is investigating—here, Catholics. As I now identify as an agnostic atheist, I would be an outsider. Though as a former Catholic, perhaps I have a residual foot in the conclave. Though surely we cannot draw so rigidly the salient identities in this study, and across the 31 interviews I conducted. My liking of science, and evolution specifically, was shared by some participants. Therefore, I, as a self-avowed evolutionist, also had insider status with other fellow evolutionists I interviewed. For those who opposed evolution, my outsider identity is doubled, as I am neither a Catholic, nor sceptical of evolutionary change. What of my demographics, being a young(er) male, this is also an identity that may play a role in insider/outsider discussions.

It may also be that the perception of me as a researcher, associated with the scientific pursuit, in some way affected the accounts in the interviews. When tentatively describing what they thought evolution was, some participants flipped the question, instead asking me what it was. I tried to minimise this perception of me as “expert” in these matters and reassured participants that they were the only true expert of their own lives. I further used self-disclosure, reciprocity and open-mindedness to mitigate perceived power differentials. For all participants, I did not initially disclose my non-religious identity and biography, but if participants asked if I was Catholic then I gave the same response: “I was brought up Catholic, I went to Catholic schools, but I don't identify as Catholic now.” I chose not to use the label of “atheist” as I believed it had the potential to negatively impact our

relationships, as it is a contested, messy, and politically charged term. If I were to use it, I would have had to engage in lengthy qualifications, introducing concepts to distinguish what I meant by the term, and this would have distracted from the task at hand: discussing the participant's views.

3.5.2 Untangling epistemological and ontological concerns

While above I have reflected on my position in and towards the work, it is now worth exploring epistemological and ontological questions related to this thesis. The potential audiences for this kind of work are numerous—STS and PUS scholars, historians and philosophers of science, sociologists of religion, theologians, natural scientists, priests, and science communication scholars and practitioners. Depending where you are situated as a reader, the following reflection may seem either convoluted, unnecessary, obvious, or useful. As this is an area where vocal scientists are critical of this type of research, labelling it “accommodationist” for asking people what they believe (Coyne, 2018), it is even more necessary to engage in some philosophical reflections. Evolutionary biologist and popular atheist, Jerry Coyne wrote: “accommodationists like those supporting the SRES project start with the premise that science and religion are compatible, and then concoct ways to justify that conclusion” (Coyne, 2018). This could not be further from the truth. I do not think science and religion are necessarily compatible, nor do I think they are necessarily incompatible. I think it depends on where, when, what, to whom and when we are asking the question. The relationships between science and religion are multiple, depend on social and historical contexts, and frames of reference. Here, Coyne is arguing from an epistemological frame, but we could equally investigate the relationship social-

institutionally. This way he himself becomes an actor engaged in stern (and contested) boundary work, proclaiming what true science and true religion are, and therefore constructing the one and true relationship between them. The obvious result of his boundary work, is not solving the issue, but selling more books.

There is, however, a real danger of work in this area taking a fully relativistic position in regard to the products of scientific knowledge. As Elsdon-Baker and Mason-Wilkes (2019: 15-16) reflect, sociologists of religion normally don't have to subscribe to the worldview of their participants, but as someone empirically studying science and perceptions of science it is uncomfortable to so drastically level the epistemological playing field. In the disciplinary forerunner to STS, sociology of scientific knowledge, scholars adopted the approaches of symmetry and methodological relativism (Pinch, 2008: 35-48). This meant not appealing to absolute standards of 'truth' or rationality for explanation of the recognition and differentiation of science and non-science. Instead, perceptions of science and non-science were assessed for their social explanations, and not in correspondence to, or weighted by, their perceived truth claims. Nonetheless, various schools of thought within STS saw things differently, with some arguing that just because STS has shown the social elements of scientific knowledge, it did not mean the knowledge was 'wrong' (Collins and Yearley, 1992). These debates continue today, where STS scholars reflect on how their perspectives have influenced the apparent "post-truth" age (Sismondo, 2017).

I would argue that in social studies of science and religion we must distinguish epistemology and ontology on multiple levels. We are dealing with the natural world of evolution, and the social world of religious attitudes towards it. In regard to natural scientific

conception of evolution itself, I hold it to be epistemologically sound, which informs my ontology, concluding evolution exists (though I believe that knowledge of evolution, and all science, is to some extent socially constructed). However, my work is not dealing with the natural scientific 'truth' of evolution, it is dealing with a complex web of social relationships around religion and science, Catholic attitudes towards evolution being a small subset of this broader web. In this thesis, I take a relativistic position on this attitudinal relationship between Catholicism and evolution, rejecting one true relationship between Catholicism and evolution therefore believing there to be multiple realities on the issue. This must then be further separated from how I constitute these relationships in the analysis and write-up of my study. Again, I suggest there are multiple realities here, and researcher decisions are paramount to which gets salience. I could, if I wished, present the reality of Catholicism-evolution relations along a (classical) axis of "Accept-Reject". But this by no means represents the sole truth of the matter, I could represent differing knowledge levels of evolution among Catholics, or indeed along a totally new conceptualisation of this relationship. There is no one way to conceive of the relationship between Catholicism and evolution. Therefore, there are multiple realities of Catholicism-science relations, the worth of each must be evaluated alongside the aims of the research.

Furthermore, the relationship between Catholicism and evolution, is largely separate from epistemological and ontological questions relating to natural scientific evolution. These are two separate questions. One, the validity of evolution, is a natural scientific question, which must be assessed and evaluated with the corresponding methodological, epistemological and ontological frameworks. The second, this thesis, is a social research

question best assessed and evaluated with the corresponding methodology, epistemology and ontological frameworks.

Additionally, as PUS scholars have argued over the years, an epistemic deficit is a poor way of understanding attitudes, therefore the epistemology of evolutionary science, likely has little bearing on Catholic attitudes. These Catholics are not reading expert literature and drawing conclusions. They are drawing from a web of popular communications and representations, influenced by values, identities, and apathy.

As I have argued above, I situate this thesis in the qualitative research paradigm, which rejects the methods of natural science for investigating social worlds. In this paradigm, I make use of social constructionism. Social construction is a term which can be applied at many different levels; it has multiple meanings and therefore the possibility of multiple misinterpretations. Thus, it is important to fully define the way I am using a notion of social construction in this thesis.

In *The Social Construction of What?* the philosopher of science Ian Hacking (1999) outlines three levels of theses relating to the depth of a social constructionists' argument:

- (1) X need not have existed, or need not be at all as it is. X, or X as it is at present, is not determined by the nature of things; it is not inevitable.
Very often [researchers] go further, and urge that:
- (2) X is quite bad as it is.
- (3) We would be much better off if X were done away with, or at least radically transformed.
(Hacking, 1999: 6-7)

In the present thesis, as well as conceiving the interview itself as an "active" site of co-construction of knowledge (Holstein and Gubrium, 2004), the relationship between

science and religion is seen as socially constructed in the sense of Hacking's thesis (1). That is, perceptions of the relationship are not inevitable, they were "brought into existence or shaped by social events, forces, history, all of which could have been different" (Hacking, 1999: 7). In this way, Catholics are not seen as having an essential attitude towards evolution; rather various attitudes are formed based on contingent events, experiences, and social forces. Hacking goes on to say that often studies slide easily from a thesis type (1) to (3), but they need not do so. The present research does not make this transition. It is fully situated in Hacking's type (1) thesis of social construction (Hacking, 1999: 6-7).

In another study of public perceptions of the relationship between science and religion, Baker (2012) also aligns with this position, noting the socially constructed nature of the perceptions of the relationship. According to Baker (2012: 341) these perceptions are "pragmatic, heuristic, and vary depending on how individuals engage both institutions, rather than being indicative of an inherent relationship between the two". It is this notion of the differing constructions of science and religion, which this thesis aims to investigate. What forms of evolution are religious individuals accepting or rejecting? What is the relationship between these constructions and their wider beliefs? As Glennan asks: "Whose science and whose religion?" (Glennan, 2009: 797).

In my research I also follow Baker's theoretical approach, bracketing the philosophical concerns of conflict and compatibility from the study, and investigating perceived relationships as an empirical issue (Baker, 2012: 341). Furthermore, I align with Evans and Evans' suggestion that where conflict is found, we should not assume it is solely based on epistemology, instead: "sociologists who examine the relationship between

science and religion [should] not assume the epistemological conflict model, but rather leave the source of contestation as an empirical question” (Evans and Evans, 2008: 101).

3.6 Conclusion

This thesis aims to empirically investigate the relationship between Catholicism and evolution in England. In this chapter I have outlined the aims, research questions, and research rationale of the study. I have also outlined the methods of the two analyses in this thesis. The first is an ECA of English newspaper representations of papal statements on evolution from 1996 to 2017. This analysis of public discourse will explore how English newspapers have represented John Paul II, Benedict XVI, and Francis’ statements on evolution. The second is a thematic analysis of 31 semi-structured interviews with Catholics in England. This analysis of public attitudes will explore how individual Catholic’s perceptions and attitudes towards evolution, and the relationship between evolution and their faith. Finally, I have reflected on my own position within and toward the research, and have attempted to untangle some epistemological and ontological concerns in this area of SSSR.

In the next chapter I detail the results of my ECA of English newspaper representations of recent papal statements on evolution. Throughout the analysis I contextualise the newspaper coverage with reviews of the papal comments themselves, and other important events which may have influenced the reporting.

Chapter 4: English newspaper representations of papal statements on evolution (1996-2017)

4.1 Introduction

On 27th October 2014, Pope Francis addressed the Pontifical Academy of Sciences (PAS) on the topic of evolution, declaring: “The evolution of nature does not contrast with the notion of creation, as evolution presupposes the creation of beings that evolve” (Francis, 2014). His speech triggered worldwide media reaction with many commentators hailing the Pope’s modern outlook. The next day *The Independent* ran with the headline: “Pope Francis declares evolution and Big Bang theory are right and God isn't 'a magician with a magic wand'; Francis goes against Benedict XVI's apparent support for 'intelligent design'” (Withnall, 2014). Writers at America’s *NBC News* reflected that the remarks “appeared to be a theological break from his predecessor Benedict XVI, a strong exponent of creationism.” (Jamieson et al., 2014). The amount of media coverage in response to Francis’ speech suggests that some outlets perceived the pre-Francis Church to be anti-science, anti-evolution, or even pro-Intelligent Design (ID).

A purported vacillation between popes’ positions has also appeared in academic literature on science and religion, with sociologist John H. Evans observing that:

There has been some ambiguity about evolution, with the Church seeming at times towards agreeing with intelligent design theory, then moving back to agreement with neo-Darwinism that has been more typical of twentieth-century Catholicism. Reflecting this somewhat ambiguous history, in February of 2009 a Vatican analyst wrote that the Vatican had just “dealt the final blow

to speculation that Pope Benedict XVI might be prepared to endorse the theory of Intelligent Design.” (Evans, 2018: 89)

Here, as will be discussed in this chapter, Evans references two English newspaper articles to make his point, demonstrating how media representations of science and religion can and do influence academic discourse on the matter.

Highlighting the contested nature of press reporting, some journalists did admonish the more sensational media coverage around Francis’s comments, and maintained that the Church had accepted evolution for some time. Two days after Francis’s comments, *Time’s* religion and politics correspondent, Elizabeth Dias, argued that “a statement like this is nothing new” for the Church and criticised the general media reaction, complaining how “site after site after site ramped up the Pope’s words and took them out of context” (Dias, 2014). As there were multiple media interpretations of Francis’s comments, with some of these very likely to be acting as an influence on academic writing on this matter, it is important to carefully investigate the varying media representations of papal comments on evolution.

To achieve this aim, in this chapter, I explore how large circulation English newspapers have represented papal statements about evolution from 1996 to 2017. To better understand how press coverage developed, throughout I contextualize the media analysis with events, articles, and speeches concerning the Catholic Church and evolution

that have directly impacted on reporting of papal comments on evolution in English newspapers across the period.¹

In this analysis, I do not seek to hypothesise on causal audience effects resulting from papal statements about evolution, instead I focus on the content and themes in the articles themselves. In this way, I seek to explore the role of the press in constructing certain versions of reality in an episode of public contact between religion and science. I will discuss three instances where popes' statements on evolution received English newspaper attention. The first instance is John Paul II's, 1996, address to the PAS, where he affirmed evolution as "more than a hypothesis". I show that Galileo is used as a historical example in many of these articles, giving an overly simplified impression of historical conflict. I also show that John Paul's views are repeatedly used as a rhetorical device by some authors when arguing against Creationism. In the second instance, 11 years later, the media reporting on Benedict XVI came in response to his statements in a 2007 book, *Creation and Evolution*. I detail how the media built a narrative before Benedict's comments, which set an expectation for him to shift the Vatican's position on evolution. I demonstrate that there are two representations of Benedict XVI's comments, one which sees him as endorsing ID and one rejecting it. However, beyond his papacy, as other outlets stop referencing his views, the non-endorsement narrative ceases, and *The Independent* continues to stress Benedict's "apparent support" for ID—despite Benedict never explicitly backing the position. In the third instance, on 27th October, 2014, Francis also addressed the PAS and stressed the

¹ It should be noted that this is not an exhaustive list of all Vatican, or broader Catholic, events concerning evolution since 1996. For example, I have not mentioned several conferences that have been held by the PAS, where members have discussed topics related to evolution.

compatibility between creation and evolution. I argue that in one newspaper, *The Independent*, because Benedict is claimed as an apparent supporter of ID, Francis's comments are represented as more progressive in *The Independent* than in other publications.

4.2 Overview of dataset

The final number of articles in the dataset was n=83. Table 4.1 displays the online, print, and total articles from each publication in the study.

Table 4.1 Number of articles by publications.: Online, print, and total.

Publication	Online	Print	Total
The Independent	9	17	26
The Times	2	21	23
The Guardian	4	10	14
The Daily Telegraph	4	4	8
Daily Mail	4	3	7
The Observer		5	5
Grand Total	23	60	83

These were split between print (n=60) and online (n=23). The distribution of print and online articles can be seen in Figure 4.1.

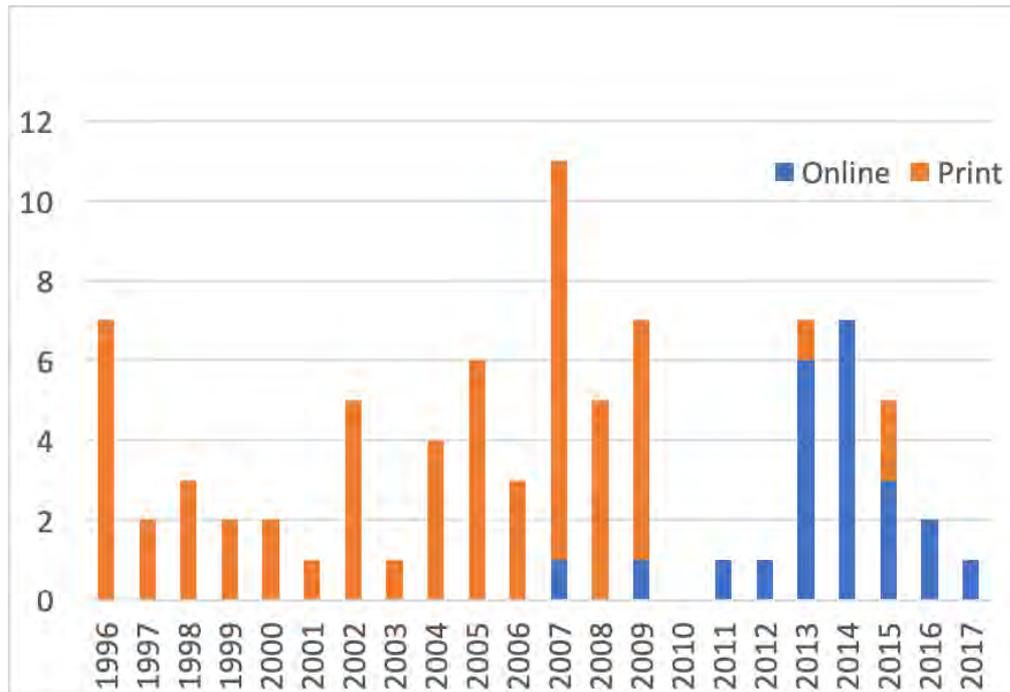


Figure 4.1 Number of articles in selected English newspapers which mention papal comments on evolution.

It is clear from the above graph that over the period considered, coverage shifts from print to online reflecting larger media trends towards online content. Although, as discussed in Chapter 3, the LexisNexis database only has full coverage of online articles from *The Times* from May 2011, *The Daily Telegraph* from March 2006, and *Daily Mail* from March 2012. Nonetheless, a clear decline in print articles over the period is evident, as discussed below, this brings with it format changes which are important for my analysis.

Further, I split the dataset between those initial news articles focussed on immediate reporting of popes' statements about evolution, and subsequent articles which reference one or more of these statements. Figure 4.2 displays the split between initial news (n=12) and the subsequent articles (n=71); with the initial news reporting coinciding with the instances of papal comment on evolution which received media attention by John Paul II in 1996, Benedict XVI in 2007, and Francis in 2014.

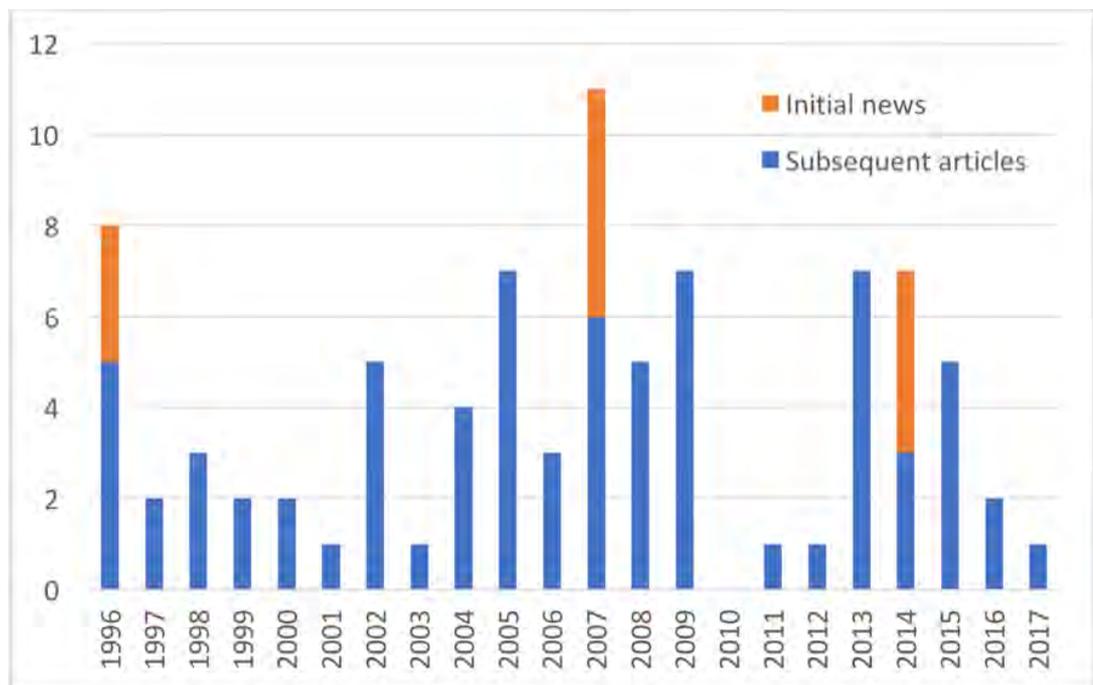


Figure 4.2 Initial news coverage and subsequent articles referring to papal comments on evolution.

Table 4.2 displays a further breakdown of the initial news coverage of each papal statement on evolution, including the publication, date, article type, and headline. The 'newsbites' article type refers to snippet articles that often use one simple quote, sometimes among other newsworthy quotes, from the same week's news.

Table 4.2 Articles comprising initial news reporting on papal statements.

Pope/date	Publication	Article type	Headline
<i>John Paul II</i>			
25/10/1996	<i>The Independent</i>	News	Vatican's slow evolution as it discovers Darwin
25/10/1996	<i>The Times</i>	News	Pope places some faith in Darwin's theory of evolution
31/10/1996	<i>The Guardian</i>	Newsbites	Pope okays Darwin
<i>Benedict XVI</i>			
12/04/2007	<i>Daily Mail</i>	News	Where I differ with Darwin, by the Pope
12/04/2007	<i>The Daily Telegraph</i>	News	Pope stirs up evolution debate
13/04/2007	<i>The Times</i>	News	Pope puts his faith in the Book of Genesis, not Darwin
14/04/2007	<i>The Guardian</i>	Newsbites	This week: What they said
14/04/2007	<i>The Times</i>	Newsbites	Theorist of the week
<i>Francis</i>			
27/10/2014	<i>Daily Mail</i> (Online)	News	The Big Bang and evolution ARE real but they were carried out by God, says the Pope as he embraces modern science
28/10/2014	<i>The Guardian</i> (Online)	News	Evolution and creation both right, says pope; Pope Francis cautions against portraying God as magician, and says it is possible to believe in evolution and creation
28/10/2014	<i>The Daily Telegraph</i> (Online)	News	Pope Francis says Big Bang theory and evolution 'compatible with divine Creator'; Theory universe born in cosmic explosion 13.7 billion years ago 'doesn't contradict' divine Creator but 'demands it', says pontiff
28/10/2014	<i>The Independent</i> (Online)	News	Pope Francis declares evolution and Big Bang theory are right and God isn't 'a magician with a magic wand'; Francis goes against Benedict XVI's apparent support for 'intelligent design' - but does hail his predecessor's 'great contribution to theology'

Table 4.2 shows that the news reporting on Francis' 2014 pronouncements took place exclusively online. This further justifies my decision to include online content in the study, as without online content the study would overlook reporting on Francis' comments.

Interesting and arresting headlines have always been a fundamental part of news reporting, however, the shift to online content has introduced new challenges for journalists and editors. Reading down Table 4.2's headline column it is clear that the online headlines are longer (in part because they are also indexed with brief article summaries). With the

competition for top places in search listings a major challenge in online journalism, search engine optimisation (SEO) has become an integral part of companies' marketing strategies. Classic newspaper headlines might have been creative, funny or cryptic, but online headlines must be straightforward, state simple key terms, and use the proper names of protagonists (BBC, 2018). For example, we can see in Table 4.2 that in coverage of John Paul and Benedict's statements the word 'Darwin' was used in headlines as shorthand for 'evolution'. Whereas 'Darwin' is absent in the more pragmatic online headlines covering Francis' comments, which focus on the most important searchable keywords. We might attribute these differences to Francis' comments covering the Big Bang as well as evolution, but we can see that even in *The Guardian*, whose headline focusses solely on evolution, the euphemisms 'Darwin' or 'Genesis' are not used in place of 'evolution' and 'creation'. *The Independent's* headline also has an allusion to Benedict being a supporter of intelligent design, a point discussed in more detail later in this chapter.

Optimising SEO can also mean using 'internal links' to related content on the same publication's website. This serves two functions, to retain and direct a website user to other content on the same website, and to increase the ranking of a website in search engines (Whalley, 2017). As will be explored, some websites use internal links more than others, with *The Independent* using internal references about Francis and evolution more than the any other publication in my study.

The dataset can be further split into articles types, including news, book reviews, comments & features, and collection (Table 4.3). The 'collection' article being an online

format, that outlines ‘best quotes’ with links to original articles where the quotes were first published.

Table 4.3 Article types in the dataset.

Publication	Book Review	Collection	Features & Comment	News	Newsbites	Total
The Independent	1	1	10	14		26
The Times	2		13	7	1	23
The Guardian	1		6	4	3	14
The Daily Telegraph			4	4		8
Daily Mail				7		7
The Observer	2		2	1		5
Total	6	1	35	37	4	83

The Independent (n=26) published the most content across all publications studied, although as stated previously, some earlier online content may be missing for other publications. The most common article type was news (n=37) followed by features & comment (n=35). Interestingly, while the *Daily Mail* published seven news articles which contained a reference to a pope’s views on evolution, it produced no comment or feature articles, reflecting the publication’s focus on entertainment.

After introducing this simple quantitative description of the dataset, I now proceed onto the qualitative analysis of the narratives and themes in the corpus. Here I focus on the reporting of initial news representations of popes’ statements, and themes in subsequent reporting. I also contextualise the reporting with summaries of the popes’ original statements, and other events and articles outside the corpus which influenced the coverage. A more detailed account of these events can be found in Chapter 2.

4.3 John Paul II (1996-2005)

On 22nd October, 1996, Pope John Paul II publicly addressed the topic of evolution, describing it as “more than a hypothesis.” He recalled the words of Pius XII’s 1950 encyclical, *Humani generis*, which had stated the Church did not forbid discussion of the evolution of the human body, but deemed it a “hypothesis” with “some sort of scientific foundation.” John Paul II’s speech, however, published in French on 22nd October, 1996, recognised evolution as “more than a hypothesis,” noting that scientific evidence in many fields had converged on the theory (John Paul II, 1996).

John Paul stressed that there are various philosophical foundations on which evolution is based: “Hence the existence of materialist, reductionist, spiritualist interpretations” (John Paul II, 1996). This recognition of the diversity of philosophical formations of evolution is an important conceptual point. John Paul, Benedict, and Francis, in their own way all state a belief in some form of evolution, while setting out certain provisos. These are related to a special conception of humanity, but also relate to the separation of evolution as a scientific theory from evolution as part of an all-encompassing atheistic/materialistic worldview. Popes, when speaking on evolution, have argued in these broader philosophical and theological terms. However, as I discuss below, some press reporting has tended to focus on the popes’ comments on evolution’s natural scientific validity—mirroring a simplistic notion of evolution as something one can ‘accept’ or ‘reject’. I will further explore the problems with this kind of dualistic thinking in subsequent chapters.

For John Paul, the special status of humans is linked to these broader philosophical and theological conceptions of evolution. John Paul argued that for humans there is an “ontological leap”, a discontinuity due to humanity’s intellect and eternal soul. He warned that theories of evolution which regard the soul as emerging from living matter “are incompatible with the truth about man” (John Paul II, 1996). Furthermore, John Paul argued that science and its observations and experiments cannot assess the experience of metaphysical knowledge, self-consciousness, moral conscience, liberty, or aesthetic and religious experience.

4.3.1 News coverage of John Paul II’s comments

Three articles in my dataset of English newspapers report on John Paul II’s 1996 address (Table 4.4). All three articles represent the topic of evolution as not just a matter of scientific validity (i.e. is it true or not), but also present some of the philosophical and theological points made in John Paul’s address.

In the first article, in *The Independent*, under the headline: “Vatican’s slow evolution as it discovers Darwin”, religious affairs correspondent, Andrew Brown, highlighted the long time it’s taken for the Vatican to present a statement on evolution. He noted that it had taken 138 years after Darwin published *On the Origin of Species*, and 6000 years after Archbishop Ussher’s calculated date for the creation of the world, for the Catholic Church to acknowledge evolution as true. Brown stressed how John Paul “continues to resist the doctrine” that the human spirit arose from unaided natural processes. Furthermore, Brown situated John Paul’s comments in the historical context of Pius’s *Humani generis*, highlighting Pius’ comments on a literal Adam and original sin:

The Pope's acknowledgement of the truth of the evolutionary, scientific view of the world's history ends a long rearguard action fought by the Roman Catholic Church to maintain some literal sense for the book of Genesis. In 1950, Pope Pius XII allowed Catholics to believe in the truth of evolution, although he insisted that it was not proven, and that full weight should be given to the arguments against it. (Brown, 1996)

Unlike some later comment and feature articles, Brown's news article did not attempt to situate the episode in a larger narrative of science-religion warfare. Although it became apparent during the analysis that a conflict narrative was prevalent in much of the press reporting of papal comments on evolution.

Table 4.4 Initial news reporting on John Paul II.

Date	Publication	Author	Article type	Headline
25/10/1996	The Independent	Andrew Brown	News	Vatican's slow evolution as it discovers Darwin
25/10/1996	The Times	Richard Owen	News	Pope places some faith in Darwin's theory of evolution
31/10/1996	The Guardian	Tim Radford	Newsbites	Pope okays Darwin

On the same day as *The Independent* article, *The Times's* Rome correspondent Richard Owen wrote that the Pope had "risked the wrath of the religious Right" by claiming evolution and Christianity were compatible. He recounted that Darwin's theories had led to "bitter controversy" in the 19th century, with "leading churchmen denouncing them as incompatible with the account given in Genesis." The phrase "leading churchmen" is not further defined, the implication being that the Catholic Church had denounced evolution. However, as discussed in Chapter 2 evolution was never denounced nor condemned by the Catholic Church, although sceptical attitudes did exist in the late 19th and early 20th century.

In the article, Owen also referenced *Humani generis* and noted how John Paul's comments "went further" than Pius', and referenced John Paul's comments on the soul being immediately created by God. Owen also raised a point of epistemic conflict, along similar lines as Dawkins' aforementioned contention, suggesting that: "The Pope appeared to side step the vexed theological question of whether, if the theory of evolution from apes and Australopithecus afarensis through Neanderthal man to Homo sapiens is correct, creatures before modern man had souls." In the article, Owen proceeded to quote a philosopher who claimed that "after Galileo's rehabilitation, acceptance of evolutionary theory was the latest in a series of steps which were 'mending the tears' in the Church's relationship with science." (Owen, 1996). This is the first reference to Galileo in the dataset; as discussed below, Galileo is repeatedly used as a historical example of the Catholic Church's relationship with science, and often used as an exemplar of conflictual science-religion relations more broadly.

In the final news article covering John Paul's 1996 comments *The Guardian's* science editor, Tim Radford, included a snippet on the Pope's comments among other stories about science from the week, including nanotubes, the world's oldest astronaut, and cattle's greenhouse gas emissions. The relevant snippet reads:

Pope okays Darwin

John Paul II cleared Galileo of episcopal charges in 1992. Last week he told the Pontifical Academy of Sciences that evolution was now 'more than a hypothesis'. But Creation itself was the work of God. Human beings also transcended the materialistic order. So, theories of evolution which considered the spirit as emerging from the forces of living material were, he said 'incompatible with the truth of man. What is more, they are incapable of establishing the dignity of man.' (Radford, 1996)

Here again we see the linking of Galileo to John Paul's comments on evolution, suggesting similarities between the two episodes. Although, assessing the initial news coverage of John Paul's comments, we may conclude that the newspaper reporting focusses not only on the scientific questions at hand, but also on the philosophical and theological questions raised in John Paul's address.

In Chapter 2 I highlighted that the "more than a hypothesis" phrase became the centre of a small controversy, with some American news outlets contending that a translation error meant that what the pope was in fact claiming was there was "more than one hypothesis in the theory of evolution" not that he thought evolution to be true. With the translation dispute, eventually being settled on 19th November 1996, when the editor of the English version of *L'Osservatore Romano*, Father Robert Dempsey, said the "more than a hypothesis" translation was the more accurate version of the Pope's words (Scott, 1997). Of the three news articles from my corpus which cover John Paul II's address, none used the phrasing of the (incorrect) "more than one hypothesis" translation. Indeed, two of the three were published before 30th October, the date of the incorrect English translation. Furthermore, all reported on the "more than a hypothesis" phrasing which was verified as the accurate translation. Neither does the "more than one hypothesis" phrase feature in any of the subsequent reporting in my corpus which reference John Paul's remarks. That there were no mentions of this translation error in English national newspapers after the incorrect English translation was published, while North American newspapers hosted arguments on the matter, highlights the different cultural orientations towards evolution, and indeed science and religion, in the US and England.

4.3.2 Conflict and Galileo

A broader narrative of conflict beyond the Catholic Church, at the more general level of religion and science, is evident in the first three comment and feature articles in the dataset, which followed initial news reporting. Here, various writers identify an overarching religion-science conflict. Science writer and broadcaster, Colin Tudge, wrote an article in *The Independent* titled: “If the Pope can find Darwin why can't Dawkins find God?” Tudge forwarded a similar argument to Stephen J. Gould’s NOMA hypothesis—science being concerned with facts and religion with teaching values. Tudge concluded the piece by stressing the importance of resolving the ongoing conflict he sees between science and religion:

Nothing could be more important than the reconciliation of science and religion. Putting the matter crudely, science gives people power, and religion, in its broadest sense, decides what they do with it. We need more than the Pope's piecemeal acknowledgement of evolutionary theory; and a great deal more than the Goebbels-esque response of some scientists, who reach for their revolvers when they hear the word "religion". (Tudge, 1996)

For Tudge, reconciliation between science and religion is important, and the way to do this is not to destroy religion but to “devise one appropriate to our age.” A reference to John Paul’s words on evolution was included, but only to show that the Pope did not go far enough for Tudge’s grand vision. Yet Tudge also chastised scientists, such as Dawkins, who he sees as having a role in the ongoing science-religion conflict.

In the second article, novelist and columnist Lucy Ellmann, in a comment piece in *The Independent*, also reflected negatively on the Pope’s words, suggesting that accepting evolution detracts from the aesthetics of a religious worldview:

[T]he Pope, who has decided to bow to science on the tricky issue of evolution. His concession: "If the human body has its origins in pre-existing living matter, the soul was created directly from God." Pre-existing living matter? Makes Eden sound like a slaughterhouse. All the poetry's gone out of religion. (Ellmann, 1997)

Writing in *The Sunday Times*, ethics writer and former editor of the *Catholic Herald* (1988 - 1992), Peter Stanford, saw John Paul's views as a "peace settlement" between religion and science. However, he went on to say that:

The Vatican then is caught offering a compromise that is too little, too late. Yet in moving as far as he has, John Paul is getting himself into dangerous doctrinal territory. As recently as 1950 Pope Pius XII instructed Catholics that the Garden of Eden account of creation "pertained to history in a true sense". Belief in Adam in the literal sense was vital, Pius said, because it preserved the doctrine of original sin - that taint carried by all humanity because of Adam's rejection of God in his exercise of free will. If John Paul does away with the story of the serpent and the golden apple, he risks uncharacteristically damaging a central tenet of the faith. (Stanford, 1996)

Here again we see a representation of the Pope's views as insufficient, or "too little too late". However, interestingly, Stanford also raised the issue of the acceptance of evolution being damaging to the Catholic faith. In the next chapter analysing interviews, I will explore how Catholic individuals understand evolution to interact with their religious faith, and whether they too share the concerns of Stanford.

The main historical context used in press coverage of John Paul II's statements was that of the Galileo affair. Across the entire dataset, Galileo is mentioned twelve times, seven of these being in *The Independent*. Some authors, such as Owen (1996) and Radford (1996), used Galileo to illustrate historical conflict specifically between the Catholic Church and science, situating John Paul as a reformer in these turbulent relations. Others, however, extrapolated and used Galileo to represent a narrative of historical conflict between science and religion in general, within which this new episode of apparent harmony is placed. For

example, the following excerpt from Peter Stanford's aforementioned article in *The Sunday Times*:

A strange rapprochement is under way between the forces of religion and science. The prophets of religion and science have scarcely been on speaking terms since the 17th century when the Inquisition forced Galileo to recant his unholy views about the Earth moving round the sun [...] As part of this rapprochement, first Galileo - in 1992 - and last week Charles Darwin have officially been absolved of their sins by Pope John Paul II. Darwin's theory of evolution, for almost 140 years the ultimate heresy in Catholic eyes, has been wrongly dismissed, writes the Pope. (Stanford, 1996)

The same allusions appear four years later in *The Independent*, where Catholic Priest, Chris Moss (2006), writing about the Church, homosexuality, and evolution observed that John Paul had "striven harder than any of his predecessors to reconcile science and religion." Moss continued that under John Paul the: "Vatican has issued an apology for its disastrous condemnation of Galileo, and declared the theory of evolution compatible with Catholic doctrine, a position which one of his predecessors, Pius XII, had denied."

By linking John Paul's pro-evolution comments to Galileo's pardoning, these articles draw parallels between the two episodes. While some similarities exist, there are however clear differences. As discussed in Chapter 2, the Galileo affair cannot be seen solely through the lens of a conflict between science and religion, with some scholars noting how the affair had more to do with the contests of power over who had the authority to properly interpret the Bible, rather than scientific claims (McGrath, 1999: 12). Furthermore, Stanford's (1996) claim that evolution was "for almost 140 years the ultimate heresy in Catholic eyes" is historically misguided, as demonstrated in Chapter 2, Darwin's conception of evolution was never publicly condemned by the Church, though sceptical attitudes certainly existed within the Vatican. The phrasing of the unitary "Catholic eyes" also suggests a united view of

Catholicism amongst Catholics. As we shall explore in the next chapter discussing interviews with Catholics in England, considering there to be a single essential view that Catholics hold is a misguided assumption. While we cannot give too much weight to one small phrase, it is a clear example of how simplification in press discourse relating to science and religion can lead to the overall appearance of necessary conflict. Although difficult to quantify, this sort of press discourse undoubtedly informs and reinforces public attitudes on science and religion. With such inaccurate claims repeatedly appearing in popular discourse on science and religion, should we be surprised that such claims are reproduced in studies of public attitudes on the matter? While there was a general scepticism within the Vatican regarding evolution after 1859, this is a different thing entirely than regarding the whole Church, or indeed all religion, as anti-science. By setting John Paul II's comments within the context of the Galileo controversy, writers in English newspapers draw on a larger narrative of conflict, which represents the Catholic Church as anti-science. Here we see the lack of the type of complexity which has been called for by historians of science and religion over the past few decades.

By placing the pope's pro-evolution statements in a historical conflict narrative, using Galileo as an exemplar, this type of reporting misses the nuanced past relationships of the Church with science—its major funding of medieval astronomy, for example, or that Belgian Catholic priest Georges Lemaître laid the conceptual work of the Big Bang theory. There is no mention of the Catholic friar Gregor Mendel who is often represented as the founding figure of the science of genetics. Instead, the only historical context given is that of the Galileo affair. I highlight this not as Christian *apologia*, but only to show that with use of different

contextual examples, the framing of the Pope and the Church's relationship with evolution and science in general could have been different. However, a simple conflict narrative linking Galileo, the Pope and conflict between the Church and science is the dominant framing used. In many ways the very format of newspaper reporting, the inevitability of framing, and a focus on entertainment, forces simplification and a reduction in complexity of discussions of science and religion (Entman, 1993). Nevertheless, it is easy to see how simplistic science-religion conflict myths dispelled by historians (e.g. Numbers, 2009), can continue to be reproduced in popular discourse.

The use of Galileo as an example of a simplified historical conflict extended well beyond John Paul's papacy. For example, *The Guardian's* religious affairs correspondent, Riazat Butt, wrote in 2011:

In the past, Roman Catholicism has hardly covered itself in glory when it comes to science. It took the Vatican more than 350 years to admit it was wrong about Galileo, cementing its contrition by erecting a statue of him in 2009. Its pronouncements over the years on life issues have often put it at odds with the scientific community, not to mention its historical vacillation over the theory of evolution. (Butt, 2011)

It seems that a science-religion conflict is an easy dichotomous discourse for journalists to draw upon when situating their stories. Although, we must remember the constraints of format, expertise, and of the time a journalist can dedicate to each story. It is perhaps unsurprising, then, that journalists place John Paul II's comments in the context of conflict, calling upon the looming shadow of Galileo to situate their stories. However, we must remain cognizant of the fact that these simplistic conflict myths are a constant feature of public discourse on science and religion, and further investigate how this may affect public attitudes on the matter.

4.3.3 “Even the Pope” and creationism

Following initial reporting which represented John Paul as a reformer of Catholicism and science relations, with some articles situating this in a broader conflict narrative between religion and science, it is interesting to see how subsequent references to John Paul’s pro-evolutionary views were used to contextualize other issues. One surprisingly common phrase adopted was “even the Pope [accepts evolution]”, which appeared in 8 English newspaper articles between 1997 and 2004 (Table 4.5). This was usually to further arguments both in favour of evolution, and against a perceived rise of creationism.

Table 4.5 Articles containing “even the Pope” phrase.

Publication	Date	Author	Type	Headline
The Independent	08/04/1997	Paul Vallely	Features & Comment	Creative tension;
The Observer	08/06/1997	Steve Jones	Features & Comment	Genes V Genesis
The Independent	10/03/1998	Judith Judd	News	Evangelical school to get state funds
The Observer	20/09/1998	Ian McEwan	Book Review	Books: Move over, Darwin...
The Independent	24/08/1999	Steve Connor	Features & Comment	He was the original action man. He packed a gun and explored the world. And he opened a can of worms when he suggested man was descended from the apes.
Sunday Times	17/02/2002	John Cornwell	Book Review	Dispatches from the never-ending battle for evolution's soul
Sunday Times	22/02/2004	Francis Wheen	Features & Comment	Creationism returns: would you Adam and Eve it?
The Observer	11/07/2004	Tim Adams	Features & Comment	Pupils are taught that Muslims are wrong, homosexuality is a sin and that God created the world in seven days.

The “even the Pope” phrase first appeared in two articles commenting on an Australian court case in 1997. The case, in which Prof. Ian Plimer, a geologist from the University of Melbourne, attempted to sue Dr. Allen Roberts, for “misleading backers” of an expedition to Turkey to uncover Noah’s Ark, was thrown out, with the court ruling: “Some issues - no matter how great the passions they arouse - are more appropriately dealt with outside the courtroom.” (David Fasold & Anor v Allen Roberts & Anor, 1997). One article was published at the beginning of the case, written by religious writer and subsequent biographer of Pope Francis, Paul Vallely, in *The Independent*. Vallely is himself a Catholic, who has written for both the Christian and secular press. The second article appeared at the case’s conclusion in early June in *The Observer*, written by geneticist Prof. Steve Jones. Both authors tie the case to a purported rising tide of creationism. The phrase “even the Pope” appears in both articles to suggest that the real fight is now over, and that those still clinging to any hope for literal creationism to win over evolution are living in an intellectual past. As Vallely argued:

The Evolution versus Creationist battle is one which was fought and won decisively decades ago. There may have been controversy in 1863 when T H Huxley published his popularisation of Darwin, with its now-famous frontispiece of a skeletonised human loping ahead of a procession of ape ancestors. But today most educated people take for granted that evolution is the most plausible explanation of life and accept our descent from the apes with equanimity. Even the Pope last year accepted that Darwinian evolutionary theory is "more than a hypothesis". (Vallely, 1997)

Interestingly, Vallely is the only author in the entire dataset to mention Georges Lemaître. He does so to stress that religion and science can be compatible:

To Christians who see the divine revealed in nature, reason and tradition there is no inevitable conflict between evolutionary theory and the belief that God created the universe - indeed it was a Belgian priest, Georges-Henri Lemaître, who, basing his ideas on Einstein's theory of gravity, first proposed the theory of the Big Bang as the origin of the universe. (Vallely, 1997)

Geneticist, Steve Jones, writing in *The Observer* later used the “even the Pope” phrase in a similar way to Vallely:

In Europe the creation controversy is dead. Last year even the Pope gave up, grudgingly he asserted only that 'new knowledge leads us to recognise in the theory of evolution more than a hypothesis'. I have taught evolution to thousands of students: but not until a week ago did I get an exam script insisting that life began in 4004 BC (a six-millennial anniversary oddly ignored by the newspapers). (Jones, 1997)

Here we see how the image of a pro-evolutionary pope was used as a rhetorical device for those wishing to stress that the creationism debate is long settled. In a sense, there is a drawing of boundaries by these writers, a demarcation between an acceptable and progressive modern form of religion, and an unacceptable fundamentalist version. The image of a pro-evolution pope is used as a device as if to say: if even the Pope, the head of this large conservative religious institution can now accept evolution, how absurd must these ‘others’ who deny it be?

We can see this process at play again in three articles, which discuss a widely reported incident of creationism being taught in the UK education system in 2004. In *The Sunday Times* political writer and broadcaster, Francis Wheen, stated:

Creationism returns: would you Adam and Eve it?

It's doubly easy for us to sneer at America's pre-modern zealots. In Britain, as elsewhere in Europe, creationism has little appeal. Both the Anglican and Roman Catholic hierarchies have long since accepted Darwin's theory: even Pope John Paul II has said that it is 'more than just a hypothesis'.

Yet in March 2002 *The Guardian* revealed that Christian fundamentalists had taken control of a state-funded secondary school in northeast England and were striving to 'show the superiority' of creationist beliefs in their classes. (Wheen, 2004)

This demarcation mirrors John Paul's pronouncement itself. Though we cannot ultimately know why the popes spoke out about evolution when they did, the timings of

their statements give us a sense that they may be doing their own boundary work. By explicitly acknowledging evolutionary science's veracity, thus bringing the Catholic Church in-line with perceived modernity, the popes' pronouncements demarcate Catholicism from more fundamentalist versions of religion which were becoming increasingly vocal throughout these periods (Blancke et al., 2014).

So, while it is impossible to say, at least from this study, if John Paul's positive statements about evolution had a positive effect on public attitudes toward evolution, we can see that an image of a pro-evolution pope became part of the rhetorical repertoire for writers who were critical of more fundamentalist, creationist movements in the period. "Even the Pope [has accepted evolution]" became a phrase which could be used to argue how uncontroversial evolution was, or indeed how uncontroversial it *should* be. The last occurrence of the "even the Pope" phrase coincided with the end of John Paul's papacy. After John Paul II was no longer Pope, it would seem, that the phrase ceased to carry much currency; however, events occurred from 2005 onwards which led the press to speculate on whether the new pope would also be pro-evolution, or if in fact he might endorse the growing ID movement.

4.4 Benedict XVI (2005-2013)

4.4.1 Preparing for a shift?

Following the death of John Paul II on 2nd April 2005 and the inauguration of Benedict XVI on 24th April 2005, events occurred which set the scene for newspaper coverage of

Benedict's comments on evolution. This in-turn influenced press reporting on Francis' subsequent comments.

On 7th July, 2005, a close friend of Pope Benedict, Cardinal Christoph Schönborn, wrote an op-ed in *The New York Times* titled "Finding Design in Nature." In it he claimed John Paul II's 1996 comments were "vague and unimportant", going on to argue that any system of thought which "denies or seeks to explain away the overwhelming evidence for design in biology is ideology, not science" (Schönborn, 2005).

In response to Schönborn's op-ed, Father George Coyne, then head of the Vatican Observatory, published an article in *The Tablet* (the UK published Catholic international weekly review), describing John Paul's 1996 comment as "epoch-making". In his response, Coyne also detailed how a neo-Darwinian conception of evolution was in fact compatible with Catholic theology (Coyne, 2005). Coyne stressed that in his opinion science was completely neutral with respect to the theological and philosophical implications which may be drawn from its conclusion.

The episode between Schönborn and Coyne is referred to in two articles in my dataset. However, given the restrictive nature of my search terms (which focussed on popes' statements) and the partial nature of online coverage in LexisNexis, the episode and further speculation on an impending shift in position likely appeared in more English newspaper articles at the time.

In one of the articles in the dataset, entitled: “Now row over evolution splits top Catholics”, environmental writer and journalist, Michael McCarthy, stated: “The conflict at the highest level of the Catholic Church about the truth of Darwin's theory of evolution breaks out publicly today.” Recounting the spat between Coyne and Schönborn, McCarthy opined that: “The key question behind the debate is the opinion of the new Pope. Some fear that the cardinal would never have published such a controversial article, in such a prominent medium, without his personal approval. But nothing will be known for certain until the Pope speaks for himself” (McCarthy, 2005).

An example of an article which was omitted from my dataset, due to the incomplete LexisNexis archive of online newspaper material, is a piece by Simon Caldwell in the *Daily Mail* (online) from the 23rd August 2006. In the article, titled “Pope sacks astronomer over evolution debate,” Caldwell claimed Benedict favours ID. Caldwell goes on to argue Benedict had removed Coyne from his directorship of the Vatican Observatory because Coyne “repeatedly contradicted the Holy See's endorsement of ‘intelligent design’ theory, which essentially backs the ‘Adam and Eve’ theory of creation.” This assertion that Coyne's retirement from the Vatican Observatory was linked to his views on evolution became so widely circulated that Coyne had to make a public statement, saying it was “simply not true” (CNS, 2006). Despite Coyne's reassurances that he was not sacked, and that his retirement had nothing to do with his comments on ID, later newspaper coverage still perpetuated this idea, as I will return to.

In the other article in my dataset to mention this dispute, Rome correspondent John Hooper suggested that the Pope was preparing to “shift the Vatican’s view of evolution”, as Benedict was set to host a conference on evolution and creation.² Hooper claimed that there had been “growing signs” that the Pope was considering aligning his church more closely with ID (Hooper, 2006). Hooper used Benedict’s close relationship with the author of the *The New York Times* piece, Cardinal Schönborn as evidence that the new pope was going to back moves to teach ID. Hooper further evidenced the perception of a coming shift of the Vatican’s view by quoting an interview with a prominent anti-evolutionary Catholic scientist, Dominique Tassot, who had told the (US) *National Catholic Reporter* that the upcoming conference would: "give a broader extension to the debate. Even if (the Pope) knows where he wants to go, and I believe he does, it will take time. Most Catholic intellectuals today are convinced that evolution is obviously true because most scientists say so" (Tassot as quoted in Hooper, 2006).

Days after Hooper’s article in *The Guardian*, Allen (2006) responded to Hooper’s usage of the Tassot interview, labelling Hooper’s claim that Benedict was preparing a fundamental shift in the Vatican’s view of evolution as “over-hyped”. In Allen’s view, it was unlikely that Tassot knew the mind of the Pope, and furthermore Tassot himself had said that it was “too early” to expect a statement from Benedict. Nonetheless, following Schönborn’s op-ed, press speculation on the possibility of a shift in the Vatican’s position had set the stage for Benedict’s comments. The question had become: will Benedict back ID?

² Evans (2019: 89) later used a decontextualized reference to this article by Hooper to claim: “There has been some ambiguity about evolution, with the Church seeming at times towards agreeing with intelligent design theory.”

4.4.2 Creation and Evolution: “We cannot bring 10,000 generations into the laboratory”

As discussed in Chapter 2, Benedict had in fact discussed evolution many times before his papacy, though the first media coverage of his comments only came in response to the 2007 book *Creation and Evolution*. The book consists of transcripts of the conference Benedict held with his former doctoral and postgraduate students after Schönborn’s *New York Times* article caused a large media reaction. Benedict’s former students presented papers in the fields of natural science, philosophy and theology, after which there was a discussion in which Benedict participated.

As will be discussed, in the English press, reporting focussed on one quote from the book where Benedict remarks on the experimental verifiability of evolution. However, first it is worth briefly exploring the broader passage. In the discussion, Benedict begins by stressing: “that it is not a question of deciding either for a creationism that is closed off from science as a matter of principle, or else a theory of evolution that has its own gaps yet overplays its hand and is unwilling to look at the questions that go beyond the methodological possibilities of the natural sciences” (Benedict, 2008: 161- 162).³ Rather, for Benedict, the real issue was the interplay and conversation between these various ways of knowing. He argued that the theory of evolution implied questions which must be assigned to philosophy, as they are beyond the scope of the natural sciences. Benedict then continued to the passage which most prominently featured in media reporting:

³ Taken here from the official English translation, published in 2008, although it is worth noting that the journalists who originally covered the conference were working from the original German 2007 edition.

In particular, to me it is important, first of all, that to a great extent the theory of evolution cannot be proved experimentally, quite simply because we cannot bring 10,000 generations into the laboratory. That means that there are considerable gaps in its experimental verifiability and falsifiability due to the enormous span of time to which the theory has reference.

A second thing that was important to me was your statement that the probability is not zero, but not one, either. And so the question arises: How high *is* the probability now? This is important especially if we want to interpret correctly the remark of Pope John Paul II: “The theory of evolution is more than a hypothesis.” When the Pope said that, he had his reasons. But at the same time it is true that the theory of evolution is still not a complete, scientifically verified theory. (Benedict, 2008: 161- 162)

Benedict’s remarks do seem to suggest he misunderstands exactly what a scientific theory is, not many scientists would argue that any theory could be “complete” and fully verified, as is the nature of science.⁴ In the context of the discussion, Professor Peter Schuster, President of the Austrian Academy of Sciences, had given a talk on the current state of knowledge of evolution in the natural sciences. In response to Benedict’s comment, Schuster replied that evolution was a science in progress, and it could only be in progress if there were unanswered questions. Schuster commented that the Pope correctly noted that we cannot carry out experiments that last eons, however suggested that the interpretation of genetic material opened another approach (Benedict, 2008: 164-165). Benedict also claimed that science’s findings can lead to great perennial questions, which go beyond the methodological principals of science itself, but that they cannot be left to religious feeling either—they must be dealt with by reason. These are the questions of where man and the world came from, and where they are going (Benedict, 2008: 163).

⁴ This might also be an allusion to the early work of philosopher of science, Karl Raimund Popper, who claimed: “I have come to the conclusion that Darwinism is not a testable scientific theory, but a *metaphysical research programme*—a possible framework for testable scientific theories.” (Popper, 1976: 168). However, Popper later reversed his view on Darwinian natural selection, stating: “I have changed my mind about the testability and logical status of the theory of natural selection; and I am glad to have an opportunity to make a recantation.” (Popper, 1978: 345). For an overview of Popper’s statements on evolution in the context of creationist discourse, see Sonleitner (1986).

Finally, it is worth recounting the quote from Benedict chosen for the back cover of the book, which perhaps pertains to the central issue in these debates:

Ultimately it comes down to the alternative: What came first? Creative Reason, the Creator Spirit who makes all things and gives them growth, or Unreason, which, lacking any meaning, strangely enough brings forth a mathematically ordered cosmos, as well as man and his reason. The latter, however, would then be nothing more than a chance result of evolution and thus, in the end, equally meaningless. As Christians, we say: I believe in God the Father, the Creator of heaven and earth. I believe in the Creator Spirit. We believe that at the beginning of everything is the eternal Word, with Reason and not Unreason. (Benedict, 2008)

This quote mirrors Benedict's broader theology, which has a strong focus on creation, and the Creative Reason, or Logos, which stands before all things (e.g. Ratzinger, 1990; 2003). Here the argument isn't if evolution is true or not true, but whether the universe is made by God.

As this is the book on which the following reporting is based, it is worth considering how the information in this book may be framed. There are numerous discussions in the book, scientific, philosophical, and theological. Therefore, there are numerous ways in which the book could be presented in the press. For example, frames could invariably focus on, Benedict's views on the experimental evidence for evolution, his views on varying philosophical conceptions of evolution, and his beliefs on these varying philosophical conceptions of evolution's compatibility with Catholicism. We have then, three (hypothetical) framing possibilities: experimental scientific validity, philosophical conceptions, and theological compatibility. Though others undoubtedly exist, I use these three frames to argue the conceptual point— that the debate in the book is not solely about the scientific validity of evolution, nor is it solely about ID vs evolution. Nonetheless, despite this availability of framing options, we see that the press run with one dominant frame to

make sense of the book: ID vs evolution. I postulate that this framing was used as there was a previous press narrative suggesting Benedict might shift the Vatican's view of evolution towards ID after Schönborn's op-ed, and it is this frame that dominates both initial and subsequent reporting on Benedict's views. In many ways this framing is similar to the binary thinking discussed in Chapter 1 when investigating public attitudes. It is the result of a focus on discerning fixed positions, rather than reflexive assessment of possible orientations.

4.4.3 News coverage of Benedict XVI's comments

All three initial news articles covering Benedict's *Creation and Evolution* statements featured sensational headlines, however, the main text of the articles was more nuanced. Each of the articles (Table 4.6) conclude that the Pope had backed evolution in one form or another, however, they differed in their evaluations of the Pope's comments in relation to ID. The *Daily Mail* piece, "Where I differ with Darwin, by the Pope", represented the book as an: "essay which will disappoint Christian fundamentalists" and stated the Pope "refused to endorse creationism or 'intelligent design'." Referring to the ongoing expectation for the Church to shift positions, the author explained: "Speculation about Benedict's views on evolution have been rife ever since one of his former students, Cardinal Christoph Schönborn, published an article in 2005 that seemed to align the Church with the 'intelligent design' view." However, the evaluation in the *Daily Mail's* news report was that the Pope had not endorsed ID in his book. The article recounted that the Pope had praised scientific progress, but had noted evolution wasn't finally provable because it could not be replicated in the laboratory. The Pope's views on the broader meaning of the evolution debate were reported on, with the article stating the: "evolution debate was actually about 'the great

fundamental questions of philosophy where man and the world came from and where they are going” (*Daily Mail*, 2007).

Table 4.6 Initial news reporting on Benedict XVI with ID evaluation.

Date	Publication	Author	Type	Headline	ID Evaluation
12/04/2007	Daily Mail	n/a	News	Where I differ with Darwin, by the Pope	“he refused to endorse creationism or ‘intelligent design’”
12/04/2007	The Daily Telegraph	Malcolm Moore	News	Pope stirs up evolution debate	“comments run counter to suggestions that the Pope had ... backed the theory of intelligent design”
13/04/2007	The Times	Richard Owen	News	Pope puts his faith in the Book of Genesis, not Darwin	“Remarks endorse ‘intelligent design’” and “The Pope did not explicitly back intelligent design or creationism.”
14/04/2007	The Guardian	n/a	Newsbites	This week: What they said	n/a
14/04/2007	The Times	n/a	Newsbites	Theorist of the week	n/a

The next day, Rome foreign correspondent, Malcolm Moore (2006) wrote in *The Daily Telegraph*, that the Pope’s comments had run: “counter to suggestions that the Pope had rejected John Paul II’s recognition that Darwinism was ‘more than a hypothesis’ and he had not backed the theory of intelligent design which insists that living organisms are so complex and varied that they must have been created by a higher ‘designer’” (Moore, 2006). Again, the Pope’s comments were not represented as an endorsement of ID. And once again, Moore also included the quote about the experimental verifiability of evolution, but claimed the Pope had defended creationism and said evolution was part of that process. Here we can see a broader use of the term creationism in the press. One not bound by an American, evangelical definition of young earth or instantaneous creation. This usage

mirrors the definition of the word creationism as used in much of Benedict's theology (e.g. Ratzinger, 1990).

The Times, however, covered the story differently. Under the title, "Pope puts his faith in the Book of Genesis, not Darwin", Rome Correspondent Richard Owen wrote:

*Evolution 'not a provable theory'

* Remarks endorse 'intelligent design'

His predecessor appeared, on balance, to favour the scientists. But the present Pope may have tipped the scales the other way in the argument over which is the truer account of the Creation: On the Origin of Species or the Book of Genesis. Pope Benedict XVI has stepped into the debate over Darwinism with remarks that will be seen as an endorsement of "intelligent design". The Pope did not explicitly back intelligent design or creationism. He praised scientific progress but said that the Darwinian theory of evolution was "not finally provable" because: "We cannot haul 10,000 generations into the laboratory." (Owen, 2007)

Here we can see that even though Owen's simple bullet point lead indicated the Pope endorsed intelligent design, and the article claimed Benedict's comments "will be seen" as an endorsement of ID, there is a caveat stating the Pope did not "explicitly back" ID, with the question left open for the interpretation of the reader. For context, Owen recalled that: "Last summer Father George Coyne, the Vatican's chief astronomer, was removed after he lambasted intelligent design, saying that it was not science." Here Owen connects Coyne's departure from the Vatican Observatory, to his support of evolution. This was widely claimed in the media, however, as previously stated, in a letter to the *Catholic News Service* Coyne himself said that his leaving the observatory was not linked to evolution in any way (CNS, 2006).

While much of Owen's article in *The Times* discussed ID, he concluded the article, in contradiction to the headline, by stating that Benedict did accept evolution, and the *Creation and Evolution* book had "advanced the view that God created life through evolution, with

the creation in Genesis explained as an allegory.” Although editors and sub-editors rather than article authors often write headlines, the juxtaposition of discussions of ID and the Pope’s views may have led the reader to interpret the Pope’s comments as an endorsement of ID. Indeed, the summary lead text for the article explicitly stated “Remarks endorse 'intelligent design'.” This raises a conceptual point about the terms ID and theistic evolution and the media’s use of them. Is ID an evolutionary process directed by God (essentially theistic evolution), or is ID a position which states evolution insufficiently explains the complexity of life on earth? If we take the words of the well-known ID textbook, *Of Pandas and People*, then ID and theistic evolution are different, as: “Intelligent design means that various forms of life began abruptly through an intelligent agency, with their distinctive features intact – fish with fins and scales, birds with feathers, beaks, and wings, etc.” (Davis and Kenyon, 1989: 99-100). It does appear that by labelling Benedict as a supporter of ID, media outlets may well be inadvertently doing the work of invested organisations, which seek to promote such positions. Kaden et al. (2019) similarly critique this process, though not in relation to public discourse, but in assessments of public opinion where public attitudes are categorised utilising labels of professional discourse. In the present example, however, it is media contributors who may well be bolstering the positions of invested groups, such as the Discovery Institute, by claiming Benedict as a supporter of ID.

As may be expected, the coverage as part of Saturday newspapers’ newsbites articles was simpler. *The Guardian’s* “This week” section included the “10,000 generations” quote from the Pope: “‘The theory of evolution is not completely provable because mutations over hundreds of thousands of years cannot be reproduced in a laboratory.’ Pope Benedict XVI

weighs in on Darwinism". With *The Times* "The Week" section, including: "Theorist of the week: We cannot haul 10,000 generations into the laboratory. Pope Benedict XVI says that the theory of evolution is 'not yet a complete, scientifically verified theory'." By focussing on the "10,000 generations" quotes the reader's frame of reference is restricted to thinking about the issue of evolution purely in relation to its experimental verifiability. Arguably, as stated on the back leaf of *Creation and Evolution*, and in Benedict's previous statements about evolution, Benedict does not have an issue with evolution *per se*, but does have an issue with it becoming a *philosophia universalis*, a first philosophy, which necessarily excludes or replaces religion. By concentrating solely on the experimental scientific validity of evolution, a point addressed in the *Creation and Evolution* book by Professor Schuster, this press coverage omitted these philosophical dimensions of the discussion completely.

This is a clear example of selection and simplification leading to a representation of conflict between religion and science. From all of the many words Benedict had written on the subject, one book was selected to be covered in the press. Indeed, this book, and the conference it was based on, were prompted by prominent discussions of ID in the press at the time—discussions not exclusively focussed on the Catholic Church. As introduced earlier, reports in English newspapers on this episode begin on 12 April 2007, while the English language version of *Creation and Evolution* was not published until 2008. Therefore, it is likely that English newspapers were receiving information about the conference proceedings from newswire services such as *Associated Press* and *Reuters*. If we turn to these newswire services we can see different framings of the information already embedded within their coverage. The *Associated Press* newswire covering this episode was titled: "Pope says

evolution can't be proven" (Eddy, 2007), while the more nuanced *Reuters* newswire was titled "Pope says science too narrow to explain creation" (Heneghan, 2007). The initial English news articles themselves, while having sensational headlines, did have some discussion of the broader philosophical and theological points in the book, beyond the natural scientific validity of evolution, although they differed in their evaluation of how these comments related to ID.

The last step in the process of media simplification is the total reduction of the debate to single quotes in the newsbites articles of the "10,000 generations" comment. Clearly the form of a newsbites piece restricts what can be said, and this is precisely the point. The chain of simplification leads from nuanced scientific, philosophical, and theological discussion (the initial *Creation and Evolution* book, among others), and reduces in complexity, until we end up with a single quote, which focusses on the natural scientific experimental verifiability of evolution.

I will further explore the point I believe Benedict was trying to make with the *Creation and Evolution* book in the following chapters on Catholic individuals' views on evolution in England. Here, echoing Benedict, I also find that the main concern for the majority of the Catholics interviewed is not whether evolution is true, rather their concern instead focusses on maintaining a role for God in creation more broadly.

4.4.4 Meeting with the Clergy of Belluno-Feltre and Treviso: "This antithesis is absurd"

Two months after *Creation and Evolution* was published Benedict made a further statement about evolution, which seems to have been prompted by the initial media

reporting of his remarks in *Creation and Evolution*. On 24th July, 2007, at a meeting with the Clergy of the Dioceses of Belluno-Feltre and Treviso, Benedict was posed a question which sought his advice for educators dealing with young people's questions about happiness, difficulty and meaning in their lives. Benedict replied:

But the big problem is that were God not to exist and were he not also the Creator of my life, life would actually be a mere cog in evolution, nothing more; it would have no meaning in itself. Instead, I must seek to give meaning to this component of being. Currently, I see in Germany, but also in the United States, a somewhat fierce debate raging between so-called "creationism" and evolutionism, presented as though they were mutually exclusive alternatives: those who believe in the Creator would not be able to conceive of evolution, and those who instead support evolution would have to exclude God. This antithesis is absurd because, on the one hand, there are so many scientific proofs in favour of evolution which appears to be a reality we can see and which enriches our knowledge of life and being as such. But on the other, the doctrine of evolution does not answer every query, especially the great philosophical question: where does everything come from? And how did everything start which ultimately led to man? I believe this is of the utmost importance. (Benedict, 2007)

These remarks, stressing the absurdity of an antithesis between creation and evolution, only appear in one article in my dataset. In a short section of an article on the then newly founded Creation Museum in Kentucky in *The Independent* (2007), the author posed a quote from the address to famous Australian-American creationist Ken Ham, who replied: "If you believe in millions of years of evolution and you didn't get it from the Bible, then you really do have to reinterpret Genesis, which means you are upending biblical authority."

It is interesting that Benedict's shorter and more direct statement of compatibility between evolution and religion did not make it into mainstream English reporting. This may be because it was a less high profile comment, to an Archdiocese in Germany, therefore more easily missed. However, that one article references the quote, and no other articles do, suggests it was not completely off the radar of English journalists. This illuminates the

contingent nature of narratives on Catholicism and evolution, and even science and religion, in press discourse. The practice of selection is important here for press representations. The selection of this quote, rather than the 10,000 generations one, by a wider range of newspapers would have led to different impressions of Benedict's positions. In short, press representation of the matter are contingent on what is being reported. Therefore, scholars investigating science and religion should be cautious when accepting media narratives uncritically.

4.4.5 Subsequent references to Benedict XVI's views

In a later online comment piece for *The Daily Telegraph*, Catholic author and journalist, Damian Thompson, also evaluated Benedict's statements as a rejection of ID, stating: "So now we know: Pope Benedict supports evolution. Thank God. If he had backed 'Intelligent Design' I would have become a Scientologist" (Thompson, 2007).

The unease about the Vatican's position on evolution in the media, however, continued. In 2007, science editor and popular science writer, Mark Henderson mentioned Benedict in a feature article in *The Times* about a stem cell treatment for male infertility. Henderson implied causality between the "10,000 generations" quote, and Benedict almost backing intelligent design:

The Vatican is growing uneasy about evolution. Although his predecessor endorsed it as "more than a hypothesis", Pope Benedict XVI thinks it is "not a complete, scientifically proven theory" and has come close to backing creationism in its new guise of intelligent design. His reason: "We cannot haul 10,000 generations into the laboratory." (Henderson, 2007)

In 2009, Richard Owen, who previously wrote the only initial news story which suggested that Benedict's comments "endorsed intelligent design" wrote another article for

The Times. In the piece, entitled “Vatican buries the hatchet with Darwin; Pope will not be endorsing Intelligent Design”, Owen wrote that the “Vatican also dealt the final blow to speculation that Pope Benedict XVI might be prepared to endorse the theory of Intelligent Design” (Owen, 2009: 5). This was after a leading Vatican official, Archbishop Gianfranco Ravasi, head of the Pontifical Council for Culture, had commented on their compatibility and stressed Darwin’s theories had never been condemned by the Church. Ravasi’s remarks were made during an announcement that the Vatican would be hosting a conference to mark the 150th anniversary of the publication of *On the Origin of Species*. However, it was this article by Owen, covering Ravasi’s remarks, that sociologist John Evans used in a recent book on science and religion to evidence the claim that: “the Church seeming at times towards agreeing with intelligent design theory, then moving back to agreement with neo-Darwinism that has been more typical of twentieth-century Catholicism” (Evans, 2018: 89). Not only do I hope the above context has shown this claim to be oversimplified, but that it also highlights that we must be careful about confusing individual actors and “the Church” in general. There are many actors who make up the institution of the Church, conflating Schönborn’s op-ed and the Church’s position, or indeed Ravasi’s comments and the Church’s position, is to conflate individuals with an institution.

Interestingly, on the same page as Owen’s article, religious affairs correspondent, Ruth Gledhill, wrote a piece titled: “The Church has been relaxed about evolution for 50 years”. Claiming: “[m]any observers of the religion versus science battleground are surprised to learn that the Roman Catholic Church has been relatively positive about the theory of evolution for more than half a century.” She went on to claim that the real battle isn’t

between religion and science, but instead between different sets of Christians (Gledhill, 2009: 5). Again, this highlights the various competing voices in the media, which further stresses the importance for scholars of science and religion to not take media representations of science-religion matters as unbiased pieces of information.

I argued in Chapter 2 that in historical studies we should not conflate the voices of individual churchmen with that of the position of the Church as an institution. Similarly, in public discourse we cannot treat publications as homogenous entities, nor conflate individual writers' views with that of the publication. As we see from the examples in *The Times* above, even in a publication with a set editorial position, multiple voices can be heard. This resisting of essentialism also applies to religious publics attitudes on science and religion. As I argue in Chapters 5 and 6, among people who all fall under the umbrella term 'Catholic' there are a variety of opinions about evolution. Therefore, we cannot treat the Church, media publications, nor Catholic individuals homogeneously, if we are seeking to carry out detailed and contextual analyses of historical relations, public discourse, and public attitudes on science and religion.

4.4.6 Schönborn and Coyne revisited

Following his explosive 2005 *New York Times* op-ed, subsequently in 2009, Cardinal Schönborn published a book detailing his exploration of evolution. In *Chance or Purpose*, Schönborn's position on evolution, or at least how he communicated it, had shifted since his *New York Times* piece. His title, *Chance or Purpose*, self-consciously references Jacques Monod's (1971) *Chance and Necessity*, which forwarded a materialistic non-teleological conception of evolution, and argued life is the result of pure chance processes. Schönborn

(2009) now argued that evolution itself is not the issue, but rather the issue is a philosophical conception of evolution which excludes God, and therefore holds evolution of humans to be unguided. On the question of “pure chance” Schönborn argued that God can create through either necessities or contingencies, and therefore even a contingent evolutionary process is compatible with God’s guidance.

In an interview for the television documentary *The Genius of Charles Darwin* (Channel 4, 2008), Richard Dawkins interviewed Father George Coyne, who had originally attacked what he perceived to be Schönborn’s backing of ID in *The New York Times*. In the interview with Dawkins, Coyne commented that if Schönborn had forwarded the argument as laid out in his later book *Chance or Purpose* in his original 2005 piece, then he would have had no issue with it.

4.5 Francis (2013-2017)

Like John Paul II, Francis’s (2014) comments on evolution were made to the Pontifical Academy of Sciences. During a speech inaugurating a bust of Benedict, Francis praised his predecessor’s life and work, commenting how Benedict’s love of the truth extended beyond philosophy and theology into science. Francis, after stating that God and Christ are present in nature, warned that when reading Genesis, there is the risk of seeing God as a magician with a magic wand. However, Francis argued, this was not the case; instead God created beings and let them develop according to internal laws. He went on to stress that evolution and creation are compatible viewpoints:

And thus Creation has been progressing for centuries and centuries, millennia and millennia, until becoming as we know it today, precisely because God is not a demiurge or a magician, but the Creator who gives life to all beings. The beginning of the world was not a work of chaos that owes its origin to another, but derives directly from a supreme Principle who creates out of love. The Big Bang theory, which is proposed today as the origin of the world, does not contradict the intervention of a divine creator but depends on it. Evolution in nature does not conflict with the notion of Creation, because evolution presupposes the creation of beings who evolve. (Francis, 2014)

Francis also emphasised the specialness of man, explaining for man there is a “change and a novelty.” This novelty is the freedom bestowed upon mankind, which is an autonomy beyond that of nature.

4.5.1 News coverage of Francis’s comments

It was the above remarks by Francis which, as mentioned in the introduction of this chapter, American journalist Elizabeth Dias (2014) in *Time* magazine suggested were ramped up and taken out of context by worldwide media. English newspapers, in fact, had mixed reporting on Francis’ comments. The initial news reporting in my dataset (Table 4.7) can be split into two groups of articles: those which claimed Francis’s comments were in line with past Catholic teaching (*The Guardian* and *The Daily Telegraph*) and those which didn’t (*Daily Mail* and *The Independent*). Of those which did not claim continuity, the *Daily Mail* included no historical context to Francis’s comments, while *The Independent* represented Francis’s comments as a change from Benedict’s “apparent support” for intelligent design. I now explore some of the content from each of these articles, before further elaborating on *The Independent’s* claims and their subsequent use.

Table 4.7 Initial news reporting on Francis.

Date	Publication	Author	Type	Headline	Historical context
27/10/2014	<i>Daily Mail</i> (Online)	Hannah Roberts	News	The Big Bang and evolution ARE real but they were carried out by God, says the Pope as he embraces modern science	n/a
28/10/2014	<i>The Guardian</i> (Online)	Lizzy Davies	News	Evolution and creation both right, says pope; Pope Francis cautions against portraying God as magician, and says it is possible to believe in evolution and creation	"Although Francis was packaging the ideas with his trademark eye for a soundbite, the content of what he was saying does not mark a break with Catholic teaching, which has modified considerably since Charles Darwin published <i>The Origin of Species</i> in 1859.
28/10/2014	<i>The Daily Telegraph</i> (Online)	Nick Squires	News	Pope Francis says Big Bang theory and evolution 'compatible with divine Creator'; Theory universe born in cosmic explosion 13.7 billion years ago 'doesn't contradict' divine Creator but 'demands it', says pontiff	"The Pope's remarks were in line with Catholic Church teaching of the last few decades."
28/10/2014	<i>The Independent</i> (Online)	Adam Withnall	News	Pope Francis declares evolution and Big Bang theory are right and God isn't 'a magician with a magic wand'; Francis goes against Benedict XVI's apparent support for 'intelligent design' - but does hail his predecessor's 'great contribution to theology'	"Speaking at the Pontifical Academy of Sciences, the Pope made comments which experts said put an end to the "pseudo theories" of creationism and intelligent design that some argue were encouraged by his predecessor, Benedict XVI."

In her article on Francis, Hannah Roberts, a freelance journalist based in Rome, writing for the *Daily Mail*, did not mention Benedict, John Paul, or Pius' comments on evolution. However, Benedict's attempts to reform the Church's relations with science were alluded to. Roberts also included a reference to Galileo, however this time incorrectly claiming that Galileo had been sentenced to death by the Church.⁵ Roberts claimed that: "Francis praised his predecessor, Benedict, who initiated attempts to shed the Catholic

⁵ See Finocchiaro (2009) for a detailed discussion of the Galileo affair. Including his sentencing to house arrest, not death.

Church's image of being anti-science, a label that stuck when it condemned the astronomer Galileo to death for teaching that the earth revolves around the sun" (Roberts, 2014).

Lizzie Davies, Rome correspondent for *The Guardian*, also stressed that popes before Francis had commented on the compatibility of Catholicism and evolution:

Although Francis was packaging the ideas with his trademark eye for a soundbite, the content of what he was saying does not mark a break with Catholic teaching, which has modified considerably since Charles Darwin published *On the Origin of Species* in 1859. Popes before him have also said that- with certain provisos - there is no incompatibility between evolution and God as divine creator. (Davies, 2014)

In *The Daily Telegraph*, Rome correspondent Nick Squires, also gave historical context. Although, while mentioning Pius XII and John Paul II, he did not mention Benedict XVI's comments:

The Pope's remarks were in line with Catholic Church teaching of the last few decades. As far back as 1950, Pope Pius XII said that there was no intrinsic conflict between Catholic doctrine and the theory of evolution, provided that Catholics believed that the human soul was created by God and not the result of random evolutionary forces. That stance was affirmed in 1996 by Pope John Paul II. (Squires, 2014)

In *The Independent*, however, the context and interpretation was different. Adam Withnall, deputy international editor, wrote: "Speaking at the Pontifical Academy of Sciences, the Pope made comments which experts said put an end to the "pseudo theories" of creationism and intelligent design that some argue were encouraged by his predecessor, Benedict XVI." Withnall offered more historical context, claiming that the Church: "has long had a reputation for being anti-science - most famously when Galileo faced the inquisition and was forced to retract his "heretic" theory that the Earth revolved around the Sun" (Withnall, 2014). Withnall went on to argue that:

But Pope Francis's comments were more in keeping with the progressive work of Pope Pius XII, who opened the door to the idea of evolution and actively welcomed the Big Bang theory. In 1996, John Paul II went further and suggested evolution was "more than a hypothesis" and "effectively proven fact".

Yet more recently, Benedict XVI and his close advisors have apparently endorsed the idea that intelligent design underpins evolution - the idea that natural selection on its own is insufficient to explain the complexity of the world. In 2005, his close associate Cardinal Schoenborn wrote an article saying "evolution in the sense of common ancestry might be true, but evolution in the neo-Darwinian sense - an unguided, unplanned process - is not". (Withnall, 2014)

Here, again in *The Independent*, we see another example of Galileo used for context when forwarding a representation of the Catholic Church as anti-science. Benedict also features as a regressive past figure, against which Francis's new statements are placed. Unlike the previous three authors of the other initial news articles, Withnall was not a specialist Rome correspondent. Here we can see that journalistic expertise is important when covering stories on science and religion, with Withnall, a non-specialist in Catholic affairs, presenting Francis' views as more radical, because of the claim that: "Benedict XVI and his close advisors have apparently endorsed the idea that intelligent design underpins evolution" (Withnall, 2014). The casual reader is unlikely to take note of which author is writing a simple news piece, therefore this questioning of expertise likely does not feature in everyday interactions with the press on the matter. As I return to below, *The Independent* continues to reference Withnall's article well into Francis' papacy, as evidence of Benedict's support of ID.

Nevertheless, Benedict's "apparent" support for ID in the UK press, gets a somewhat harder edge in some American news outlets, with *NBC* reporting: "The Pope's remarks on Monday to the Pontifical Academy of Sciences appeared to be a theological break from his predecessor Benedict XVI, a strong exponent of creationism." (*NBC News*, 2014). The

commentaries in the UK are more constrained, but here Benedict as an “apparent” supporter of ID is further reiterated in *The Independent*.

4.5.2 The Independent’s positioning of Francis vs. Benedict

From 2014 onwards, *The Independent* adopts Francis as a progressive figurehead. They use a reference to his pro-evolution views in a variety of pieces, all linked to the paper’s socially progressive editorial stance; with three of these articles also referring to his predecessor Benedict’s “apparent support” for intelligent design, with an internal link back to Withnall’s aforementioned article. Interestingly, these three articles are the only ones in my dataset which refer to Benedict’s views beyond initial news coverage of Francis in 2014.

The six article titles read (italics denotes those that mention Benedict):

- Elton John brands Pope Francis 'my hero'
- *Pope Francis: 'Caring for the poor does not make you a communist'*
- Pope Francis Thug Life is probably the finest Thug Life video yet
- Pope Francis calls the gender pay gap a 'pure scandal'
- *Pope Francis eats with the homeless as he turns 80*
- *Pope Francis' best quotes: Pontiff celebrates four years as head of Roman Catholic Church; The 80-year-old has declared evolution and the Big Bang are real and said it is 'better to be an atheist than hypocritical Catholic'*

In each of these articles, a scarcely relevant reference to Francis’ comments on evolution is made, in what seems like an attempt to show how progressive he is.

Interestingly no other newspapers do this. This may well be because Francis’ views align more with the editorial stance of *The Independent* than those of the more traditional and often conservative Benedict.

In a January, 2015, article: “*Pope Francis Thug Life is probably the finest Thug Life video yet; Damn, it feels good to be a pontiff*” the author, Hooton, says: “The Pope's comment was set to Dr. Dre's Rat-Tat-Tat-Tat, and is the latest in a long list of chill remarks, including permitting women to breast feed in church and accepting that the Big Bang and evolution are real” (Hooton, 2015a).

Coinciding with Francis' 80th birthday, on 18th December 2016, *The Independent* published an article reflecting on his papacy, again stressing his apparent difference from Benedict, hyperlinking their own earlier article by Withnall:

Pope Francis has been credited with overhauling the Catholic Church's dogmatic image into a more inclusive one, with his more progressive take on divorce and same-sex relationships. He went against his predecessor Benedict XVI's apparent support for "intelligent design" and has said the theories of evolution and the Big Bang are real. God is not "a magician with a magic wand", he said in 2014. (Saul, 2016)

For writers at *The Independent*, the pope's pro-evolution views appear to be inseparably tied to his progressive social values, championing social issues and political positions that the paper cares about and wants to forward. In an April 2015 article covering Francis's critical comments about the gender pay gap, the same author who wrote the “Thug Life” piece above, concluded by stating how: “Last October, Pope Francis stunned the world by acknowledging the existence of the Big Bang theory and evolution” (Hooton, 2015b).

In March, 2017, *The Independent* also published an article celebrating four years of Francis' pontificates, by listing the Pope's “best quotes”. Among other passages, the article refers to his views on evolution, again stressing his progressive nature compared to Benedict:

"Evolution in nature is not inconsistent with the notion of creation, because evolution requires the creation of beings that evolve."

Experts interpreted his comments as an attack on the "pseudo theories" of creationism and intelligent design which some argued his predecessor, Benedict XVI, had espoused.

But Pope Francis' comments followed those of Pope Pius XII who actively welcomed the Big Bang theory and Pope John Paul II who suggested evolution is "more than a hypothesis" and is an "effectively proven fact". (Osborne, 2017)

These articles all appear online, which means we must consider the different format of online publishing. As introduced earlier, some online publishers make use of internal links to redirect users to other aspects of their websites. In the above articles, these references to Francis' views which are embedded in the story are hyperlinked to the original news article on Francis' views on evolution. This is an attempt to drive traffic towards that article. If we were to cynically interpret these references to Francis and evolution, it would seem that the sensational representation of Francis as progressive vs Benedict as an "apparent supporter of intelligent design", may have been repeatedly made to force traffic around the website, and thus increase the ad revenue generated. Or indeed, given the 'click-bait' nature of the titles of these pieces, *The Independent* may well have been seeking to attract a younger and more casual demographic, as they venture into the online media space.

In contrast to *The Independent's* generally positive reporting on Francis, papers with a different editorial stance reported on Francis less favourably. In a piece responding to Francis' comments on the dangers of ignoring climate change, *The Daily Telegraph*, offer the reader an alternative interpretation of events. Here, the author suggested climate change might not be that detrimental, and that Francis' progressive views might get him in trouble. The paper used a historically inaccurate image of science and religion conflict to argue that

the Pope may be embarrassed in the future, by getting the science wrong on climate change, this time by accepting scientific consensus too soon:

Papal advisers may feel that, by associating himself with environmentalism, the Pope is reading the signs of the times. The opposite could be true. He could be painting himself into a corner, as some in the Church did in the past when they denounced the theory of evolution. (Moore, 2015)

As introduced in Chapter 2, we must remember that although sceptical attitudes have existed in the past, the Vatican has never denounced or condemned evolution. This claim doesn't feature prominently and thus isn't being used to sell the newspaper, instead a claimed past conflict between the Church and science is used rhetorically, to warn off the pope, and the reader, from getting the science wrong about climate change; though not through a rash rejection, but rather through a too hasty acceptance of climate science. Here, we see how beyond specific religion and science contestations, references to the religion and science debate can be used to forward particular agendas, arguments, and positions, which sometimes may seem counterintuitive. In this case, arguing against accepting a mainstream scientific idea—that climate change is real and will have dire consequences.

We must remember that reporting is intricately bound to the political and social stances of each newspaper and the journalists who write for them. Beyond solely reporting on what has been said by popes, or past interactions of the church and science, these instances, historically valid or not, can be used in numerous ways to forward various positions and ideas, which certain newspapers, or certain journalists, wish to champion.

4.6 Conclusion

In this chapter I have analysed English newspaper representations of papal statements on evolution from 1996 to 2017. News reports of John Paul's 1996 comments were nuanced, with newspapers not only framing the story in natural scientific terms, but also including philosophical and theological arguments on the matter. In subsequent reporting, a reference to John Paul's positive remarks about evolution became a useful rhetorical device for writers challenging Creationism up to 2004.

Reporting on Benedict's 2007 comments cannot be understood without reference to a press narrative which anticipated that he may shift the Vatican's view of evolution. This narrative was influenced by Cardinal Schönborn's 2005 op-ed in *The New York Times*, rather than anything Benedict himself had said on the topic. The English newspaper reporting of Benedict's 2007 comments in *Creation and Evolution* was mixed, with three publications claiming Benedict had not endorsed ID and *The Times* claiming his comments would be seen as an endorsement. Over time, coverage of Benedict's views simplified, with newsbites articles solely focussing on his "10,000 generations" quote about evolution's experimental verifiability. Furthermore, Benedict's later comments on evolution-creation compatibility, and the apparent reality of evolution, did not feature in newspaper reporting. This highlights the contingent nature of media realities on the subject, and the processes of selection and simplification which are inherent in media practice.

Subsequent reporting from *The Independent*, however, persistently labelled Benedict as an apparent supporter of ID. Because of this evaluation of Benedict, it is unsurprising that

while other papers situated Francis's 2014 comments in a longer historical context of acceptance of evolution in the Church, *The Independent* stressed how his views contradicted Benedict's purported ID position. This led Francis' comments to appear more radical than they in fact were. However, claims of Benedict's support for ID or creationism were not as pronounced in the English press, as they were in the USA (e.g. Berger, 2014; Jamieson et al., 2014).

What of Evan's (2018: 89) claim that the Church, under Benedict, seemingly supported ID? Hopefully I have shown that this is a misguided understanding of the situation. The 'seeming support for ID' was a press narrative built around Benedict, mainly influenced by Schönborn's op-ed rather than anything Benedict himself had said. This raises an important point concerning the media in the social study of science and religion. We must remember that as scholars of science and religion, media discourse is an *object of study*, not an unbiased source of primary information. It is perhaps the main forum where contentious debates on the matter happen. If we uncritically reproduce media claims on questions of science and religion, we may well be forwarding the positions of individuals who have stakes in the very subject we seek to understand. These stakes may not even be directly related to science and religion, but may be the political positions which undergird various publications. This is evident in *The Independent's* subsequent reporting on Francis, where his pro-evolution views were presented alongside other issues, which the paper agreed with. Here, political positions may lead to differing interpretations and representations of the events in question.

It is worth considering for a moment why the press reporting on Benedict was somewhat messier than for John Paul and Francis's comments. If we look at the source of the comments which instigated coverage, both John Paul and Francis made their remarks in addresses to the PAS. The total length of John Paul's address was ~1600 words, and Francis's around ~1000 words. Furthermore, both contained easy to understand 'soundbites' regarding their positions. For John Paul (1996), this was: "new findings lead us toward the recognition of evolution as more than a hypothesis." While for Francis (2014), the soundbite was: "The evolution of nature does not contrast with the notion of creation." Not only are addresses themselves short in words, but the phrasing and these two popes' evaluations of evolution are concisely articulated.

Compare this to Benedict. I argued in Chapter 2, that it is in fact difficult to concisely summarise what Benedict believes on evolution. He has produced many words on the subject, which are discursive, with his position shifting over time. His comments often take the form of philosophical and theological ruminations on the topic, not simple press soundbites. Furthermore, his comments on evolution that did receive press attention did not come from a short address to the PAS, but instead in the form of a book with 210 pages. While the majority *Creation and Evolution* does not contain Benedict's comments—instead the detailed scientific, philosophical, and theological presentations of his students on the topic—without having read the presentations themselves, one cannot understand the context of Benedict's remarks. This is because his comments were made in a discussion of the presentations he had just heard. With the discursive nature of the content, and the

length of the medium, perhaps it is unsurprising that this led to more ambiguous media interpretations of Benedict's position, both in England and abroad.

We must also consider the effect of the languages of the comments themselves, and the language of the publications analysed. John Paul's 1996 address was made in French, and while English publications did not become embroiled in the translation dispute about the 'more than a/one hypothesis' dispute, some USA outlets certainly did (See Chapter 2; Scott, 1997). The *Creation and Evolution* book containing Benedict's comments was first published in German. This indeed may have exacerbated the multiple interpretations in English publications. Finally, Francis's comments to the PAS were made in Italian, although were also officially released in English, French, German, Portuguese and Spanish. Compared with John Paul's French comments on the official Vatican website (Vatican.va) which are only translated into Italian and Spanish. Perhaps this shift in the availability of official language translations released by the Vatican has been a conscious effort to counteract language barrier difficulties, not just on the reporting on the topic of evolution, but on messages from popes more broadly. Nevertheless, language certainly played a factor in conversations about John Paul's comments in the US, but not in the UK. This translation dispute centred on one line of text, the very soundbite itself: "more than a hypothesis." Therefore, the German language of Benedict's remarks may also have led to some difficulties in the English-language press understanding his comments. Especially when coupling the press narrative around Schönborn's op-ed, the length of the *Creation and Evolution* book, the high-level discursive content, and the fact it was published in German, perhaps it is unsurprising and understandable that the press reporting on the matter is

contradictory. This may explain why some outlets decided to focus on the “10,000 generations” quote, the closest thing to a soundbite which can be found.

Across my dataset, there were also multiple examples of the Catholic Church being represented as anti-science, again reinforcing my contention that in the study of science and religion, the Catholic Church is held in a paradoxical position. On the one hand, for scholars investigating public attitudes, Catholics aren't seen to be a problematic group regarding evolution; but on the other, in public discourse, the Church itself is held as anti-science. Further evidencing this, Galileo featured prominently in the dataset, mainly as a simple marker of a historical science-religion conflict discourse. If one wants to argue about necessary or historical conflict between science and religion, it seems all one needs to do is mention Galileo. This also reflects historical studies in the area, discussed in Chapter 2, which have demonstrated the ubiquity of the Galileo Affair, when forwarding notions of conflict between science and religion.

Finally, we must be aware that evolution is not something that is simply accepted or rejected. What does acceptance of evolution look like? There are legitimate scientific divergences in opinion about the mechanisms driving evolution, and the extent of its explanatory power. However, more importantly here for the popes is that a person's view of evolution is embedded within a wider set of philosophical assumptions. Two people may 'accept' evolution, but what is their conception of it? Materialistic or theological, unguided or teleological, both or indeed many more. In the next two chapters I aim to elaborate on how Catholic publics in England conceive of evolution, and how they see it interacting with their religious beliefs, beyond simple categorisations of acceptance or rejection.

Chapter 5: Catholic publics' (non-)opposition to evolution

5.1 Introduction

While since 1996 every successive pope has stressed the compatibility of some form of evolution with Catholicism, to date there have been no dedicated, qualitative studies of Catholic publics' attitudes towards evolution, in England or elsewhere in the world.¹ The present and following chapter, then, present the first qualitative data on the topic. As argued in Chapter 1, previous studies have tended to focus on creationist groups, mainly Evangelical Christians in the US (e.g. Long, 2011), and more recently Muslims in the US and elsewhere (e.g. Guhin, 2016; Moran, 2019). Members of the public with presumed conflict positions are overrepresented in the literature, and without looking outside these perceived problem groups, we risk perpetuating a skewed image of how science and religion can relate in societies.

Beyond *which* religious publics we study, *how* we study them must also be considered. Most survey research on public attitudes towards evolution has either been conducted by: (1) measuring participant's belief in human evolution (using true and false responses); or (2) self-classification into various researcher-defined belief positions (e.g. evolution, theistic evolution, ID, creationism, etc.) (Hill, 2019: 31). Approach (1) reflects some newspaper coverage of papal statements on evolution, which have focussed on

¹ Although, as discussed in Chapter 1, there are quantitative studies such as Unsworth and Voas (2017), which include Catholics as a subsample.

evolution as something which can be either 'accepted' or 'rejected', rather than reflexively considering how evolution may be variously conceptualised. Beyond my own media sample, there are numerous other media reports on the prevalence and problem of the rejection of evolution and the calls for the need to increase public acceptance, accompanied by proposed effective strategies to do so (Wilson, 2005; Gjersoe, 2016). Recent qualitative work has also critiqued approach (2): self-classification into various belief positions denoted by fixed evolution-related labels. Kaden et al (2019) have shown that unless people are directly involved in organisations which deal with science-religion questions, individuals tend not to simply and directly identify with labels such as 'creationism', 'intelligent design', 'theistic evolution' etc.

Furthermore, as I argued in Chapter 1, academic measurement of attitudes towards evolution, and indeed media discourse on the matter, are disproportionately shaped by the US cultural context. This context is radically different to England, therefore importing research framings from the US may not be the best way to understand the present context. Qualitative studies present the opportunity to have participant-led framing of the issue at hand. As outlined in Chapter 3, in this thesis I seek to assess the bottom-up push of people's experiences (Hacking, 1986). Using this inductive qualitative approach can challenge the problematic researcher-led framing of investigations into evolution and religion critiqued by Elsdon-Baker (2015a).

In this endeavour to give voice to how our participants are conceptualising the topic, we are presented with an issue: just how should we categorise people's perceptions? In a recent thesis, Moran (2019: 127) also articulates this categorisation problem in qualitative

studies of attitudes towards evolution. Untethered from the pre-defined categories of the researcher in quantitative studies, the open-ended, discursive, sometimes contradictory nature of interviews makes categorisation difficult. There are potentially as many conceptions of evolution, and attitudes towards it, as there are participants in a study. Furthermore, attitudes can shift and change within a single interview, depending on the discursive work being done. To say anything analytically useful about the data, some categorisation is required, but how do we categorise participants' attitudes without falling foul of the issue framing and restrictive categories utilised in some quantitative work? Contending with this very issue is perhaps the most difficult, but also most important, aspect of qualitative research in the area.

During my interviews, and in the following analysis, it became clear that 'acceptance' and 'rejection' of evolution was not how these Catholic participants were expressing themselves. Instead, the majority talked in terms of not being opposed to evolution, so long as a role for God as creator was maintained. Conversely, a small number listed various reasons for their opposition to evolution. It became evident that dividing participants in terms of opposition and non-opposition, rather than acceptance and rejection, better matched my participants' lived experiences. I therefore divided my participants into two broad groups, those who expressed opposition to evolution (Oppositionals) and those who did not (Non-oppositionals).

After critiquing the forcing of individuals' attitudes into boxes it is important to justify this analytic choice. I am not saying that all Oppositionals occupy the same space, nor that all Non-oppositionals are happy with any conception of evolution. What I am arguing is that it

was clear from the interviews that an axis of non-opposition/opposition better fit these Catholics' lived experience than the more traditional language of acceptance/rejection. Furthermore, these categorisations were developed inductively through the analysis, rather than being defined before it. The concepts of acceptance and non-opposition also perform different functions for the researcher. I cannot claim that all non-oppositionals 'accept' evolution, as some did not really know what evolution was. As I will explain in this chapter, some individuals conceived of evolution as a grand narrative of the Big Bang, and an expanding, unfolding universe, life included. In what sense do these people accept biological evolution? They have a conceptualisation of evolution that they are not opposed to. Likewise, these Non-oppositionals do reject a form of evolution, a materialistic/atheistic conception of it. As will be explored, Oppositionals did not say that they 'rejected' evolution, instead they listed justifications for their opposition to it. They were often in a positional grey area, where they knew what they did not believe, but did not have a fixed set of alternative beliefs.

In this chapter I give examples of these two broad groups of attitudes, non-opposition and opposition, analysing the differences and similarities between them. I first explore the ways that both groups articulated their orientation toward evolution. Then continuing to Oppositionals' articulations of having no alternative view to evolution, which raises methodological insights for how we study religious attitudes towards evolution. I finish the chapter by exploring the conceptions and knowledge of evolution found in both Oppositional and Non-oppositional groups, discussing the evident non-relationship between

knowledge and attitudes. This is in line with critiques of the deficit model in PUS and science communication (Bauer et al., 2007).

5.2 Overview of method and participants

For this analysis of public attitudes, 31 semi-structured interviews (female n=16; male n=15) with self-identifying Catholics in England were conducted between October 2017 and April 2018.² The shortest interview lasted 31:30 and the longest lasted 2:40:13, with the mean interview duration being 1:03:29. All interviewees' names have been pseudonymised to ensure anonymity. See Appendix VI for a table of all participant information, including age, gender, and location.

The interviews were semi-structured. I therefore utilised a schedule of questions, but allowed flexibility in question order, and permitted other topics which were deemed relevant to emerge during the interview. The interviews were audio recorded, then transcribed verbatim, before being uploaded into NVivo qualitative analysis software. I then followed Braun and Clarke's (2014) thematic analysis procedure, thoroughly familiarising myself with the data, coding and recoding relevant themes using constant comparison, before compiling the analysis.

² See Chapter 3 for an expanded version of this methods section.

5.3 Opposition and Non-opposition to evolution

In this study, 26 out of 31 participants were unopposed to evolution, so long as the proper role for God in the universe was maintained.³ There was, however, great diversity in this group, not only in terms of participant's knowledge of evolution, but also in terms of how they, if at all, saw their Catholic faith interacting with their views on evolution. Conversely, 5 of the 31 Catholics were opposed to evolution. That is, they articulated problems they had with evolution. Their expression of this was not in terms of an outright 'rejection' of evolution, rather they listed reasons why they questioned evolution, justifying their opposition to it.

In this section I discuss themes which arose in the interviews with Catholics considering their orientation towards evolution. First, I discuss the language of "no problem" most often used when stressing non-opposition to evolution. Next, I explore the mainly scientific justifications found for opposing evolution. Finally, I argue that while Oppositionals did not subscribe to evolution, they had no alternative view in its place, which has implications for how we measure public attitudes towards evolution

5.3.1 No problem

The majority of Catholic participants (n=26) in this study were unopposed to evolution. The most common way these Catholics expressed their orientation towards evolution was using some variant of the words: "no problem". As the articulation of "no

³ I outline the broad numbers here to give the reader a view of how many participants I am analysing in each group, not because these numbers have any representative significance at the population level. For this kind of data, see Unsworth and Voas (2017).

problem” rather than “I accept it” was the most common way of articulating their orientation to evolution, this is a clear example of how categorising this Catholic population as non-opposition/opposition, rather than accept/reject, more closely resembles how these Catholics conceptualised and expressed their attitudes in the interviews. This was both in terms of asking what participants thought about evolution itself *and* how they saw it interacting with their religious beliefs. In the following excerpt from John (South West, retired chemical engineer, 80-89), we see a clear example of this articulation of “no problem”:

INTERVIEWER: What's your position on evolution as a science?

JOHN: Same as John Paul II, I think, who said, "We have to accept that it's beyond a hypothesis." Evidence is very, very clear. Species, for example, evolving into different species. I have actually read *The Origin of Species*, which most people who get het up about it, haven't. It seems to me very clear and has done since I was about-- I remember it coming up when I was taking the 11 Plus. I have no problem with it.

John was one of a small number of participants who had heard of any of the popes' comments on evolution, suggesting a discontinuity between Catholic elites and publics on the matter. Although, perhaps to caution against a romanticised view of John and other Non-oppositionals being the 'rational', or 'modern' individuals while Oppositionals are 'irrational' and 'pre-modern', it is important to stress that while John had 'no problem' with evolutionary science, he did have a problem with climate science: "I've yet to be convinced by climate change. The measured effects are not as large as the publicity screams out at it. Whether it is associated with man-made carbon dioxide or other things, is yet to be proven, I think. To me, that is still a hypothesis. The people who promote it, some of them, are

extremely intolerant.” As I will discuss later, attitudes to specific sciences should not be conflated with attitudes to science in general, or indeed on other specific topics.

Neil, (Midlands, a maths teacher, 50-59), also stressed his position of not having a “particular problem” with evolution sitting alongside his religious beliefs:

All life evolves, as I understand it, and I’m not particularly a biologist, but as I understand it there is an acceleration at times, due to environmental or other factors, in the evolution of the species. If you work backwards, to the origins of life and the planet, I don’t have any particular problem with the theory of evolution sitting alongside my Christian beliefs. I wouldn’t claim to know enough about it, to be able to justify as far as biological evolution is concerned. I would take it back to creation, and the Big Bang Theory, and when I read the account of the creation of the earth in Genesis, I can’t see anything between the two, that contradict each other, if you read them with a broad mind.

As stressing a lack of opposition to evolution using variants on the words “no problem” was the most common way Catholic interviewees talked about their views on evolution, it is worth considering the possible origins of this phrasing. We could interpret the ‘no problem’ response in multiple ways. It is possible that these Catholics could be so apathetic towards evolution that they do not feel the need to describe their position in positive language. However, I believe it is more likely that the expression of non-opposition towards, or “no problem” with, evolution is driven by cultural expectations—i.e. the conflict narrative, which suggests they *should* have a problem. Indeed, a recent poll conducted in the UK found that while many religious people did not feel it difficult to accept evolution in reference to their personal beliefs, the majority also said that it would be difficult for other religious people to do so (Elsdon-Baker et al., 2017b). The responses stressing “no problem” in the present study, may well be made in response to the expectation that religious people are generally thought to reject evolution.

In the present study, almost all of the Non-oppositionals reported that conversations about evolution don't occur often, if at all, in their day to day lives, with people from within or beyond their faith. Indeed, many could not recall a single conversation where they had talked about, or disagreed about, evolution with another person. Interestingly, while discussing other people's perceptions of their views, it was much more likely for Catholic Non-oppositionals to say they had been confronted by somebody pre-empting their stance on abortion and homosexuality, rather than the topic of evolution. With most participants unable to remember ever being prejudiced against for their views on evolution, and Catholics in this study anticipating a conflict narrative through the stressing of "no problem" around evolution and their faith, the question then arises: is there an implicit expectation of conflict at play here, and if so where did this expectation of conflict come from, if not from the direct lived experience of conflict?

Media narratives influenced by secularisation and conflict theses dominate public discourse on religion and science. For some time, the media have used a conflict narrative as a useful and frequent point of drama (Barbour, 2000). In the present study, when discussing science and religion in the media, a few participants were uninterested or had not thought about media coverage, for example, Christine (40-50, Midlands, university lecturer): "I honestly haven't thought about it. I'll be really honest. I actually probably just... I probably just let it wash over me and don't get into any sort of...I don't get stressed about it at all." However, a far more common response was of dissatisfaction with how the media treats the topic, and also a general perception that the British media 'has it in' for the Catholic Church

in general. Nick (Midlands, religious studies teacher, 20-29), gives an archetypal response of this view of media coverage of the Church and science specifically:

You know, they – the media – always portrays the Church as not being forward-thinking or in line with science, but there are currently priests in the Vatican now who are scientists, with doctorates, who are spending part of their time looking for extra-terrestrial life. We don't shun science. You know, we're quite keen on it, to be honest.

With media led conflict narratives we are dealing with two interrelated strands which require disentangling. The first, is evolution being communicated atheistically, which means evolution itself is expected to be necessarily an anti-religious belief. An exemplar of this is the polemics of Richard Dawkins, who forwards the strong version of the conflict thesis between science and religion more broadly, and argues that evolutionary science can explain religion itself (Dawkins, 2017). The second, where Catholicism is represented as being broadly anti-science, and therefore, Catholics themselves are expected to be anti-evolution. These two strands (anti-religious evolution and anti-evolution religion) interrelate, and indeed end up at the same point: expected conflict between Catholicism and evolution. Certainly, I found in my media analysis of coverage of papal statements on evolution a common theme of representations of the Catholic Church as anti-science, often using the example of Galileo to embody the conflict between religion and science at large (Chapter 4). Given the dearth of other studies conducted in this area, it is hard to extrapolate from my study to argue more generally about the role of media discourses in informing individual's opinions on the subject. Nonetheless, broader communication studies have clearly shown the potential of media effects on audiences, though the communications field has gone through many paradigms of thinking on the matter, which differ in the potential magnitude of these effects (McQuail, 2014). Future studies should assess the relative appearance of

evolutionary anti-religious and religious anti-evolutionary narratives in popular media, to disentangle and delineate these two vectors of the conflict narrative, which may impact on public opinion.

It is also possible that, given the constructed nature of the interview, my position as a PhD researcher influenced the way in which my participants were answering questions (Braun and Clarke, 2014). A researcher, somewhat associated with the scientific pursuit of knowledge, could be seen as an individual looking for conflict. Indeed, when potential participants heard about my study, some of the Non-oppositionals in my sample may well have responded to get their voices of non-opposition heard. Although, the obverse could also feasibly be true, with some Oppositionals not responding to the interview invite through fear of ridicule or derision. Nevertheless, almost all stated that voices such as theirs are not represented in wider public discourse, whatever their positions may have been. Due to this perception of me as a 'scientific' researcher, participants may have been initially defensive, leading them to stress their non-opposition towards evolution. If participants associated me with the scientific endeavour, and perhaps therefore anticipated that I was expecting to find conflict, or indeed hoping to find it, this is just another facet of the larger conflict narrative previously discussed, and indeed indicates its penetration into the lives of Catholic publics in England.

5.3.2 Justifications for opposition

It is not easy to extract a person's motivations from interview data, therefore, motives for opposing evolution remain largely unclear. However, we can analyse the reasons and justifications given as to why these individuals oppose evolution. As the number of

Oppositionals in this study is small (n=5), clearly the following details of their reasons and justifications for opposition cannot be considered exhaustive. Overwhelmingly the justifications given for opposing evolution were scientific in nature, however some Oppositionals also argued in philosophical terms. Interestingly, and returned to in Chapter 6, no Oppositionals cited Biblical texts or positions as a reason for opposition to evolution.

Of the five participants in this study who opposed evolution, three had a background in science or engineering, though two were retired, and one was no longer working in engineering. Their justifications are interesting, then, as all used their expertise and knowledge of science and engineering to challenge the legitimacy and credibility of evolution. A clear example of this is in the following excerpts where Peter, a retired electronic engineering lecturer in his 80s, argues that probability means that evolution, in terms of abiogenesis, could not have happened. He also touches upon one of the vectors of the conflict narrative disentangled above, that evolution is seen as atheistic:

I mean I have read a lot about evolution, Darwin, succession and so on, and ... it is only a theory. There is a lot of flaws in it. It is taught as though its fact in school's which is entirely wrong, it is not a fact. There are as many scientists of great renown who see the flaws in Darwin's theory, as there are who applaud it. And unfortunately, Darwin's theory has become the mantra of the atheistic humanists. That is their Bible, their religion if you like, erm whereas there are some enormous flaws if you like. I mean the two great pillars ... I'm going off a bit now ... the two great pillars of evolution: One is that you had biogenesis, you had the creation of life from chemicals coming together, in a pre... pre-biotic soup of something, right? That was one of the basics ... tenet Neo-Darwinism. And the other thing is that you had macroevolution, that you can go from one species to another through this Darwin process ... this Darwinian process of mutation and natural selection. And both of those have not been proven. And in fact you can ... Sir Fred Hoyle has done a mathematical probab... probabilistic erm analysis, of the chances of the chemicals coming together in the right way to create a living cell. When you look at the probability it's impossible. Right? I mean we are talking about something like $1 \times 10^{40,000}$, right, which is a hell of a big number, and in fact is an impossible.

Gregory, now retired, who has a PhD in physics, and held various industry jobs relating to physics and engineering, went further than Peter, and called into question the

entire discipline of biology. In Gregory's view, as biology started off as natural history it was not a science. He goes on to state that to be a science, biology needed a theory, and Darwin came up with evolution. Gregory, then argues that evolution fails Popperian demarcation:

Apart from anything else, you see, I'm also a follower of the philosopher of science Karl Raimund Popper, and Popper...the main claim to fame that Popper has was he asked a very simple question and gave it a very simple answer. What's the difference between science and stuff that isn't science? [...] Anyway. So, you see, it's very difficult to see how you could disprove the theory of evolution because the theory of evolution is all about things happening over enormous periods of time. So, unless you had an enormous period of time and said that over this enormous period of time the theory of evolution made a particular prediction and then that particular prediction didn't come true you wouldn't disprove, but the theory of evolution doesn't make specific predictions of anything. You know, it doesn't say that if you do this then that will happen. So, even if you had a time machine and could observe things over a period of time the theory of evolution still doesn't produce any predictors that could be proved wrong. If...even if it tried to and something else happened you'd always be able to find a reason why it hadn't worked out how you'd expected because something else had cropped up that had frustrated what you had predicted. It's utterly unfalsifiable from any basis. So, according to Popper's demarcation the theory of evolution isn't a scientific theory.

As we will discuss later, some Catholics (both Oppositionals and Non-oppositionals) refer to evolution as 'just a theory', without a clear understanding how the word theory is defined in science (or indeed in the philosophy of science). However, Gregory above argues that evolution itself does not meet the requirements to be labelled a scientific theory at all. Without its unifying theory of evolution, for Gregory, biology is relegated from the sciences entirely.

Not all Catholics who gave scientific justifications for their opposition had a science or engineering background. Thomas, a theological author in his 50s, suggests his opposition stems from the scientific method itself:

INTERVIEWER: Has there been any particular author or any particular influence on your position now when it comes to ideas around evolution?

THOMAS: Well, on the one hand the scientific method itself. If empiricism believes in proceeding from the evidence then I think a strong sense of that is almost part of the empirical tradition. Show me the evidence. In that sense, it's a very basic question.

Thomas positions evolutionary science in opposition to the scientific method and empiricism, arguing it does not meet the criteria of good science, as it does not adhere to the scientific method and the empirical tradition. As other scholars have found (e.g. Hilderling et al., 2012), this "othering" enables people to maintain a positive attitude towards science, while maintaining opposition to evolution as a non-science.

Thomas was one of two Oppositionals, along with Gregory, who both detailed long philosophical as well as scientific critiques of evolution. These arguments centred on essentialism and wholeness. Throughout the conversation Thomas repeatedly referred to a problem with evolution being that a "wholeness" was missing. This related to a philosophical principle he held, by which something sophisticated could not come from something simpler. Having an anthropocentric, goal-oriented view of creation, i.e. that evolutionary processes would have to lead to human beings, he could not conceive of how this could happen:

Because there's a principle in philosophy that you can't have something more sophisticated come from something simpler. That makes perfect sense. If you've got an inert gas how can an inert gas produce breathing, putting it at its extreme? You've got to have something within what's inert that's capable of being developed into breath. Now, obviously you've got oxygen, but that's not breathing, that's what is breathed. So this is one of the problems with an evolutionary goal process is how can what is sophisticated come from what is simple if it's not present in what is simple? Now, in the wood itself you have a material. I bring the goal of the shelf to it, and construct the shelf...The wood doesn't possess within itself the goal of being a shelf. It's a susceptible material because of how it's structured that I can make use of it, but I bring the goal to it. So who brings the goal to the evolutionary process, bearing in mind these discontinuities that make it possible to develop. These are the kinds of questions I think that are open and debatable.

In the above excerpt Thomas' claim of certain questions being "open and debatable" brings up another important theme from Oppositionals. While all had specific justification for opposing evolution, none had a fixed alternative view. Instead all held that it was an open debate, and had no certainties regarding alternative positions. I further explore this in the following section.

Whilst interviewing participants in this study, it became clear that self-professed positive attitudes towards science were common, and indeed were not necessarily connected to participants' views on evolution. By positioning science against evolution, or relegating evolution and biology from the sciences, Oppositional Catholics in this study could maintain a positive attitude towards science in general, while specifically opposing evolution. This demotion to bad science, or non-science, was also found in Hilderling et al.'s (2012) study of Dutch Protestants. This suggests the same strategies to maintain a positive attitude towards science are employed by those who oppose evolution across cultural, denominational and linguistic boundaries. However, for those concerned with anti-science movements, or a purported growing suspicion of science in society, this finding also suggests that even for those who oppose one aspect of science, they often do not reject the whole endeavour. This is seemingly related to findings in previous PUS studies, which find some connection between scientific knowledge and attitudes in general, but on specific issues there appears to be no direct correlations (Allum et al., 2008). In the present study, though, for these Oppositionals, 'science' has epistemological and cultural authority, that is why they use it to argue against a particular scientific discipline or theory that they are opposed to.

5.3.3 No alternative view

During my interviews with Catholics in England, it became clear that several of my participants were part of an understudied group of individuals whose views, or lack thereof, could not adequately emerge through quantitative research. As introduced in Chapter 1, problems arise through efforts to categorise people into set belief positions: e.g. atheistic evolutionist, creationist, ID, etc. In effect, this type of work means that to measure opposition to evolution, the researcher relies on the participant to self-classify into an alternate belief position.

In this study, however, while Oppositionals articulated various reasons for their opposition to evolution, none of these individuals articulated a fixed alternative view. This was not to say that these individuals were not deeply interested in the subject, the length of the interviews and their list of justifications for opposition demonstrated this was not the case. However, while they could talk at length about their various reasons for opposition, they did not offer an alternative position. In the following excerpt, Peter (Opposed, retired electronic engineer in his 80s), states how he sees the whole debate as an open question:

I think the evidence is still open. Erm ... I erm ... I can't ... I mean I don't have the theory that would say how it happened. I look at the theories, and I accept them as theories, and they have flaws and so on ... All of them. I am open to final ... we may never know... And I have read all of these, but I wouldn't like to label myself as a Darwinist, Evolutionist, Creationist. I don't see myself in that way. I have got an open mind still. Let's put it that way.

Thomas (theology author, 50-59) also explains how he isn't committed to an alternative view in the following excerpt. Opposition to evolution is enough, and he does not see the appeal of having an alternative view:

INTERVIEWER: So we spoke a bit about your scepticism of the evidence as it is today to be able to back up evolution as an explanation of great varieties of life on Earth in a way. Did you have a view as to the alternative as you see it?

THOMAS: I'm not necessarily committed to an alternative, because if the question is open to investigation I don't see that I have to come up with an alternative. But if we acknowledge things like variety as well as local variation within variety that does itself seem to be persistent evidence. If you acknowledge the difference between atoms and molecules and a cellular structure that is persistent evidence. Now, if the evolutionary hypothesis wasn't just a hypothesis but was in some way an enduring event then why aren't we seeing in some visible way that transition from inorganic to organic or from one type of species to another if it's an evolutionary process that's ongoing, otherwise somehow it's stopped? And is it stopped because it never started.

Thomas reverts here back to justifications for his opposition towards evolution, he later states that one reason he is not committed to an alternative view is because: "on the one hand because Genesis is a literary account it appeals in its own right as an intelligent exposition of if you don't know what happened but you accept there was a beginning." He goes on to state that while Genesis provides a literary explanation: "Now, whether that itself answers the question of actually how did God do it, it's a slightly different question because it's already intelligent as it is. It's already reasonable. It's already recognising that things have an origin." As will be picked up again in the next chapter, here Thomas isn't arguing for seeing Genesis as an alternative scientific explanation, rather that it offers some symbolic narrative of creation. Indeed, none of the Oppositionals in this study argued for a literal reading of Genesis.

Catherine (South East, public opinion researcher, 20-29), sees science itself as at fault for the lack of alternative positions. In her view, as evolution has become the dominant paradigm, no scientists can dissent without being subjected to ridicule. This has left an information vacuum, where the only alternative sources of information come from faith groups. She says:

But my biggest problem is that all the resources I look for are all framed very much within...they're trying to defend one thing or another. So, if I try to look for anything that's to do with evolution...sometimes it's a bit more neutral, but if I try to look for anything that contradicts that it almost always comes from some sort of faith site that will say the reasons for this are this and it's very important because of this and you must defend this. There's just no space to say let's just explore all the different options, which is what I want. So, I feel obliged almost to support the antievolution stuff as a way of defending my faith.

Catherine suggests an interesting way in which identity may be playing a role in the answering of surveys. Catherine is opposed to evolution, and would like an alternative, but feels she cannot find any information on an alternative that is scientific rather than faith based. However, she feels the amount of anti-religious, pro-evolution literature forces her somewhat to oppose evolution, to protect her social group.

So, of all the Catholic participants who opposed evolution in this study, none had a fixed alternative view of how life on earth developed, and they furthermore did not simply align with the labels of professional discourse as found by Kaden et al. (2019). As discussed in Chapter 1, beyond the three-part blunt measures of evolution in polls, such as *War on Science*, which gave the options of 'creation theory', 'intelligent design theory', or 'evolution theory', recent quantitative work has begun to offer a greater number of belief positions. Ecklund and Scheitle (2018: 74-79), for example, asked participants to choose from six narratives on the origin and development of life: young-earth creationism, recent human creation, God-guided evolution, Intelligent Design, God-initiated evolution, and naturalistic evolution. Interestingly, Ecklund and Scheitle (2018) found that 57.5% of respondents said none of the narratives were "definitely true". Furthermore, they found that the majority of individuals in every religious group selected more than one narrative on the origin of life. Ecklund and Scheitle interpreted this selection of multiple narratives as an indicator that individuals are not sure enough about their position to commit to one perspective. While to

a degree reinforcing this finding, my results of Catholic Oppositionals having no fixed alternative position goes further, calling into question the very utility of self-classification options in general for this type of individual. Indeed, if opposition to evolution continues to be measured by self-classification into various alternate belief positions (creationist, ID etc.) then we are potentially overlooking a sub-population of interest who oppose evolution, but have no alternative position. This also extends to those who have no traditional religious or spiritual beliefs. Elsdon-Baker et al. (2017a) found that 5% of the UK non-religious/non-spiritual population of their sample thought evolution difficult (somewhat difficult, difficult or very difficult) to accept evolution in reference to their own personal beliefs. It is clearly inadequate to measure this non-religious evolution opposition by offering religiously-inspired alternate belief positions such as creationism or ID.

5.4 Conceptions and knowledge of evolution

A challenge when researching attitudes towards science is determining what specific conception of science participants hold and how this relates to the attitudes they are articulating. For example, a common attitudinal survey item, which participants can agree or disagree with, is: “science makes our way of life change too fast” (National Science Board, 2016). While this measure may tell us about an individual’s general disposition towards the impact of science on society and culture, it cannot tell us how the individual is conceptualising science, which specific facets of science they are considering when answering, or indeed the numerous conceptualisations of “ways of life” and how they may

change. The problem here is that such measures have no “unequivocal focus”, which leads to idiosyncratic answers (Allum et al., 2008: 39). In qualitative studies, we have the opportunity to delve deeper into participant’s conceptualisations of science. It is important to not assume that just because an individual states that they have no opposition to evolution that the participant is working from the same definition of evolution as the researcher. Therefore, it is necessary to overview the various understandings and conceptions of evolution found in the dataset.

5.4.1 Knowledge of evolution

Catholics interviewed for this thesis displayed a wide range of knowledge about evolution, from those who could detail the history of the concept and the process of natural selection, to those who offered only abstract notions of a changing and unfolding universe. Nonetheless, all participants attempted to give a description of what evolution is, although some were given tentatively. The depth of an individual Catholic’s explanation of evolution in this study appeared to have no bearing on their attitudes towards evolution, with some of those who knew the most about evolution also showing the strongest opposition towards it. Likewise, the majority of those who knew little about evolution also stressed how they were not opposed to the concept. This is in line with well-known critiques of the deficit model, discussed in Chapter 1, which reject a straightforward relationship between knowledge and attitudes (e.g. Bauer, 2007).

An example of a participant who had less knowledge of evolution, and who answered tentatively, is Dorothy (Non-oppositional, Midlands, university administrator, 50-59). When asked to describe what evolution is, Dorothy responded: “What from science? Erm ... the Big

Bang theory, and man evolving from a fish, and coming out and getting legs and going up and turning into Ne-un-thal man whatever and modern man and that basically. Is that right?" Dorothy's answer is indicative of two other themes amongst the Catholics in this study: the linking of evolution to the Big Bang, and the anthropocentric focus of previous species turning into *Homo sapiens* over time. I will return to both these themes in the following section.

For a few participants, their faith combined with a strong interest in science had led them to research the topic of evolution more, leading to more knowledge on the subject. Paul (Non-oppositional, 50-60, ex-civil servant now working in IT) suggested his interest in exploring "hot potato" topics, such as the first two chapters of Genesis, had led him to explore many issues in more depth. He often gives talks at his Church, on theology, science and environmentalism, and would undoubtedly score highly on any quantitative science literacy scales. Paul describes how he likes to explain natural selection to others in the following way:

I've also tried to explain natural selection, by saying, just go through the park and you'll see an oak tree, for example, how many acorns do you think an oak tree is going to produce each season, or over its life? It's over 100,000 or something, maybe millions. But we're not knee deep in oak trees are we? Only some of them survive. Look at aphids, we're not knee deep in aphids. Or cats, or any of these other things. So, they have stupid numbers of offspring, but if the population is stable, it's approximately one for one on average, but averages are averages, and you might have one individual that might have ten offspring, and nine individuals who have no offspring. So, you're going to get that sort of selection. And then when I explain it like that, people can see, yeah, I suppose, that's natural selection, and they can understand that.

Allum et al.'s (2014) research suggests that when religious people who have a value predisposition come into contact with an area of science which is opposed to their faith, the more they learn about the science, and the more they deliberate, the more entrenched their

opposition towards it becomes. This, it is suggested, manifests itself quantitatively in an inverse relationship between knowledge and attitudes (Allum et al., 2014). With this value predisposition, the more someone learns, the less they like it. What does this mean for oppositional Catholics, who know a lot about evolution? Has an inevitable epistemological conflict between religion and science manifest itself only because those who know more about evolution have discovered that it cannot be compatible with their faith? It would appear not. Unopposed Catholics, who also have more theological and scientific knowledge, and who have deliberated on the questions of souls and suffering have reached different conclusions. For example, in the following excerpt from David, a business lecturer who used to work in industry:

DAVID: [O]ne of the biggest challenges to faith I think is a ... for example is: if we believe that we have evolved from ... apes is the most obvious example but we can go further and further back in time, we have a problem insofar as we can say... we if we believe that people go ... that people who live the appropriate life will go to heaven and those who don't will go to hell, let's say, then what is the cut-off point in history? As to when that process started? Right? So, for example we ... because the idea is that it's not just that when Jesus arrived ... that everyone after Jesus ya know will go to heaven, its not like that, everyone alive through history before Jesus, could have gone or could not go to heaven. And one of the challenges to our faith is well what is the cut off point then? In evolutionary terms, when are we going to draw the line and say, well human beings became what they are... from a religious perspective. [...] so, for me so I think there are lots of mysteries about the way we came to be where we are today. Evolution being one, but I also think we can get you further back and talk about the big bang on the origin of the universe and how did it all start and yet because when I heard this argument put ... it might even have been of Start the Week or some other such program with Richard Dawkins or somebody and I thought: no you're making wrong point here because you're getting your getting focussed in on the detail here about that particular logical or seemingly logical contradiction whereas I believe is not like that in the sense that it's it's not about saying when did this happen it's a broader thing ... if that makes sense? [...] I think that's the essence of my faith in that I don't think it's about saying well who's a going to be in heaven then, is this ape going to be in heaven? Or is this human going to be in heaven and so therefore what point do we cross that boundary.

David's response here shows the subtlety of a person's views. It shows how one can resist the issue framing of the evolution debate, as designated here by Dawkins. It also shows that thinking deeply on the topic of evolution and your faith does not necessarily lead

to opposition. This would suggest there is no inevitable connection between having one of these theological issues with evolution, and opposing evolution outright.

5.4.2 Just a theory

In public discourses on the rejection of evolution, one of the most common misunderstandings involves the word “theory”. Richard Dawkins, prominent atheist and science communicator, has even proposed a new word “theorem” to help with this misunderstanding of what exactly a theory is (Dawkins, 2002: 13). Although, to date, it has not gained traction. The confusion arises from the different use of the word theory in scientific literature and in everyday use, where theory in everyday use is more akin to a hypothesis in scientific language. Public (mis)understanding of the processes of science also plays a role, where some individuals think that over time, and with more evidence, a scientific theory can become a ‘scientific fact’ (e.g. *Quora*, 2018).

In my dataset, the “just a theory” argument does arise, even from those who have a scientific or engineering background. For example, Peter (retired electronic engineer and lecturer), who opposed evolution, argued that evolution was a theory not a fact: “I have read a lot about evolution, Darwin, succession and so on, and ... it is only a theory. There is a lot of flaws in it. It is taught as though it fact in schools which is entirely wrong, it is not a fact.” Later in the interview Peter commented that, while he had doubts about evolution, the Big Bang Theory and creation were compatible. Interested by this, I asked him about his views on the Big Bang also being a theory, as opposed to a fact, as he had described evolution:

INTERVIEWER: I'm interested as you said before that evolution is only a theory, and not a fact, erm what would you say ... because the Big Bang is a theory... but do you see those two theoretical positions differently?

PETER: Yeah ... well I think ... yes I do, I think there is more evidence for the Big Bang than there is for evolution ... evolution is a theory in, in the Darwinian version of it... whereas the Big Bang, there is a lot more evidence for that. I mean the fine tuning of the universe is incredible, the four forces are so precisely tuned. The Big Bang itself, I was reading the other day about the sensitivity of the structure of our universe to the forces, I mean they are completely disparate, the gravity, electromagnetic, and the weak and the strong nuclear forces, I mean the different sort of levels, and they are all so precise, and if you change any one of them by a small amount the universe wouldn't be the way it is. So ... and I mean this is why they have multi-universe theories ... you know, we are one of many, and we just happen to be here. And I can understand if you don't believe in God why you would take that, as a scientist, why you would take that as a possibility. Because it is the only way of explaining the sensitivity of our universe to all the parameters. So, I think the Big Bang theory, in a way, is more supportive of design and intelligence than it is of randomness, personally.

Here we find the need to maintain a role for God in creation, and a rejection of randomness, a point discussed in the following chapter. This time, it results from the discussion of the Big Bang, rather than evolution.

Interestingly, though, it is not just those who opposed evolution who stated evolution was 'just a theory'. Nick, a religious studies teacher in his late 20s, who was not opposed to evolution, also displays the 'just a theory' argument:

I won't say that sometimes I take great delight in my high ability classes also, debating the point that it's called the theory of evolution for a reason. It is a theory. We have a lot of evidence to suggest that it is true, but at the moment it is still only labelled a theory. Not many people would – I don't know, maybe – I suppose, quoted as saying that it is absolute scientific fact yet. Or at least that is my understanding of quite a few of the positions held. Purely because though – and I say this as well to my classes and so it's something that can't be observed by scientific method – it cannot be observed over time. We can see adaptations, but we can't see evolution.

Nick continues to say, however, that even though he holds the 'just a theory' view, he perceives no conflict with his beliefs, and sees sufficient evidence for evolution: "there's nothing in Church doctrine or teaching that suggests that evolution is wrong. And with all

the scientific evidence that we have, there is nothing in my belief that challenges evolution and I see them working very closely together. For myself... there's no issue with that."

This isn't to say that no Catholics in the study understood the scientific distinction between theory and hypothesis. Paul, an ex-civil servant now working in IT who was unopposed to evolution, had a deep knowledge of both theology and evolution, mentioned how frustrating it was for him to talk to people about evolution: "Urgh... 'Evolution's only a theory.' [mocking impression] ... I get so annoyed having to explain to people, between a theory and a hypothesis."

5.4.3 Big Bang and anthropocentrism

The notion of 'accepting' evolution presupposes a particular conception of evolution which is being accepted by a study participant. If I told you that Person X accepts evolution, you would probably have your own conception of what 'evolution' Person X was accepting. However, as was the experience of some Catholics in this study, a participant could express non-opposition towards their concept of evolution, whilst not being able to articulate a description of evolution that would be recognisable to an evolutionary biologist or indeed a PUS researcher. For example, we see this non-opposition in an excerpt from Eileen (40-50, Midlands, college religious support staff), who has studied theology to master's degree level:

INTERVIEWER: So the project's specifically looking at evolution. Are you familiar with the term evolutionary science, and what do you understand by that term, or what does it mean to you?

EILEEN: Erm... I haven't read the Origin of the Species but that's probably where I'd start. (laughs)

INTERVIEWER: (Laughs) Me neither.

EILEEN: But that sense that...and that... I've no problem with that sense of an evolving, unfolding universe really, rather than... rather than just humanity within it.

When asked what they understood by the term evolution, it was common for participants to give an overarching narrative, which linked the beginning of the universe, the Big Bang, to the origin and subsequent development of life on Earth. This suggests that for some participants the word evolution resonates as more of an overarching narrative of science's explanation for the universe and everything within it. There was a wide range of how knowledgeable people were about this grand science narrative, with the majority who articulated this view, like Dorothy above, simply referring to “the Big Bang theory, and man evolving from a fish, and coming out and getting legs and going up and turning into Ne-un-thal man”, to a very small number who were comfortable discussing the formation of atoms and elements.

Thomas (2012: 158) and Moran (2019: 211) also found this conflation of the Big Bang and evolution in their studies of British Muslim perceptions of evolution. That the Big Bang-evolution conflation can be found across religious groups in the same country, suggests the cause of this conflation may not necessarily be a feature of individual religious traditions. Pursuing a line of inquiry investigating if non-religious individuals also perceive this conflation, would help to identify whether the linkage of the Big Bang and evolution is a specifically religious idiosyncrasy, or if (as I suspect) it is a quirk of the public understanding of evolution at large, as perhaps influenced by educational and media practices in the UK.

We can see an example of a simpler explanation of evolution, which may be described as recognition but with little understanding, in the following quote from Anna who

was not opposed to evolution (20-30, German undergraduate student, studying theology in the UK). Anna was asked how she would describe evolution:

ANNA: There was this Big Bang and then planets moved together, and there was this heat and I can't say it in English, I can't even say it in German.

INTERVIEWER: No, that's all right.

ANNA: Then the Earth was there, and somehow over time things came, dinosaurs and stones and water and I don't know, yes, I don't really know stuff about that.

As understood by biological sciences, evolution is a process not focussed on humans, but on all species of life on earth. It is interesting then that when asked to give an explanation of evolution, without me as the interviewer mentioning *human* evolution, almost all Catholic participants, opposed or not, focussed on humanity as the subject of evolutionary processes. It cannot be said that this would be any different from the wider public's conceptions of evolution, as there is insufficient data to make such a claim, however it is an interesting feature of the data in this study.

For example, when asked to give an overview of what evolution is, Judith (Non-oppositional, South East, local government, 50-59) explained: "It's a study of how we grow and change, and where we came from and, in some way, where we are going to." In one sense, it is unsurprising that these individuals conceptualise evolution as affecting humans, as they are humans. It would be easy to assume that these anthropocentric conceptions stem from a broader anthropocentrism in religious, specifically Catholic, thinking. Indeed, as discussed in Chapter 4, when popes have publicly commented on evolution they have stressed the specialness of man. In some sense, the majority of branches of Christianity place humanity as a special species in the world, sacred and uniquely able to commune with

God. In short, Christianity is anthropocentric. However, there is insufficient evidence to suggest that this is the reason why these Catholic participants decided to offer explanations of evolution with humanity as the subject. Like the Big Bang-evolution conflation, evolutionary anthropocentrism might be another quirk of the public understanding of evolution at large. It may well be that humans are (inescapably) anthropocentric, rather than it being a specific idiosyncrasy of religious, in this case Catholic, thought.

5.5 Conclusion

Catholics in England can be unopposed to evolution with both high and low knowledge levels, suggesting lack of knowledge of evolution is not a major factor in attitude formation. Like previous studies, I found a great variety of knowledge of evolution, and also a similar conflation of evolution with the Big Bang. As has been discussed, there is a tendency for Catholics to use the language of “no problem” when discussing their views, which suggests Catholics are working from within a dominant conflict narrative of science and religion, where they perceive there to be an expectation for them to reject it. However, I find that evolution is not a salient topic for many Catholics in this study, with conversations rarely occurring about evolution with people within and beyond their faith group. That the topic of evolution rarely came up in their day-to-day lives, but respondents appeared to be operating within a narrative of expected conflict, suggests this narrative does not originate from interpersonal communication. I would argue that the media plays a large role in the dissemination of this conflict narrative. Certainly, from my media analysis in Chapter 4, I found general representations of the Church as anti-science, and the Galileo Affair used as an exemplar of science-religion conflict relations. Future work should focus on the relative

prevalence of two strands of conflict narrative pertinent to this case: evolution communicated as anti-Catholic, and Catholicism represented as anti-evolutionary.

For Catholics who oppose evolution in this study, we see the main linguistic battles being fought on scientific and philosophical grounds, not on religious or scriptural grounds—a topic I return to in the next chapter. Similar to previous studies, evolution was relegated to a contested, bad, or even a non-science. This othering of evolutionary science allows participants to maintain positive attitudes towards science in general.

As I contended in the introduction to this thesis, we must go beyond perceived ‘problem groups’ if we are to truly understand the varieties of science-religion reactions in societies. A clear example of an insight generated here is the Catholic Oppositionals who could detail explicitly what they do not believe, but offered no alternative view as to what they do believe. Perhaps these Oppositional non-alternatives are the most interesting finding of the study. As researchers in an area, we’re keen to accurately map the various views of the given topic we are interested in. As has been shown by other recent research (e.g. Ecklund and Scheitle, 2018), we can move beyond blunt three-part measures to offering more belief positions to participants, but this doesn’t necessarily mean we will get better results. If we continue to measure opposition to evolution through quantitative self-classification into set belief positions, this population of Oppositional non-alternatives may well continue to elude our studies.

It may be, however, that these Oppositional non-alternatives end up selecting one of the other boxes offered on a survey. This too is problematic, as it would lead to

overrepresentation of these set belief positions. Some researchers may argue that the “I don’t know” option included in surveys allows for the expression of positions which don’t correspond to those delimited by the researcher. However, based on the evidence laid out above, I argue that the “I don’t know” option is insufficient to encapsulate how religious individuals are conceptualising their position, or lack thereof, on evolution. In many cases participants do know something and would like to express it, even if what they know is their opposition to evolution rather than an alternative position, but are restricted by decisions made by the researcher. Furthermore, offering the “I don’t know” option, misses how identity cues impact on respondents’ answers. As Catherine explains, as someone who is oppositional to evolution but who has no fixed alternative: “It’s hard to defend a non-position.” She further suggests she may align with anti-evolution arguments to defend her faith: “There’s just no space to say let’s just explore all the different options, which is what I want. So, I feel obliged almost to support the antievolution stuff as a way of defending my faith.”

After introducing the broad groups of Oppositionals and Non-oppositionals in this chapter, I proceed in the next chapter to analyse how Catholic participants conceive of evolution interacting with their religious beliefs. I begin by exploring participants’ views on the relation, or lack thereof, between their views on evolution and the creation account in the Book of Genesis, before exploring the various views of God’s role in relation to evolution.

Chapter 6: God, Genes and Genesis

6.1 Introduction

In the previous chapter I introduced the distinction between Catholic Non-oppositionals and Oppositionals, and detailed their varying knowledge and conceptions of evolution. In the present chapter I explore the question of how evolution interrelates with Catholic participants' religious beliefs. I pay particular attention to critiquing what I term here the *literalistic-rejection model*, which presents biblical literalism as the cause of evolution rejection. While this model may fit some religious traditions, i.e. Evangelical Protestantism, it does not explain evolution opposition among Catholics. I explore how the notion of 'scripture and tradition' is an important boundary for both Catholic Non-oppositionals and Oppositionals in my study. After exploring participants' views of Genesis, for many of whom the key message being God had *some* role in creation, I investigate how Catholic Non-oppositionals perceive God's role as specifically related to evolution. I finish by critiquing research approaches that expect participants to have formalised positions on this question.

When thinking of the various ways that attitudes to Genesis and evolution may relate, it is easy to assume a simplistic epistemological model. Firstly, we might imagine that if a person has a literalistic view of Genesis, they must therefore oppose evolution. Following on from this, if a person has a symbolic or allegorical view of Genesis, then we might assume they will not oppose evolution. Evidently, people exist who take a literal view

of Genesis and because of this view therefore oppose evolution. Of the few previous qualitative studies available, a clear example of this can be seen in Hildering et al.'s (2012) study of evolution rejection among Dutch Protestant Christians, where they found that the rejection was based on an *a priori* decision to trust a literal interpretation of the Bible over science. For Catholics, however, literal interpretations of Genesis (or the Bible more broadly) are not as strong a part of the contemporary theological tradition, compared with some sections of Protestantism (Hayes and Gearon, 1999: 27). Some Catholic literalists exist, however figures for the US show the literalist view is far less prevalent among Catholics there compared with some Protestant groups (Hoffmann and Bartkowski, 2008).¹ Although there is a shortage of equivalent data in the English context, given the lack of major doctrinal difference between American and English Catholicism, I think it fair to postulate a similar lack of prevalence of Biblical literalism in among English Catholics.

In my interviews, no Catholic participant claimed to be a biblical literalist. Indeed, it was clear that this very difference in the practice of their theological traditions was a key boundary for the Catholics in my study.² This was often articulated by stressing that while Protestants only have Biblical scripture as a source of theological authority, Catholics have both scripture and tradition. This was true of both Non-oppositionals *and* Oppositionals. It

¹ According to aggregated data from General Social Survey data from 1984-2002, 56% of US Conservative Protestants interpreted the Bible literally, compared with 22% of US Catholics (Hoffmann and Bartkowski, 2008: 1256).

² By 'boundary' in this analysis, I refer to symbolic boundaries as described by Lamont and Molnar: "Symbolic boundaries are conceptual distinctions made by social actors to categorize objects, people, practices, and even time and space. They are tools by which individuals and groups struggle over and come to agree upon definitions of reality. Examining them allows us to capture the dynamic dimensions of social relations, as groups compete in the production, diffusion, and institutionalization of alternative systems and principles of classifications. Symbolic boundaries also separate people into groups and generate feelings of similarity and group membership." (Lamont and Molnar, 2002: 168).

became apparent in my interviews that Biblical literalism was not a factor for my Catholic participants in shaping their attitudes towards evolution. It was not, therefore, that symbolic readings of Genesis led individuals to not oppose evolution, and literalistic interpretations had led to opposition. All participants in this study, Non-oppositionals and Oppositionals, stated they read Genesis as a symbolic account. With the majority claiming that the main message they took from Genesis being that God had some role in creation. However, as will be discussed in this chapter, most did not have a specific view of God's role, and only wished to maintain that he had one.

Given the conflict narrative present in much popular discourse, it is interesting that the majority of participants in this study who were not opposed to evolution did not find evolution to be a salient issue, nor was it something they had struggled to resolve with respect to their religious faith. A recurrent theme of the interviews was how evolution was not a 'big topic' for them. For example, Lucy, (home tutor, 50-59, Midlands) stressed: "If you read the letters in *The Tablet*, no one is talking about evolution, it's not a hot topic I wouldn't say. I wouldn't say I've ever heard anybody talk about it, I don't think anybody cares ... amongst Catholics." However, while evolution was not a salient issue for the overwhelming majority of Catholic Non-oppositionals in this study,³ for Oppositionals evolution was a salient issue. Oppositionals on average would talk at a greater length than

³ With the notable exception of Paul, introduced in Chapter 5, (Non-oppositional, 50-60, ex-civil servant now working in IT) for whom exploring "hot potato" topics, such as the first two chapters of Genesis, had led him to explore many issues in more depth.

Non-oppositionals, who would typically just stress how it was a non-issue for them, and not have much more to say on the topic.

In Guhin's (2016) US study on the comparative moral salience of evolution in Evangelical and Sunni Muslim creationist high schools, he argued that the theory of evolution is salient for American Evangelicals because it is dissonant with their key practice and boundary: reading the Bible literally. For American Sunni Muslim creationists, however, the key practice is prayer and the key boundary is gender performance, and as these factors are not dissonant with evolution, Guhin argues it therefore has less moral salience even though it is still rejected. Catholics, however, do not share the practice of Biblical literalism. Indeed, I found that an anti-literalistic position (in the interviews often termed 'scripture and tradition') was the key boundary among all participants in this study, used to distinguish their group from other Christian denominations. So, we could say that both Evangelicals and Catholics share the same boundary, that of biblical literalism, however they approach that boundary from different sides. Evangelicals through the practice of literal interpretation, and Catholics through the rejection of it. As scripture and tradition was a key boundary for Catholics, yet evolution was still a salient issue for Catholic Oppositionals in this study, it suggests that's Guhin's findings may be specific to the cultural milieu of the USA. I found that in England, *non-literalistic* Catholic Oppositionals also perceived evolution as a salient issue.

I expand on the above points in this chapter, first exploring Catholic participants' views of the relationship between Genesis and evolution, and secondly analysing participants' views, or lack thereof, regarding God's role in relation to evolution. Similarly to

the previous chapter, I then critique research approaches which seek to categorise individuals in fixed belief positions, and evidence why this may be inadequate for some populations.

6.2 Genesis and evolution

6.2.1 Scripture and tradition

The majority of Catholics in my sample drew strict boundaries between their own religion and Protestantism, most often specifically Evangelical fundamentalism. The main justification given for the difference between their Catholic faith and Evangelical Christianity was that Catholicism values both scripture and tradition, whilst Evangelical Christianity has a sole focus on scripture. This difference was important to the Catholic interviewees, who used this dual theological approach to stress the non-determinate nature of their beliefs. Due to a perceived societal ridicule aimed at Evangelical beliefs, Catholic individuals may have stressed their difference in an attempt to legitimise their own faith position. For my participants, the difference between themselves and Evangelicals was an important one. This is clear from the following excerpt from Eileen (40-50, Midlands, college religious support staff), discussing how she sees her religious beliefs relating to her position on evolution:

INTERVIEWER: I'm also interested in human origins within that kind of evolution narrative or creation narrative. Do your beliefs as a Catholic relate to your position on the origin of humans, do you think?

EILEEN: I think the Catholic position is actually okay with that. I think my understanding of the Catholic Church and knowledge is that actually it's always seen it as a good thing and maybe it's because it holds the Bible and tradition as co-equals rather than some Evangelical Protestant traditions which is, if it's not in the Bible, it didn't happen. And, therefore, the last...almost believing that God's revelation stops on the last page. So yeah, it's never been taught to me as having a problem.

We can see the same demarcation at play in the following excerpt from Lucy, (50-59, home tutor, Midlands):

I remember once hearing this guy on the radio saying... he obviously wasn't a believer: "Well, you must believe it's true, it's in the Bible. You're a Christian and it's in the Bible." And I thought, well it depends what kind of Christian, because not all Christians agree. And I think this is one of the big areas of disagreement amongst Christians, how you view the Bible. And this is where we have a cop out or a let out, because erm we have scripture and tradition, and we think that the Church wrote the Bible. It was ... we had the Church then the Church wrote down the Gospels, after the Church was already up and running. So I think that is a Catholic view, whereas the Protestant view doesn't seem to grasp that idea at all, and I don't think they think about it, if they thought about it they'd realise that of course the Church does predate the New Testament anyway, or that the Jewish community predates the Bible.

Dual importance of scripture and tradition in the Catholic Church is a recurrent theme in the dataset, and a key boundary for Catholic individuals. It is used discursively to allow both a flexibility in biblical interpretations and to differentiate the Catholic faith from other religious traditions, mainly Evangelicalism. Furthermore, Non-oppositional Catholics themselves use the literalistic-rejection model as a discursive justification of their ability to accept evolution. For them, they argue that the dual theological approach of scripture and tradition means that evolution is not an issue. Interestingly, however, as discussed below, this boundary is also maintained for Catholics who oppose evolution. It is not due to literalism that they oppose evolution.

6.2.2 Genesis as symbolic

The main theme when talking about interpretations of Genesis was that it used symbolic, metaphorical, or literary language. With these interpretations of Genesis, but not

necessarily because of these interpretations, some Catholics found no issue reconciling evolution with their faith. However, while some individuals stressed that they themselves found no problem with Genesis, or indeed were not that interested in it, they believed it would be a problem for others. This is a similar position found in other studies, which have evidenced this type of cultural projection surrounding religious attitudes towards evolution at the national level (Elsdon-Baker et al., 2017b). In the following excerpt, Christine (Midlands, education management, 40-49), explains that while she does not see a problem with evolution, those subscribing to “the Catholic view” might:

INTERVIEWER: Yes. And do your beliefs as a Catholic relate to or inform your position on evolution?

CHRISTINE: It is a tricky one because obviously if you're going to go with what Catholics believe - and obviously you've got the readings where God made the world in so many days - it doesn't tie in with evolution, so that might be a struggle for some people. Not so much for me, I don't think. I do believe that God created the world but I don't necessarily believe it was done in that timeframe and in that way. I think that's more symbolic.

INTERVIEWER: Yes. So as you say, some people don't necessarily think Genesis' literal account of creation, but they still take something from it, in a way?

CHRISTINE: Yes.

INTERVIEWER: Do you still take anything from that creation account?

CHRISTINE: I suppose I take from it that God did actually make everything originally, and it probably took millions of years and not a week. But it was probably all created by God originally.

Christine's response raises another interesting theme in the interviews; that the main interpretation taken from Genesis was that there was a beginning, and a Creator. For Catholics unopposed to evolution, Genesis serves as a message that creation was the work of God, however many see this as totally separate from how exactly that creation took place. George, a retired businessman from the IT sector, stressed this succinctly. After stating that the Genesis accounts are “not factual, they are more parables”, I asked if there

was a particular message which he saw in those parables. To which George definitively replied: “No ... only that you know there was a creation and there was a Creator. And that’s the only thing I draw from that....” When asked how, if at all, his positive views about evolution and his Catholic beliefs relate, George replied: “Well they don’t ... I see no conflict between science and Catholicism at all. None.” Like previous examples, George stresses the lack of conflict when asked about how his beliefs interrelate with his views on science, but goes further to say they don’t relate at all. He sees them as separate, but not conflicting. While George succinctly explains how he sees the main message of Genesis being that there was a Creator, others talked through this in more detail. However, the main message taken from the Genesis account for non-oppositional Catholics in this study was that creation was an event, and that there was a Creator. This is not to say, however, that these Catholics had a specific view of what God’s role was in relation to creation, a point I will return to.

6.2.3 Conflict and compatibility

The epistemological conflict narrative posits that incompatibilities between the knowledge claims of religion and science lead to conflict between religion and science (Evans and Evans, 2008). However, throughout my data collection it became clear that Non-oppositionals were not perceiving an incompatibility between evolution and their religious beliefs, that they were struggling to solve. While some, like George above, saw these two spheres as separate but non-conflicting, many Catholics saw these two spheres as co-corroborating. Neil, a maths teacher, explains:

And, the way I have explained it in the past, to children, is, if you are explaining the Big Bang Theory, and the creation of the universe to people who have limited scientific understanding, then portraying it in the way that it’s told in Genesis, would be a pretty good way to go. It’s

largely the same order of events, I understand, I believe I heard at some stage, the actual words used in the Old Testament, so it would have been Hebrew, wouldn't it, the word used for days is as equally well translated as era, or epoch.

So, the style of writing of, not just biblical writing, but generally of thousands of years ago, wasn't intended to be scientific, specific as in the way we would interpret it, it's an account of creation. And, although that's creation, as opposed to evolution, I'm fairly comfortable that evolution would sit in the same way. When God created the earth, he didn't create it static, as it was, it has continued to evolve, and will continue to evolve.

It was clear in the interviews that those who were unopposed to evolution, all had symbolic or metaphorical interpretations of Genesis. Although it cannot be concluded that it is because of these interpretations of Genesis that they were not opposed to evolution. As will be discussed below, Catholics who opposed evolution also shared these symbolic readings of the Genesis account of creation. For Non-oppositionals, however, there were differences in how they saw their Catholic beliefs relating to evolution, broadly split in two groups: one viewing them as totally separate domains, and another who found a harmony between the creation narratives of both science and religion.

This is not to say that all the Catholics in this study found their views on science and religion in general easy to reconcile. An example of this is the following excerpt from Jane (Non-oppositional, North West, humanities PhD student, 20-29) who talks about her experience of difficulty in marrying up the scientific and religious parts of her identity:

I think it's hard for me and others, but I think for me, it's particularly hard because I read a lot about science and things, and I do feel like it's important to be exacting and correct about stuff. And I feel like sometimes the Catholic side of me doesn't marry up with that. The Catholic side of me is faith-based and you can't be exacting about faith. So that's really difficult to marry the two if you're like...if I am going to live my life in mostly an evidence-based way. So, when I deal with medicine or going to the doctor's, I mean, are true things evidence-based? But then one of the main parts of your life can't be evidence-based. Your faith can't really be evidence-based. It's hard to marry the two.

Here we see, beyond the specifics of Genesis and evolution, Jane questioning the methodological compatibility of scientific and religious epistemologies. Later, Jane goes on to say that while it is hard for her to marry the two methods, she does find a solution: “they’re antitheses of...they reject each other almost, but...somehow you find a way in the middle.” This suggests we should avoid categorising people as wholly subscribing to conflict or harmony positions in general. Or indeed, it suggests operating with caution when using any other more nuanced typologies, such as Barbour’s (1997) conflict, independence, integration and dialogue. In the same person, on different topics, and when varying between specifics and the abstract, positions can shift. This finding echoes Reid’s (2018) recent conclusions from a study of clergy attitudes, cautioning the use of overarching normative typologies in science-religion research:

Typologies, while useful in terms of creating a framework for how people might understand science and religion, should also be treated with caution: my own research with clergy in England has shown the often complex, multilayered and contradictory approaches that they take to understanding the relationship between science and Christianity. (Reid, 2018: 98)

6.2.4 Literalistic-rejection model

As previously discussed, when conducting interviews with Dutch Protestant Christians Hildering et al. (2012) found that main reason for rejecting evolution was an *a priori* decision to trust the Bible more than science. In the present sample of Catholics in England, however, trust in the biblical account of creation was not forwarded as a reason for opposing evolution. Gregory (Oppositional, retired engineer who now writes on theological subjects), notes how he does not view Genesis historically:

The...well the...Genesis Chapter 1 with the kind of...the seven days of creation, I don’t believe that’s historical. I mean it’s quite amusing that the order is actually not a million miles away from

what we think because actually the order follows complexity really. So...and that's kind of why. So, the...Genesis starts with the simplest things and builds up to the more complicated things and, of course, that's how it happened because that's how it would happen. So, there's a bit of...there's quite a bit of insight there but it...but it certainly isn't historical in any ordinary sense of the word 'historical'. There was nobody...we weren't there to witness it so how could it be this [...] So, Genesis Chapter 1 clearly isn't historical. Genesis Chapter...whether there were the first two humans and whether there was some kind of event which is kind of captured in that story I don't know. I...it...from...I believe that Genesis Chapter 2/3 are actually profound philosophical tomes.

I previously discussed the use of the term 'scripture and tradition' which was used by Non-oppositionals to differentiate themselves from Evangelical believers. For Non-oppositionals, their non-literal reading of Genesis was also offered as a reason why they themselves could accept evolution, whilst other literalistic Christians rejected it. It is therefore interesting that Catholic Oppositionals in this study also maintained this non-literalistic 'scripture and tradition' boundary. That Catholics can oppose evolution, whilst not justifying this via a literalistic interpretation of the Bible, reminds us that the literalistic-rejection model is insufficient to explain all Christian opposition to evolution. An example here comes from Catherine, (Oppositional, South East, 20-29, public opinion researcher):

[T]here are plenty of Catholics who don't agree with evolution, not necessarily because they agree with the literal interpretation of the Genesis account but because they just don't know, and then they would feel torn because their loyalty to the church and her authority...because Catholics believe very much that in addition to having revelation through scripture that there is also tradition.

In Chapter 5 I discussed how Oppositional Catholics in this study offered no alternative view to evolution. Calling upon scripture and tradition, instead of literalism, as their key boundary and practice, may well lead to this position. So, while Hilderling et al.'s (2012) Dutch Protestant Christians could clearly articulate an alternative view of the origin and development of life based on scripture, Catholics in this study did not, or could not, do so. By rejecting evolution, and positioning themselves against perceived Evangelical

fundamentalism, oppositional Catholics enter a positional grey area. There is a rejection of a literalistic special creation account as believed by some Evangelical Protestants, and an opposition to evolutionary theory, leaving them in an ineffable middle position. As discussed in the previous chapter, this grey area renders approaches which seek to classify belief positions into a typology unable to easily categorise this population of individuals opposed to evolution.

Furthermore, the literalistic-rejection model is used not only as a description of evolution rejection in some academic studies (e.g. Hildering et al., 2012), but also by Catholic Non-oppositionals in the present study as a reason why evolution is not an issue for them. The effects of this are twofold. Firstly, academic work around religion and evolution has focussed on problem groups, and these have mainly been creationist fundamentalists in the US and elsewhere (e.g. Long, 2011; Hildering et al., 2012; Guhin, 2016). This has led to a masking of the varieties of opposition to evolution. While the literalistic-rejection model may well hold up for some faith communities, it is unlikely to explain evolution opposition from more diverse contexts, where literalism is not a part of faith traditions.⁴ Secondly, and I think more prominently, the literalistic-rejection model does discursive work for Catholics in this study (and I imagine other non-literalistic Christian traditions), who pose the literalistic-rejection model as a reason why they themselves do not reject evolution. If, however, as is found in the present study, evolution opposition is not predicated on biblical literalism, we must look elsewhere for our reasons for evolution opposition, and indeed non-opposition,

⁴ Though it should be noted that none of these authors have argued that literalism is the only source of evolution rejection. My contention is rather, that studying only these specific literalistic groups has led to a myopia in the varieties of evolution opposition.

which seem not to be only tied to theological interpretations, nor scientific knowledge. This seems to align with insights from Elsdon-Baker et al. (2017a), who found scepticism around evolution—which was more pronounced around questions relating to aspects of human evolution—in non-religious and non-spiritual groups, as well as religious groups. We may summarise this critique of the literalistic-rejection model by simply stating: religious literalists may oppose evolution, but not all those who oppose evolution are religious literalists.

6.3 God and evolution

6.3.1 God vs. chance and randomness

I previously discussed that Catholics who were not opposed to evolution stressed that the main (and often only) message taken from Genesis, was that there was a Creator. This maintains a role for God in these Catholic individuals' worldviews. In a recent study of religious attitudes towards science in the USA, sociologists Ecklund and Scheitle (2018) conclude that when science and religion do conflict, it stems from religious individuals maintaining a role for God in the world and upholding the sacredness of humanity. If these two conditions are not contravened, the authors conclude, there is no conflict. In my interviews with Catholics in England, it became clear that maintaining a role for God was an important condition when discussing evolution and creation.

What was evident in the interviews with Catholics in England, was how God playing the role of Creator was often positioned against the alternative, which was usually termed “chance” or “randomness”. We see this in the following excerpts from Julie, a retired public health researcher, who when asked if she identified with any labels around evolution and creation, Julie was quick to stress that she was not an “evolutionist”. However, what became clear was that in resisting this label, Julie was in fact not opposing evolution *per se*, but actually resisting a worldview of evolution in the absence of God. Julie went on to clarify, that she does believe things develop due to evolution, however not *just* because of evolution:

[T]he whole thing about why I think faith is more... belief in God, and how God works is more important than evolution, is that this earth... we are not random, this earth is not chaotic, there is order. Now order just doesn't happen. You know. If you read Lord of the Flies or something. Chaos would want to dominate. But we live in such an ordered society. How does an ordinary tiny bee make those perfect hexagonal containers for the honey? How do they work it out? This is why I love maths so much. There are only three ways leaves are formed on stems, 80% are formed in a particular way, a particular angle, the Golden angle. You know, how does that happen? So, nobody can convince me that God does not have a role to play.

From this excerpt, we can see perhaps the most important feature of all the interviews. Perceiving, maintaining and defending a role for God in the universe, as opposed to an atheistic view in which existence arose through ‘chance and randomness’. Thus, for most of my interviewees, as long as a role for God is maintained, then evolution can be believed, but this point goes beyond evolutionary biology. For these participants it is down to whether God exists, and if he does not, then the majority questioned how our existence and all this complexity could have emerged out of chaos. For them God plays a role, and without God's role evolution could not work. So, the stressing of God's place as the architect of creation, was set against the alternative chance and randomness view. In scholarly

discourse we may label these positions: atheistic and theistic evolution. Though, as found in previous studies, participants themselves rarely identified with, or used, this type of language or categorisation (Kaden et al., 2019).

6.3.2 God's ineffable role

When conversations moved onto the specifics of participants' thoughts on how God's role was conceived in relation to evolution, the majority of Non-oppositionals had not thought of the issue in much detail. Most participants, who had very little to say on the matter of evolution, were just happy to stress their non-opposition, so long as God's role as creator was acknowledged. This can clearly be seen in the following excerpt from Dorothy (Midlands, university administrator, 50-59):

INTERVIEWER: And what are your thoughts on that view of evolution?

DOROTHY: Erm... yes... probably... but whatever happened, however it happened, God's hand was in it. Whether we came as a fish out wherever out the sea ... and started getting legs and then going in the trees and whatever and coming down ... God's hand was in all of that.

INTERVIEWER: So God guided that process?

DOROTHY: That just didn't happen just by itself, God's hand guided that

INTERVIEWER: Yeah so I'm interested how people's beliefs as a Catholic inform their understanding of evolution

DOROTHY: As opposed to Adam and Eve do you mean?

INTERVIEWER: Not necessarily no, like how people understand evolution, and how their beliefs as a Catholic relate to it

DOROTHY: Yeah yeah yeah yeah ... God's hand was in all of that

INTERVIEWER: So, in terms of ... well bringing up Adam and Eve because that is a good point of discussion as well, what do you make of the Adam and Eve story and how it relates to the evolutionary story of creation?

DOROTHY: Haha oh God ... I know ... that's hard that is. Erm... well it's in the Bible so ... hmm... (long pause) they were part of that process of ... and they were like a ... time ... a snapshot ... of evolution, they are part of evolution, they're part of that evolutionary story of man erm... but the way it was left to us in the, in the Bible ... erm ... I don't discount it, obviously, but I don't discount evolution either. (pause) I don't really have any particular views on either, but evolution, I do think God's hand was in that. If science has proven that is how we evolved.

The way Dorothy repeatedly stresses “God’s hand was in all of that” reinforces how important maintaining a role for God is to her. In Dorothy’s closing remarks, we also see her acknowledging that Adam and Eve were a “snapshot” in the evolutionary view. However, as is clear from the transcript, Dorothy was very unsure about answering this question. As she states afterwards, she doesn’t “really have a particular view” on it. However, asking questions on the specifics of her beliefs forced her to respond. No matter what her response was, again when ending the answer she further reiterated God’s role. Similarly, it is possible that when quantitative survey items ask for specifics on peoples’ views, especially for people who do not have a particularly well-defined position, that the same process may be at work. Rather than selecting, “I don’t know”, participants may well choose the option, which they see as maintaining their faith position. Above, Dorothy does this by quickly synthesising Adam and Eve with evolution, before admitting she does not have a view on it. It is impossible to know which one of these answers from Dorothy would emerge in a survey.

As discussed in Chapter 1, categorising attitudes towards evolution has developed from blunt three-part questions (atheistic evolution, God-guided evolution, creationism), to more nuanced measures where different narratives of creation are offered to participants (e.g. Ecklund and Sheitle, 2018). However, it became clear during my research that most participants who were not opposed to evolution, also did not have a particular view on God’s role in relation to the process of evolution. While a few participants did see God as

setting initial conditions, others as God maintaining every part of the process, or more of an intervener, these views were not held with certainty, and indeed often articulated in the negative. For example, Spencer, a retired academic and industrial chemical scientist in his 80s, stressed how he could not conceive of God as an intervener in evolution, or anywhere else:

SPENCER: It happened, and yes, it's almost...I mean, that's why I think some people say, you know, God made the Big Bang and then tinkers with it when he feels like it, but that's a stupid way of looking at it.

INTERVIEWER: So you're not in favour of that intervening idea of God?

SPENCER: No, not intervening, no. No, I don't think we'd have so many disasters if God was intervening regularly.

However, again, while Spencer could define what his views were not (i.e. an intervening God due to the problem of suffering), he struggled to formulate what exactly his conception of God was in relation to creation and evolution, eventually concluding God is a spiritual force which guides evolution "but not consciously guiding it, because it can't help doing it."

While a minority engaged in the topic, the majority of participants did not have a particular view of God's role at all, with some stating they had not thought about it before. Tom, an undergraduate education student, when asked if he had a view of God's role in relation to evolution (either initiating or intervening in the process), states that he has not got an answer for the question of what God's role in evolution is and admits that he had never thought about it before:

TOM: Erm ... I don't really know, you've stumped me ... you've got me there ... yeah you've got me there haha.

INTERVIEWER: No it's alright on any of these to not have an answer

TOM: That's the first time I've not had an answer for anything, fair play haha

Similarly, Christine (Midlands, education management, 40-49) responds to the question of her view of God's role in evolution, with: "I would never have put two and two together really to think about what his role would have been." John (Midlands, 80-89, retired engineer) goes further, stressing how that kind of knowledge is unknowable:

INTERVIEWER: Interesting. Do you have any particular view of God's role in relation to that process of evolution?

JOHN: It would be presumptuous to have a view on that. No, it's not for us to know the times and seasons. I'm sure he's involved. No, it would be very easy to speculate and waffle and then retract on second thoughts. No.

While the original three-part blunt measures have been shown to be inadequate measures of religious attitudes towards evolution, perhaps these responses also show that our more sophisticated measures may also be an insufficient way of measuring attitudes towards evolution. They all presuppose people have a thought through position, which a survey can capture. While there is a "don't know" option in some of these surveys, it is uncertain that any of the above participants would have ticked it. Even if they had, it is highly unlikely that the researcher would analyse their responses further.

Maintaining a role for God in creation was the most important condition stressed by Catholic interviewees who were unopposed to evolution. Whatever that role may or may not be. However, it was clear from the interviews that expecting a thought through belief position on how religious and scientific knowledge interact in individuals is on the one hand overly optimistic, and on the other overly one-dimensional. Just because researchers are

interested in the specific details, does not necessarily mean that their subjects are as well. This helps to explain the often “confused and contradictory” attitudes found among quantitative surveys (Lawes, 2009). Or the uncertain and overlapping beliefs found by Ecklund and Scheitle (2018: 74-79), for example, when they asked participants to choose from six narratives including: God-guided evolution, Intelligent Design, God-initiated evolution, etc. While Ecklund and Scheitle interpreted participants’ selection of multiple narratives as an indicator that individuals are not sure enough about their position to commit to one perspective, it may be that most participants simply do not have a finely thought through perspective on the matter at all. Indeed, as was found in the 2009 *Darwin Now* survey, when asked: “Generally speaking, how much time, if any, have you spent thinking about the origins of species and development of life on earth?” 20% of the British sample (n=973) answered “None at all”, and 42% answered “Not very much”. Interestingly, the figure for “None at all” rose to 27% for those who chose the ‘creationist’ option in the blunt measure (*Darwin Now*, 2009). As was found in the present study, for some Non-oppositionals, acknowledging God had a role in creation and evolution is enough. To ask questions about God-initiated vs God-guided may well be fine for a select few who are heavily invested in these debates and have dedicated time to them, but to expect the population at large to have such intellectualised positions is misguided and risks essentialising them. Perhaps the question of attitudes towards evolution need to be reframed once more. We have gone from the problematic three-part blunt measure to new measures of multiple narratives, however perhaps the problem in this research is *expecting* publics to have coherent narratives in the first place.

6.4 Conclusion

All participants in this study had symbolic readings of Genesis. Furthermore, rejecting simplistic biblical literalism served as a key boundary drawn by Catholic participants, between Catholics and Protestants, most notably Evangelicals. However, while Non-oppositionals offered this boundary as the reason why they had no issue with evolution, the same 'scripture and tradition' boundary was also maintained by those who were opposed to evolution. Their opposition was not based on an *a priori* decision to trust the Bible more than science, as Hilderling et al. (2012) had found among Dutch Protestant communities. This leads us to rebuff a literalistic-rejection model for Catholics in England, and must force us to seek other reasons for evolution rejection. However, the present study's sample of Oppositionals was too small to draw any significant conclusions on the reasons for Catholic evolution opposition. Nonetheless, the maintenance of this non-literalistic boundary may well have contributed to the lack of alternative views introduced in the previous chapter. Whereby opposing evolution, but having no scriptural alternative, may have led participants to fall into a grey space, not easily categorised on classic survey measures.

In Chapter 2, I discussed the theological tradition of Modernism, which was being debated in the Church at the same time evolution was being widely debated across society. I find that today the labels of 'Modernist' or 'Traditionalist' are rarely used when discussing individual Catholics' theological positions, and how they relate to evolution. While undoubtedly, we could categorise some participants' views as more Traditionalist or Modernist, Catholic participants themselves did not argue in these terms, and rarely aligned with any fixed theological tradition. This suggests Catholic publics' attitudes towards

evolution are somewhat disconnected from some of the scholarly discourse on the matter, at least terminologically.

In this study, I find that maintaining a role for God is the most important condition for Catholics unopposed to evolution. This is often articulated in contrast to, and positioned against, the alternative view of 'chance and randomness'. In many ways, Catholic individuals defining their position against 'chance and randomness' is the same boundary drawing found in papal statements on evolution, only using different lay language. As I have discussed in Chapter 2 and 4, modern popes have expressed opposition to materialistic and atheistic forms of evolution, which deny God's involvement in the process. Therefore, the materialistic vs theistic evolution distinction, or 'chance and randomness' vs 'God having a role', is found in elite theological discourse and public attitudes, though different language is used to express this distinction. Perhaps reinforcing the above point about Modernism and Traditionalism, publics may well hold similar positions which are found in scholarly or professional discourse on science and religion, but they do not express these views in the same formalised terms. This has implications for how we measure people's views in surveys, where researchers utilise terms such as 'theistic evolution'. While we may see such terms as simple ways to group like beliefs, they may be inappropriate for much of the population, who may be unsure about their meaning and would not use them to describe themselves. Therefore, terms such as 'theistic evolution' are not only the language of scholarly and professional science and religion discourse, but when used in research they become an etic categorisation for some of the population studied. More work should be done to measure the lived experiences of specific populations' views on evolution, and therefore the

production of emic categories.⁵ This finding and recommendation aligns with and echoes that of Kaden et al. (2019).

While most Non-oppositionals counterposed their view of ‘God having a role’ against the ‘chance and randomness’ view, the majority of these Catholic Non-oppositionals had not thought about exactly how their view of evolution and the role of God in creation fit together. So long as God’s role as creator was maintained, and existence was not the result of ‘chance and randomness’, they had no issue. This finding of a lack of specific views about God’s role in or relating to evolution for Non-oppositionals, on top of the previous chapter’s exploration of those Oppositionals with no alternative view, may help explain the confused and contradictory, or uncertain beliefs, which emerge in some quantitative studies of religious attitudes towards evolution (e.g. Lawes, 2009; Ecklund and Scheitle, 2018). Even if we include more distinct categorisations, such as God-guided or God-initiated evolution, it may well be that individuals lack such formalised positions on the topic. This echoes the conclusions of Hill: “[T]he vast majority of what is ‘out there’ is elite dialogue about these topics. [...] Elites often assume that the public is as invested in creating coherent and intellectually defensible positions as they are, but this is simply not true” (Hill, 2019: 47).

⁵ The emic/etic distinction was first introduced by linguistic anthropologist Kenneth Pike (1954). Pike borrowed from linguistics the suffices of *phonemics* and *phonetics*, where phonemics refers to the examination of sounds for their meaning-bearing roles in a specific language, while phonetics refers to the study of universal sounds covering all languages (Xia, 2011). The emic/etic distinction has been used in very different ways in many different disciplines over the years (see Headland et al., 1990). Here, however, I use the distinction to represent different perspectives that take the point of view or language of either the insider/the people under investigation (emic), and the outsider/researcher (etic). Note, this is not a subjective/objective distinction.

In Chapter 4 I suggested that when popes spoke out about evolution, they may well have been doing their own boundary work by distancing the Catholic Church from vocal creationist movements and aligning the Church more closely with modern science. However, as discussed, there was another dimension to this boundary drawing, the differentiation between evolution as an explanation of the development of life on earth and evolution as part of an overarching materialistic worldview, in which God played no part. In Chapter 4 I demonstrated that some sections of the English press sensationalised Benedict's comments, and missed the nuanced philosophical boundary work done by his pronouncements. Certainly, as discussed in the last chapter, Catholic individuals were generally unhappy with media representations of the Catholic Church, both in general and specifically concerning science. Given the prevalence of the conflict narrative in media coverage, and the omission of philosophical dimensions to the discussion, it would seem that these Catholic individuals are somewhat justified in their dissatisfaction with media coverage of the Church and evolution.

These findings further speak to the utility of studying both public discourse and public attitudes relating to evolution, as well as studying groups who have not been traditionally seen as problematic. Such groups can offer us insights into how we may better measure attitudes to evolution more broadly. In the following concluding chapter, I tie together the results of these analysis chapters, and reflect on what studying both public discourse and public attitudes around Catholicism and evolution in England can contribute to the broader study of religion, evolution, and science in society.

Conclusion

Introduction

This thesis' primary aims were to empirically investigate the relationship between Catholicism and evolution in England. The studies included here had two specific top-level research questions, one for each of the analyses of public discourse and of public attitudes:

- 1) How have papal statements on evolution been represented in the large-circulation English newspapers?
- 2) In what ways do Catholic individuals in England perceive evolutionary science in relation to their faith and worldview?

I have attempted to answer my research questions in two ways: first, by investigating an instance of public discourse, through analysing how English newspapers have represented recent papal comments on evolution; second, by investigating public attitudes, through exploring how Catholic individuals perceive evolution as interacting with their religious beliefs. Of primary concern throughout this thesis was the importance of specifying which conceptions of science and religion we mean, investigating how participants of a specific religious group perceive the science in question, and exploring how the relationship between that science and that religion are represented in public discourse.

The preceding chapters have demonstrated the issues involved in answering questions around science and religion through a socially oriented research lens. As has been discussed in Chapter 1, the majority of social studies of science and religion (SSSR) research has taken place in a North-American context, focussing overwhelmingly on Evangelical Protestant groups. In designing this research project, I aimed to reveal new insights into the relationship between science and religion by looking at contexts and groups which are not obvious candidates of study, though are yet still subject to public debate. Given the multifarious, exploratory nature of this thesis, the insights generated lead to a number of possible future research directions. While some of these pertain specifically to the study of Catholicism and evolution, others apply to the study of religion and evolution, and religion and science more generally.

The findings of this thesis primarily contribute to the small but growing area of SSSR, and the more well-established area of public understanding of science (PUS). In this concluding chapter I detail these contributions, by first overviewing the top-level findings of my analysis of public discourse, and the recommendations and future research directions. Then, I detail the findings, recommendations and future research directions for public attitudes. Finally, I conclude with a reflection on the field of SSSR.

Public discourse

Top-level findings

I have argued that it is important to study both public attitudes and public discourse on science and religion. In this thesis, I analysed an example of public discourse, English newspaper representations of recent papal statements on evolution. In this section, I detail the top-level findings which emerged from this analysis of public discourse.

Benedict XVI did not support ID

In Chapter 4, I demonstrated that Pope Benedict did not support or endorse Intelligent Design positions, despite the claims of some news reporters in England and abroad. Instead, numerous factors played into the narrative of Benedict potentially shifting the Church's position on evolution in the mid-2000s. The factors cited included the *New York Times* op-ed of Cardinal Schönborn, the length and content of Benedict's comments, and that his book on the subject was first published in German. It should be of concern that the claim "the Church seeming at times towards agreeing with intelligent design theory" has crept into scholarly books on the topic (Evans, 2018: 89). Furthermore, this interaction between public and scholarly discourse evidences my call for more attention to be paid, and more research conducted, into public discourse on science and religion. Under this approach, media narratives are an object of study, not unbiased pieces of primary information. They are the forum where debates take place, and ideological presuppositions scaffold the content. More work should be done in the analysis of the media representations of religious groups' relations with science, and the ideological underpinning of various media producers, as this is an area where little work has been conducted to date.

I have also demonstrated that in some major English media outlets there is a conflict narrative around communication on the Catholic Church and science. Furthermore, many articles which have forwarded the conflict narrative used the exemplar of Galileo to evidence this conflict between Catholicism and science, and even science and religion at large.

This conflict narrative found in English newspapers is indicative of a larger cultural narrative which promotes an expectation of conflict between religion and science. These narratives may well shape public attitudes or expectations on science and religion in ways that have not been acknowledged in previous research, such as the language of “no problem” that I found Catholic individuals commonly used when discussing evolution. Although this is not to draw a causal link between the articles I analysed and the public attitudes I found, rather, the articles are but one expression of a more deeply embedded cultural narrative of conflict, to which the stressing of “no problem” by Catholic Non-oppositionals is an implicit response. Similarly, other studies have shown a certain amount of ‘social projection’ when analysing public attitudes to science and religion (Elsdon-Baker, 2017b). This means that while members of a certain religious group may not perceive conflict between science and religion themselves, other people perceive and project conflict onto them. My findings further evidence this claim, with the majority of Catholics in my study having no issue with evolution, yet a narrative exists in public discourse suggesting that for their denomination there is a conflict between their faith and science.

Recommendations and future research directions

The media analysis in this thesis has demonstrated the importance of studying not only public attitudes, but also public discourse on science and religion. It is as important to investigate what is being said about religions and sciences in the public domain, as it is to study what those religious groups themselves are thinking, and the possible vectors and interactions between the two. In this section I outline the recommendations and future research directions into public discourse around Catholicism and evolution, and science and religion more broadly.

Humani generis and the opening of Pius XII archives

Access to the Vatican archives is integral to our understanding of the internal workings of the Vatican. It was the opening of the archives of the Congregations of the Holy Office and of the Index in 1998, which enabled Artigas et al. (2005) to produce their detailed study of Vatican dealings with pro-evolution Catholic authors between 1877 and 1902. Their study revealed the complex nature of elite Catholic dealings with evolution in the late-19th century. The archives relating to Pius XII's papacy (1939-1958) are, however, still closed. There have been calls for many years for the opening of these wartime archives, with some commentators believing the Vatican to be hiding possible relations between the Church and Nazi Germany during World War II (Posner, 2015). While it is usual practice to wait 70 years after the death of a pope to open the archives, there has been considerable pressure for the Vatican to open the archives of Pius' pontificate (D'Emilio, 2019). At the start of this thesis, there had been no sign that they would be opened, however as the project is coming to an

end, there has been positive news. Francis announced on 4th March, 2019, that the Vatican's secret archives for Pius XII's papacy will be opened on the 2nd March 2020 (Pullella, 2019).

Once opened, while much academic interest will rightly turn to scrutinizing the relations between the Vatican and Nazi Germany during World War II, there will also be an opportunity to further our knowledge about the past relationship between Catholic Church and advocates of evolution. As Pius XII's famous encyclical *Humani generis* was published in 1950, the opening of the archives will allow researchers the opportunity to investigate the internal documents surrounding its publication, and the inside debates that led to the Vatican's first public comment on evolution. This work will hopefully help to illuminate the previously unknown internal politics which led to Pius' famous address.

International coverage of papal statements on evolution

In Chapter 4 I demonstrated that coverage of recent papal statements on evolution in English publications was more restrained than in some US outlets. However, without a systematic investigation of representations in US coverage, we cannot make a complete comparison. Future work should seek to investigate other nation's coverage of the same episodes of papal statements on evolution, so a more systematic comparison of public discourse on the issue can be made. These are the types of comparisons we need to demonstrate the complexity of public discourse around science and religion, where the exact same events can receive differing representations in various national and cultural contexts. This type of work will further demonstrate the contingent nature of science-religion representations in public discourse; acting as further caution against relying passively on media sources for information on science and religion, and informing research

which demonstrates there is no fixed essential or categorical relationship between the two domains.

Untangling the 'two vectors' of the conflict narrative

In Chapter 5, I argued that more attention must be paid to the main 'two vectors' of the conflict narrative in public discourse. Specifically, for this study, this would mean: (1) evolution being represented as atheistic, or anti-theistic in nature; (2) the Catholic Church, or Catholic individuals, being represented as anti-evolution, or anti-science. Both vectors of the conflict narrative (anti-religious evolution and anti-evolution religion) emphasise the same point: an a priori and expected conflict between Catholicism and evolution. Certainly, my media analysis of coverage of papal statements on evolution evidences a distinct theme of representations of the Catholic Church as anti-science, often using the example of Galileo to embody the conflict between religion and science at large.

However, future work need not have Catholicism and evolution as the focus of this disentanglement. To understand the conflict narrative in more detail, we need to compare the relative responsibility attributed to 'science' and to 'religion' for causing said conflict. This can be achieved by investigating how 'science' and 'religion' are being represented in public discourse. We can then differentiate the types of conflict narrative present: i.e. who or what is being represented as the problem? Religion for being anti-science, or science for being anti-religion? Or more specifically, a religion for being anti a particular branch of science, or a science for being anti a particular denomination of religion. Currently, little attention has been paid to disentangling these two vectors in public discourse, hopefully future studies will do so.

The use of science-religion surveys in the media

In Chapter 1 I argued that of all the outputs from SSSR, it is almost exclusively survey work on science and religion which breaks through into media reporting. This is most evident in the repeated media citation that 40% of the US population are young earth creationists (YEC), a figure which has subsequently been shown to be problematic (Hill, 2014a). Thus, more so than any other methodological approach, survey research into public attitudes becomes a part of public discourse on science and religion. However, following in the tradition of Elsdon-Baker (2015a), I have also critiqued how these surveys are constructed, and the contrived results which can be generated by them. In Chapters 5 and 6 I demonstrated that there are certainly groups in society who don't neatly fall into the predetermined boxes of large-scale surveys on religious attitudes and evolution.

Not only do scholars need to develop better ways of conducting surveys, we should also turn our gaze to how they are used in the media. Of the existing science and religion, or evolution and religion surveys, which are most quoted in the media? What individuals, organisations or institutions conducted these prominent surveys, and for what implicit or explicit reasons? What arguments do media producers use these survey results to forward, and what are the dynamics between authorial voice, headlines and media marketing? These are important questions for the SSSR, first and foremost, because as academics in an area of study, we are producing results which feed directly back into our object of study – thus the results of our studies that initially set out to measure and analyse public perceptions are a key vector in informing and shaping public discourse on science and religion.

Public attitudes

Analysis of public attitudes is perhaps the most well developed area of SSSR. However, in Chapter 1 I highlighted that there are shortcomings in the way which some studies have sought to measure public attitudes on evolution. I have also argued that the groups we choose to study is an important consideration, and that there has been a tendency to focus on ‘problematic groups’. In this section, I discuss the top-level findings of my public attitudes analysis of interviews with Catholics in England on the topic of evolution.

Top-level findings

Catholic non-opposition: “No problem”

In Chapter 5, I detailed that the most common way for Catholics to describe their position on evolution was through stressing they had “no problem” with evolution. This is an interesting finding, as this emic language does not neatly map onto our usual etic categorisation of “acceptance”. This is the reason why in this study I chose to categorise my participants’ views mirroring language which they themselves had used, i.e. non-opposition and opposition. Clearly there is a difference between accepting something and not opposing it, for example, in one sense it could not be said that all my Non-oppositionals accepted ‘evolution’, as some could not detail an explanation which could be recognised in a biology textbook. However, they had no problem with ‘evolution’, thus they weren’t opposed to it.

Catholics unopposed to evolution rarely used the words of acceptance, instead choosing language of non-opposition. This may well be influenced by a dominant narrative in public discourse that expects opposition between Catholics, or religious people more

broadly, and science or evolution. Indeed, as discussed in Chapter 5, there was a general dissatisfaction with how the media treat the Catholic Church and science among my interviewees. Furthermore, as I have shown in my media analysis, there is a conflict narrative surrounding the Catholic Church and science in some English newspaper reporting on papal statements between 1996 and 2017. Of course we cannot show causality between the two, however the experience of dissatisfaction with media coverage of the Church and science, and my finding of a dominant conflict narrative in English newspapers, is indicative of the potential influence of public discourse on public attitudes. In this case, I would posit, Catholic individuals using the language of having “no problem” with evolution, is made in response to a dominant cultural narrative of expected conflict between Catholicism and evolution, which can be found across many areas of public discourse in England, including newspapers.

Debunking the ‘literalistic-rejection model’

In SSSR, there have been calls and moves in recent years to look beyond the epistemic when investigating supposed conflicts between science and religion (Evans and Evans, 2009; Long, 2011; Kaden et al., 2017). Scholars such as Hill have indeed found that the belief in Biblical inerrancy only predicts creationist beliefs when also coupled with belonging to a community that rejects evolution, highlighting the importance of social networks for creationist beliefs (Hill, 2014a; 2014b). The present thesis has followed this new direction in the field, moving away from epistemic factors of explanation. In Chapter 6, I critiqued what I term the ‘literalistic-rejection model’— the idea that Biblical literalism is the sole or only cause leading to positions opposing evolution. As the above call to move from

epistemic explanatory factors suggests, contemporary SSSR research does not hold literalism to be the sole factor in evolution rejection, though the simple linkage of literalism to evolution opposition can be found. For example, Miller et al. argue:

The biblical literalist focus of fundamentalism in the United States sees Genesis as a true and accurate account of the creation of human life that supersedes any scientific finding or interpretation. In contrast, mainstream Protestant faiths in Europe (and their U.S. counterparts) have viewed Genesis as metaphorical and— like the Catholic Church—have not seen a major contradiction between their faith and the work of Darwin and other scientists. (Miller et al., 2006: 765)

In this thesis, I have demonstrated that in England Catholics opposed to evolution and Catholics unopposed to evolution both had symbolic readings of Genesis. Therefore, evolution opposition was not linked to Biblical literalism in this study of Catholics in England. Conversely, it cannot be said that evolution non-opposition stemmed from these metaphorical readings of Genesis.

Interestingly, however, those who were unopposed to evolution did use the literalistic-rejection model themselves as a reason why they had no problem with evolution. For Non-oppositional Catholics in England, the literalistic-rejection model is used as a linguistic resource to justify their ability to endorse evolution. However, given that Oppositionals also had the same metaphorical readings of Genesis as Non-oppositionals, it is not likely the root cause of non-opposition. Furthermore, Oppositionals in this study did not refer to Genesis as a reason for their opposition to evolution, rather they used scientific and philosophical justifications for their opposition. Therefore, in this study at least, the relationship between Genesis and evolution was a somewhat detached one, with no simple

linkage of positions (i.e. literal = reject; symbolic = accept) as would be suggested by the literalistic-rejection model.

To reiterate, however, the use of the literalistic-rejection model by Catholic Non-oppositionals to justify why they have no problem with evolution is an interesting feature of the data in this study, and warrants further investigation. It may well be that this use of the literalistic-rejection model by Non-oppositionals is another facet of the social projection around science and religion found by Elsdon-Baker et al. (2017b). Elsdon-Baker et al. found that 60% UK respondents said they think religious members of the public will find it very difficult, difficult or somewhat difficult to “accept information about evolutionary science, in reference to their own personal beliefs or way of seeing the world” (Elsdon-Baker et al, 2017b: 3). Another question becomes, why do they think this? What percentage of this 60% are formulating this opinion of expected conflict because of a subscription to the literalistic-rejection model? Could it be that holding to the literalistic-rejection model is a widespread opinion regarding others’ attitudes to science and religion for the public at large, thus contributing to this social projection of conflict? Or, is the belief in the literalistic-rejection model more specific to non-literalistic religious individuals, like the Catholic Non-oppositionals in this study, for whom their belief in symbolic interpretations of Genesis justifies their own non-opposition to evolution? Future studies should assess the root causes of the social projection found by Elsdon-Baker et al. (2017b), and the prevalence of subscription to the literalistic-rejection model within this group.

Aligning with calls to move beyond simple epistemic explanations of attitudes in SSSR (e.g. Kaden et al., 2017; Evans, 2018), and work in PUS more broadly (e.g. Bauer et al., 2007),

this thesis finds no direct link between knowledge and attitudes towards evolution. That Catholics in this study could be unopposed to evolution with both high and low knowledge levels, and could oppose evolution with much knowledge of it, demonstrates there is no simple causal link between scientific knowledge and attitudes. This finding is similar to recent qualitative studies of Muslim attitudes to evolution in the UK (Moran, 2019) and is in line with critiques of the deficit model of PUS (Bauer et al., 2007).

Opposition with no alternative

There has been a tendency in SSSR to investigate Evangelical Christians and self-proclaimed creationist groups (Toumey, 1994; Hildering et al., 2012; Long, 2011). This is understandable, as these groups show some explicit antipathy to evolution, thus are worthy of study. However, I have argued that the focus on ‘problematic groups’ in the literature restricts our understanding of the ways in which religious beliefs and evolution may relate. Through the study of a group that has thus far not received dedicated study, Catholics in England, I find that there are a number of individuals who will also be missed by the type of blunt measures critiqued in Chapter 1. These individuals I term ‘Oppositional Non-alternatives’. They oppose evolution, yet have no alternative position which they can articulate. For these Catholics, the ‘scripture and tradition’ boundary is used to demarcate themselves from other traditions, in particular Evangelical Protestantism, whilst also meaning that they oppose evolution with no alternative scriptural position to fall back on, leading to an attitudinal grey space which cannot be categorised by blunt measures.

Recalling Hill’s (2019) two types of evolution polling questions: (1) true or false measures of human evolution, (2) self-categorisation into belief positions, it is clear that

studies attempting the second approach will not be able to capture the views of these Oppositional Non-alternatives. This is true even going beyond the three-part blunt measures found in the Gallup and *War on Sciences* polls critiqued by Elsdon-Baker (2015a), to the more sophisticated survey measures of Ecklund and Scheitle (2018). Offering even more belief positions for the public to choose from, will not allow the views of Oppositional Non-alternatives to emerge through survey data.

No fixed position on God's role regarding evolution

Linked to the above point is the finding that many of my participants had no formal position on God's role in relation to evolution. While maintaining a role for God was a major condition on which non-opposition to evolution relied, most did not have a thought-through view on exactly what that role was. Therefore, the more sophisticated self-classification surveys which offer participants multiple choices, e.g. God-guided or God-initiated evolution, (e.g. Ecklund and Scheitle, 2018) presuppose views which many religious individuals may not have. Indeed, Ecklund and Scheitle themselves found that very few people chose one box exclusively, and they interpreted participants' selection of multiple narratives as an indicator that individuals were not sure enough about their position to commit to one perspective (Ecklund and Scheitle, 2018: 79). Given my findings, it may well be that for some sections of religious populations, stressing non-opposition to evolution, so long as a role for God in Creation is maintained, is a detailed enough position.

It is also interesting to consider that while many of my participants had no fixed, thought through view of evolution and their faith, media coverage of attitudes towards evolution often forwards a notion of definitive fixed positions held with certainty, such as

the repeated indignation at the ~40% YEC figure in the USA (e.g. Ramsey, 2014). As articulated earlier, this is also linked to how we as researchers measure public opinion on science and religion. Our surveys, which provide neatly demarcated, all-encompassing belief positions play into public discourse on science and religion, further creating the expectation that people should and do have intellectualised views on the topic, that are held with conviction. Yet this is not always the case. I further reflect on what my findings mean with regard to future survey research in the next section.

Recommendations and future research directions

In the Introduction to this thesis, I argued that Catholicism is in a somewhat paradoxical position regarding science, religion, and evolution. On the one hand, in public discourse, Catholicism is held to be a particularly conflictual religious tradition with regard to science. References to Galileo are scattered *ad libitum* as though they tell the entire past relationship between not only the Catholic Church and science, but science and religion in general. On the other hand, in the academic study of religious attitudes to evolution, Catholics are not perceived to be a 'problematic group', and therefore have not yet received much scholarly attention. Given that the present thesis is the first dedicated qualitative study of Catholic attitudes towards evolution, I have generated insights from this study which may not have arisen from studying more obvious problematic religious groups. Below, I list the future research directions which these insights indicate, both for the study of Catholics and beyond.

More research into non-literalistic evolution opposition

None of the participants in this study opposed evolution because of a literal interpretation of the Bible. More qualitative work should be done to investigate opposition to evolution, particular within groups whose opposition to evolution is not linked with literalism. The present study's sample of Catholic evolution opponents was too small to draw any significant conclusions about the reasons for opposition, although as outlined in Chapter 6 their claimed justifications for opposition were mainly scientific and philosophical, not religious. While these are clearly emic justifications of the participants themselves, future work should look more deeply into etic accounts of non-literalistic evolution opposition. Recent work on Evangelicals, non-religious groups and Muslims has shown social networks and group identity to be promising analytic avenues in this regard (Hill 2014a; 2014b; Jones et al., 2018; Moran, 2019).

Distinguishing biological evolution from cosmological in surveys

The present thesis found a conflation of the Big Bang and biological evolution in a number of participants. That this conflation has also been found in research into Muslim perceptions of evolution (Moran, 2019), means caution must be exercised in future survey work. While the majority of measures used in surveys do include a short description of evolution, we must remain cognizant that when the word evolution is being interpreted on a public survey, individuals may well be conflating biological evolution with the Big Bang. Or indeed be thinking of an overarching narrative of science's explanation for the creation and development of the universe as a whole. This is not necessarily a bad or wrong interpretation of the word 'evolution', however the problem occurs when we as researchers

take attitudes towards this idiosyncratic interpretation, and analyse them as if they were only attitudes towards a consistently defined and neatly bound conception of biological evolution.

There are multiple paths forward for researchers in this regard. We may choose to accept that 'evolution' is a term interpreted in multiple ways, and therefore exercise care over the insights we draw from research specifically seeking to assess perceptions of biological evolution. Or, we may choose to be more specific when wanting to measure attitudes to biological evolution specifically. This could be achieved through qualifying the questions about evolution with the word 'biological', or a number of more specific questions including phrases about the change of animals, plants, and humans over time. Whichever way forward chosen, future researchers should be aware that publics interpret the term 'evolution' variedly, therefore in future survey work that seeks views on biological evolution specifically, we must be aware of issues such as the evolution-Big Bang conflation.

Rethinking self-classification in surveys

Scholars such as Elsdon-Baker (2015a) and Kaden et al. (2017) have critiqued attempts to quantitatively measure public attitudes through simplistic blunt or binary either/or measures, which seek to categorise public beliefs with the formalised positions (such as idealised versions of YEC) found in public discourse. Scholars have also attempted to disaggregate the beliefs of those who may tick the YEC option on a survey (Hill, 2014a; Unsworth and Voas, 2017). For example, Hill (2014a) has shown in the US that when disaggregated into multiple measures, such as and the earth was created in six 24-hour day, biological evolution is untrue; God created humans; humans are descended from a literal

Adam and Eve, etc., the standard figure of 40% YECs in Gallup polling falls to 8%. This highlights the differences between public opinion on the matter and the idealised versions of beliefs, as per the categorisation used in many surveys.

That Ecklund and Sheitle (2018) find uncertain belief positions when utilising more sophisticated survey items rather than the traditional three-part blunt measures, emphasises the need for new ways to measure public attitudes to religion. My own results, of Oppositional Non-alternatives and Non-oppositionals with no set view of God's role, also highlights the need for rethinking self-classification measures of religious individual's attitudes towards science. However, to rethink how we measure public attitudes to evolution in surveys is a complicated task.

It is clear that some people do hold fixed beliefs, which mirror the labels and positions of public discourse. This is evident from Hill's (2014a) disaggregation study, which showed that 8% of the US population do align with an idealised-form of YEC. Although, again this is much less than the 40% usually measured though Gallup polling (Kaden et al., 2017). So, some sections of the population do have fixed views, and from Ecklund and Sheitle's (2018) US study, we can tell that some people hold their fixed view with apparent certainty. Yet those who hold their views with certainty are outnumbered by those who do not, with 57.5% of respondents saying *none* of the origins narratives offered by Ecklund and Sheitle were "definitely true" (Ecklund and Sheitle, 2018: 77).

We are left, then, with a tricky proposition. How do we design quantitative measures which allow for those with fixed and certain beliefs, whilst at the same time allowing for the

fluid, heterogeneous, non-formalised views of other individuals to emerge in the same survey? More work must be done that allows the views of those who fall into a positional grey space to emerge through our survey designs. A fruitful research direction is in more qualitative work which seeks the 'bottom-up' push for various religious and non-religious publics' lived experience regarding evolution. While it is clear that most of our survey measures impose etic labels onto the populations we seek to study, we must further develop our understandings of the emic self-categorisation actually used by publics, regarding evolution. This aligns with Kaden et al.'s recommendation to develop a system of labels which are less reliant on the terms used in public discourse and debate (Kaden et al., 2019: 73). Indeed, as has been shown in the present study, these may not be positive belief positions, but instead the alignment with simple statements of opposition to evolution, or indeed non-opposition towards it.

Finally, however, we may question the whole enterprise of conducting representative surveys of attitudes to evolution altogether. What are the agendas behind these efforts to survey the opinions of a population regarding evolution? As has been suggested by Elsdon-Baker, creationists are often painted as the "ultimate unenlightened monsters that threaten scientific, and by extension societal, progress" (Elsdon-Baker, 2018: 259). Research methods which have been used in the past such as Gallup-style blunt measures have overinflated the prevalence of YEC, and therefore overemphasised this perceived 'creationist threat' to science and society. Consequently, perhaps we may speak in favour of more sophisticated surveys, and indeed more qualitative work, which seeks to allow the voices of individuals to speak on the topic of evolution in terms which more closely

resemble their own, even, and perhaps especially, if they don't have much to say.

Otherwise, we risk perpetuating a rigid, certain, divisive, and politically charged view of public perceptions of evolution and religion in society.

Coda

In this thesis, I have attempted to demonstrate the need to move beyond so-called 'problematic groups' in SSSR. This goal echoes the words of Elsdon-Baker and Mason-Wilkes (2019: 19), who call for a complexity thesis, akin to the historical complexity thesis, in SSSR. I have argued that we must go beyond classic sites of science-religion interaction which receive the most attention, if we are ever to truly understand the complexity of science-religion interactions which pervade contemporary societies. For my part, this has been in looking beyond the classic 'problematic groups', instead investigating the relationship between Catholicism and evolution in England.

Whilst achieving this goal of social complexity, I have also argued that it is paramount to study both public attitudes and public discourse on science and religion, even if it is difficult to demonstrate that one directly affects the other. Without understanding public discourse around the science and the religion in question, we miss the cultural milieu and expectations in which these public attitudes are situated. Furthermore, without detailed investigations of media representations of events, alongside the events themselves, we may fall foul of the trap of taking press narratives at face value, as has occurred around Benedict's comments on evolution. We must always remember that media discourse on the topic of science and religion is an object of study, not an unbiased source of information.

This thesis also fits in with the ‘myth-busting’ genre which has dominated historical studies of science and religion over the past few decades (e.g. Numbers, 2009). Recent work in SSSR has also adopted this myth-busting approach (e.g. Ecklund and Scheitle, 2018; Moran, 2019). On the broadest level, the very fact this thesis demonstrates complexity of science-religion interactions makes it a text critiquing prior essentialist accounts, as I reject the idea of an all-pervading conflict meta-narrative. However, on a more specific level, I help deconstruct two common dominant narratives about Catholicism and evolution. First, that Pope Benedict was a supporter of ID. Second, that evolution opposition is necessarily tied to Biblical literalism.

I referred in Chapter 1, to a review of Harrison’s (2015) *Territories of Science and Religion*, in which Lightman (2016) asked if the work was in line with the historiographic method of the past few decades, or represented a new meta-narrative of historical science-religion interactions. In response, Harrison (2016) argued his work was an attempt to explain historical complexity, which emerges in part from the projection of 21st-century categories of science and religion onto past events. Harrison also spoke in defence of meta-narrative, asking counterfactually, how would historians of science and religion have occupied themselves without the existence of the conflict narrative, and their work in critiquing it? Nevertheless, Harrison argued that myth-busting must eventually come to an end, and a reconstructive process of historical accounts must begin (Harrison, 2016).

While the myth-busting process of historical studies may well come to an end, I feel that for SSSR, a similar process is just beginning. There is no shortage of instances of public discourse, which forwards a contemporary and at heart essentialist conflict narrative. With

every instance providing a new avenue and opportunity for more holistic social research which highlights the true complexity of actual lived experiences. However, revealing the complex tapestry of social science-religion interactions will require the concerted effort of social researchers. Given the preponderance of a science-religion conflict narrative in contemporary public discourse, and that research is beginning to show this does not necessarily reflect peoples' lived experiences, it would seem that social studies of science and religion have a fruitful period ahead.

What is the relationship between science and religion? Given that in one religion, there can be individuals both for and against a particular science such as evolution; and given that different popular media may represent a single individual's views as both opposed to and unopposed to evolution, as happened for Benedict, perhaps we need to expand the question we ask. What are the possible relationships between a science and a religion, and who gets to define them? However, in line with the social complexity thesis, and to guide our future research efforts, perhaps it is better to reformulate once more: What are the relationships between sciences and religions?

This thesis has demonstrated that future research endeavours which attempt to answer this question must move beyond solely studying 'problematic groups' if we are to build a complexity thesis in SSSR. Furthermore, we must study not only public attitudes but also public discourse on the topic in question. Finally, as scholars in an area of research, we must remain aware that the work we produce may well feedback into one of our objects of study—public discourse around science and religion, which indeed may feedback into public attitudes. Thus, we must be cognizant of the interrelationship between science and religion

professionals, media producers, public attitudes, and our own scholarly work. Hopefully future work will begin to map this web of social interaction concerning religion, science, and their many contingent relations.

List of References

- ABC. (2006) 'National daily newspaper circulation: 2006', *Audit Bureau of Circulations*. Available at: <https://www.abc.org.uk/data/reports-and-analysis> (Accessed: 15 April 2017)
- Aechtner, T. (2015) 'Galileo Still Goes to Jail: Conflict Model Persistence within Introductory Anthropology Materials', *Zygon: Journal of Religion and Science*, 50: 209–226.
- Allen, J. (2006) 'Benedict's thinking on creation and evolution', *National Catholic Reporter*, 1 September.
- Allum, N., Sibley, E., Sturgis, P., and Stoneman, P. (2014) 'Religious beliefs, knowledge about science and attitudes towards medical genetics', *Public Understanding of Science*, 23(7): 833–849.
- Allum, N., Sturgis, P., Brunton–Smith, I., and Tabourazi, D. (2008) 'Science knowledge and attitudes across cultures: A meta–analysis', *Public Understanding of Science*, 17(1): 35–54.
- Altheide, D.L. (2004) 'Ethnographic content analysis', in Lewis-Beck, M.S., Bryman, A., and Futing Liao, T. (Eds) *The SAGE encyclopedia of social science research methods*. Thousand Oaks, CA: SAGE Publications Ltd.
- Altheide, D. and Schneider, C. (2013) 'Ethnographic content analysis.' (2013). In Altheide, D. and Schneider, C. (Eds) *Qualitative media analysis*. London: SAGE Publications Ltd, pp. 23-37.
- Appleby, R.S. (1999) 'Exposing Darwin's "Hidden Agenda": Roman Catholic Responses to Evolution,' in Numbers, R.L. and Stenhouse, J. (Eds) *Disseminating Darwinism. The Role of Place, Race, Religion, and Gender*. Cambridge: Cambridge University Press.
- Artigas, M., Glick, T.F., and Martinez, R.A. (2006) *Negotiating Darwin: The Vatican Confronts Evolution 1877-1902*. Baltimore: The Johns Hopkins University Press.
- Baker, JO. (2012) 'Public perceptions of incompatibility between "science" and "religion",' *Public Understanding of Science*, 21(3):340-53.
- Barbour, I.G. (1966) *Issues in Science and Religion*. New Jersey: Prentice-Hall.
- Barbour, I.G. (1974) *Myths, Models, and Paradigms*. New York: HarperCollins.
- Barbour, I.G. (1990) *Religion in an Age of Science*. San Francisco: Harper & Row.

Barbour, I. G. (1997) *Religion and Science: Historical and Contemporary Issues*. San Francisco: Harper San Francisco.

Barbour, I.G. (2000) *When Science Meets Religion: Enemies, Strangers, or Partners?* New York: HarperCollins.

Barker, E. (1979) 'In the beginning: the battle of creationist science against evolutionism', *The Sociological Review*, 27(1): 179–200.

Barthélemy-Maudaule, M. (1982) *Lamarck the Mythical Precursor. A Study of the Relations between Science and Ideology*. Cambridge, MA: MIT Press.

Bauer, M. (2008) 'Survey research on public understanding of science', in Bucchi, M. and Trench, B. (Eds) *Handbook of public communication of science and technology*. London: Routledge.

Bauer, M.W. (2009) 'The evolution of public understanding of science - discourse and comparative evidence', *Science, Technology and Society*, 14(2): 221-240.

Bauer, M.W., Allum, N., and Miller, S. (2007) 'What have we learnt from 25 years of PUS research – liberating and widening the agenda', *Public Understanding of Science*, 15(1): 1-17.

BBC. (2006) *Britons Unconvinced on Evolution*, 26 January. Available at: <http://news.bbc.co.uk/1/hi/sci/tech/4648598.stm> (Accessed: 10 February 2019)

BBC. (2018) *Search engine optimisation (SEO)*, Available at: <http://www.bbc.co.uk/academy/journalism/article/art20130702112133608> (Accessed: 11 February 2019)

Behe, M.J. (1996) *Darwin's Black Box: The Biochemical Challenge to Evolution*. New York: Free Press.

Bell, J. (2005) *Doing Your Research Project: A Guide for First-Time Researchers in Education, Health and Social Science*. 4th edn. Berkshire: Open University Press.

Benedict XVI. (2005) Homily of His Holiness Benedict XVI. Available at: https://w2.vatican.va/content/benedict-xvi/en/homilies/2005/documents/hf_ben-xvi_hom_20050424_inizio-pontificato.html (Accessed: 23 May 2017)

Benedict XVI. (2007) Meeting with the clergy of the Dioceses of Belluno-Feltre and Treviso in Auronzo di Cadore. Available at: http://w2.vatican.va/content/benedict-xvi/en/speeches/2007/july/documents/hf_ben-xvi_spe_20070724_clero-cadore.html (Accessed: 23 May 2017)

Benedict XVI. (2008) *Creation and Evolution: A Conference with Pope Benedict XVI*. San Francisco, CA: Ignatius Press.

Benedict XVI. (2013) 'Full Text of Benedict XVI's Letter to Atheist', *NCR Register*, Available at: <http://www.ncregister.com/blog/edward-pentin/full-text-of-benedict-xvis-letter-to-atheist-odifreddi> (Accessed: 18 October 2018)

Bennett, D.J. and Jennings, R.C. (2011) *Successful science communication: Telling it like it is*. Cambridge: Cambridge University Press.

Berger, D. (2014) 'Pope Francis: God is not "a magician with a magic wand"', *MSNBC*. 28 October. Available at: <http://www.msnbc.com/msnbc/pope-francis-god-not-magician-magic-wand#50899> (Accessed: 2 February 2018)

Berger, P.L. (1967) *The Sacred Canopy: Elements of a Sociological Theory of Religion*. New York: Doubleday.

Berger, P.L. (ed.) (1999) *The Desecularization of the World*. Washington DC: Ethics and Public Policy Center.

Berger, P.L. and Luckmann, T. (1966) *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. New York: Anchor Books.

Berger, R. (2013) 'Now I see it, now I don't: researcher's position and reflexivity in qualitative research', *Qualitative Research*, 15(2): 219-234.

Blancke, S. (2013) 'Catholic Responses to Evolution, 1859–2009: Local Influences and Mid-Scale Patterns', *Journal of Religious History*, 37: 353–368.

Blancke, S., Hjerimitslev, H.H., Braeckman, J., and Kjærgaard, P.C. (2013) 'Creationism in Europe: Facts, Gaps, and Prospects', *Journal of the American Academy of Religion*, 81 (4): 996-1028.

Blancke, S., Hjerimitslev, H.H., and Kjærgaard, P.C. (Eds). (2014). *Creationism in Europe*. Maryland: JHU Press.

Bowler, P.J. (1988) *The Non-Darwinian Revolution: Reinterpreting a Historical Myth*. Baltimore: Johns Hopkins University Press.

Bowler, P.J. (1996) *Charles Darwin: The Man and his Influence*. Cambridge: Cambridge University Press.

Bowler, P.J. (2005) 'Revisiting the Eclipse of Darwinism', *Journal of the History of Biology*, 38(1): 19-32.

Bowler, P.J. (2009) *Science for all: the popularization of science in early twentieth-century Britain*. Chicago: University of Chicago Press.

Boylan, M. (2005) 'Aristotle: Biology', *Internet Encyclopaedia of Philosophy*. Available at: <https://www.iep.utm.edu/aris-bio/> (Accessed: 20 January 2019)

Brooke, J.H. (1990) 'Science and Religion', in Olby, R.C., Cantor, G.N., Christie, J.R.R., and Hodge, M.J.S. (Eds) *Companion to the History of Modern Science*, London: Routledge, pp. 763-782.

Brooke, J.H. (1991) *Science and Religion: Some Historical Perspectives*. Cambridge: Cambridge University Press.

Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3 (2): 77-101.

Braun, V. and Clarke, V. (2013) *Successful qualitative research: A practical guide for beginners*. London: Sage Publications Ltd.

Brenner, P.S. (2011) 'Identity importance and the overreporting of religious service attendance: Multiple imputation of religious attendance using the American Time Use Study and the General Social Survey', *Journal for the Scientific Study of Religion*, 50(1): 103-115.

Brossard, D., Scheufele, D.A., Kim, E., and Lewenstein, B.V. (2009) 'Religiosity as a perceptual filter: Examining processes of opinion formation about nanotechnology', *Public Understanding of Science*, 18(5): 546-558.

Brougham, H. (1827) *A Discourse of the Objects, Advantages, and Pleasures of Sciences*. London: Baldwin, Cradock, and Joy.

Brown, A. (1996) 'Vatican's slow evolution as it discovers Darwin', *The Independent*, 25 October.

Brundell, B. (2001) 'Catholic Church Politics and Evolution Theory, 1894-1902', *The British Journal for the History of Science*, 34(1): 81-95.

Brundell, B. (2008) 'Book review: Mariano Artigas; Thomas F. Glick; Rafael A. Martínez. Negotiating Darwin: The Vatican Confronts Evolution, 1877-1902', *Isis*, 99(2): 415-416.

Bryson, B. (2016). 'Symbolic boundaries', in Inglis, D. and Almila, A. (Eds) *The SAGE Handbook of cultural Sociology*, London: SAGE Publications Ltd, pp. 349-362.

Bucchi, M. (2008) 'Of deficits, deviations and dialogues: Theories of public communication of science', in Bucchi, M. and Trench, B. (Eds) *Handbook of public communication of science and technology*. London: Routledge.

Bullivant, S. (2016) *Contemporary Catholicism in England and Wales: a statistical report based on recent British Social Attitudes Survey Data*. Project Report. Benedict XVI Centre for Religion and Society.

Butterfield, H. (1931) *The Whig Interpretation of History*. London: G. Bell and sons.

Caldwell, S. (2006) 'Pope sacks astronomer over evolution debate', *MailOnline*, 23 August. Available at: <https://www.dailymail.co.uk/news/article-401950/Pope-sacks-astronomer-evolution-debate.html> (Accessed: 21 June 2018)

Campbell, G.L. (2003) '*Lucretius on creation and evolution: A commentary on De rerum natura, book five, lines 772-1104*', Oxford: Oxford University Press.

Cantor, G. (2010) 'What shall we do with the "Conflict Thesis"?', in Dixon, T., Cantor, G., and Pumfrey, S. (Eds) *Science and Religion: New Historical Perspectives*. Cambridge: Cambridge University Press, pp. 283-298.

Cantor, G. (2015) 'John Tyndall's religion: a fragment', *Notes and Records: the Royal Society Journal of the History of Science*, 69: 419-436.

Cantor, G. and Brooke, J.H. (1998) *Reconstructing Nature: The Engagement of Science and Religion*. Oxford: Oxford University Press.

Cantor, G. and Kenny, C. (2001) 'Barbour's Fourfold Way: Problems with His Taxonomy of Science-religion Relationships', *Zygon*, 36: 765-781.

Cantor, G. and Swetlitz, M. (2006) *Jewish tradition and the challenge of Darwinism*. Chicago: University of Chicago Press.

Catholic Church. (2012) 'The Sacrament of the Eucharist', in *Catechism of the Catholic Church*. 2nd edn. Vatican City: Libreria Editrice Vaticana. Available at: http://www.vatican.va/archive/ccc_css/archive/catechism/p2s2c1a3.htm (Accessed: 18 September 2019)

Catto, R. (2015) 'Sociology of religion in Great Britain: Interdisciplinarity and gradual diversification', in Blasi, A. and Giordan, G. (Eds) *Sociologies of religion: National traditions*. Leiden: Brill, pp. 107–131.

Chaberek, M. (2015) *Catholicism and Evolution: A History from Darwin to Pope Francis*. Ohio: Angelico Press.

Chaberek, M. (2015) 'On Evolution, Theology and Thomism: An Interview with Michael Chaberek', *Evangelical Philosophical Society*, Available at: <http://epsociety.org/library/articles.asp?pid=271> (Accessed: 18 October 2016)

Clarke, V. and Braun, V. (2013) 'Teaching thematic analysis: Over-coming challenges and developing strategies for effective learning', *The Psychologist*, 26(2): 120-123.

Clarke, V. and Braun, V. (2014) 'Thematic analysis', in Michalos, A.C. (ed.) *Encyclopaedia of Quality of Life and Well-Being Research*. Netherlands: Springer, pp. 6626-6628.

CNS. (2006) Vatican Observatory head rebuts suggestions that he was fired. *Catholic News Service*. 11 September.

Collins, F. (2008) *The Language of God: A Scientist Presents Evidence for Belief*. New York: Simon and Schuster.

Collins, H. and Yearley, S. (1992) 'Epistemological Chicken', in Pickering, A. (ed) *Science as Practice and Culture*. Chicago: University of Chicago Press.

Collins, H. and Pinch, T. (1993) *The Golem: What Everyone Should Know About Science*. Cambridge: Cambridge University Press.

Comte, A. (1853) *The positive philosophy of Auguste Comte*. London: Chapman.

Cooper, C. P. and Yukimura, D. (2002) 'Science writers' reactions to a medical 'breakthrough' story', *Social Science & Medicine*, 54(12): 1887-1896.

Courtney, L. (2014) 'Pope gives the rule book a tweak', *The Sunday Times*, 2 November.

Coyne, G. (2006) 'God's Chance Creation', *The Tablet*, 6 August.

Curtice, J., Clery, E., Perry, J., Phillips M., and Rahim, N. (Eds) (2019) *British Social Attitudes: The 36th Report*, London: The National Centre for Social Research.

Daily Mail (2008) 'ET could be out there, says Vatican astronomer', 14 May.

Darwin, C. (1872) *On the Origin of Species by Means of Natural Selection*. 6th ed. London: John Murray.

Darwin Now (2009) J09-007003 - Project Darwin Omnibus - Great Britain April. Ipsos Mori.

David Fasold & Anor v Allen Roberts & Anor (1997) Federal Court of Australia, 439, 2 June. Available at: http://www8.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/federal_ct/1997/439.html (Accessed: 7 January 2018)

Davie, G. (1994) *Religion in Britain since 1945: Believing without belonging*. Oxford: Blackwell.

Davie, G. (2013) *The sociology of religion: A critical agenda*. London: Sage.

Davies, L. (2014) 'Evolution and creation both right, says pope; Pope Francis cautions against portraying God as magician, and says it is possible to believe in evolution and creation', *The Guardian*, 28 October.

Davies, S.R. (2008) 'Constructing communication: Talking to scientists about talking to the public', *Science Communication*, 29(4): 413–434.

Davis, D. (1997) *Theistic Evolution: What Difference Does It Make?: Like Fire and Ice, the Bible and Evolution Don't Mix*. Available at: <https://answersingenesis.org/theistic-evolution/what-difference-does-it-make/> (Accessed: 10 January 2018)

Davis, T. (2018) 'Core Tenets or Assumptions of Theistic Evolution', *BioLogos*, 15 October. Available at: <https://biologos.org0/articles/theistic-evolution-history-and-beliefs> (Accessed: 28 May 2019)

Davis, P. and Kenyon, D.H. (1989) *Of Pandas and People: The Central Question of Biological Origins*. Texas: Foundation for Thought and Ethics.

Dawkins, R. (1999) 'Statements from: *The Descent of Man*', *Australian Broadcasting Corporation, Radio National*, 22 January. Transcript available at: www.abc.net.au/rn/science (Accessed: 2 June 2018)

Dawkins, R. (2006) *The God Delusion*. London: Bantam Press.

Dawkins, R. (2009) *The Greatest Show on Earth: The Evidence for Evolution*. New York: Simon and Schuster.

Dawkins, R. (2017) 'Richard Dawkins: Why Religion and Evolution Don't Mix Well', *Big Think YouTube Channel*. Available at: https://www.youtube.com/watch?v=6u8gAV7om_g (Accessed: 5 April 2018)

Dawson, G. (2012) 'Paleontology in Parts: Richard Owen, William John Broderip, and the Serialization of Science in Early Victorian Britain', *Isis*, 103(4): 637-667.

Dawson, G., Noakes, R., and Topham, J.R. (2004) 'Introduction', in Cantor, G., Dawson, G., Gooday, G., Noakes, R., Shuttleworth, S., and Topham, J.R (Eds) *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*. Cambridge: Cambridge University Press, pp. 1-15.

D'Emilio, F. (2019) *Vatican to open archives on World War II-era Pope Pius XII*. Available at: <https://cruxnow.com/vatican/2019/03/04/vatican-to-open-archives-on-world-war-ii-era-pope-pius-xii/> (Accessed: 15 April 2019)

De Bont, R. (2005) 'Rome and Theistic Evolutionism: The Hidden Strategies Behind the "Dorlodot Affair", 1920-1926', *Annals of Science*, 62(4): 457-478.

De Bont, R. (2007) 'A Serpent without Teeth. The Conservative Transformism of Jean-Baptiste d'Omalus d'Halloy (1783–1875)', *Centaurus*, 49: 114–137.

De Bont, R. (2008) *Darwins Kleinkinderen: De Evolutietheorie in België 1865-1945*. Nijmegen: Vantilt.

Dean, C. and Goodstein, L. (2009) 'Leading Cardinal Redefines Church's View on Evolution', *The New York Times*, 5 July.

Dennett, D. (1995) *Darwin's Dangerous Idea: Evolution and the Meanings of Life*. London: Penguin.

Dennett, D. and Plantinga, A. (2011) *Science and Religion: Are They Compatible?* New York: Oxford University Press.

Dias, E. (2014) Sorry, But Media Coverage of Pope Francis is Papal Bull. Available at: <http://time.com/3545844/pope-francis-evolution-creationism/> (Accessed: 20 October 2016)

Dobzhansky, T. (1937) *Genetics and the Origin of Species*. New York: Columbia University Press.

Donnelly, P.J. (2006) 'A Critique of evolution within Catholicism and its subsequent links with fundamental Christianity', PhD Thesis. Freedom Bible College and Seminary.

Douglas, M. and Wildavsky, A. (1982) *Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers*. California: University of California Press.

Draper, W. (1874) *History of the Conflict Between Religion and Science*. New York: D. Appleton and Company.

Dwyer, S.C. and Buckle, J.L. (2009) 'The Space Between: On Being an Insider-Outsider in Qualitative Research', *International Journal of Qualitative Methods*, 8(1): 54–63.

Eddy, M. (2007) Pope says evolution can't be proven. 11 April. Available at: https://usatoday30.usatoday.com/tech/science/2007-04-12-pope-evolution_N.htm (Accessed: 15 October 2018)

Ecklund, E.H. and Park, J.Z. (2009) 'Conflict Between Religion and Science Among Academic Scientists?' *Journal for the Scientific Study of Religion*, 48(2): 276-292.

Ecklund, E.H. and Scheitle, C.P. (2007) 'Religion among academic scientists: distinctions, disciplines, and demographics', *Social Problems*, 54(2): 289–307.

Edwards, R. and Holland, J. (2013) *What is qualitative interviewing?* London: A&C Black.

Eldson-Baker, F. (2007) *Historiographical constraints on evolutionary theory: conceptualisations of the inheritance of acquired characteristics*. PhD Thesis. University of Brighton.

Eldson-Baker, F. (2015a) 'Creating Creationists: The Influence of "issues Framing" on Our Understanding of Public Perceptions of Clash Narratives between Evolutionary Science and Belief', *Public Understanding of Science*, 24(4): 422–439.

Eldson-Baker, F. (2015b) 'Contested inheritance: debates on the role of "inheritance of acquired characteristics" in late nineteenth century Darwinian and Weismannian thought', *Textual Practice*, 29(3): 547-571.

Eldson-Baker, F. (2018) 'Re-examining 'creationist' monsters in the uncharted waters of social studies of science and religion', in Nerlich, B., Hartley, S., Raman, S., and Smith, A. (Eds) *Science and the Politics of Openness: Here be Monsters*. Manchester: Manchester University Press, pp. 259-277.

Eldson-Baker, F., Leicht, C., Mason-Wilkes, W., Preece, E., and Piggott, L. (2017a) 'Summary report of preliminary findings for a survey of public perspectives on Evolution and the relationship between Evolutionary Science and Religion'. Available at: <https://sciencereligionspectrum.org/wp-content/uploads/2017/09/SRESYouGov-survey-preliminary-findings-5.9.17.pdf> (Accessed: 30 October 2018)

- Eldon-Baker, F., Leicht, C., Mason-Wilkes, W., Preece, E., and Piggott, L. (2017b) 'Supplementary summary report of preliminary findings for a survey of public perspectives on Evolution and the relationship between Evolutionary Science and Religion'
- Ellegård, A. (1958a) *Darwin and the general reader: the reception of Darwin's theory of evolution in the British periodical press, 1859-1872*. Chicago: University of Chicago Press.
- Ellegård, A. (1958b) 'Public Opinion and the Press: Reactions to Darwinism', *Journal of the History of Ideas*, 19(3): 379-387.
- Ellmann, L. (1996) 'Multicoloured salads and other disturbances', *The Independent*, 27 October 1996.
- Engel, R. and Warner, K. (2019) 'Steve Bannon and U.S. ultra-conservatives take aim at Pope Francis', *NBC News*, 12 April. Available at: <https://www.nbcnews.com/news/world/steve-bannon-u-s-ultra-conservatives-take-aim-pope-francis-n991411> (Accessed 23 May 2019)
- Entman, R.M. (1993) 'Framing: Toward clarification of a fractured paradigm', *Journal of Communication*, 43: 51–58.
- Entman, R.M. (2004) *Projections of Power: Framing News, Public Opinion and US. Foreign Policy*. Chicago: University of Chicago Press.
- Epley, N., Converse, B.A., Delbosc, A., Monteleone, G.A., and Cacioppo, J. T. (2009) 'Believers' estimates of God's beliefs are more egocentric than estimates of other people's beliefs', *Proceedings of the National Academy of Sciences*, 106(51): 21533-21538.
- Erwin, D.H. (2001) 'Macroevolution is more than repeated rounds of microevolution', *Evolution & development*, 2(2): 78-84.
- Evans, J.H. (2002) *Playing God? Human Genetic Engineering and the Rationalization of Public Bioethical Debate*. Chicago: University of Chicago Press.
- Evans, J. H. (2011) 'Epistemological and Moral Conflict Between Religion and Science', *Journal for the Scientific Study of Religion*, 50: 707–727.
- Evans, J.H. (2018) *Morals not knowledge: Recasting the contemporary US conflict between religion and science*. Oakland, CA: University of California Press.
- Evans, J.H. and Evans. M.S. (2008) 'Religion and Science: Beyond the Epistemological Conflict Narrative', *Annual Review of Sociology*, 34: 87–105.

- Evans, M.S. (2009) 'Defining the public, defining sociology: hybrid science—public relations and boundary-work in early American sociology', *Public Understanding of Science*, 18: 5-22.
- Finlay, L. (2002) "'Outing" the researcher: The provenance, process, and practice of reflexivity', *Qualitative health research*, 12(4): 531-545.
- Finocchiaro, M.A. (2001) 'Science, Religion, and the Historiography of the Galileo Affair: On the Undesirability of Oversimplification', *Osiris*, 16: 114-132.
- Finocchiaro, M.A. (2009) 'That Galileo was imprisoned and tortured for advocating Copernicanism', in Numbers, R. (ed) *Galileo Goes to Jail: And Other Myths About Science and Religion*. Cambridge, MA: Harvard University Press, pp. 68-78.
- Fisher, R. (1918) 'The correlation between relatives on the supposition of Mendelian inheritance', *Transactions of the Royal Society of Edinburgh*, 52: 399–433.
- Fleming, C. and Goodall, J. (2002) 'Dangerous Darwinism', *Public Understanding of Science*, 11: 259-271.
- Francis (2014) *Plenary Session of the Pontifical Academy of Sciences; inauguration of the bust in honour of Pope Benedict XVI*. Available at: https://w2.vatican.va/content/francesco/en/speeches/2014/october/documents/papa-francesco_20141027_plenaria-accademia-scienze.html (Accessed: 12 November 2016)
- Francis, L.J. and Greer, J.E. (1999) 'Attitudes towards creationism and evolutionary theory: The debate among secondary pupils attending Catholic and Protestant schools in Northern Ireland', *Public Understanding of Science*, 8(2): 93-103.
- Frazzetto, G. (2004) 'Embryos, cells and God', *EMBO Reports*, 5(6): 553–555.
- Freiburger, D. and Numbers, R.L. (2009) 'Review of: "Peter M. J. Hess; Paul L. Allen: *Catholicism and Science*, and Don O'Leary: *Roman Catholicism and Modern Science: A History*', *Isis*, 100(3): 636-638.
- Fyfe, A. (2004) *Science and salvation: Evangelical popular science publishing in Victorian Britain*. Chicago: University of Chicago Press.
- Gamson, W.A. and Modigliani, A. (1987) 'The changing culture of affirmative action', in Braungart, R.G. and Braungart, M.M. (Eds) *Research in political sociology*, 3rd edn. Greenwich, CT: JAI Press, pp. 137–177.

Gieryn, T.F. (1983) 'Boundary-work and the demarcation of science from nonscience: strains and interests in professional ideologies of scientists', *American Sociological Review*, 48: 781–95.

Gieryn, T.F., Bevins, G.M., and Zehr, S.C. (1985) 'Professionalization of American scientists: public science in the creation/evolution trials.' *American Sociological Review*, 50: 392–409.

Gillott, G. (2014) 'Points: And email letters', *The Sunday Times*, 16 November.

Gitlin, T. (1980) *The Whole World is Watching: Mass Media in the Making and Unmaking of the New Left*. Berkeley: University of California Press.

Given, L. M. (2008) *The SAGE encyclopedia of qualitative research methods*. California: SAGE Publications Ltd.

Gjersoe, N. (2016) 'Evolution makes scientific sense. So why do many people reject it?' *Guardian Online*, 31 March. Available at: <https://www.theguardian.com/science/head-quarters/2016/mar/31/intelligent-design-popular-evolution-creationism> (Accessed: 12 December 2018)

Glennan, S. (2009) 'Whose science and whose religion? Reflections on the relations between scientific and religious worldviews', *Science and Education*, 18(7): 797–812.

Glick, T.F. (ed.) (1988) *The Comparative Reception of Darwinism*. Chicago: University of Chicago Press.

Glick, T.F. (2017) 'Intelligent design', *Encyclopædia Britannica*, 28 February. Available at: <https://www.britannica.com/topic/intelligent-design> (Accessed: 14 June 2019)

Goodman, S. (2008) 'The generalizability of discursive research', *Qualitative Research in Psychology*, 5(4): 265-275.

Gotthelf, A. (1999) 'Darwin on Aristotle', *Journal of the History of Biology*, 32: 3-30.

Gough, B., Lawton, R., Madill, A., and Stratton, P. (2003) *Guidelines for the supervision of undergraduate qualitative research in psychology*. York: LTSN Psychology.

Gould, S.J. (1997) 'Nonoverlapping Magisteria', *Natural History*, 106: 16-22.

Gould, S.J. (1999) *Rocks of Ages: Science and Religion in the Fullness of Life*. New York: Random House.

Gray, J. (2018) *Seven Types of Atheism*. London: Penguin Uk.

Green, E. (2015) 'The Pope's moral case for taking on climate change,' *The Atlantic*, 18 June.

Gregory, A. (2016) *Anaximander: A Re-assessment*. London: Bloomsbury Publishing.

Gregory, J. and Lock, S.J. (2008) 'The evolution of "public understanding of science": Public engagement as a tool of science policy in the UK', *Sociology Compass*, 2(4): 1252-1265.

Guest, G., MacQueen, K.M., and Namey, E.E. (2012) *Applied thematic analysis*. California: Sage Publications Ltd.

Guhin, J. (2016) 'Why worry about evolution? Boundaries, practices, and moral salience in Sunni and evangelical high schools', *Sociological Theory*, 34(2): 151–74.

Gülker, S. (2019) 'From 'Science and Religion' to 'Transcendence in Science', or: What We Can Learn from the (History of) Science and Technology Studies', in Jones, S., Kaden, T., Catto, R. (Eds) *Science, Belief, and Society: International Perspectives on Religion, Non-Religion and the Public Understanding of Science*. London: Brunel University Press, pp. 105-128.

Gustafson, P. (2001) 'Meanings of place: Everyday experience and theoretical conceptualizations', *Journal of Environmental Psychology*, 21(1): 5–16.

Hacking, I. (1986) 'Making Up People', In Heller, T.C., Sosna, M., and Wellbery, D.E. (Eds) *Reconstructing Individualism: Autonomy, Individuality, and the Self in Western Thought*, California: Stanford University Press, pp. 161–71.

Hacking, I. (1999) *The Social Construction of What?* Massachusetts: Harvard University Press.

Hall, A. (2019) 'A Humanist Blockbuster? Jacob Bronowski and The Ascent of Man,' in Lightman B. (Ed) *Rethinking History, Science, and Religion: An Exploration of Conflict and the Complexity Principle*. Pittsburgh: University of Pittsburgh Press, forthcoming November 2019.

Harrison, P. (2015) *The Territories of Science and Religion*. Chicago and London: University of Chicago Press.

Harrison, P. (2016) 'Old Categories, New Territories, and Future Directions: A Response to Bernard Lightman', Available at: <http://scienceligionsspectrum.org/long-reads/harrison-lightman-territories-science-religion/> (Accessed: 20 January 2017)

- Haught, J.F. (2013) 'Darwin and Catholicism', In Ruse, M. (ed) *The Cambridge Encyclopedia of Darwin and Evolutionary Thought*. Cambridge: Cambridge University Press, pp. 485-492.
- Hayes, M.A. and Gearon, L. (1999) *Contemporary Catholic Theology: A Reader*. London: A&C Black.
- Head, E. (2009) 'The ethics and implications of paying participants in qualitative research', *International Journal of Social Research Methodology*, 12(4): 335-344.
- Headland, T.N., Pike, K.L., and Harris, M.E. (1990) *Emics and etics: The insider/outsider debate*. Thousand Oaks, CA: Sage Publications Inc.
- Hess, P. and Allen, P.I. (2008) *Catholicism and Science: Greenwood Guides to Science and Religion*. London: Greenwood Press.
- Heilbron, J.L. (1999) *The Sun in the Church: Cathedrals as Solar Observatories*. Massachusetts: Harvard University Press.
- Henderson, M. (2007) 'The 'End of Men' is postponed', *The Times*, 16 April.
- Heneghan, T. (2007) 'Pope says science too narrow to explain creation', 11 April, Available at: <http://www.reuters.com/article/us-pope-evolution/pope-says-science-too-narrow-to-explain-creation-idUSL1015081120070411> (Accessed: 28 August 2017)
- Hilderling, P., Consoli, L., and Born, R. (2013) 'Denying Darwin: Views on Science in the Rejection of Evolution by Dutch Protestants', *Public Understanding of Science*, 22(8): 988–998.
- Hill, J.P. (2014a) *National study of religion and human origins*. Grand Rapids, MI: BioLogos.
- Hill, J.P. (2014b) 'The Recipe for Creationism', Available at: <https://biologos.org/articles/the-recipe-for-creationism> (Accessed: 1 February 2019)
- Hoffmann, J.P. and Bartkowski, J.P. (2008) 'Gender, religious tradition, and biblical literalism', *Social Forces*, 86(3): 1245-1272.
- Holstein, J.A. and Gubrium, J.F. (2004) 'The Active Interview', in Silverman, D. (ed) *Qualitative Research: Theory, Method and practice*. London: Sage, pp. 114-129.
- Hooton, C. (2015a) 'Pope Francis Thug Life is probably the finest Thug Life video yet; Damn, it feels good to be a pontiff', *The Independent*, 16 January.

Hooton, C. (2015b) 'Pope Francis calls the gender pay gap a "pure scandal"; "The seed of radical equality between men and women must bring new fruits"', *The Independent*, 29 April.

Horizon: A War on Science (2006) *BBC*, 26 January.

Hull, D.L. (2005) 'Deconstructing Darwin: Evolutionary Theory in Context', *Journal of the History of Biology*, 38: 137-152.

Hutchby, Z. and Wooffitt, R. (2008) *Conversation Analysis*. 2nd edn. Cambridge: Polity Press.

Huxley, T.H. (1896) *Darwiniana: Essays by Thomas H. Huxley*. New York: D. Appleton and Co.

Huxley, J. (1942). *Evolution: the modern synthesis*. London: Allen and Unwin.

IpsosMORI. (2006) 'BBC Survey on The Origins Of Life', Available at: <https://www.ipsos.com/ipsos-mori/en-uk/bbc-survey-origins-life> (Accessed: 3 November 2018)

Irwin, A. (1995) *Citizen Science: A Study of People, Expertise and Sustainable Development*. London: Routledge.

Irwin, A. (2008) 'Risk, science and public communication: Third-order thinking about scientific culture', in Bucchi, M. and Trench, B. (Eds) *Handbook of public communication of science and technology*. London: Routledge.

Jablonka, E. and Lamb, M.J. (2007). Précis of evolution in four dimensions. *Behavioral and brain sciences*, 30(4): 353-365.

Jamieson, A., Lavanga, C., and Ong, E. (2014) 'Pope Francis: Evolution and Big Bang Theory Are Real', 28th October, Available at: <https://www.nbcnews.com/news/world/pope-francis-evolution-big-bang-theory-are-real-n235696> (Accessed: 12 February 2016)

Jasanoff, S. (2000) 'The 'science wars' and American politics,' in Dierkes, M. and Grote, C. (Eds) *Between Understanding and Trust: The Public, Science and Technology*, Amsterdam: Harwood, pp. 39–60.

Joffe, H. (2011) 'Thematic analysis', in Harper, D. and Thompson, A.R. (Eds) *Qualitative methods in mental health and psychotherapy: A guide for students and practitioners*. Chichester: Wiley, pp. 209-224.

John Paul II. (1985) 'To participants in the International Symposium on Christian Faith and Theory of Evolution', *Vatican Archive*, 26 April.

John Paul II. (1996) 'Address of Pope John Paul II to the Pontifical Academy of Sciences', *Vatican Archive*, 22 October.

Johnstone, R.L. (1997) *Religion in Society: A Sociology of Religion*. New Jersey: Prentice Hall.

Jones, S. [Unpublished Manuscript] 'The Cultural Meanings of Science: Understanding Science Identification Using the Sociology of (Non)religion'.

Jones, S. (1997) 'Genes Vs. Genesis', *The Observer*, 8 June.

Jones, S., Catto, R., Kaden, T. and Elsdon-Baker, F. (2018) "'That is how Muslims are required to view the world": race, culture and belief in non-Muslims' descriptions of Islam and science', *The Sociological Review*.

Jones, S., Kaden, T., and Catto, R (2019) 'Editors' Introduction: Science, Belief and the Sociological Tradition', in Jones, S., Kaden, T., and Catto, R. (Eds) *Science, Belief, and Society: International Perspectives on Religion, Non-Religion and the Public Understanding of Science*. London: Brunel University Press, pp. xix-xxxvi.

Kaden, T., Jones, S., Catto, R. (2019) 'Language, Labels and Lived Identity in Debates about Science, Religion and Belief', in Jones, S., Kaden, T., and Catto, R. (Eds) *Science, Belief, and Society: International Perspectives on Religion, Non-Religion and the Public Understanding of Science*. London: Brunel University Press, pp. 55-78.

Kaden, T., Jones, S., Catto, R., and Elsdon-Baker, F. (2017) 'Knowledge as explanandum: disentangling lay and professional perspectives on science and religion', *Studies in Religion*, 47(4): 500–552.

Kelly, J.N.D. (1998) 'Patristic literature', Available at: <https://www.britannica.com/topic/patristic-literature> (Accessed: 15 December 2018)

Kitzmiller vs. Dover (2005). District Court, M.D. Pennsylvania. 4:04-cv-02688.

Krippendorff, K. (2004) *Content analysis: An introduction to its methodology*. California: Sage Publications Ltd.

Lamont, M. (2001) 'Symbolic boundaries', in Smelser, N. and Baltes, P. (Eds) *International Encyclopedia of the Social and Behavioral Sciences*. Oxford: Elsevier, pp. 15341-15347.

Lamont, M. and Molnar, V. (2002) 'The Study of Boundaries in the Social Sciences', *Annual Review of Sociology*, 28: 167–195.

Larson, E.J. and Witham, L. (1998) 'Leading scientists still reject God', *Nature*, 394: 313.

Latour, B. and Woolgar, S. ([1979] 1986) *Laboratory Life: The Construction of Scientific Facts*. New Jersey: Princeton University Press.

Lawes, C. (2009) *Faith and Darwin: Harmony, Conflict or Confusion?* London: Theos.

Lawson, A. and Worsnop, W. (1992) 'Learning about evolution and rejecting a belief in special creation—effects of reflective reasoning skill, prior knowledge, prior belief and religious commitment', *Journal of Research in Science Teaching*, 29: 143-166.

Layton, D., Jenkins, E.W., Macgill, S., and Davey, A. (1993) *Inarticulate Science? Perspectives on the Public Understanding of Science and Some Implications for Science Education*. East Yorkshire: Studies in Education Ltd.

Lease, G. (1996) 'Denunciation as a Tool of Ecclesiastical Control: The Case of Roman Catholic Modernism', *The Journal of Modern History*, 68: 819-830.

Legare, C.H., Evans, E.M., Rosengren, K.S., and Harris, P.L. (2012) 'The coexistence of natural and supernatural explanations across cultures and development', *Child development*, 83(3), 779-793.

Leuba, J.H. (1934) 'Religious beliefs of American scientists', *Harper's Magazine*, 169: 291–300.

LexisNexis. (2019) 'Boolean Searching', *LexisNexis Academic Wiki*. Available at: <https://www.lexisnexis.com/communities/academic/w/wiki/56.boolean-searching.aspx> (Accessed: 20 June 2019)

Lightman, B. (2009). *Victorian popularizers of science: designing nature for new audiences*. Chicago: University of Chicago Press.

Lightman, B. (2010) 'Darwin and the popularization of evolution', *Notes and Records: The Royal Society Journal for the History of Science*, 64: 5-24.

Lightman, B. (2011) 'Victorian Periodicals, Evolution, and Public Controversy', *Spontaneous Generations: A Journal for the History and Philosophy of Science*, 5(1): 5-11.

Lightman, B. (2012) 'Does the History of Science and Religion Change Depending on the Narrator? Some Atheist and Agnostic Perspectives', *Science and Christian Belief*, 24: 149-168.

Lightman, B. (2016) 'Harrison's Take on the Nineteenth Century: A New Peter Principle?', May 29, Available at: <http://scienceligionsspectrum.org/long-reads/peter-harrisons-the-territories-of-science-and-religion-a-new-peter-principle/> (Accessed: 10 June 2017)

Lightman, B. and Dawson, G. (Eds) (2014) *Victorian Scientific Naturalism: Community, Identity, Continuity*. Chicago: University of Chicago Press.

Lindberg, D.C. and Numbers, R.L. (1986) *God and Nature: Historical Essays on the Encounter Between Christianity and Science*. California: University of California Press.

Livingstone, D.N. (1987) *Darwin's Forgotten Defenders: The Encounter between Evangelical Theology and Evolutionary Thought*. Michigan: W.B. Eerdmans.

Livingstone, D.N. (1999) 'Science, Region, and Religion: The Reception of Darwinism in Princeton, Belfast, and Edinburgh,' in Numbers, R.L. and Stenhouse, J. (Eds) *Disseminating Darwinism. The Role of Place, Race, Religion, and Gender*, Cambridge: Cambridge University Press, pp. 7-38.

Long, D.E. (2011) *Evolution and religion in American education: An ethnography*. Dordrecht: Springer.

Macnamara, J. R. (2005) 'Media content analysis: Its uses, benefits and best practice methodology', *Asia-Pacific Public Relations Journal*, 6(1): 1-34.

Marler, P.L., and Hadaway, C.K. (1999) 'Testing the attendance gap in a conservative church', *Sociology of Religion*, 60(2): 175-186.

Matthes, J. (2009) 'What's in a frame? A content analysis of media framing studies in the world's leading communication journals, 1990-2005', *Journalism & Mass Communication Quarterly*, 86(2): 349-367.

Mayr, E. (1942) *Systematics and the Origin of Species*. New York: Columbia University Press.

McCarthy, M. (2005) 'Now row over evolution splits top Catholics', *The Independent*, 5 August.

McCoy, T. (2014) 'Pope Francis may believe in evolution, but 42 percent of Americans do not', *The Washington Post*, 29 October.

McGrath, A.E. (1999) *Science & Religion: An Introduction*. Oxford: Blackwell Publishers.

McQuail, D. (2014) 'Paradigm shifts in the Study of Media Effects', in Donsbach, W., Salmon, C. T., and Tsfati, Y. (Eds) *The spiral of silence: New perspectives on communication and public opinion*. Routledge: London.

Mead, R., Hejmadi, M., and Hurst, L.D. (2017) 'Teaching genetics prior to teaching evolution improves evolution understanding but not acceptance', *PLoS Biology*, 15(5): e2002255.

Merton, R.K. (1975) 'Thematic analysis in science: notes on Holton's concept', *Science as Culture*, 188: 335-338.

Mivart, St.G.J. (1871) *On the Genesis of Species*. London: MacMillan.

Moore, J.R. (1979) *The Post-Darwinian Controversies: A Study of the Protestant Struggle to Come to Terms with Darwin in Great Britain and America, 1870-1900*. Cambridge: Cambridge University Press.

Moore, M. (2007) 'Pope stirs up evolution debate', *The Daily Telegraph*, 13 April.

Monod, J. (1971) *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology*. New York: Alfred A. Knopf, Inc.

Morgan, M.S. and Wise, M.N. (2017) 'SI: Narrative in Science', *Studies in History and Philosophy of Science Part A*, 62: 1-98.

Morris, J.D. (1996) 'What Is The Difference Between Macroevolution And Microevolution?', 1 October, Available at: <https://www.icr.org/article/what-difference-between-macroevolution-microevolut/> (Accessed: 5 June 2019)

Murray, M. (2003). Narrative psychology. In J. A. Smith (Ed.), *Qualitative psychology: A practical guide to research methods* (pp. 111-131). London: Sage Publications Ltd.

Myrick, J. and Comfort, S.E. (In press) 'The Pope, politics, and climate change: An experimental test of the influence of news about Pope Francis on American climate change attitudes and intentions', Forthcoming in *The Journal of Religion, Media, and Digital Culture*.

National Science Board. (2016) *Science and Engineering Indicators 2016 (NSB-2016-1)*. Arlington, VA: National Science Foundation.

Neuman, W. (1997) *Social Research Methods: Qualitative and Quantitative Approaches*. Needham Heights, MA: Allyn & Bacon.

Newbold, C., Boyd-Barrett, O., and Van Den Bulck, H. (2002) *The Media Book*. London: Bloomsbury Publishing.

Newport, F. (2014) 'In U.S., 42% believe creationist view of human origins', Available at: <http://www.gallup.com/poll/170822/believe-creationist-view-human-origins> (Accessed: 11 January 2018)

Nisbet, M.C. and Scheufele, D.A. (2009) 'What's next for science communication? Promising directions and lingering distractions', *American Journal of Botany*, 96(10): 1767–1778.

Numbers, R.L. (1985) 'Science and religion', *Osiris, Second Series*, 1:59–80.

Numbers, R.L. (2006) *The Creationists: From Scientific Creationism to Intelligent Design*. Cambridge, MA: Harvard University Press.

Numbers, R.L. (Ed.) (2009) *Galileo Goes to Jail: And Other Myths About Science and Religion*. Cambridge, MA: Harvard University Press.

Numbers, R.L. (2010) 'Simplifying complexity: patterns in the history of science and religion', in Dixon, T., Cantor, G., and Pumfrey, S. (Eds) *Science and Religion: New Historical Perspectives*. Cambridge: Cambridge University Press, pp. 263–282.

Numbers, R.L. and Stenhouse, J. (1999) *Disseminating Darwinism. The Role of Place, Race, Religion, and Gender*. Cambridge: Cambridge University Press.

Malthus, T. (1798) *An Essay on the Principle of Population*. Electronic Scholarly Publishing Project 1998.

Mayr, E. (1982) *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*. Cambridge, MA: Belknap Press.

Merton, R.K. (1936) 'Puritanism, Pietism, and Science', *The Sociological Review*, 28: 1-30.

Merton, R.K. (1938) 'Science, Technology and Society', *Osiris*, 4.

Okasha, S. (2006) *Evolution and the levels of selection*. Oxford: Oxford University Press.

Okasha, S. (2010) 'Levels of selection', *Current Biology*, 20(7): 306-307.

O'Leary, D. (2006) *Roman Catholicism and Modern Science: A History*. New York: Continuum.

- O'Leary, D. (2009) 'From the *Origin* to *Humani Generis*: Ireland as a Case Study,' in Caruana, L. (Ed.) *Darwin and Catholicism: The Past and Present Dynamics of a Cultural Encounter*. London: T&T Clark, pp. 13-26.
- Osborne, S. (2017) 'Pope Francis' best quotes: Pontiff celebrates four years as head of Roman Catholic Church', *The Independent*, 14 March.
- O'Toole, R. (1984) *Religion: Classic Sociological Approaches*. Toronto: McGraw-Hill Ryerson.
- Owen, R. (1996) 'Pope places some faith in Darwin's theory of evolution', *The Times*, 25 October.
- Owen, R. (2007) 'Pope puts his faith in the Book of Genesis, not Darwin', *The Times*, 13 April.
- Pagel, M. (2009) 'Natural selection 150 years on', *Nature*, 475: 808-811.
- Patton, M.Q. (2002) *Qualitative Research and Evaluation Method*. 3rd edn. California: Sage Publications Ltd.
- Paul, H.W. (1979) *The Edge of Contingency: French Catholic Reaction to Scientific Change from Darwin to Duhem*. Gainesville, FL: University Presses of Florida.
- Peters, H.P. (2000) 'From information to attitudes? Thoughts on the relationship between knowledge about science and technology and attitudes toward technology', in Dierkes, M. and Grote, C. (Eds) *Between Understanding and Trust: The Public, Science and Technology*. Amsterdam: Harwood, 265-287.
- Pike, K.L. (1954) 'Etic and emic standpoints for the description of behavior', in Pike, K.L. (Ed.), *Language in Relation to a Unified Theory of the Structure of Human Behavior*. Glendale, IL: Summer Institute of Linguistics, pp. 8-28.
- Pinch, T. (2008) 'Relativism: Is it Worth the Candle?', in Mazzotti, M. (Ed.) *Knowledge as Social Order: Rethinking the Sociology of Barry Barnes*. Aldershot: Ashgate, pp. 35-48.
- Pius XII (1950) '*Humani Generis*. Encyclical Letter of Pope Pius XII', *Vatican Archive*, 12 August.
- Polkinghorne, J. (1998) *Belief in God in an Age of Science*. Connecticut: Yale University Press.
- Popper, K.R. (1976) *Unended Quest. An Intellectual Autobiography*. LaSalle, IL: Open Court.
- Popper, K.R. (1978) 'Natural Selection and the Emergence of Mind', *Dialectica*, 32: 339-355.

Posner, G. (2015) 'Open the Vatican's Holocaust-era archives', *The Washington Post*, 18 September.

Potter, J. (2002) 'Two kinds of natural', *Discourse Studies*, 4(4): 539-542.

Pullella, P. (2019) 'Church "not afraid of history": Pope Francis to open secret Pius XII archives', 4 March. Available at: <https://uk.reuters.com/article/uk-pope-archives/church-not-afraid-of-history-pope-francis-to-open-secret-pius-xii-archives-idUKKCN1QL11O> (Accessed: 24 March 2019)

Quora. (2018) 'Why are scientific "facts" we were taught in school that are really just theories?' Available at: <https://www.quora.com/Why-are-scientific-facts-we-were-taught-in-school-that-are-really-just-theories> (Accessed: 13 January 2019)

Ramsey, N. (2014) 'Poll: More believe Bible over Darwin on humanity's origin', *MSNBC*, 3 June. Available at: <http://www.msnbc.com/the-last-word/poll-pits-creationism-against-evolution> (Accessed: 20 June 2019)

Randerson, J. (2006) 'Four out of 10 say science classes should include intelligent design', 26 January. Available at: <https://www.theguardian.com/science/2006/jan/26/evolution.schools> (Accessed: 7 October 2018)

Rapley, T. (2004) 'Interviews', in Seale, C., Gobo, G., Gubrium, J. F. and Silverman, D. (Eds) *Qualitative research practice*. London: SAGE Publications Ltd, pp. 16-34.

Ratzinger, J. (1990) *In the Beginning: A Catholic Understanding of the Story of Creation and the Fall*. Huntington, IN: Our Sunday Visitor Inc.

Ratzinger, J. (2003) *Truth and Tolerance: Christian Belief and World Religions*. Fort Collins, CO: Ignatius Press.

Reid, L. (2019) 'Researching Clergy Attitudes towards Science: A Reflective Account of Key Methodological Challenges', in Jones, S., Kaden, T., Catto, R. (Eds) *Science, Belief, and Society: International Perspectives on Religion, Non-Religion and the Public Understanding of Science*. London: Brunel University Press, pp. 79-104.

Roberts, R. (2014) 'The Big Bang and evolution are real but they were carried out by God, says the Pope as he embraces modern science', 27 October, Available at: <http://www.dailymail.co.uk/sciencetech/article-2809915/The-Big-Bang-evolution-real-carried-God-says-Pope-embraces-modern-science.html> (Accessed: 13 June 2017)

Ruse, M. (2018) 'Creationism', *The Stanford Encyclopedia of Philosophy*, Zalta, E.N. (ed.), 21 September. Available at: <https://plato.stanford.edu/archives/win2018/entries/creationism>

(Accessed: 28 May 2019)

Russell, C.A. (2002) 'The Conflict of Science and Religion', in Ferngren, G.B. (Ed.) *Science and Religion: A Historical Introduction*. Maryland: JHU Press, pp 3-13.

Sandelowski, M. (1995) 'Sample size in qualitative research', *Research in Nursing & Health*, 18(2): 179-183.

Saul, H. (2016) 'Pope Francis eats with the homeless as he turns 80', *The Independent*, 18 December.

Scheitle, C.P. (2011) 'U.S. college students' perception of religion and science: Conflict, collaboration, or independence? A research note', *Journal for the Scientific Study of Religion*, 50(1): 175–186.

Scheufele, D.A. and Lewenstein, B.V. (2005) The public and nanotechnology: How citizens make sense of emerging technologies, *Journal of Nanoparticle Research*, 7: 659–667.

Schultz, J.G. (1998) 'Developing theoretical models/conceptual frameworks in vocational education research', *Journal of Vocational Education Research*, 13: 29–43.

Scott, E.C. (1997) 'Creationists and the Pope's Statement', *The Quarterly Review of Biology*, 72(4): 401-406.

Schönborn, C. (2005) 'Finding Design in Nature', *The New York Times*, 7 July.

Searle, J.R. (1997) *The Construction of Social Reality*. New York: The Free Press.

Sedley, D. (2003) 'Lucretius and the New Empedocles', *Leeds International Classical Studies*, 2(4): 1-12.

Sedley, D. (2009) *Creationism and Its Critics in Antiquity*. California: University of California Press.

Secord, J. A. (2003). *Victorian sensation: The extraordinary publication, reception, and secret authorship of Vestiges of the Natural History of Creation*. Chicago: University of Chicago Press.

Shank, M.H. (2000) 'Review of: John L. Heilbron. The Sun in the Church: Cathedrals as Solar Observatories', *Renaissance Quarterly*, 53(2): 574-575.

Shapin, S. (1990) 'Science and the public', in Olby, R.C., Cantor, G.N., Christie, J.R.R., and Hodge, M.J.S. (Eds) *Companion to the History of Modern Science*, London: Routledge, pp. 990-1007.

Silverman, D. (1993) *Interpreting Qualitative Data: Methods for Analysing Talk, Text and Interaction*. London: Sage Publications Ltd.

Silverman, D. (2000) *Doing Qualitative Research: A Practical Handbook*. London: Sage.

Silverman, D. (2005) *Doing Qualitative Research: A Practical Handbook*. 2nd edn. London: Sage.

Silverman, D (2013) *A very short, fairly interesting and reasonably cheap book about qualitative research*. London: SAGE Publications Ltd.

Silverstone, R. (1990) 'Communicating science to the public', *Paper given at the conference 'Policies and publics for science and technology', Science Museum, London, 7–11 April*.

Simis, M.J., Madden, H., Cacciatore, M.A., and Yeo, S.K. (2016) 'The lure of rationality: Why does the deficit model persist in science communication?' *Public Understanding of Science*, 25(4): 400-414.

Simpson, G.G. (1944) *Tempo and Mode in Evolution*. New York: Columbia University Press.

Sismondo, S. (2017) 'Post-truth?' *Social Studies of Science*, 47(1): 3–6.

Slovic, P. and Peters, E. (1998) 'The importance of worldviews in risk perception', *Journal of Risk Decision and Policy*, 3(2): 165–170.

Smallman, M. (2014) 'Public Understanding of Science in turbulent times III: Deficit to dialogue, champions to critics', *Public Understanding of Science* [First published online September 18, 2014; Print: Smallman, M.(2016) *Public Understanding of Science*. 25(2): 186-197]

Smith, G.A. (2019) 'Just one-third of U.S. Catholics agree with their church that Eucharist is body, blood of Christ', 5 August, *Pew Research Centre*, Available at: <https://www.pewresearch.org/fact-tank/2019/08/05/transubstantiation-eucharist-u-s-catholics/> (Accessed: 18 September 2019)

Smith, J.A. and Osborn, M. (2003) 'Interpretative phenomenological analysis', in Smith, J.A. (Ed.) *Qualitative Psychology: A Practical Guide to Methods*. London: Sage Publications Ltd, pp.235–251.

Sober, E. (2014) *The Nature of Selection: Evolutionary Theory in Philosophical Focus*. Chicago: University of Chicago Press.

Sonleitner, F.J. (1986) 'What did Karl Popper really say about evolution?', *Creation/Evolution Journal*, 6(2): 9-14.

Speer, S.A. (2002) 'Natural and contrived data: a sustainable distinction?' *Discourse Studies*, 4(4): 511-525.

Stenger, V. (2011) 'Why Science and Religion are Incompatible', *The Huffington Post*, 27 June.

Stenner, P. (1993) 'Discoursing Jealousy', in Burman, E. and Parker, I. (Eds) *Discourse Analytic Research: Repertoires and readings of texts in action*. London: Routledge, pp. 94-132.

Snyder, M. (1984) 'When belief creates reality', *Advances in Experimental Social Psychology*, 18: 247-305.

Stark, R. (1963) 'On the incompatibility of religion and science: A survey of American graduate students', *Journal for the Scientific Study of Religion*, 3(1): 3-20.

Stanford, P. (1996) 'Science meets God halfway', *The Sunday Times*, 27 October.

Stanford, P. (2019) 'One church, two popes: why Catholicism is in crisis this Easter', 20 April, Available at: <https://www.theguardian.com/commentisfree/2019/apr/20/popes-church-catholicism-easter-francis-steve-bannon> (Accessed: 21 May 2019)

Strauss, A. and Corbin, J. (1998) *Basics of qualitative research: Techniques and procedures for developing grounded theory*. California: Sage Publications Ltd.

Sturgis, P.J. and Allum, N.C. (2004) 'Science in Society: Re-evaluating the Deficit Model of Public Attitudes', *Public Understanding of Science*, 13: 55-74.

Talar, C.J.T. (2010) 'The 'Synthesis of All Heresies': Roman Catholic Modernism', *Religion Compass*, 4: 426-435.

Tanghe, K.B., De Tiège, A., Pauwels, L., Blancke, S., and Braeckman, J. (2018) 'What's wrong with the modern evolutionary synthesis? A critical reply to Welch (2017)', *Biology & Philosophy*, 33(3): 1-23.

The Independent. (2007) 'Gods and monsters', 19 August.

The Guardian. (2007) 'This week: What they said', 14 April.

The Guardian. (2015) 'The Guardian view on Laudato Si': Pope Francis calls for a cultural revolution', 18 June.

The Times. (2007) 'The week', 14 April.

Thomas, C. (1996) 'Evolution of the pope', *Washington Times*, 30 October.

Thomas, C. (1997) 'The evolution of a bad translation', *San Diego Union-Tribune*, 17 January.

Thomas, P. (2012) *The Creation-Evolution Debate: An Islamic Perspective*. PhD Thesis. London: Kings College London.

Toumey, C. P. (1994) *God's own scientists: Creationists in a secular world*. New Brunswick, NJ: Rutgers University Press.

Tudge, C. (1996) 'If the Pope can find Darwin why can't Dawkins find God?' *The Independent*, 27 October.

Turner, F.M. (1978) 'The Victorian conflict between science and religion: a professional dimension', *Isis*, 69(3): 356–76.

U.S. Constitution (1791) Amendment 1. Available at:
https://www.usconstitution.net/xconst_Am1.html (Accessed: 12 December 2018)

Unsworth, A. and Voas, D. (2017) 'Attitudes to evolution among Christians, Muslims and the Non-Religious in Britain: Differential effects of religious and educational factors', *Public Understanding of Science*. Available at:
<https://journals.sagepub.com/eprint/XtSkYCSNfEFmHQVgWWV8/full> (Accessed: 23 February 2018)

Vallely, P. (1997) 'Creative tension', *The Independent*, 8 April.

Verhey, A. (1995) "'Playing god" and invoking a perspective', *Journal of Medical Philosophy*, 20: 347–364.

Verhey, S. (2005) 'The effect of engaging prior learning on student attitudes toward creationism and evolution', *BioScience*, 55: 996–1003.

Walker, T. (2006) 'Creationist debate moves to Britain', *The Independent*, 18 May.

Wernick, A. (2005) 'Comte, Auguste', in Ritzer, G. (Ed.) *Encyclopedia of Social Theory*. California: SAGE Publications Ltd, pp. 128–134.

Willig, C. (2003) 'Discourse analysis', in Smith J.A. (Ed.) *Qualitative psychology: A practical guide to research methods*. London: Sage Publications Ltd, pp. 159-183.

Wilkinson, S. (1988) 'The role of reflexivity in feminist psychology', *Women's Studies International Forum*, 11(5): 493-502.

Wilson, D. B. (2002) 'The Historiography of Science and Religion', in Ferngren, G.B. (Eds) *Science and religion: a historical introduction*. Maryland: JHU Press, pp. 13-31.

Wilson, D.S. (2005) 'Evolution for everyone: how to increase acceptance of, interest in, and knowledge about evolution', *PLoS Biology*, 3(12): 364.

Withnall, A. (2014) 'Pope Francis declares evolution and Big Bang theory are real and God is not "a magician with a magic wand"; Francis goes against Benedict XVI's apparent support for "intelligent design" - but does hail his predecessor's "great contribution to theology"', *The Independent*, 30 October.

Whalley, B. (2017) 'How to Use Internal Linking to Improve Your Website's SEO', Available at: <https://blog.hubspot.com/blog/tabid/6307/bid/31388/how-to-use-internal-linking-to-improve-your-website-s-seo.aspx> (Accessed: 23 August 2018)

When, F. (2004) 'Creationism returns: Would you Adam and Eve it?' *The Sunday Times*, 22 February.

Wynne, B. (1991) 'Knowledges in context', *Science, Technology and Human Values*, 16(2): 111–121.

Wynne, B. (1992a) 'Public Understanding of Science Research: New Horizons or Hall of Mirrors?' *Public Understanding of Science*, 1(1): 37–43.

Wynne, B. (1992b) 'Misunderstood misunderstanding: Social identities and public uptake of science', *Public Understanding of Science*, 1(3): 281-304.

Wynne, B. (1995) 'Public understanding of science', in Jasanoff, S., Markle, G.E., Peterson, J.C., and Pinch, T. (Eds) *Handbook of Science and Technology Studies*. Thousand Oaks, CA: SAGE, pp. 361-388.

Xia, J. (2011) 'An anthropological emic-etic perspective on open access practices', *Journal of Documentation*, 67(1): 75-94.

Yeo, S. K., Xenos, M., Brossard, D., and Scheufele, D.A. (2015) 'Selecting our own science: How communication contexts and individual traits shape information seeking', *The Annals of the American Academy of Political and Social Science*, 658: 172–191.

Ziman, J. (1991) 'Public understanding of science', *Science, Technology and Human Values*, 16: 99–91.

Appendix I: Interview Schedule

Introduction and research ethics

Explain the aims of the research and the Newman University research ethics processes, including:

- *The participant can choose to go into as much or as little detail as they want to regarding the topics discussed;*
- *The participant can withdraw at any time, and can choose not to talk about any topic;*
- *How the interview transcript will be anonymised/transcribed/stored, and who might see it;*
- *Give participant information sheet and the consent form and acquire a signature,*
- *Ask if they have any questions before beginning, and again at end.*

Personal biography and religious background

Icebreaker: 'Can you tell me a little about yourself, your background, and what you do?'

- Probe if necessary: Did the participant go to university? If so, to study what subject?
- What is the participant's current/past job(s)?

'If I asked you to describe yourself in terms of your identity or identities, how would you describe yourself?'

'You identify as a Catholic, was that the religious tradition you were brought up in? How would you characterise the beliefs of your immediate family and close friends?'

'Have your beliefs changed significantly over time? How have they altered? What have been the main influences that have shaped your perspective today?'

Belief and practice

'How would you describe your beliefs and your Catholic identity now?'

- Would you identify as Roman Catholic, Orthodox, or any another term?'

'Some people use other particular terms to refer to their Catholicism: traditional, conservative, liberal, modernist. Do you think any apply to you?'

- If interviewee does use a particular term to identify themselves: 'What do you understand by this term?'
- If the interviewee does not identify with a particular term: 'What are the problems you see with these terms, if any? How would you describe yourself?'

'Have you attended the meetings/services of any kind of Catholic community of belief in the last six months?'

- If Yes: 'What are these meetings/services like? Can you recall an example?'

Religion

'What is religion, and how would you describe its role in society?'

'How would you describe your trust in religious authority?'

Experience of the sciences

‘Would you say that you have an interest in the sciences? Do you have much experience of studying scientific themes or subjects?’

- Probe if necessary: Beyond academic interests do the participants engage with science shows, podcasts, articles, or books? Or attend any events to do with science? Science identity?

Science

‘What is science, and how would you describe its role in society?’

‘How would you describe your trust in scientific authority?’

Catholic belief and evolutionary science

‘Are you familiar with the term “evolutionary science”? What do you understand by the term, and what does it mean to you?’

- What are your views on the mechanism that drives evolution?

‘How, if at all, do your beliefs as a Catholic relate to or inform your position on evolutionary science?’

- Explain and elaborate if necessary, probing on relevant themes:
 - Does the interviewee separate science and religion’s ‘magisteria’?
 - What is the relation, if any, between scientific and religious knowledge?
 - If the person believes in God, what do they see as God’s role in evolution?

What about your position on human origins specifically, do your beliefs as a Catholic relate to or inform your position on evolutionary science in that regard?’

- What is the relation, if any, between scientific and religious knowledge?
- If the person believes in God, what do they see as God’s role in human evolution?
- How does, if at all, an evolutionary account and the Genesis account of human origins relate?

‘What, or who, has influenced your understanding of, and perspective on, evolutionary science?’

- What are the sources of information about evolutionary science? Was it studied at school?
- Does the interviewee refer to individuals who are seen as influential?

‘Was evolution/science ever discussed in your Catholic community or services? What was the discussion about? What role did you play in these discussions? Do you see yourself as typical within that organisation, or different?’

- If not: Why not? What other issues are more important?

‘There are a wide range of terms that are currently used to describe people’s views on evolution (Darwinist, Creationist, evolutionist, advocate of intelligent design). Do you think any apply to you?’

- If interviewee does identify with a particular term: ‘What do you understand by this term?’
- If the interviewee does not identify with a particular term: ‘What are the problems you see with these terms, if any? How would you describe yourself?’

Perceptions of others’ beliefs

Do you think Catholics are more or less likely to accept evolution than other religious groups? Or do you think there is no difference? For what reasons do you think this is the case?

- What other groups are mentioned? What reasons are given for any differences both for Catholics and other religious groups?

‘How widely accepted would you say evolution is in this country?’

- Follow up by asking about the interviewees’ view on the position and social influence of other groups.

‘Can you recall an occasion where you talked to, or learned about, how people with beliefs different from your own understand evolutionary science?’

- Probe to see if the interviewee regards other religious or secular beliefs as necessarily involving a specific stance on evolution, or if he or she believes that in order to believe in evolution one needs to have a particular set of beliefs.

Experiences and perceptions of prejudice

‘Do you think that people make [or would make] false assumptions about your position on evolution or on science because of your religious background? Can you recall a specific occasion when this has happened?’

- If Yes: ‘Have you ever felt the need to hide or mask your beliefs or your views about evolutionary science?’
- Do you think non-Catholics generally think Catholics would have a problem with evolution?
- If Yes: ‘Why do you think those misperceptions have become popular?’
 - Prompt if necessary: ‘Do you think these misperceptions are generated by the media, particular public figures or prominent religious movements?’
 - How do you deal with those misperceptions?

Public discourse on religion and evolution

‘What are your thoughts on the present debate about religion and evolutionary science? Do you think your and other’s views are represented accurately?’

- Which individuals are mentioned from these debates?

‘Are there any particular public figures you see as being particularly trustworthy or authoritative on issues to do with evolutionary science, belief and the link between the two?’

- Probe, if it is possible/relevant to do so:
 - ‘Are there any figures from the history of science you view as especially significant?’

- ‘What about contemporary public figures?’

Stimulus Materials

Popes, the Church, and Evolution

We are now going to look at a statement from Pope Francis in 2014, about his personal view of evolution:

“When we read the account of Creation in Genesis we risk imagining that God was a magician, complete with an all powerful magic wand. But that was not so. He created beings and he let them develop according to the internal laws with which He endowed each one, that they might develop, and reach their fullness. He gave autonomy to the beings of the universe at the same time in which He assured them of his continual presence, giving life to every reality. And thus Creation has been progressing for centuries and centuries, millennia and millennia, until becoming as we know it today, precisely because God is not a demiurge or a magician, but the Creator who gives life to all beings. The beginning of the world was not a work of chaos that owes its origin to another, but derives directly from a supreme Principle who creates out of love. The Big Bang theory, which is proposed today as the origin of the world, does not contradict the intervention of a divine creator but depends on it. Evolution in nature does not conflict with the notion of Creation, because evolution presupposes the creation of beings who evolve.”

‘What are your thoughts about the statement from Francis?’

- Does the participant agree or disagree with the statement?

‘Do you think that the Church should set out a position on evolution for its followers?’

- If yes: What should that position be? If no, for what reasons do you think that?

Media

We are now going to look at a media article responding to the above statement from Francis in 2014:

“Pope Francis has conceded evolution and the Big Bang theory are real, saying God isn't "a magician with a magic wand". He made the comments at a meeting of the Pontifical Academy of Sciences at the Vatican, no doubt to a scene of carnage with cardinals screaming as though they were in Francis Bacon portraits. It seems that Pope Francis is arguing that an ancient text which acts as the Christian rule book can accommodate proven realities that are diametrically opposed to its contents. Because this book tells us our world was spun out of nothingness over six days. Hasn't he just contradicted what is written in the Bible? Nobody would care were it not for that pesky doctrine of papal infallibility.”

‘What are your thoughts about the excerpt?’

- What do you think of the article’s representation of the Pope’s views?
- What do you think of the representation of the reception of the Pope’s views by the Church? Are they the same or do they differ from your own thoughts of how the comment might have been received?
- The article talks about the relationship between scientific knowledge and the bible, what do you make of this representation?

Do you think there is an expectation for religious people, or specifically Catholics, to be anti-science?

'Do you think this type of reporting is typical or not typical of newspapers in England?'

- Do you think the topic of science and religion is covered differently by different newspapers? If so, what do you think are the reasons for these differences?

Appendix II: Ethics Approval Proposal Form

NEWMAN UNIVERSITY

ETHICS APPROVAL PROPOSAL FORM

RESEARCH PROJECT / WORK PLACEMENT

Please read the documents Ethical Guidelines and Ethical Approval for Research and discuss the possible ethical implications of your research project/work placement with your supervisor. Note: for work placements this means your supervisor at Newman University, not at the work placement.

If the research for your project/work placement raises ethical issues you must complete this form. The project/work placement must not be started until ethics approval has been given by the Subject Area or the Research Ethics Committee, and you have received the confirmation letter and certificate of approval.

THIS FORM MUST BE COMPLETED, SIGNED IN INK AND GIVEN TO YOUR SUPERVISOR

Student: James Riley
Student No: 1504835
Supervisor: Alexander Hall, Fern Elsdon-Baker
Module Code: PhD
Subject Area/Programme: Social Sciences
Research Project/Work Placement: PhD Thesis
Date this form submitted:
Proposed starting date: June 2017

Brief title of investigation: Catholicism and Evolution: Historical, Media and Social Perspectives

Aims/Purpose of the study:

On 27th October 2014, Pope Francis addressed the Pontifical Academy of Sciences on the topic of evolution. His statements, which affirmed his belief in biological evolution and its compatibility with the doctrine of creation, sparked media reaction around the world. Some media commentators, however, remarked that the Pope's position was in no way a new direction for the Church, and criticised the general media reaction, observing how "site after site after site ramped up the Pope's words and took them out of context" (Dias, 2014). The content of this widespread media coverage suggests that some media producers perceive the Catholic Church to be anti-science, anti-evolution or even pro-Creationism.

The broad aim of this research is to provide empirical evidence of contemporary Catholic attitudes toward, and the media representations of, the relationship between their religion and evolution. This aim will be achieved by undertaking two linked studies:

- (i) By assessing media representations of Catholic attitudes towards evolution by conducting a media content analysis on the framing of British newspaper articles covering successive Popes' public statements on the topic of evolution;
- (ii) And by conducting a series of structured interviews investigating Catholic individuals' perceptions of the relationship between evolutionary biology, official Catholic doctrine, media representations of their Church's 'science stance', and their own personal religious beliefs.

Proposed participants in research:

- (i) Print media articles from the LexisNexis newspaper database (for more details on LexisNexis Academic see: <http://guides.library.oregonstate.edu/LNA>);
- (ii) Public individuals who identify as Catholic. Participants will be mixed members of the UK public, aged 18 and over. Any participants below the age of 18 will be filtered out of the participant pool at the pre-screening stage.

Brief description of procedure:

- (i) Media Analysis: The procedure will follow Hansen's (1998: 98) 'Key Steps' of content analysis as follows:
 - (1) *Definition of the research problem.*

Analysing the framing of instances of Popes' pronouncements on evolution in selected newspapers, and assessing how these statements have been represented by the print media. E.g. does the British print media's framing of this subject take a normative position which presumes that the Catholic Church is anti-science.
 - (2) *Selection of media and sample.*

Selected British newspapers from the LexisNexis database. The articles will be selected from a representative range of major national UK newspapers. Date sample 1996-2015.
 - (3) *Defining analytical categories.*

The study will be a frame analysis, as outlined by Matthes and Kohring (2008). With this method, frame elements are coded and a statistical cluster analysis is used to reveal frames and/or analytical categories.
 - (4) *Constructing a coding schedule.*
 - (5) *Piloting the coding schedule and checking reliability.*
 - (6) *Data-preparation and analysis.*

Analysis will assess if media framing of Catholic Church statements changed during the period 1996-2015, exploring how coverage has changed, or remained similar, and detailing what new elements may have emerged.
- (ii) Contemporary attitudes:

Catholic participants from the public will be recruited using the on-line pre-screening questionnaire which is part of the larger *Science and Religion: Exploring the Spectrum (SRES)* project, which has already received approval from the Newman University Research Ethics Committee. This pre-screen gathers basic information about the potential participants' demographic characteristics (for example, age, gender, socio-economic classification), as well as more detailed data about beliefs (for example, religious identification, religious participation and beliefs about God, the soul, the afterlife etc.), and awareness of evolutionary theory. It also gathers basic contact details, such as email addresses. Additional participants will also be recruited through personal and institutional contacts, the identification of gatekeepers, and possible snowballing of recruitment. NVivo will be used to code and analyse the interview data.

Evidence of how it has been established that the methodology proposed will produce sufficient data to draw meaningful conclusions:

- (i) Media analysis:
Using content analysis is the primary method of analysing large-scale media data (Hansen, 1998; Krippendorf, 2004). Similarly, to analyse how subjects are represented in the media, the use of a reflexive framing analysis methodology (e.g. Matthes and Kohring, 2008) allows researchers to study how media frames change over time. Media content analysis studies have previously been deployed in public understanding of science (PUS) and science communication research (e.g. Cassidy, 2005) and, along with attitudinal studies, make up a significant proportion of research in the PUS field (see: Bauer et al., 2007; Smallman, 2016). Based on the significant amount of methodological and practice based literature which has developed these methods, as introduced above, the media content analysis as proposed, will produce sufficient data to address the research aims.

- (ii) Contemporary attitudes:
Questions for structured interviews will be developed in response to a detailed review of the sociological literature on the relationship between religion, Catholicism and evolutionary science. This review enables the exploration of areas that have not yet been addressed, or where current research is ambiguous or contradictory. During the interviews, questions will be addressed both directly and indirectly, allowing participants to give an account of their beliefs and experiences following a well-established semi-structured approach (Patton, 2002). Following the completion of the interviews all the transcripts will be summarised and coded, with these codes being reviewed at regular points in the research process.

How will participants' informed consent be obtained for the study?

Before starting the interviews, participants will be introduced to the research and ethics procedures, including the codes of conduct that the research project will follow (such as the

ESRC Framework for Research Ethics and Newman University's *Ethical Guidelines*).

Participants will be asked to confirm that they have read the participant information sheet and to give their informed consent for the information submitted to be stored and analysed for research purposes.

Does the study involve any potential hazards or procedures which might cause distress or discomfort? (indicate all that apply)

Questionnaires touching on sensitive issues	YES	
Deception		
Experimental procedure that might cause distress – even inadvertently		
Designs involving stressful situations		
Possible breach of confidentiality	YES	
Invasion of privacy		
Working with children		
Working with vulnerable people		
Work involving animals		
Other area where you think there may be ethical issues involved	YES	

What procedures will be used to address these issues?

Sensitive questionnaire themes

Part (ii) of the research involves asking participants about their personal religious beliefs. This will be necessary because the study is concerned with how religious belief may or may not impact upon perceptions of evolutionary theory. As in the ethics approved *SRES* project, the risks associated with this will be addressed by explaining the broad question themes, which we will cover in the research prior to starting the questionnaire (omitting details where this may present a risk of socially desired responding), and by offering participants the chance to withdraw at any point during the research. Interview questions will also be reviewed by both supervisors prior to data collection, to ensure the items are not unnecessarily personal or challenging.

Breach of confidentiality

During the project, I will be collecting significant amounts of personal data from participants. To ensure the security of this data, all non-anonymised sensitive personal data (as defined under the Data Protection Act 1998) will be stored in a password protected location on

Newman University's servers. All sensitive research data will be encrypted on occasions when it is transported to locations outside of Newman University, for example, a personal laptop. Only members of the research team and transcribers will be given access to the research data. Where transcriptions are outsourced, transcribers will sign confidentiality agreements and I will use transcription services who guarantee that raw data is not saved to laptops or hard drives (for example by using FIPS encrypted flash drives). Interviewees will be allotted pseudonyms for transcription and the key linking these to their contact details will be stored securely and separately from interview transcripts. Data that could be used to directly or indirectly identify participants will be destroyed at the end of the project and only anonymised data retained.

Informed consent

In structured interviews, participants will be fully informed of why the project is being conducted before the research begins. Informed consent will be implemented at three points in the interview process:

1. During the pre-screening questionnaire (online) participants will be introduced to the research and ethics procedures, including codes of conduct, and asked for permission for a member of the team to contact them for further studies. (This stage has already received Newman University ethical approval as part of the larger SRES project.)
2. All interview invitations will include a participant information sheet, explaining what the research will be used for, and how (and for how long) data will be stored.
3. Immediately prior to each interview the interviewer will explain the full details of the project, and outline the interviewee's right to withdraw at any time, before asking the interviewee to sign a form giving consent to the research.

Plan of Work

Data Collection (Media): June 2017 – July 2017 (Pending ethics approval)

Data Collection (Interviews): July 2017 – December 2017

Analysis/Final Write-Up: December 2017 – January 2019 (Submit)

I have read Ethical Guidelines and Ethical Approval for Research. I am satisfied that all ethical issues have been identified and that satisfactory procedures are in place to deal with those issues in this research.

References

Bauer, M.W., Allum, N. and Miller, S., (2007) What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public understanding of science*, 16(1): 79-95.

Cassidy, A. (2005) Popular evolutionary psychology in the UK: an unusual case of science in the media? *Public Understanding of Science*, 14(2), 115-141.

Dias, E. (2014) Sorry, But Media Coverage of Pope Francis is Papal Bull. *Time Magazine*, 29 October.

Hansen, A. (1998) Mass communication research methods. NYU Press.

Krippendorff, K. (2004) *Content analysis: An introduction to its methodology*. Sage.

Matthes, J. Kohring, M. (2008) The content analysis of media frames: Toward improving reliability and validity. *Journal of communication*, 58(2): 258-279.

Patton, M.Q. (2002) *Qualitative Research and Evaluation Method*. Third edition. Sage Publications, Thousand Oaks CA.

Smallman, M. (2016) Public Understanding of Science in turbulent times III: Deficit to dialogue, champions to critics. *Public Understanding of Science*, 25(2): 186-197.

Amendments

As the aim of the research is to investigate a range of beliefs from individuals who identify as Catholic, I will ensure recruitment of individuals from a range of Catholic communities. This will go beyond solely churchgoing communities, to those who may seem less traditionally Catholic, or indeed use the term more as an inherited label. Furthermore, I will ensure a range of generations, and care will be taken to balance the genders of the sample. Lastly, I will focus on several locations, Bristol, Birmingham, London, Nottingham, so that all participants will not be from similar geographical communities. Care will be given in analysis as to whether the individual comes from an established Catholic community, or a newer one, as this may impact on their views, given the history of anti-Catholicism in the country.

Appendix III: Ethics Certificate

CERTIFICATE OF RESEARCH ETHICS APPROVAL

Catholicism and Evolution: Historical, Media and Social Perspectives

Module: PhD Project Number: 2731

This is to certify that this project has received approval from the Research Ethics Committee of Newman University

Student Number: 1504835



L. A. Wrayford

Chair of the Research Ethics Committee

Date: 27th September, 2017

Appendix IV: Participant Information Sheet

Who is the researcher and what is the purpose of the research?

I am James Riley, a PhD student at Newman University, Birmingham. My PhD is focussing on the relationship between science and religion—specifically the Catholic Church, Catholic individuals and evolutionary science. I am conducting a series of interviews to see how people who identify as Catholic perceive the relationship between science and religion. The data may be reproduced in the final thesis, future publications and presentations, but will appear anonymised.

What type of data is being collected?

As part of this research I am conducting semi-structured interviews with individuals who identify as Catholic. A semi-structured interview is a type of interview which aims to cover certain topics or themes, but rather than a strict script of questions which must be stuck to, the interview is flexible in that it can change to discuss new topics that may arise during the discussion. In this research the theme is science and religion, specifically Catholicism and evolution. I am interested in your views and opinions on the topic. It is not a test and there are no right or wrong answers.

What will participation in the interview involve?

The interview will last about an hour, although please allow for slightly longer in your planning in case we run over. During the interview, you will be asked to discuss your views on science, religion, Catholicism, evolution, and their relationships.

When and where will the interview take place?

I'm hoping to arrange the interviews for some time between **October 2017 and March 2018**, and they can take place on a weekday or weekend, daytime or evening, whenever is best for you. We can do the interview wherever is best for you, be that at work, or your home, or another quiet location such as a coffee shop. The location has to be quiet enough for the audio recording to work properly, but some background noise is ok. I can travel to you, although I am based at Newman University, Birmingham, so if you would prefer to have the interview at the university, then that is also possible.

What will happen during the interview?

On the day, I'll first talk you through the aims of the research, the ethics process, how the data will be used, and then ask you to read and sign a consent form. You will have an opportunity to ask any questions about the research that you may have. Once you are happy to begin the interview, I'll start the audio recording and ask the first question. At the end of the interview you will have another opportunity to ask questions about the research.

What are the benefits of taking part?

While there are no monetary incentives for taking part in the interviews, the benefits are in taking part in the discussion itself. An interesting discussion about your beliefs, opinions and perceptions of science and religion. Taking part in this research means you will be contributing to important debates in our society.

Are there any risks involved?

There are no particular risks involved in this interview, and there is no deception. The general risks involved in interviews are the potential to become upset or distressed by a question. If you do find any topic distressing, then do let me know. You can say as much or as little as you wish on any topic, and have the right to withdraw from the interview at any time.

Will I be identifiable?

No. All the data from the interviews will be anonymised and stored under password protection. The only people to see the raw data will be myself and a professional transcriber. Once anonymised your views will be analysed and excerpts may appear in my PhD thesis and further publications and presentations thereafter. Although excerpts from the interview may appear in the text, identifying information (such as names) will be omitted. While full anonymity is aimed for in this type of research, there are certain limits to this. There are ways the data could potentially be hacked and stolen, or requested by courts. However, this is extremely unlikely to happen given the topics we will be discussing.

Can I withdraw?

Yes, once you have agreed to be part of the research you can still withdraw. If you wish to withdraw from the project after the interview, please you notify myself within 30 days of your interview by emailing the address below.

If you have any questions, please contact:

James Riley, PhD candidate, Newman University, Birmingham. +44(0)121 476 1181
James.Riley@newman.ac.uk

This research has been approved by the Newman University Research Ethics Committee.

Appendix V: Consent Form

This PhD research aims to better understand the relationship between Catholicism and evolutionary science in England.

Please initial in the box provided

I confirm that I am over 18, have read and understood the participant information sheet, have been given the opportunity to ask questions, and I give my consent to participate in this interview on science and religion.

I am participating in the interview on a voluntary basis, and I understand I am free to decline to answer any question.

I understand that I can withdraw from the research, without giving a reason, within 30 days of the interview taking place (up to _____).

I understand that all information from the interview is anonymous and confidential.

I understand the interview will be audio recorded, and the only people who will hear the recording are the researcher (James Riley) and a professional transcriber.

I understand that the interview data will be reproduced and analysed in the researcher's PhD thesis, and potentially in future publications and presentations, and these excerpts will appear anonymised.

Name of participant

Signature of participant

Date

Signature of researcher

If you have any questions about the research, please contact:

James Riley (James.Riley@newman.ac.uk)

Centre for Science, Knowledge, and Belief in Society, Newman University, Birmingham, B32 3NT. (Tel: 0121 476 1181)

This research has been approved by the Newman University Research Ethics Committee.

Appendix VI: Participant demographics

Alias	Evolution orientation	Gender	Age	Occupation category	City	Length
Eileen	Non-Oppositional	Female	40-50	University - Religious service	Birmingham	1:13:24
Anna	Non-Oppositional	Female	20-30	University - student	Birmingham	0:56:22
Wilfred	Non-Oppositional	Male	50-60	University - Lecturer	Birmingham	0:43:04
Spencer	Non-Oppositional	Male	80-90	Retired - Engineer/scientist	Sheffield	0:56:36
Nick	Non-Oppositional	Male	20-30	Teacher - Secondary	Birmingham	0:47:10
Neil	Non-Oppositional	Male	60-70	Teacher - Secondary	Birmingham	0:38:58
Judith	Non-Oppositional	Female	50-60	Local Government	London	0:32:39
Kirsty	Non-Oppositional	Female	40-50	University - Lecturer	Birmingham	1:02:34
Christine	Non-Oppositional	Female	40-50	University - Lecturer	Birmingham	0:31:30
Claire	Non-Oppositional	Female	20-30	University - student	Birmingham	0:34:27
Penny	Non-Oppositional	Female	40-50	Teacher - Secondary	Birmingham	0:34:59
David	Non-Oppositional	Male	50-60	University - Lecturer	Birmingham	1:00:24
Tom	Non-Oppositional	Male	20-30	University - student	Birmingham	0:49:49
Lucy	Non-Oppositional	Female	50-60	Teacher - Home tutor	Birmingham	0:55:03
Julie	Non-Oppositional	Female	70-80	Retired - Engineer/scientist	Birmingham	1:14:24
Paul	Non-Oppositional	Male	50-60	University - professional service	Birmingham	1:48:30
Dorothy	Non-Oppositional	Female	50-60	University - Admin	Birmingham	0:35:17
Rebecca	Non-Oppositional	Female	60-70	Retired - Education management	Hereford	1:15:53
George	Non-Oppositional	Male	50-60	Retired - IT	Hereford	0:44:20
Jane	Non-Oppositional	Female	20-30	University - Student	Crewe	0:47:18
Victor	Non-Oppositional	Male	50-60	Manual labourer	Cheltenham	0:54:01
Don	Non-Oppositional	Male	60-70	Business owner	Cheltenham	1:32:12
Laura	Non-Oppositional	Female	60-70	Non-university researcher	Cheltenham	1:24:17
Rachel	Non-Oppositional	Female	50-60	Local Government	Cheltenham	0:51:24
John	Non-Oppositional	Male	70-80	Retired - Engineer/scientist	Cheltenham	1:17:04
Joan	Non-Oppositional	Female	80-90	Retired - Housewife	Bristol	0:49:53
Gregory	Oppositional	Male	70-80	Retired - Engineer/scientist	Cheltenham	2:36:21
Peter	Oppositional	Male	80-90	Retired - Engineer/scientist	Birmingham	1:04:27
Thomas	Oppositional	Male	50-60	Author	Cheltenham	2:40:13
Catherine	Oppositional	Female	20-30	Non-university researcher	London	1:21:13
Mark	Oppositional	Male	50-60	Manual labourer	Bristol	1:37:49