Understanding Radicalisation

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

Abstract

Given the considerable amount of effort and public resources invested in countering radicalisation, achieving a clearer understanding of what radicalisation is and of its causes is arguably a worthwhile and necessary endeavour. This thesis argues that such an understanding is lacking at present. Up until recently, researchers have relied upon interviews with current or former radicals in order to try and tease out those factors which might have contributed to radicalisation. As a result of the methodological approach, the focus has been upon individuals who are radicalised and their personal backgrounds, rather than on causal factors and mechanisms which might have been at work at other levels of analysis. Utilising and developing a tripartite theory of radicalisation by Bouhana and Wikström 2011, this thesis focuses on the emergence of radicalising settings. The role of so-called macro-level, or systemic, factors, which would affect the broader ecology and explain why settings propitious to radicalisation do or do not emerge in particular environments (e.g. communities) at particular times has been largely overlooked. One explanation is that such factors are rarely accessible through interviews conducted with those who commit terrorist acts.

By using a relatively new methodology in the field, agent-based modelling, simulation experiments were conducted to examine the impact of collective efficacy and social disorganisation upon the emergence and maintenance of radicalisation within a setting. Systematic reviews were conducted in order to elucidate existing data for modelling parameters, while interviews with former radicals and current deradicalisation experts were carried out in order to provide new data for the model and add to a field in which this primary data is still limited. Agent-based modelling is shown to provide the field of radicalisation studies with a methodology in which to test and refine theory, scientifically examine current hypothesis and generate more by investigating potentially unexpected results from simulation experiments. This could be of great help to practitioners who seek to understand the impact of their interventions when conducting counter-radicalisation or de-radicalisation work in the future.

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1. Introduction

Terrorism is nothing new, from the Sicarii fighting Roman rule in Palestine two thousand years ago to the recent consolidation of territory by the Islamic State in Syria and Iraq. The US-led war on terror, launched after the 9/11 attacks, has seen trillions of dollars spent on conflicts in Afghanistan and Iraq, with the US intelligence community requesting $16.6 billion for counter-terrorism efforts in 2013 alone (Pew 2013). The UK has faced terrorism from Irish Republican groups for decades, but since the lethal, so-called "7/7 attacks" in London, Al-Qa'ida-inspired groups have been deemed the greatest threat. Between 2001 and 2012, a total of 2,297 people were arrested for terrorism-related offences in the UK, with 838 subsequently charged. Arrests increased in 2012/13 to 249 compared to 206 in the previous year (Home Office 2013).

In the UK, efforts to counter the threat on the domestic stage have been embodied in the government's CONTEST strategy, of which the Prevent strand is concerned with stopping individuals from getting involved in terrorism in the first place. The Channel programme is the government's de-radicalisation strategy targeted at individuals who are deemed vulnerable to radicalisation, or who are believed to have already been radicalised. By 2012/13, a total of 2,653 people had been referred to the Channel programme (ACPO 2012), with referrals coming from diverse parts of the community, including teachers and law enforcement officials. All police forces in the UK and all local councils are involved in the programme. Given its scope, Channel can be said to break new ground in the Western world. It also raises questions as to selection of the participants in this and similar counter-radicalisation programmes, governmental approaches to the design and use of counter-radicalisation strategies, and the very definition of radicalisation from which such initiatives operate.

Given the considerable amount of effort and public resources invested in countering radicalisation, achieving a clearer understanding of what radicalisation is (the problem to be addressed) and of its causes (the factors and mechanisms which can be acted upon to prevent or disrupt the process) is arguably a worthwhile and necessary endeavour. The argument is presented early on in this thesis that such an understanding – of what constitutes the phenomenon of radicalisation and of how it is to be explained – is lacking at present.

The case has been made that, compared to other areas of social science concerned with human development and behaviour, empirical research in radicalisation studies has been scarce and theoretical progress remains at a relatively low level of sophistication. From a scientific viewpoint, the field is still in its infancy (Bouhana and Wikström 2011). Up until recently, researchers have relied upon interviews with current or former radicals in order to try and tease out those factors which might have contributed to radicalisation. As a result of

the methodological approach, the focus has been upon individuals who are radicalised and their personal backgrounds, rather than on causal factors and mechanisms which might have been at work at other levels of analysis.

Since terrorism is a crime, albeit a particularly high-profile one socially and legally granted special status, turning to criminology can fruitfully inform approaches that could be taken to study and explain radicalisation (Freilich and LaFree 2015). Notably, it can provide foundations for the development of theoretical frameworks which could be used to order incomplete and disparate findings, and suggest new avenues of investigation. One such criminological framework, Situational Action Theory (SAT; Wikström 2006), explains crime in terms of the interaction between individuals and their criminal propensity (their morality and capacity for self control) and the characteristics of the settings in which these individuals find themselves (their criminogenic properties, such as moral rules and their level of enforcement, and criminogenic temptations and provocations). For SAT, individuals who develop a propensity for a criminal act will perceive this act as a possible alternative for action when motivated to act upon a temptation or provocation. Within this framework, radicalisation can be defined as the socio-biological process of development through which an individual acquires a propensity for terrorism; in other words, radicalisation is the process through which an individual comes to perceive terrorism as a possible alternative when he or she is motivated to take action. Unless otherwise indiciated, radicalisation will be defined thusly throught this thesis.

In a rapid evidence assessment of research on Al-Qa'ida-influenced radicalisation, Bouhana and Wikström (2011) developed the criminological approach further, building upon the component of SAT concerned with personal emergence (i.e. the development of propensity). They proposed that the development of the propensity to engage in terrorism is the outcome of three interacting categories of causal factors: factors related to individual vulnerability to moral change; factors related to an individual's exposure to radicalising settings; and factors related to the emergence of these settings within an individual's activity field. This theoretical model, which may be called IVEE, provides the analytical foundation for this thesis, and is discussed in greater detail in Chapter 2.

While individual-level factors which are implicated in individual vulnerability have been the main focus of research so far (e.g. historical life events; mental disorders; religious or ethnic background), the factors implicated in individual exposure to settings of radicalisation and their emergence remain under-researched. Some work has touched upon the ecological factors which could affect exposure, by focusing notably on the role of certain built environments in the radicalisation process, such as mosques and prisons (Brandon 2009, Trujillo et al 2009, Neumann 2010). However, the role of so-called macro-level, or systemic,

factors, which would affect the broader ecology and explain why settings propitious to radicalisation do or do not emerge in particular environments (e.g. communities) at particular times has been largely overlooked. One explanation is that such factors are rarely accessible through interviews conducted with those who commit terrorist acts. Yet differences in social ecology (i.e. the socio-physical makeup of the environment in which people do, or do not, radicalise) may do as much, if not more, than individual-level factors to explain why some people radicalise when others don't, or why certain environments (e.g. countries, communities, neighbourhoods) experience radicalisation at some times more than others. In other words, attention to emergence processes might go some way towards addressing the "problem of specificity", as coined by Marc Sageman (2004); it might help us explain why individuals with certain kinds of backgrounds or 'vulnerability profiles' radicalise when a majority of people with the same profile do not (Bouhana and Wikström 2010). If we are to tackle this thorny issue, we must attempt to move beyond research that is wholly focused on individual-level factors, and address such questions as: how do factors at different levels of analysis interact to bring about the radicalisation process? Which factors contribute to this process at the systemic level and what, exactly, is their role? In thinking about this issue, Bouhana and Wikström (2011) contend that systemic factors matter inasmuch as they support or prevent the emergence of radicalising settings, settings characterised by the presence of moral teachings, often couched in the form of a narrative, supportive of terrorism, and whose moral context provides conditions favourable to the propagation of these teachings.

We can turn to criminology and crime prevention to begin to develop an understanding of the role of systemic factors in the emergence and maintenance of criminogenic (in this case radicalising) settings. Since the Chicago School of Criminology emerged in the 1920s, factors such as poverty, population heterogeneity, unemployment and social ties have been posited to affect levels of crime. Under the banner of social disorganisation theory (to be discussed in detail in Chapter 2), Sampson and Groves (1989) have tested the role of such systemic factors and found strong correlates with area level crime rates. Social disorganisation theory and empirical research inspired by it (e.g. Warner and Pierce 1993, Lowenkamp et al 2003) together suggest that ineffective community structures lead to an inability to maintain social control within a community, and a lack of effective supervision allows crime and disorder to take place (Sampson and Groves 1989). Networks of social control within a community are either lacking or too weak to enforce collective norms of behaviour. Collective efficacy refers to a community's belief in their own ability to achieve changes or solve problems through collective action. A higher level of collective efficacy can manifest itself as higher levels of social control by the community in order to prevent unwanted behaviour, alongside informal monitoring by members of the community (or even formal monitoring in cases such as

neighbourhood watch schemes). It also allows stronger transmission of communal rules and norms which help shape the morality of members of the community (Wikström and Sampson 2003). Given this background, social disorganisation and collective efficacy are two factors which can be postulated as having an effect on the emergence of radicalising settings through their effect upon levels of monitoring of settings. It is this hypothesised relationship, between systemic factors and the emergence of radicalising settings, which this thesis is setting out to investigate.

To explore the role of these factors, the present study introduces a relatively new technique to the field: agent-based modelling (ABM). Part of the toolkit of the field of complexity science, ABM is designed to recreate complex interactions between agents and their environment to produce emergent behaviours that cannot necessarily be predicted from observation of the individual components themselves. For example, Schelling's (1971) model sought to explain how social segregation occurred in a community in US cities. He showed how simple rules about the tolerance of individuals to the racial differences of their neighbours can quickly produce entire neighbourhoods segregated along racial lines. As modelled in Bouhana and Wikström's (2011) framework, radicalisation is the outcome of a series of interactions between individuals and the social ecological environment, which, given the paucity of empirical data (notably, systemic-level data) in the field, suggests that a technique designed to model complex interaction, such as ABM, may hold promise for theory testing.

By allowing researchers to build complex environments with heterogeneous interacting agents, ABM enables in-silico 'experimentation', in which variables or hypothesised causal mechanisms can be manipulated and their effects on simulated outcomes observed. Such experimentation is not possible in the real world, but this is not the only benefit of ABM. The development of an ABM requires that theories and causal mechanisms be formally specified, and this process is in-and-of-itself incredibly valuable, as it forces a level of formalism rarely encountered in social science theory and in turn allows testing, on logical grounds, of the theory concerned (Epstein 2008).

Hence, in this thesis, ABM is used to test the internal logic of the theories examined and to investigate the factors implicated in the process of radicalisation. A model is developed that simulates the radicalisation framework put forward by Bouhana and Wikström (2011), in order to refine our understanding of the possible interaction effects which occur during this process. Because they allow us to arbitrarily vary conditions within the environment, the models presented here can set out to test the role of social disorganisation and collective efficacy in different kinds of communities. Because they allow us to manipulate the characteristics of agents (radical and non-radical) and settings (radicalising and non-radicalising), the models

make manifest the interactions between layers of causal processes, in a way that traditional methodologies do not.

Though as a hypothesis-testing tool, ABM can stand on its own, the value of the technique is enriched by the use of empirical data. Indeed, ABM researchers such as Epstein (2008) and Tubaro and Casilli (2010) advocate the combination of simulation techniques and qualitative data collection methods. Notably, qualitative research can enrich a simulation, while the simulation experiments can drive the refinement of interview questions. In the present thesis, in-depth interviews with former violent extremists[1] and counter-radicalisation professionals were carried out to provide data from which to set ABM parameters, as well as collect valuable data on the radicalisation process, using an interview protocol informed by the analytical framework developed by Bouhana and Wikström (2011). Questions were designed to investigate the role of different factors and mechanisms affecting individual vulnerability to moral change and selection for exposure, the interviewees' exposure to radicalising settings, as well as the nature of these settings and the conditions under which they had emerged and were sustained. The experience of interviewees varied, with some having worked for decades in the area of countering violent extremism and others being relative newcomers to the area, but all brought their own unique perspective of either participation in extremist organisations or working with individuals vulnerable to radicalisation. To bring to light possible differences between the radicalisation and deradicalisation processes experienced by individuals in the UK, USA and Canada, both from Al-Qa'ida-inspired and far-right groups, the interview methodology adopted a comparative approach on the grounds of culture and ideology. Data from these interviews was then used to refine and strengthen the ABM which was created.

The interviews also set out to explore the workings of deradicalisation and counter-radicalisation programmes (governmental or not) implemented within these contrasting contexts, to try and glean any best practice, and to begin to investigate the effect of differences in context upon the implementation and success of these initiatives. While the UK runs the Channel programme, the incarnation of the UK government's deradicalisation effort, the USA and Canada do not administer anything as structured or centralised. Nevertheless, Canada does operate a counter-terrorism programme similar to the UK's CONTEST strategy, which includes a section on countering extremism by means of the Royal Canadian Mounted Police's National Security Community Outreach programme (Government of Canada 2013). This programme aims to promote interaction and relationship building with at-risk

[1] While the terms 'extremist', 'violent extremist' and 'radical' are often used synonymously, they are not done so within this thesis. However, it is common for governments and civil society organisations to use the term 'countering violent extremism', and for former members of terrorist or violent organisations to refer to themselves as 'former extremists', which is why this is done so here.

communities. The government is, furthermore, considering implementing a deradicalisation programme based upon the UK Channel programme[2]. Given this, it is a particularly interesting time to document some of the non-governmental work taking place in Canada, and the context in which it is operating. Currently, the USA is also reliant on non-governmental organisations, as it lacks a centralized deradicalisation strategy.

Combining qualitative research methods and ABM, and with a view to informing future thinking regarding counter-radicalisation measures and counter-narratives, the aim of this research is to enhance understanding of the radicalisation process and the role of systemic factors. Given the relative youth of the discipline, the aim of the thesis is not to build a 'complete' model of the radicalisation process, nor is it to build a 'predictive' model. Instead, using a mixed methods approach, the aim is to test and if necessary refine one theoretical model of radicalisation. As such, in the first part of the thesis, ABM will be used to subject the theory to a 'formalisation test'. That is, we will set out to determine whether it is possible to express the theory in a formal programming language and, having done so, to see whether the theory is found to be complete or lacking crucial elements. This will involve explicitly stating the causal mechanisms believed to be involved in the process of radicalisation, according to the theory. Having specified the model formally, it will be necessary to attribute values to model parameters. A second element of the research will involve identifying those parameters that can be estimated using existing empirical data, and for which new data need to be collected. Where data are found to be lacking, an attempt is made to collect the missing data as part of the thesis. However, and inevitably, it is not possible to collect all of the necessary data. Hence, part of the contribution of the thesis is to identify those data that should be targeted in future research.

The process adopted in this thesis shows the advantages of using ABM as a methodological tool which forces the researcher to explicitly specify the workings of their theory, and to explain how mechanisms are believed to generate outcomes, and how they might do so in varying contexts. It shows how the creation of an agent-based model can bring to the fore a gap in our scientific understanding and, therefore, guide priorities for data collection which should be of benefit to the field of enquiry more generally. It also demonstrates how the collection of such data feeds back into model development, as well as raising questions about the importance of certain assumptions within the theory. Finally, it shows how much must be taken into account with respect to policies implemented to impact upon the process of radicalisation: programmes designed to prevent or counter radicalisation must have a clear

[2] Private discussions with Government of Canada officials, February 2014

understanding of the mechanisms they wish to alter if they are to stand a chance of producing the desired outcome.

1.1 Chapter outline

Chapter 2 sets out the rationale for the thesis, discusses the state of the field of radicalisation studies and draws conclusions as to the direction it may need to take in order to move forward. The theory utilised as both the foundation and object of this research, developed by Bouhana and Wikström (2011), is put forward, and a literature review conducted which identifies the research currently available to contribute towards our knowledge in the area. The use of theories from within the realm of criminology is explained and justified, with the research question and aims articulated. Agent-based modelling is introduced as a methodology. The modelling requirements are elucidated in order to justify the format of the rest of this work.

Chapter 3 is a scoping review of current agent-based models within the realm of radicalisation and terrorism, conducted in order to assess the state of the art of knowledge within the field, so that the model built within this thesis may stand upon these foundations. It explores the theories used within the models, the paucity of studies within the area, and includes models on extremism in order to widen our understanding. The main results of the scoping review are presented, concluding that no systematic testing of theories is conducted within the models, with the parameters and datasets used varying widely, making further research within this area based upon solid theoretical foundations a necessity.

Chapter 4 is a systematic review of agent-based models of criminology, with a focus on urban crime. The aims of the review are to summarise the state of the art in criminological agent-based models, to identify areas where a strong empirical basis for model parameters exist, and to identify gaps which limit our ability to create models that reflect realistic conditions and offender decision-making. Theories of movement and decision making which could inform the radicalisation model are extracted, as are any relevant parameters and data sources. The environments used within agent-based models of criminology are also analysed to provide a foundation for the model outlined in the subsequent chapter.

Chapter 5 details the agent-based model of radicalisation created for this thesis. It is based upon the theory of radicalisation outlined in Chapter 2 and utilises relevant theories, parameters and data gained from the scoping and systematic reviews conducted in chapters 3 and 4. The initial model development presented in Chapter 5 identifies various gaps in the knowledge that is required to calibrate the model. These gaps are used to motivate the qualitative research presented in chapters 6 and 7.

Chapters 6 and 7 report on the findings from a sample of interviews conducted with former radicals and counter-radicalisation professionals in the UK, USA and Canada. Chapter 6 outlines the interview methodology employed, presenting an analysis of the results of these interviews based around the radicalisation theory (IVEE) used to design the interview protocol. The question of whether the theory can explain the process of de-radicalisation, as well as radicalisation, is tackled. The findings show support for the usefulness of the theory. Al-Qa'ida inspired and right-wing ideological groups are compared, as are the differing contexts on either side of the Atlantic. An examination of the experience of the interviewees, on both a personal and professional level, suggests how some of the knowledge gaps identified in Chapter 5 might be filled.

Chapter 7 provides an analysis of the data collected from the interviews, this time focusing upon the deradicalisation and counter-radicalisation programmes to which the interviewees have been exposed. The Channel programme in the UK forms the focus of the analysis for much of the chapter, looking at the strengths and weaknesses of the programme in its current format, through the interviewees' perspective. A tentative, comparative analysis with non-governmental programmes in the UK, USA and Canada is then completed, addressing the role of the different contexts upon programme design, objectives and outcomes. This is then related back to the IVEE model of radicalisation.

Chapter 8 incorporates the findings from the qualitative research in chapters 6 and 7 back into the agent-based model of radicalisation, strengthening its empirical basis and increasing its complexity. Simulation experiments are then run to test the effect of different community types on the levels of radicalisation emerging from the model, with selected parameters varied in order to see their impact upon simulated outcomes. The results suggest that, while communities with higher levels of collective efficacy and social organisation produce less radicalisation within the simulations, the fact that many of the parameters are still without an empirical basis affects the validity of the model. We must therefore seek to fill more of these knowledge gaps in the future.

Chapter 9 concludes the thesis by drawing together the main findings of the research and the contribution to the field, in terms of knowledge about the process of radicalisation and the particular theory used, alongside with the contribution of agent-based modelling to this area of study. It outlines the strengths and weaknesses of the work completed and points out fruitful avenues for future work.

2. Study Rationale

2.1 What is radicalisation?

The field of terrorism studies has long been impaired by the lack of a universal definition of terrorism (Crenshaw 2000), and those academics researching the process of radicalisation have experienced the same lack of conceptual consensus (Schmid 2004). The lack of a consensual definition means that each researcher must come up with their own definition or justify their use of one or another. Predictably, as there is no accord on the object of study itself, theories of radicalisation also vary widely in their focus and scope. Arguably, such fractionalisation is likely to continue to impede scientific progress. One example of such definitional difficulties is in the use of the term 'violent radicalisation'. The European Commission Expert Group on Violent Radicalisation (2008:5) defines violent radicalisation as involving 'embracing opinions, views and ideas which could lead to acts of terrorism' but with the caveat that 'there is no uniform usage of the terms "radicalisation" and "violent radicalisation" in the social sciences and humanities literature.' This notion of the distinction between violent and non-violent radicalisation is also promoted by Bartlett et al. (2010:7) who insist that, while '(t)he journey into terrorism is often described as a process of 'radicalisation'… to be a radical is to reject the status quo, but not necessarily in a violent or even problematic manner'. Such nuances have only served to cloud the field with seemingly endless definitions and re-definitions, chosen partly to suit the author's agenda. Without an agreed-upon definition of radicalisation, or detailed elucidation of the processes involved, research in the field continues to be disjointed, lacking a common focus, and this inevitably impacts upon the counter-radicalisation work attempted by government and civil society alike (Sageman 2014).

This leaves radicalisation as a term which is often misunderstood and misused. We must attempt to create a scientifically meaningful concept rather than the ambiguous desciptions which are often used, and in order to do so we must use appropriately scientific terminology, drawing from other fields of academia if necessary. Since one potential outcome of radicalisation is criminal activity in the form of terrorist acts, using theories from the field of criminology, including Situational Action Theory (SAT), to help us in our quest for understanding is logical. Situational Action Theory (Wikström 2006) has been used to show how individuals whose propensity development leads to the inclusion of the relevant action alternatives can commit crime and other rule-breaking actions. We are concerned with those who commit terrorist acts. Terrorism, as all crime, is a moral act – guided by rules stating what is right or wrong. Since terrorism is against the law, and those who commit terrorism know

this, we seek to understand what it is that drives them to break this law, this moral rule. SAT states that a person's moral actions (in this case committing a terrorist act as defined by law) are the outcome of their exposure to an environment in which an act of terrorism could take place (or in which they perceive it could take place) and their propensity for that action. It is the development of that propensity for certain actions which is of concern in this thesis. Radicalisation can therefore be defined as 'the process by which an individual acquires the propensity to engage in acts of terrorism' (Bouhana and Wikström 2011). If they are then in a situation where these actions are a possibility, an act of terrorism may occur.

When confronted with the term 'radicalisation', many people immediately think of Al-Qa'ida-inspired radical individuals and groups, and the acts they have committed. Such individuals have been at the forefront of Western security policy for the last decade (Home Office 2011), but we must not consider radicalisation as having a single ideological narrative (i.e. a set of messages told in a story format imparting a moral message). Radicalisation using far-right-inspired narratives continues to prove a problem in the USA and Germany (Vertigans 2007; Langenbacher and Schellenberg 2011), and history reminds us that when economic woes affect large portions of a country, those with nationalistic, racist and far-right tendancies come to the fore and often find vulnerable individuals to convert to their cause. A recent Governmental report from the USA confirms that they fear this is currently the case there (U.S. Department of Homeland Security 2009). It should therefore not be the tenor of the narrative itself which concerns us, but its form and function. What all successful radicalising (or *moralising*) narratives have in common are being action-oriented and giving their adherents absolute moral rules (Bouhana and Wikström 2011:43).

2.2 The state of play

Dalgaard-Nielsen (2010) reviewed the recent literature on radicalisation in Europe, and concluded that three schools of thought emerge: French sociology, which argues that radicalisation 'occurs as individuals seek to reconstruct a lost identity in a perceived hostile and confusing way', whose advocates include Keppel (2004), and Roy (2004); Social Movement Theory and Network Theory, which focus on the role of groups and networks on radicalisation, whose representatives include Sageman (2004) and Wiktorowicz (2004); and Empiricism, or case-study driven research, whose proponents include Nesser (2004). The latter identifies certain types of activists within groups, such as the leader, the loner, the convert etc., in an attempt to identify any differences in the mechanisms by which these types of activist become involved with the ideology and the group. Dalgaard-Nielsen makes the point that each school of thought cannot stand alone as they focus upon different levels of analysis and different background factors as explanations, and are indeed likely complementary – bringing together

these levels of analysis is only beneficial. The general absence of empirically-focused studies is noted, as is the need for control groups and more knowledge of the differences between radical leaders and those with the same profiles who engage in peaceful activities.

Within the field of radicalisation studies, scholars have a tendency to adopt a tripartite framework, including variations on the theme of individual, social and environmental levels of analysis: Precht (2007) identifies background factors (personal experiences), trigger factors (in a sense the exposure to a message) and opportunity factors (settings in which to meet others) in his work on Islamist radicalisation in Europe. Olsen (2009) concludes that identity, ideology and social group processes were paramount to the radicalisation process experienced by his interviewees, and the process variables considered crucial by Taylor and Horgan (2006:592) are setting events (past contextual influence which cannot be changed), personal factors (psychological and environmental context which the individual experiences) and the social, political and organisational context (external to the individual). Bouhana and Wikström (2011) suggest that factors and processes which cause individual vulnerability to the radicalising context, exposure to radicalising settings, and the emergence of these settings are crucial causal categories when seeking to explain the radicalisation process. This analytical framework serves to highlight the research gap and lack of knowledge we face when considering the systemic factors involved.

A number of theoretical models of the process of radicalisation exist, many based upon case studies or knowledge of jihadi groups and individuals (King and Taylor 2011). Silber and Bhatt (2007) theorise a pyramid of stages that an individual must move up, with fewer and fewer individuals closer to the top. The first stage is 'pre-radicalisation', where an individual may have one or multiple of a set of traits making them vulnerable to radicalisation. The next stage is 'self-identification', where an individual suffers from a crisis, such as discrimination, and turns to Islam for help in managing the crisis. They are then exposed to the jihadi-Salafi school of thought, which they accept in the third stage, that of 'indoctrination'. They adopt this world view and believe that violence is acceptable. In their fourth and final stage, 'jihadization', the individual declares themselves mujahedeen and is committed to violent jihad. This model is based upon case studies of European and US home-grown jihadis, and the authors used their knowledge in the New York Police Department to apply it to another set of cases in New York.

Another linear model is that of Moghaddam (2005), who uses the metaphor of a staircase to describe the path an individual moves along in the process of radicalisation. At each stage, the individual takes a decision to move upwards to the next step. Moghaddam's stages begin with feelings of relative deprivation for their group (be it social or religious), moving on to channelling their discontent, considering radical ways of countering their perceived injustice.

The third level sees them begin to morally justify terrorism, with the fourth level moving beyond radicalisation to joining a terrorist group. The fifth and final level sees them willing to commit an act of terrorism. Borum (2003) also uses a linear, progressive model starting with feelings of social and economic deprivation, moving on to inequality and resentment and finally to blaming another group for those ills. Wiktorowicz's 2004 model is also linear, describing the need for a cognitive opening in an individual, followed by the individual's seeking of religion, their frame alignment through which they see the world (orientated to Islam in this case), and finally the stage of socialising and joining, where the individual joins the radical or terrorist group with their identity reformulated around that group membership and ideology.

Sageman's 2008 model is not linear, but based upon the interplay of four different factors. He again talks of the need for the frame through which an individual interprets the world, in this case the West at war with Islam. He states the need for a sense of moral outrage to be felt by the individual, and for some kind of resonation with personal experience. All of these three are cognitive factors, while the fourth factor revolves around the interaction with other individuals in a network (whether face-to-face or online) through which the individual is mobilised. McCauley and Moskalenko (2008) summarise twelve mechanisms through which radicalisation to political violence happens. These are grouped into mechanisms on the individual level (including personal victimisation and political grievance, joining a group and the slippery slope into activism), on the group level (including cohesion under isolation and threat, and competition for the same support based), and mechanisms of radicalisation to political violence at the mass level (including hatred of an outgroup and the desire for martyrdom). While these models have some similarities, especially the linear ones in terms of the focus on individual notions of grievance or deprivation, there is no real attempt to look at the role of systemic factors in the radicalisation process. While the interaction between individuals and groups is addressed somewhat by Sageman, Wiktorowicz and Moghaddam, there is no systematic effort to identify which mechanisms are at work beyond the individual and group levels of analysis.

2.3 Issues with the field

Other than definitional variation and the focus upon individual layers of analyses, one of the main problems which the field of radicalisation studies faces is that of data collection and empirical validation (Sageman 2014). The methodological approach taken by the majority of studies into the process of radicalisation is in-depth interviews with current or former radicals which, while providing a large amount of data on one individual, are time-consuming, difficult to arrange and can create complex ethical issues if offending is discussed. This means that

achieving a large enough number of interviews to generalise their findings and gain an understanding of the underlying mechanisms of radicalisation is very challenging, and most studies are further hampered by focussing upon either a single narrative, such as Al-Qa'ida-inspired or right-wing, or country-specific cases. Some studies have taken a wider focus, such as Precht (2007) who has looked at a number of European countries, and a comparative approach will undoubtedly be beneficial as long as enough interviewees are gathered. However, data collection on an issue such as radicalisation will always be difficult and the tendency remains, as in the early days of criminological research, to turn to individual narratives or the description of specific settings – approaches that crime research has largely left behind as it grew in sophistication.

The reliance upon individual traits as explanatory factors in the process of radicalisation is a natural consequence of this focus on individual backgrounds. The desire to achieve the unachievable, the 'profile of the radical', continues to spur researchers on as project after project confirms or refutes the importance of gender, religion, economic background and the like, within any explanation of the particular author's own notion of radicalisation (Horgan 2008). It is likely that these factors may be considered 'markers' of the actual causes of radicalisation, but are not the causes themselves: a person's age does not cause them to be radicalised (Wikström 2012), but certain factors which come with youth may contribute towards the vulnerability of an individual to radicalising narratives. To date much of the focus has been upon 'risk' factors (Sageman 2014), rather than an understanding that some factors which pose a risk in certain situations may also increase a person or setting's resilience to radicalisation in others. Equally, by searching for risk factors, researchers have been focussing upon correlates rather than causes of radicalisation: this is often seen in criminological research but fails to account for causal processes (Wikström 2012). A substantial theoretical framework tying any of these factors to their role within the radicalisation process, and explaining their interaction between levels of analysis, has unfortunately been long in coming.

The current high-profile terrorist threat to the Western world, that which is Al-Qa'ida-inspired, and the fact that a particular religion, Islam, is used to justify the actions of those radicals who go on to commit terrorist acts, has led to a scrutiny of the profile of various religious 'leaders' or 'experts' who are adept at spreading this message of violence (Pantucci 2010). Their charismatic qualities are often noted (De Poot and Sonnenschein 2011; Post et al. 2002) and their recruitment methods scrutinised (Smelser 2007). The profile of their followers who go on to become radicalised has come under even greater examination, with social or psychological weaknesses sought, alongside similarities in upbringing or behaviours. A review of the extensive literature in this area is presented below. Specific cases of terrorism have highlighted

certain settings where radicalising teaching seems to have flourished, exposing a great many individuals to such ideas, including mosques, prisons and the internet (Munton et al. 2011). However, it remains to be seen whether these particular environments are really the radicalising hubs that they appear to be, with one report from the U.S suggesting that the problem within prisons was actually not as widespread as first believed (Useem and Clayton 2009). Our understanding of the mechanisms or systemic factors involved in the emergence and maintenance of radicalising settings in certain environments remains limited.

2.4 Explaining the process of radicalisation: The IVEE model

> 'The cause of crime [*in this case a terrorist act*] is thus the causal interaction of relevant personal and environmental factors that initiate a causal process [*the development of a propensity to see terrorist acts as moral – otherwise called radicalisation*], the outcome of which is an act of crime [*a terrorist act*]' (Wikström 2012:58).

In order to understand the importance of the role of systemic factors in radicalisation and how they affect the emergence of radicalising settings, we must define our understanding of the process of radicalisation itself. The definitional problem has been previously addressed here, requiring any researcher within the field to set out their own definition and justification of its usage in order to proceed further. A review of the literature will suggest that causal factors at different levels of analysis are implicated in the explanation of the radicalisation process. On an individual level, various factors, either alone or in combination, seem to contribute to an individual's susceptibility to the influence of radicalising narratives (Bouhana and Wikström 2011; Sageman 2008; Silber and Bhatt 2007; Wiktorowicz 2004). Oft-cited factors include life experiences, such as the experience of alienation and the search for belonging, feelings of grievance, trauma, a sense of dissonance between life expectations and reality, or even biological processes, such as hormonal changes or normal brain development, which are regularly implicated in explanation of juvenile delinquency (Loeber et al 2006).

For a susceptible individual to come into contact with radicalising influences, however, they must be exposed somehow, by happenstance, by way of their social networks, or through an active seeking process (Bouhana and Wikström 2011). Radicalising teachings (i.e. moral rules which promote terrorism as a legitimate action alternative) are often transmitted by an individual or group of individuals who are perceived as trustworthy and legitimate. The characteristics of these promoters, or radicalising agents, as well as the form and content of their message, have been a topic of significant attention in the radicalisation literature (Leuprecht et al 2010, Precht 2007). Likewise, attention has been devoted to the spaces within which the encounter between susceptible individuals and radicalising agents can occur, be they built environments, such as a mosque, pub, community centre, place of internment –

such as a prison or asylum centre – or a virtual environment, such as the internet (Bouhana and Wikström 2011).

It is when we shift our attention to the socio-physical setting within which radicalisation occurs that the concept of emergence acquires its importance: for radicalisation to occur there must exist such spaces as settings where (likely sustained or repeated) encounters between susceptible individuals and proponents of radicalising teachings can occur. For these settings to emerge and be maintained in any given environment, certain conditions have to be present. Members of the community of which the setting is part may agree with the radicalising teachings and allow their promotion; take note of the radicalising activity, disagree with it, but feel for some reason that they are unable to prevent or disrupt it; or, finally, they may not notice the terrorism-promoting activity taking place in the radicalising setting at all. To fully explain radicalisation is, therefore, to account also for those systemic (community-level and beyond) factors, which account for the conditions that allow for the emergence and maintenance of radicalising settings at certain times in certain environments, and without which the exposure of (susceptible) individuals to radicalising influence would not occur. In other words, to explain the development of individual terrorist propensity is to explain the interaction between three layers of causal factors: individual vulnerability to moral change (the individual level of explanation), exposure to radicalising teachings in particular settings (the social ecological level of explanation), and the emergence of these settings (the systemic level of explanation) (Bouhana and Wikström 2011).

2.5 Key questions to move forward

As a consequence of its continuing struggle with a chronic shortage of empirical data and persistent disciplinary fragmentation (Silke 2001; Sageman 2014), the field of radicalisation suffers arguably from a lack of integration of research findings, conceptual clarity, and scientific formality of the kind which is taken for granted in other domains of social science enquiry. The aforementioned focus upon individual-level factors and processes (notably, psychological) has led to an abundance of studies reliant upon interviews with existing or former radicals, which by their methodological nature are not well-suited to hypothesis-testing, including a test of assumptions about the roles and relative importance of causes located at different levels of analysis. The rationale for working towards a multilevel understanding of the radicalisation process goes beyond a scientific drive to leave no causal stones unturned; as the experience of criminology and crime science demonstrates, investigating causes which are more distal from the outcome of interest opens up the scope for prevention measures – for example, complementing programmes which target individuals with interventions which target the immediate (criminogenic) situation or the broader

environment. To achieve this level of preventative sophistication in the radicalisation domain, approaches which investigate causal processes beyond the individual level must be developed. As will be discussed below, some research has been conducted into factors at the social ecological level of analysis, notably focusing upon the nature of radicalising narratives, the radicalising agents who promote them, and the socio-physical settings in which this promotion takes place (for example, prisons or mosques). However, little research has been carried out by radicalisation researchers on the (systemic) factors which give rise to this radicalising social ecology, beyond still relatively informal assumptions made regarding the role of military conflicts or foreign policy, which are generally hypothesised to be sources of individual motivation.

One recent attempt to formalise the role of systemic factors and the interplay between different levels of causation can be found in Bouhana and Wikström's (2011) rapid evidence assessment of the causes of Al Qa'ida-influenced radicalisation. In order to systematically assess and organise available empirical findings, they developed an analytical framework which articulates three layers of causal factors and processes hypothesised to interact in order for radicalisation to occur: factors related to individual vulnerability to radicalising moral contexts and to individual susceptibility to selection into radicalising environments, mechanisms of exposure to radicalising settings, and processes of emergence of radicalising environments (ibid: 22). For ease, this analytical framework, or causal model of radicalisation, will henceforth be referred to as 'IVEE' (Individual Vulnerability, Exposure, Emergence). The IVEE model will be used throughout this thesis as a tripartite analytical framework, allowing us to identify where research gaps exist, and guiding attempts to address them. While, as Bouhana and Wikström observe, individual-level factors, and to a lesser extent ecological factors of exposure, have been the object of some investigation, processes of emergence of radicalising environments have been largely neglected and remain poorly understood.

2.6 The importance of emergence

Before addressing the role of emergence in the radicalisation process, we must first clarify what is meant by emergence. Theories of emergent behaviour state that the *interaction* between the components of a system can result in effects that could not be predicted by looking at the individual components of the system in isolation (Epstein 2006, Sawyer 2012). Put crudely, the whole can manifest effects which are more than the outcome of the mere sum of the parts. Wikström (2012:69) states that:

> ‘the concept of *emergence* essentially refers to how something becomes as it is: for example, how a person comes to acquire a particular crime propensity or how an environment (setting)

[in this case a radicalising setting] comes to acquire a particular criminogenity. I also take it that emergence refers to the occurrence of higher-order qualities that are not reducible to the lower-order processes that constitute the entity in question. I also take it that even if these higher-order qualities are not reducible to lower-order processes, they may be explained by such processes… *Social emergence* is a 'kinds of settings' question… Of key interest here… are processes by which different kinds of settings develop particular moral contexts'

The factors that cause the emergence of radicalising settings have been described as "the 'causes of the causes' of radicalisation" (Bouhana and Wikström 2011:48). These factors account for why certain environments (e.g. communities) contain radicalising settings when others do not. Radicalising settings may have identifiable physical boundaries, such as a building or park, or more diffuse borders. An online posting forum is an example of a setting with such fuzzy boundaries, creating exposure opportunities for people who may be geographically scattered across the globe. It is important not just to be able to explain why these settings *emerge*, but also why they are *sustained* for long enough to have the desired effect. The case can be made that systemic factors which affect the emergence and sustainability of radicalising settings play a key role in the radicalising process: without a radicalising setting, there would be nowhere for a vulnerable individual to be exposed to radicalising ideas.

While the systemic level of analysis has been relatively neglected in the study of individual radicalisation, we can turn to criminology for guidance and inspiration. The Chicago School, so-called for the research it conducted in Chicago during its rapid transformation in the first half of the twentieth century, was the first to systematically investigate the effect of various systemic factors upon the rates of crime and deviance in the city's suburbs. Looking at factors such as poverty, familial disruption and employment status, they postulated that these conditions combined in an overall measure of social disorganisation, which ultimately impacted upon individual behaviour and could push people towards crime (Hirschi 1969, Bulmer 1984). Later, proponents of this school of thought refined their explanation, hypothesising that "social disorganization has an effect on crime and deviance because it affects informal social control in the community" (Akers and Sellers 2009:181). Low levels of formal (by police or other authorities) or informal (by members of the community) social control were associated with high levels of residential mobility and heterogeneity often found in inner city environments, by undermining the social networks and social cooperation which might otherwise operate between residents within a neighbourhood. The importance of informal social control for crime prevention has been famously expounded by Sampson, Raudenbusch and Earls (1997), and is discussed further below. Bursik and Grasmick (2001) have postulated that effective community control provides fewer opportunities for criminal

behaviour. We see Neighbourhood Watch schemes as an example of residents exercising a measure of control over the behaviour in their area, and this leads to the issue of the importance of monitoring of behaviour (whether formally or informally) within criminology (Bursik and Grasmick 2001).

Taken together, this work has led to the understanding that a criminogenic setting (one which produces crime) is more likely to emerge in an area in which effective monitoring by formal or informal authorities is lacking (ibid). The level, or effectiveness, of monitoring can be affected, notably, by access to the resources required to carry it out, which may be financial or in terms of willing volunteers. Opportunity theories, such as Routine Activity Theory (Cohen and Felson 1979), expounded on that understanding by stating that guardianship, or the lack thereof, is a key element in the explanation of why crime occurs where and when it does. In the absence of a guardian – person or technology – whose role, formally or informally, is to monitor activity within any given setting, an offender (for example, a radicalising agent) coming into contact with a 'victim' or target (for example, a person vulnerable to radicalising influence) is more likely to perceive a criminal opportunity and be able to carry out the crime unimpeded (for example, to promote terrorism-supportive teachings and encourage their adoption by the targeted party). Ineffective monitoring by formal or informal authority figures has been posited as a major factor in the emergence of criminogenic settings, with Felson (1995) disaggregating these supervisory figures into guardians (who monitor targets), supervisors (who monitor offenders) and managers (who monitor places).

2.7 What do we know about the emergence of radicalising settings?

Although little empirical research has been carried out on the role of systemic factors in the radicalisation process, some systemic effects have been hypothesised. For example, it has been theorised that the media can play an important part in the emergence of radicalising settings by affecting the development and adoption of certain moral norms within communities (Richardson 2006). They disseminate certain messages, which can include radicalising narratives, which are absorbed by members of the community and could affect what is perceived to be morally correct. Conflict environments (such as civil violence or full-scale war) can also lead to the development of social norms (those informal rules which govern behaviour in society) being severely distorted, leading to heightened exposure to in-group out-group mentalities and dehumanising of ‘the other’, to the extent that violence becomes morally acceptable (Hafez 2006). Conflict can also be responsible for destroying the community and governmental organisational mechanisms which suppress crime and disorder, both through formal instruments such as the police and informal social mechanisms, while creating higher levels of social disorganisation. Finally, by its very nature conflict has the effect

of changing the rules of conduct that civilians are expected to follow (such as increased surveillance and suspicion of others in the community who may be perceived as potential enemies) and break the patterns of daily routines, which have kept society orderly, as well as reducing the resources available to maintain law and order. Other systemic factors, including immigration and ghettoisation within European cities (Leiken and Brooke 2006), and generational dynamics (Roy 2004) have also been proposed as explanatory factors, but the problem remains that isolating and validating the role of systemic factors is extremely difficult to do not least because those factors which promote the emergence of radicalising settings in certain instances may suppress them in others. To return to the example of the media, they can promote messages encouraging existing social norms to be maintained within communities, including cohesion, or they can be used to promote disharmony and violence between different sub-groups, as seen in the use of local radio stations to stir up hatred between Hutus and Tutsis in Rwanda, leading to genocide there (Kellow and Steeves 1998).

Here again, turning to criminological theories and research, which have benefited from a longer history of methodologically-sophisticated research in a relatively data-rich domain, can prove worthwhile. The concepts of social disorganisation and collective efficacy can be fruitful points of departure in helping us think through what may affect the emergence of radicalising settings. Social disorganisation theory, as briefly discussed above, states that ineffective community structures lead to an inability to maintain social control within a community, and a lack of effective supervision allows crime and disorder to take place (Sampson and Groves 1989). Networks of social control within a community are either lacking or too weak to enforce collective norms of behaviour. Collective efficacy refers to a community's belief in their own ability to achieve changes or solve problems through collective action (Sampson, Raudenbusch and Earls 1997). A higher level of collective efficacy can manifest itself as higher levels of social control by the community in order to prevent unwanted behaviour, alongside informal monitoring by members of the community (or even formal monitoring in cases such as neighbourhood watch schemes). It also allows stronger transmission of communal rules and norms which help shape the morality of members of the community (Wikström and Sampson 2003), leading to an environment where phenomena such as crime and radicalisation are less likely to flourish. Both social disorganisation theory and collective efficacy have been empirically tested in large-scale studies in the UK and USA (Sampson and Groves 1989, Sampson, Raudenbusch and Earls 1997, Lowenkamp et al 2003), and have a set of established variables in order to be measured and analysed, providing a researcher wanting to use them with equations easily transferable to methods requiring such precision, including agent-based modelling. Both theories are discussed in greater detail below.

2.7.1 Social Disorganisation

Shaw and McKay's (1942) theory of social disorganisation was a seminal work in the field of ecological criminology. They stated that differences in crime and delinquency rates could be attributed to three structural factors: residential mobility, ethnic heterogeneity and low economic status. The theory was not empirically tested until decades later when Sampson and Groves (1989) tested these factors, as well as family disruption, using data from the 1982 British Crime Survey. They used the survey data to produce measures of exogenous variables (socio-economic status, ethnic heterogeneity, residential stability, family disruption and urbanization), intervening variables (local friendship networks, unsupervised peer groups and organizational participation), and victimization rates of selected crimes and offending rates within neighbourhoods. They found support for social disorganisation theory, and demonstrated that between-community variations in social disorganization account for much of the effect of community structural characteristics on rates of both criminal victimization and criminal offending. Lowenkamp et al (2003) replicated the study using data from the 1992 British Crime Survey, finding even stronger support for the theory. Crime survey data is much better for gaining an accurate picture of crime and disorder than police recorded crimes, but to add another perspective upon the situation Warner and Pierce (1993) used calls to the police in Boston in 1980 to measure victimisation. They find that "(p)overty and heterogeneity, along with family disruption and structural density, are found to be important variables for understanding the distribution of crime rates among neighborhoods" (1993:493) for their sample. Such structural factors, it is suggested, act to weaken the social ties between communities, to lower the availability of formal and informal resources, and to therefore also impact upon formal and informal monitoring within communities. In combining all of these, social disorganisation can be seen to directly impact upon the emergence of radicalising settings.

Following a review of the field of ecological criminology, Sampson (2011:220) concluded that:

> 'neighbourhoods characterized by (a) mistrust, (b) perceived lack of shared expectations and cultural heterogeneity, (c) sparse acquaintanceship and exchange networks among residents, (d) attenuated social control of public spaces, (e) a weak organizational and institutional base, (f) low participation in local voluntary associations and (g) moral/legal cynicism are associated with an increased risk of interpersonal crime and public disorder within their borders.'

This provides a list of testable variables to incorporate into any research, and indeed suggests a description of those communities in which Al-Qa'ida-inspired radicalisation may flourish: 'communities with high levels of cynicism and a perceived lack of legitimacy of normative and

legal rules' (ibid:219). Indeed, Al-Qa'ida-inspired narratives actively draw upon the illegitimacy of Western democratic rule compared with that of Sharia law, negating the need to abide by the laws of the land and allowing terrorist acts to be justified, and indeed glorified (Change Institute 2008).

2.7.2 Collective Efficacy

Collective efficacy was once treated as a sub-component of social disorganisation, but the concept has come to stand alone. Sampson, Raudenbusch and Earls' study into the effect of collective efficacy on neighbourhoods and violent crime defined the construct as "social cohesion among neighbors combined with their willingness to intervene on behalf of the common good" (1997:918). They found that collective efficacy mediated links between violence and concentrated disadvantage and residential stability. Bandura (2000) delves deeper into the psychological processes involved, and gives an interesting insight which could be of use when investigating what may occur in communities where radicalising settings emerge:

> 'People who believe they can achieve desired changes through their collective voice, and who view their governmental systems as trustworthy, are active participants in conventional political activities. Those who believe they can accomplish social changes by perseverant collective action, but view the governing systems and office-holders as untrustworthy, favor more confrontive and coercive tactics outside the traditional political channels' (2000:78)

Bandura contends that '(p)eople's shared beliefs in their collective efficacy influence… how well they use their resources, how much effort they put into their group endeavor' (2000:76), which will include the resources allocated to informal monitoring by the community in question, linking once again directly to the emergence of radicalising settings.

One final association to consider is the possible role of collective efficacy in the promotion and enforcement of shared norms within a community. Wikström and Sampson (2003:131) theorise that, by influencing the socialisation practices within a community, collective efficacy 'determines the frequency with which children and adolescents in the community will encounter behavior settings having characteristics that may promote individual development of self-control and morality.' Higher levels of self-control and a strong adherence to conventional morality may both have an effect upon whether an individual is more or less vulnerable to a radicalising message. As we will see below, the development of morality is key to the understanding of the radicalisation process.

On the basis of these perspectives, we may therefore create a set of hypotheses about the systemic factors which could affect the emergence of criminogenic, in this case radicalising, settings.

- A setting found in a community in which the level of social disorganisation is high is more likely to have a low level of monitoring and informal control than a community where the level of social disorganisation is low.
- A setting found in a community in which the level of collective efficacy is low is less likely to promote conventional (non-criminal) morality, than a setting with a high level of collective efficacy.
- A setting in which the level of monitoring is low is more likely to promote radicalising teachings than a setting where the level of monitoring is high.
- A setting in which the level of conventional morality is poorly enforced is more likely to promote radicalising teachings than a setting where conventional morality is more strictly enforced.

The main research question driving these hypotheses is as follows:

- What are the factors that affect the emergence of radicalising settings?

2.8 How to move forward

Having established that the field of radicalisation studies requires a more integrated understanding of the levels of causal factors within the radicalisation process, it remains to establish how to tackle what is quite an ambitious agenda. This work continues from the hypotheses formulated above as to the role of systemic factors, rather than concentrating, as has been traditionally the case, on the role of individual factors in the radicalisation process.

Firstly, we must investigate the factors that may create a state change in the setting, from a non-radicalising to a radicalising one. Secondly, in order to advance understanding of the interaction between the levels of causal factors, the work attempts to integrate each of the three levels in a single modelling approach: systemic factors which explain the emergence of radicalising settings; ecological factors which explain an individual's exposure to the radicalising setting and radicalising narrative; and individual factors which explain an individual's vulnerability to the narrative and susceptibility to exposure to that narrative.

Investigating *interaction*, rather than merely describing categories of causal factors, requires that we go beyond the methodologies typically adopted within the field, notably interviews with individuals who have been through the process of radicalisation. The lack of available

data and formal understanding (i.e. theoretical models) about the role of systemic factors within the radicalisation process also means that we must be creative with our methodological approach, giving centre stage to theory development and refinement, if systematic empirical testing is to be conducted productively in the future. It may be the case that access to sources of systemic-level data will vastly improve, but at this point in time we must build upon what is available and embrace alternative methods of conducting research to try and move forwards. Therefore, this project adopts a dual approach to data collection and analysis: alongside the use of interviews with former radicals and counter-radicalisation professionals in the UK, USA and Canada, a computer simulation technique known as agent-based modelling is utilised to allow for the simulation of environments in which radicalisation may occur, and for the multilevel, IVEE model of radicalisation adopted here to be tested and refined. The worth of robust theoretical models to data-poor fields should not be underestimated, as these theoretical models can then guide robust data collection which in turn, if carried out and analysed correctly, can improve the field of knowledge (Wikström 2007).

2.9 Using agent-based modelling

Agent-based modelling is a technique that allows researchers to simulate the behaviour of agents (human or otherwise) within an environment. While much focus upon simulation modelling has been upon its predictive value, it has been stressed that this is merely one of many reasons to create such models (Epstein 2008). Agent-based modelling can be used to test and falsify theory, and Epstein argues that most theories indeed come before data is collected to test and derive them, rather than data producing theory. In this thesis, agent-based modelling will be used to test the sufficiency of the theory of the radicalisation process put forward here. The model must be generative – if it cannot generate a pattern reflective of real life scenarios using the theory it is based upon, the theory, or the model, is incorrect or incomplete. The control which is granted over the creation and manipulation of variables (at a micro, meso and macro level) is something that researchers often dream of while in the field, but in order to use it correctly the underlying theories to be written into the model must be well-formalised, well-understood by the researcher, and justifiable to peer review. Bruch and Atwell (2013:4) note that 'because the models are usually built from the ground up, they bring into sharp relief our 'implicit models', that is, latent assumptions regarding individual traits and behaviour, the nature of interaction among individuals, and the environment in which the interaction takes place'. By forcing modellers to make the implicit explicit, the ABM process strengthens the theory being tested, and the understanding of that theory.

This technique will allow the conjectures put forward within this research to be precisely modelled and sensitivity-tested to ensure the accuracy of the variables used. It will also allow

different environmental factors to be created and varied, which is central to the purpose of the research. In order to model a tripartite process of the interaction between the individual, exposure to the radicalising setting, and the emergence and maintenance of that setting, interacting sub-models will need to be created. Different models will also be created for the environments required, with three types of community represented: one with low levels of collective efficacy and social organisation, one with medium levels and one with high levels. Agent-based modelling is founded upon complexity theory: the assumption that interactions between individuals can lead to the emergence of complex macro level patterns which would be difficult to observe or explain using traditional statistical methods. Arguably, and based upon what we know about radicalisation from previous research, the radicalisation process involves individuals being subject to the influence of immediate and distal environmental conditions, as well as by the behaviours of other individuals, making radicalisation an appropriate case study for agent-based modelling over more traditional statistical techniques, which are less able to model multilevel interactions. More detail on agent-based modelling is given in Chapter 3 below, where the findings of a scoping review of its use in the field of radicalisation and terrorism studies are reported. Further details of the methodology are given in Chapter 5.

2.10 Modelling data requirements

To create a model of the process of radicalisation, information will have to be integrated into the model to allow us to represent different environments through the creation of different models (as explained above), and to create sub-models for each level of explanation (i.e. individual, social ecological, systemic). To model the two levels of analysis that we know the most about, the individual (which related to vulnerability) and the social ecological (which relates to individual exposure to the radicalising setting), we can conduct a review of current work into the area and utilise those facts already known. The accuracy of these two sub-models will be dependent upon the exploitation of existing research, therefore an in-depth review is necessary to inform modelling decisions, such as which are the most important variables that are needed for the model, alongside any parameter settings that can be identified. Throughout the modelling exercise, we must, however, remain aware of the principle of parsimony, which is crucial to the ability to create agent-based models: in other words, a model must be as simple as possible, while still considered generative (able to generate the patterns it is looking to simulate).

2.10.1 Review of literature on Individual Vulnerability

A large part of the available literature on radicalisation relates to an individual's vulnerability to the process; in other words, his or her susceptibility to taking on board radicalising moral teachings (often conveyed in narrative form) and come to see terrorism as a plausible, moral action alternative. Much can also be learnt from the extensive research into terrorist groups and the attempts to profile their members, which have occurred for decades – interviews with these individuals can provide us with a rich source of information about their lives, experiences, reasons for joining a terrorist group and reasons for leaving. The observations reported in the literature, as they relate to the characteristics of individuals vulnerable to radicalisation, can be organised into four categories: biological and socio-economic; psychological; social; and events and experiences. These factors matter to the explanation of radicalisation, to the extent that they contribute to an individual's cognitive susceptibility to radicalisation, but also to the extent that they influence their susceptibility to being selected for exposure to radicalising settings, a neglected dimension of individual vulnerability. For example, a person's socio-demographic characteristics may contribute to where they live, which buildings they visit, and who they do or do not spend time with. All of these can affect whether they are exposed to certain settings, including radicalising settings.

2.10.1.1 Biological and socio-economic factors

Historically, the profile of a terrorist has been that of young, poor, uneducated man (Merari and Elad 1986), though in many cases this has proven to be the exception more than the rule. Nevertheless, it remains that research has shown that the majority of those who go on to commit terrorist offences are men. This is notably the case when considering right-wing and Al-Qa'ida-inspired radicals in the UK (Jackson 2011; Munton et al. 2011). Women are more often seen in supporting roles, although there have been a few high-profile cases of women who have been convicted of terrorist offences in the past few years, including Roshonara Choudhry who stabbed MP Stephen Timms (BBC 2010), and Shasta Khan who, with her husband, plotted to attack the Jewish area of Oldham (UK) with an improvised explosive device (BBC 2012). Female suicide bombers are more commonly observed in Chechnya and Sri Lanka with the Tamil Tigers (Bloom 2005), and they have reportedly been found to have different motivations for their actions than men, with females more motivated by personal events than males, who were more nationalistic and religious (Jacques and Taylor 2008). Nevertheless, it remains that the majority of those who are known to the authorities to be at the forefront of radical movements and actions are male. This tallies with the findings of criminological research and official statistics, which show that most crimes are attributed to men, notably young men between the ages of 15-25. According to Silke (2003: 36), '(h)igher

impulsivity, higher confidence, greater attraction to risk-taking and needs for status can all work to give life as a terrorist a certain appeal for some young males.' Cota-McKinley, Woody and Bell (2001) found a correlation between youth and vengeful attitudes, and vengeance is often cited by those who have become radicalised to justify their actions and beliefs (Munton et al. 2011).

While age and gender may be indicators (flagging something, but not in themselves causal) of a higher likelihood of becoming radicalised and committing violent actions, one myth which has been dispelled is that of the notion of psychological abnormality playing a significant role in terrorist violence. It was common from the 1970s to adopt theories from psychoanalysis to 'diagnose' terrorists, with models of abnormal personalities being posited by authors including Post (1990) and Pearlstein (1991). However, as far back as the 1980s, Corrado (1981) was raising a warning that there was no data to suggest abnormality, and actually data suggested the opposite. Silke (1998:51) concluded that 'the findings supporting the pathology model are rare and generally of poor quality. In contrast, the evidence suggesting terrorist normality is both more plentiful and of better quality.' Research on radicalisation has equally concluded that, while a small number of those who become radicalised may suffer from psychological problems, the majority cannot be said to do so (Sageman 2004). Nevertheless it may be that the symptoms of certain mental illnesses, such as obsessive behaviour for example, may increase the vulnerability of an individual (Ridley 1994).

Regarding socio-demographics other than age, different studies have found varying results regarding the employment, marital and educational status of those radicals within Europe. It would seem that unemployment, or underemployment, may be an indicator in right wing groups in the UK (Bartlett and Littler 2011), which is the same with the UK and US Al-Qa'ida-inspired cases studied by Gartenstein-Ross and Grossman (2009) and Altunbas and Thornton (2011). In Christine Fair's (2007) study on Pakistani militants, it was found that a very large number of those who became mujahid were un- or underemployed the year before they joined – much more than the national average and surprising given the high level of education among those who joined. Un- or underemployment may contribute in two ways to the radicalising process: it may trigger a sense of grievance to those affected which they may find difficult to deal with if their level of cognitive vulnerability is high; and may give people a greater amount of free time in which to be exposed to and explore radicalising narratives and those promoting them.

Educational status is another issue which has produced varied results. Suicide bombers in Palestine have been found to be more educated than their peers within the same organisation (Weinberg, Pedahzur and Cannetti-Nisim 2003), while Gartenstein-Ross and Grossman (2009)

found their sample of home-grown terrorists in the US and UK to be less educated than Sageman’s (2004) sample of Al Qa’eda members. Sageman has speculated that a certain level of education is necessary in order for the individual to know enough about a situation to ‘care’ enough to do something. Sageman's sample also dispelled the notion that poverty is associated with terrorism involvement. Rather than absolute poverty providing motivation, Gurr (1970) has suggested that relative deprivation may be a more productive construct. Indeed, the notion of individual grievances, be it with their own situation or identifying with the situation of others within the same group (racial, ethnic, religious or geographic), may play a role in the process of radicalisation (Munton et al, 2011), as discussed in greater detail below.

One notable, yet not entirely surprising, finding has been the number of immigrants involved in European Al-Qa’ida-inspired radical groups. In their study of Dutch Jihadi terrorist groups, de Poot and Sonnenschein (2011) found large representation of illegal immigrants, while Jordan, Manas and Horsburgh (2008) found the perpetrators of the Madrid bombings to be Moroccan immigrants. Leiken and Brooke’s Quantitative Analysis of Terrorism and Immigration (2006) found that, of convicted terrorists between 1993-2004 in North America and Western Europe, 87% were immigrants. However, perhaps the more interesting analysis here is not in terms of percentage, but in terms of the lack of integration felt by a number of second and third generation Muslim immigrants within Western societies that leads them to seek out identities which can include those identities influenced by radical narratives (Roy 2004).

2.10.1.2 Psychological factors

The concept of identity seeking is one which features heavily in the literature. The French sociological school of thought on radicalisation, as identified by Dalgaard-Nielsen (2010), argues that radicalisation is attributed to the reconstruction of lost identities, and Roy (2004) argues that it results from the efforts of westernised Muslims to assert their identity in a non-Muslim context. This revitalised assertion of identity happens in a context where Islam has become fragmented and diluted by generations of immigrants to Europe, with youths now rejecting integration in favour of neofundamentalism. Feeling torn between their parents’ culture and that of their host country, second and third generation immigrants in Europe have been at the heart of many of the recent terrorist plots (Simcox, Stuart and Ahmed 2010). Feeling neither part of one culture nor the other, the search for their place within society has – so the theory goes – led this generation to seek out and accept a narrative which embraces them and allows them to assert a strong identity based upon seemingly unassailable religious truths. Silber and Bhatt (2007) conclude that their review of five US case studies shows that

radicalisation in the West is based upon identity seeking, blaming Europe's failure to integrate second and third generation Muslim immigrants, economically, socially and politically.

The emotional state of those who have become radicalised has been discussed, and interweaves with their life experiences and social identifications. The notion of the angry young man may well be true in the sense that feelings of anger, frustration and loneliness are often reported by those who are interviewed. These may lead to a 'cognitive opening', increasing the person's receptivity to new ideas and narratives. de Poot and Sonnenschein (2011:22) report on Jihadi terrorists in the Netherlands and 'their shared feelings of powerlessness, humiliation, and anger' which bound them together. Feelings of humiliation and powerlessness may tie to their empathy with persecuted groups with whom they identify, such as civilians in Palestine, and these feelings can easily turn to anger and a desire for retribution in their name. Olsen (2009) noted that his interviewees looked to relieve the humiliation of others who they viewed as helpless. Loneliness is again tied to life events, with those whose circumstances have changed, including students, migrants and refugees, often being removed from the networks which gave them emotional support. Alongside these emotions, we also see feelings of deprivation and discrimination playing their part. Precht (2007) identifies these two feelings as part of his background motivational factors for Islamist radicalisation in Europe, while Bartlett et al (2010) report on feelings of exclusion and a disconnect from society. In his research on the English Defence League in the UK, Jackson (2011) found that feelings of frustration and powerlessness were key drivers in the movement's membership.

2.10.1.3 Social factors

Many of the emotions discussed above contribute to, or can be attributed to, social factors. A disconnect from wider society results from chosen patterns of physical segregation of many immigrant communities within the UK and wider Western world (Leiken and Brooke 2006). Cultural ghettoization, where immigrants fight to maintain their identity in their host society, leads to a lack of integration and an enforcement of certain attitudes based upon culture or religion which pervade (Wiktorowicz 2005), potentially leaving individuals vulnerable to certain narratives based upon said cultures or religions. A religiously-inspired narrative has been promoted by those committing the latest wave of terrorist attacks in the UK, bringing the Muslim community in the West under scrutiny and pressure. However, religion is a factor which can affect a person's susceptibility to narratives which use it as their justification. We see this come to a head in areas such as Pakistan and Palestine, where religious beliefs towards paradise interweave with community support for violent actions (Pedhazur et al 2003). When cultural support for violence exists, and cultural norms embrace such acts as

suicide bombings through narratives honouring martyrdom, an individual's use of violence is perceived to be morally justified (Hafez 2006).

The social attachments a person possesses, or feels that they need to possess, can leave them cognitively vulnerable to radicalising narratives, while increasing their vulnerability to self-selection to exposure to radicalising settings. Cases of friends and family radicalising together are reported (Bakker 2006, Christine Fair 2007), while Sageman (2004) is one of the foremost proponent of the importance of group socialisation in radicalisation. The psychological need for group belonging and an identity provided by that, whether because of identity seeking or even for protection in a new and potentially hostile environment, increases an individual's vulnerability, especially in certain circumstances: if a person has lost their original familial or social ties due to relocation (immigration, prison sentences etc.), their attempt to build new ones leads to potentially new socialising situations and narratives which can include those favourable to radicalising ideas. The need for social bonding has been highlighted many times (Choudhury, 2009, de Poot and Sonnenschein 2011, Wiktorowicz 2004), and a strong attachment to someone who already has radical beliefs must make a person much more likely to encounter and potentially, but not necessarily, be vulnerable to their adoption.

2.10.1.4 Events and experiences

Cognitive vulnerability (not having the capabilities to deal with stressful situations) can be brought about by life events such as separation, which can remove existing social ties, lead to loneliness, a lack of social guidance, and identity seeking in a culture which is different to one's own. By removing the psychological support given by an existing social or familial network, the search for other individuals to replace this support can lead to encounters with either settings in which radical ideologies are promoted, or individuals who espouse such ideologies. An enforced change in environment, such as imprisonment, acts much the same, breaking social ties and increasing feelings of loneliness and vulnerability (Brandon 2009). One thing such life events do contribute to is a change in an individual's field of activity from which they draw their daily interactions and through which they can become exposed to radicalising settings, most importantly that *prolonged* exposure which is necessary for radicalisation to occur (Bouhana and Wikström 2011). Unemployment for example can lead to an excess of 'spare' time in which individuals may adopt activities leading to the discovery of radical ideologies and those promoting them, such as surfing the internet and accessing chat rooms, or visiting social hubs such as cafes (ibid). An extreme example would be the experience of asylum seekers in holding centres, who can spend much of their time idle but without anywhere to go to relieve the boredom. Equally, they may have nowhere to go to remove themselves from those promoting radical narratives that are also located within such settings. de Poot and

Sonnenschein (2011) have highlighted the role of asylum centres as meeting places for radical Islamist extremists within their research. Experiences such as redundancy, discrimination and racism can lead to grievances which leave people feeling angry, frustrated or excluded. When studying motivations for suicide bombings, Jacques and Taylor (2008) found that personal events were a strong factor for women, while a traumatic event is often said to inspire many to join such movements (Pape 2006). Such grievances can lead to a person's moral framework being weakened, and indeed the adoption of new moral frameworks.

While the literature supporting the role of individual vulnerabilities is extensive, it is important to look beyond this layer of analysis if we are to adequately explain the mechanisms behind the process of radicalisation. Horgan (2008) pleads the case for moving away from profiling individuals and towards the inclusion of contextual factors, and Richardson (2006:14) reminds us that 'the causes of terrorism are not to be found in objective conditions of poverty or privation or in a ruthless quest for domination but in subjective perceptions, in a lethal cocktail containing a disaffected individual, an enabling community and a legitimizing ideology.' It is towards the exposure to that legitimising ideology that we now turn.

2.10.2 Review of literature on Exposure

Understanding how an individual comes to be exposed to a radicalising influence requires us to delve into the features of the settings in which that influence is found, the narratives through which that influence is often exerted, those radicalising agents who extoll such narratives, and the processes of social and self-selection through which a person comes to find themselves in these settings (Bouhana and Wikström 2011). The processes by which a person is exposed to a radicalising setting bridges the gap between those whose individual vulnerability would make them receptive to radicalising narratives and the emergence of radicalising settings within an area: without exposure to the settings, the individual is never introduced to the narrative, and in most cases a radicalising agent, which contribute to their socialisation into a terrorism-supportive moral framework.

2.10.2.1 Features of radicalising settings

Various settings have been identified in the literature as hosting radicalising agents and narratives, including mosques, universities, asylum centres, prisons and bookshops (Munton et al 2011). It has been noted that in recent years, due to the increased interest in radicalisation by the authorities and a greater level of surveillance, settings have been moving from public places to private, whether these are the homes of the radicalising agents or other exclusive areas within which they are not likely to be overheard (Bouhana and Wikström 2011). The main role of the radicalising setting, however, is to provide an environment in which the

narratives can be discussed and social bonds and trust formed between the agents and individuals whom they are targeting (ibid). The internet has been widely discussed as a radicalising setting which is of particular concern to the authorities (Jenkins 2011, Neumann and Rogers 2007, Silber and Bhatt 2007), and this setting epitomises one of the necessary features for a radicalising narrative and agent to be present: a lack of formal or informal monitoring. This deficiency can be due to a lack of resources or a lack of willingness to intervene. An absence of trust in the formal authorities within immigrant communities can lead to them being unwilling to report a radicalising setting to the police, feeling that they should deal with it as an internal community matter (Briggs 2010). A sense of loyalty towards others within the same ethnic group, alongside a fear of being associated with an extremist culture, can equally lead to a failure to report (Sheikh et al 2010). This failure of monitoring may allow radicalising narratives to be propagated, but understanding the features of these narratives is crucial.

2.10.2.2 The radicalising narrative

While the nuances of a radicalising narrative will change depending upon the specific radical group or agent, certain features may be overarching, providing the narrative with the strength and ability to convince those who are vulnerable to it (Bouhana and Wikström 2011). Firstly, the narratives include, or are supported by, moral authority. This is suggested in the Al-Qa'ida-inspired narratives, which use verses from the Qu'ran to claim that their message is religiously justified. They are also delivered by people declaring themselves to be religious authorities, such as Sheik Abu Hamza, and the London preacher Abu Qatada (Pantucci 2010). Leuprecht et al (2010) contend that the religious narrative is particularly important in justifying violence against the West, claiming them to be crusaders and mirroring medieval combative language. Such religious narratives are also seen in Pakistan and Palestine, where suicide bombings are justified using symbolic narratives honouring martyrdom (Hafez 2006, Pedhazur 2007), since suicide is specifically banned in the Qu'ran. Religion can work both for and against such narratives, however: Salafis in Brixton have used their superior knowledge of Islam and the Qu'ran to contest the Al-Qa'ida-inspired narratives being propagated within the area, in order to remove young people from such violent influences (Lambert 2008). Secondly, the narratives are action-oriented: convincing people to commit acts of protest or violence for the cause rather than to remain quiet is particularly appealing to younger men and those who seek to avenge their own, or their group's, humiliations.

This is believed to be helped by the third feature of the narratives – they are categorical. They split people into us versus them, believers versus non-believers, good versus evil (Leuprecht et al 2010). This classic psychological tool allows the proponent of the narrative to dehumanise

those who are 'the other', decreasing the cognitive dissonance (those feelings of discomfort at internal conflicting attitudes in a situation) which would arise from committing violence against them. The Change Institute (2008) reports on the constellation of narratives they have found in their research, including those portraying the hostile society in which people live, and the anti-imperialistic attitude that must be taken. Pantucci (2010) equally states the importance that anti-establishment ideas play within such narratives. Finally, these narratives must be easy to understand and access. Simplistic categorisation and blaming the out-group for the world's ills resonates with those looking for a scapegoat for their own problems and feelings of helplessness. By manipulating religious texts, Al-Qa'ida-inspired narratives engage with deep-seated emotions and transcendental contexts that are difficult to disprove or argued against. The easy availability of these narratives in various forms is how so many of those convicted for terrorist offences were introduced to them. Videos, sermons and preaching on the Internet are easy to find and provide the viewer with a sometimes overwhelming sensory experience (Precht 2007).

2.10.2.3 Radical teachers

Arguably the most common and effective way of convincing a person of the narrative remains face-to-face contact, leaving the proponent of the message to play an important role in the radicalising process. Indeed, the internet is rarely the only contact that individuals have with radicalising narratives (Stevens and Neumann 2009). The notion of charismatic leadership finds a strong voice in research into radicalisation: Precht (2007) identified the presence of charismatic or spiritual leaders as a trigger factor in the process of radicalisation, while de Poot and Sonnenschein (2011) extoll the importance of charismatic leaders, their credibility and ability to articulate their ideology clearly. The European Commission Expert Group on Violent Radicalisation (2008:12) remarks that radical teachers 'are often charismatic persons motivated by idealism and a strong sense of justice'. But it is not just their charismatic leadership skills that are important to spreading their narrative; it is also the relationships that they form with their targets. From birth we are socialised by those who care for us, usually our parents, but it seems that radical teachers can create an environment of perceived care and trust which can even supersede that from our childhood. This is especially important when considering people who have been removed from their home environment or lost the attachments of care and social bonds from family or friends (Bouhana and Wikström 2011). By forming strong and lasting attachments with individuals, radical teachers form tight-knit groups who at times replace the family unit and go on to commit terrorist acts together. This is where Sageman's (2004) 'bunch of guys' theory comes to prominence and we are able to see the importance of socialisation in the radicalisation process. Indeed, such groups were

responsible for the July 7th 2005 London bombings, and the July 21st 2005 attempted bombings, as well as many other notable terrorist atrocities in the Western world.

2.10.2.4 Social selection

The process by which individuals come to be exposed to radicalising settings, and the teachers and narratives they encounter there, is an understudied aspect of radicalisation. Social and self-selection are the processes by which an individual comes to be at a setting where radicalising narratives may be present, helping to explain why certain groups of people may be exposed to narratives while others may not (Bouhana and Wikström 2011). Social selection revolves around the social groups in which a person finds themselves, not necessarily by choice: these 'enable (encourage) or restrict (discourage) particular kinds of persons from taking part in particular kinds of time- and place-based activities' (Wikström 2012). For example, Al-Qa'ida-inspired radicalisation is based upon a narrative partially justified by Islam, leading to it being targeted towards those already of the faith, and in places where people of that faith congregate. Therefore Muslims are much more likely to be exposed to settings such as mosques or Islamic bookshops where such narratives may be spread. Equally, during the Troubles in Northern Ireland, the Republican-inspired narratives were targeted towards those of the Catholic faith, meaning Protestants were less likely to come across them in their daily activities. The employment status of a person may lead to their social selection to exposure to radicalising settings: those who are unemployed, or students, have more time to surf the internet and come across radicalising materials, or socialise in cafes, bookshops or centres where radicalising teachers may target (Bouhana and Wikström 2011). One interesting case of social selection would be that of criminals who are imprisoned: while they didn't choose to be imprisoned, their life choices led to the incarceration in a place in which their activities are constrained, and which may house radical teachers and radicalising narratives to which they are then exposed. We see here how a person's routine activities (often influenced and constrained by their social selection) affect their likelihood of exposure to a radicalising setting.

2.10.2.5 Self-selection

The process of self-selection has been proposed to explain how a person's individual preferences can come to shape their attendance in a particular setting that may house radicalising narratives. These preferences can change over time, and indeed become shaped by a person's exposure to the radicalising narrative: if a person joins a radical group they may become more action-oriented and desire to travel abroad to a terrorist training camp (Bouhana and Wikström 2011). A preference for social status within the community may lead a

person to visit a religious institution more frequently, exposing them to narratives supporting radicalisation, while someone who already has a propensity for political participation or action may take part in a demonstration during which they are exposed to radicalising agents who also attend: the anti-war marches in London attract those from various parts of the political spectrum, including Islamic extremists.

As discussed, the features of radicalising settings, radicalising narratives and the importance of radicalising agents must be understood alongside the processes of self-selection and social selection through which a person will become introduced to such settings. However, none of this explains how a radicalising setting comes to exist and to be maintained for long enough for an individual to have prolonged exposure to the narratives.

It is the emergence of these radicalising settings which is the least understood of any of these processes, but which we seek to develop an explanation of within this body of research. The above sections have provided a review of research conducted into individual factors and the exposure to the radicalising setting, which will be used to create a sub-model of variables and parameters necessary for the interaction effects to be studied.

2.11 Contribution to the field

The intention of this research is to further develop understanding of the process of individual radicalisation. While the majority of studies focus upon individual factors, this research focuses upon bridging the gap between the individual, ecological and systemic levels of analysis and developing our knowledge of the interaction effects between them. By investigating the role of systemic factors within this causal chain, specifically by studying the effect of these upon the emergence of radicalising settings, the aim is to further our limited understanding of this level of explanation of the radicalisation process and to set the stage for further research in this area. The intention is that improving understanding of the radicalisation process may eventually be able to inform counter-radicalisation techniques designed to prevent these narratives from taking hold amongst populations in the UK and the wider world. By using agent-based modelling alongside the traditional research methodology of interviews with former radicals and counter-radicalisation professionals, this research aims to showcase a technique which has not been widely used within the field, but which has great potential to make a significant contribution towards theory development and data generation in the area of radicalisation, an area of scholarship which suffers from a lack of empirical data. By permitting the simulation of any environment and the control of variables which affect the radicalisation process, agent-based modelling allows researchers the flexibility and control which they are unable to achieve when collecting data and examining processes in the field. It

is used here as a new approach to theory-testing and falsification, which goes beyond reliance upon interviews with previous or current radicals.

3. Agent-based modelling for radicalisation and terrorism: a scoping review

The field of terrorism and radicalisation studies has long suffered from difficulties with the collection of data, and one recent attempted resolution has been the use of agent-based modelling. These models allow the processes of radicalisation and the growth of terrorist groups to be simulated, theories to be tested and processes analysed. However, in order to contribute to the field of knowledge, they require that theories are accurately formulated and programmed, and the models and their outcomes rigorously validated. If these strict principles are adhered to, generative explanations of radicalisation and the growth of terrorist groups can be tested and the insights gained could be of great interest to scholars in the field. The approach, for example, allows for a theoretically infinite number of different situations to be tested in silico, without the need for laborious, expensive, and sometimes dangerous fieldwork. By using a scoping review methodology, the aim of what follows is to answer these questions: 1) Which theories have agent-based models used to model radicalisation and the formation of, or recruitment to, terrorist cells? 2) Have sources of data been commonly used to calibrate models, or parameters commonly employed, which could be standardised for future research? 3) Do the findings of these studies support, refute or otherwise inform current theories within the field of radicalisation and terrorism studies? In conclusion, gaps within the current research in this area are highlighted and possible future developments outlined.

3.1 Agent-based modelling

Agent-based modelling (ABM) has been exploited for many years in the biological and physical sciences (Railsback and Grimm 2012), but has only really been used as a tool for social research in the past two decades (Gilbert and Troitzsch 2010). It involves the creation of a computer programme in which autonomous agents interact with their environment, allowing various situations to be simulated, manipulated and analysed. Agents can be homogenous or heterogeneous, and endowed with multiple attributes specified by the researcher. The environment can be equally varied, with the ability to affect, or be affected by, interactions with the agents, time, or a multitude of other variables. Agent-based modelling can either be based upon a theory, which it sets out to test, or it can be generative, allowing theories to be developed from behaviour that emerges from the model (Gilbert 2008). ABM is based upon four essential principles: the autonomy of agents; the interdependence of agents; that agents follow simple rules (which together may generate complex behaviours); and that agents are adaptive and backward looking (having the ability to learn) (Macy and Willer 2002:146).

There are different types of agent-based models depending upon what the researcher hopes to achieve. Abstract models are very simplistic, aiming to demonstrate a basic process in an abstract manner rather than replicate a specific environment or situation. These are in direct contrast to facsimile models, which use specific case studies and empirical data to replicate a phenomenon as accurately as possible, often with the purpose of being able to make predictions from these models. Middle-range models lie between the two, aiming to describe the characteristics of a phenomenon in a way that it is still generalizable, giving qualitative resemblances and not solely based on a single case study (Gilbert 2008). One of the most attractive functions of agent-based modelling is that it allows hypothesis testing in areas for which data collection may be difficult, for example for physical, ethical, or financial reasons. It is equally useful for the refinement of theory in newer areas of research for which the empirical base is yet to be developed (Epstein 2008, Gilbert and Troitzsch 2010). However, it is important to note that for a model to be useful, it must be based on robust theorisation and correct coding – if the program is written incorrectly, or based on unsound premises, it cannot hope to be valid.

3.1.1 Agent-based modelling in social research

Bearing this in mind, we may agree with Watkins et al (2008:1) when they state that it is easier to create models in the physical sciences, where 'well understood, commonly accepted, and validated models of physical phenomena' exist. The unfortunate truth is that such a set of agreed-upon concepts and theories is rare in the realm of the social sciences. Those theories which do exist may not be easily converted to an agent-based model, due to a lack of in-depth formalisation or to conceptual ambiguity. The process required to encode social science theory into an agent-based model requires formalisation and clear articulation of concepts, which is a strength of the approach. Bruch and Atwell (2013:2) note that 'agent-based models are very useful for sharpening one's thinking about an empirical problem and identifying key explanatory mechanisms', which is exactly what is needed in the field of radicalisation studies. The problem remains, however, that 'the major difficulty we face in building a model of a complex socioeconomic system is in quantifying social situations' (MacKerrow 2003:186).

It has been argued that the qualitative methods which are used within social research can be complemented by agent-based modelling in various ways: ABM 'can be used as a tool to perform 'thought experiments' to test the consistency of social theories', as well as suggesting 'new questions for the fieldwork', which scientists can then set out to answer (Tubaro and Casilli 2010:66). Indeed, it is suggested that 'qualitatively-informed ABM achieves a clearer, more relevant and more understandable description of social structures and processes' (ibid: 67). It may also remove some of the apprehension felt by social scientists when dealing with

computer simulation and the fear of the 'black box', whereby phenomena are supposedly modelled but mechanisms and processes are not understood. Another strength of agent-based modelling is its potential use as a policy guide: by allowing policy makers to test the effect of their proposed interventions in silico, these policies can be refined to achieve maximum impact with the resources available to them, while revealing possible unintended consequences. A two-way feedback can then occur, with the data informing the model, the results of which then inform the situation being modelled.

The ideal-type agent-based model would use an interwoven set of micro-theories to create an environment where macro-behaviour, such as terrorism or radicalisation, can emerge and begin to be tested and understood. The concept of emergence has a uniquely specific meaning in the context of this methodology, being defined as 'system dynamics that arise from how the system's individual components interact with and respond to each other and their environment' (Railsback and Grimm 2012:10). Gilbert and Troitzsch (2010:11) describe it in slightly simpler terms as 'when interactions among objects at one level give rise to different types of objects at another level.' It is emergent behaviour which a model endeavours to generate, yet the more complex the behaviour, the more difficult it is to model. In recent years a number of social science agent-based models have been created and successfully validated, from Epstein's seminal work on modelling civil violence (2002), which is the basis of some of the works included in this scoping review, to the recent testing of criminological theories regarding burglary patterns (Birks, Townsley and Stewart 2012). Individual, group, and even large-scale societal behaviour has been modelled and tested, with agent-based modelling proving a flexible enough technique to encompass disciplines as diverse as particle physics and warfare. Indeed it is extremely useful for those seeking a multidisciplinary approach to their work, since 'agent-based models can integrate data and theories from many different sources and at many levels of analysis' (Bruch and Atwell, 2013:4). The best model, however, is that which can be validated by real-world data, which unfortunately is not always readily available.

3.1.2 Agent-based modelling for radicalisation and terrorism

The current state of research in the areas of radicalisation and terrorism is such that high quality data, in sufficient amounts to inform and validate a theory, are exceptionally difficult to obtain. Genkin and Gutfraind (2011:6) are correct in stating that 'there is a shortage of empirical sources, as well [as] difficulties in generalizing beyond the cases examined'. The main methodologies used are either interviews with proponents of radical or terrorist views and actions, or larger scale quantitative works based on the number and location of attacks (LaFree et al 2008), alongside the affiliation or basic socio-economic characteristics of the attackers. Contention arises over which methodology best allows the formation and testing of theory,

and this is not helped by issues which underpin the foundation of the field: while figures such as Sageman (2004) and Hoffman (2006) are oft quoted, there is no field-wide, national, or international recognition of a definition of radicalisation or terrorism, and certainly no agreed-upon theory of the causes of such phenomena.

This necessarily makes creating an agent-based model in this area difficult from the very beginning: the lack of foundation for a model makes building one problematic. The number of theories which are sufficiently detailed to allow the coding process to be implemented are minimal, necessitating the development of one within this research, and we see that the theories utilised and tested in our studies below are often from parallel or divergent disciplines. Nonetheless, agent-based modelling as a methodology has much to offer the fields of radicalisation and terrorism, and it is beginning to be explored. By employing and combining theories from sociology and psychology, such as group identity and grievance theory, alongside those such as opinion dynamics and epidemiology, which help to explain the transmission of ideas and behaviours, we may be able to model the emergence of such complex behaviours as radicalisation and recruitment to terrorist groups. Indeed, 'by creating artificial societies one can systematically manipulate the parameters of interest to discern meaningful relationships and isolate factors that will be influential over the long term' (Genkin and Gutfraind 2011:6).

Due to the lack of empirical data within the field of radicalisation, the initial aim of agent-based modelling creation may be testing for the coherency and completeness of the theory rather than validation in a traditional, statistical, sense. By programming in and adjusting existing and novel theories, it may be possible to discover and isolate those variables which appear to have the most profound impact upon the process of radicalisation, in order to inform empirical research at a later date. Rather than agent-based modelling being an experimental or predictive tool as it has been in other disciplines, it is possible here for it to be used for the development and refinement of theory and the explanation of past and present behaviours. Along these lines, Johnson and Groff (2014) have discussed the use of agent-based models for testing the fitness of criminological theories, as well as assessing how well specified they are, and therefore, how good a foundation they provide for empirical research. The use of agent-based modelling in this field is still in its infancy, yet its successful utilisation in areas such as economics and natural resource management (Gilbert 2008), and the tentative steps that are being taken by those working in areas such as computer science and homeland security, make a review of its progress to date a worthwhile endeavour.

3.2 Scoping reviews

The aim of a scoping review is to seek out and synthesize existing knowledge in a particular subject area. While systematic reviews have become commonplace in the area of medical science, it is not yet as popular in social science, although recent pieces on the effectiveness of counter-terrorism strategies (Lum, Kennedy and Sherley 2009) and the root causes of non-suicide terrorism (Campana and Lapointe 2012) have shown them to be a useful and worthwhile addition to current methodology in the field. One of the main advantages of a scoping review is their transparent nature and the ability for others to replicate the methodology used by the researcher. They also allow an exhaustive search of all possible literature as long as the correct search terms are selected for use in comprehensive electronic databases, coupled with hand-searches of relevant journals and the bibliographies of included items if necessary. The aim of this review is to assess the state of the art in terms of software used in agent-based modelling, the data used to calibrate the parameters of the models, and to find any commonality in the theories used within the models. The findings of this review will be summarised and any research gaps highlighted, some of which are be addressed in the models built in chapters 5 and 8 of this thesis.

3.2.1 Inclusion criteria

Given the aims of this review, the initial inclusion criteria employed were:

- That the research must include an agent-based model about radicalisation or the formation of, or recruitment to, terrorist groups. It was accepted that this would not have to be the singular focus of the piece due to the frequent coupling of terrorist group formation and counter-terrorist activities in studies regarding security, from which a large amount of the final pieces for this review were predicted to come. Nonetheless, a significant part of the study must concentrate upon the formation of the model and the theoretical basis for it.
- Due to the suspected scarcity of resources within this area, it was decided that the piece didn’t have to be published or peer reviewed, and indeed a number of those papers within the final selection of this article were not. It was recognised that this is an area of methodological development, and as yet there are no obvious candidates for journals in which to publish such articles, so limiting the search to journal articles or other published works would be detrimental to this review.

3.2.2 Search terms and search strategy

Agent-based modelling is often also referred to as individual-based modelling, or even not explicitly stated to be agent-based and merely referred to as simulation. To accommodate this, and in order to explore as wide an area as possible, the following search terms were decided upon:

agent based | ABM | individual based | simulat*

AND

terror* | radical* | violen* | militant* | fanatic* | extrem* | conflict*

Where a "*" is used, it is to indicate that any manuscripts containing the first fragment of the word (e.g. terror) should be selected. Using this approach identifies more pieces than more restrictive terms (e.g. terrorism or terrorist) and does not require the specification of all possible combinations of words including the word fragment in question.

While the terms terror* and radical* were taken from the research questions above, it was clear from the author's own experience that the fields of radicalisation and terrorism often utilise terms such as militants, extremists and fanatics, so these were deemed to be justified for inclusion. Equally the nature of terrorism research makes the terms violen* and conflict* sensible inclusions if as broad a search as possible is to be conducted.

A database search was conducted using these search terms, and three main search engines:

- MetaLib (which encompasses FRANCIS, GEOBASE, JSTOR, PubMed, SCOPUS, Web of Science and Zetoc)
- Web of Knowledge
- Google Scholar

The terms simulat*, radical*, violen* and extrem* proved problematic, throwing up hundreds of thousands of physical science hits. It was therefore necessary to apply relevant filters where possible to disregard the fields of chemistry, biology and physics etc. It was also decided that only studies written after 1980 would be included, although it was expected that the past decade would provide the vast majority of any studies meeting the inclusion criteria.

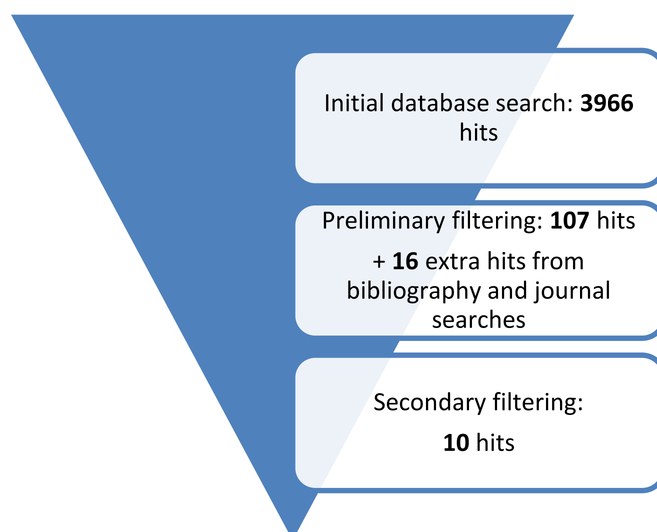
3.2.3 Selection process and criteria for final inclusion

After this initial search, a first filtering exercise was conducted which involved reading the titles and, if deemed relevant, abstracts of all pieces, and removing duplicates. This significantly narrowed the list of potential pieces to 107 items, after which their place of

publication was noted, if the piece was indeed published. The Journal of Artificial Societies and Social Simulation was identified as the most popular place (N=11) in which to find potential studies of interest, and this was consequently manually searched for other pieces. Hand searches could have been conducted for other journals. However, it is worth noting that a number of items were not published, and that those that were could be found in such a multitude of journals that a hand search of all of them would not only be impractical, but probably futile since the vast majority of journals identified only had one study which met the primary filtering criteria. This again showed the vast spectra from which papers on this subject were drawn: from computer science to politics, and mechanics to conflict resolution.

A bibliography (backward) search was conducted of the 107 studies in order to detect any remaining items of research which may not have been previously identified. This led to an additional 16 items being found. When a second filtering exercise was conducted and these items were read to assess their relevancy given the criteria for inclusion, it became clear that the number of studies meeting the criteria was minute (see Figure 1). The majority of studies which passed the first filtering exercise to be read in their entirety were predominantly counter-terrorism based, an area outside of the scope of the current review. There were also a significant number of studies on regional conflicts which, while of great interest in their own right, were again not the focus of this research.

Figure 1: Search process and filtering for scoping review



It was decided that, in order to have enough studies to complete the review, the criteria would have to be relaxed, allowing studies which theorised, but did not necessarily build, an agent-based model to be included. Alongside this, it was felt necessary to include studies for which the inclusion criteria were only a part of the paper, albeit a significant part – for example,

those models which included the destruction of terrorist groups as well as their creation. Despite this, only 10 items remained (details of which can be found in table 1), and it was decided that a further 4 items on extremism would also be included (see table 2). Although not fully meeting the criteria for inclusion they were considered worthy of retention due to the methodological insight which they could provide on the nature of opinion dynamics, an area which was often utilised in the originally retained items (see section 3.7.4).

3.2.4 Potential problems with the search

As in all reviews which rely upon electronic databases, the potential for undiscovered items remains. While relevant search filters were applied in order to narrow the number of studies from hundreds of thousands to just under 4,000, this may have led to relevant studies being unintentionally excluded at this stage. However, in order to try and compensate for that, the bibliographies of all studies which made it through the first filtering stage were examined and the fact that only 16 extra studies were found to add to the second filtering stage was reassuring; this did not necessarily mean that they were included in the final list of studies. It must be added that, while the search terms selected were chosen to reflect as wide a range of potential items as possible, there again remains the risk that studies were not discovered because they did not meet these terms. Nonetheless, the author remains confident that as many studies as possible were included in the first and/or second filtering stage.

It is important to add the caveat that, while including unpublished works allows the widest range of items to be included, it also means that the process of peer review may not have been applied in such cases. The quality of several of the studies that were considered as part of this review, including some which were included in the final list, is relatively poor and would not have met stricter quality control criteria. In their defence, a number of them were also not designed to answer the questions which the inclusion criteria pose, and are split in their focus between for example terrorism and counter-terrorism tactics, meaning a detailed theoretical exploration of radicalisation or terrorist group recruitment is not always attempted. However, due to the severe shortage of studies which met the initial and subsequently less stringent criteria, it was felt necessary to include lesser quality studies to try and learn as much as possible from what has been attempted in the field so far.

Table 1: Radicalisation and terrorism studies retained after secondary screening

Title	Author(s)	Date	Journal/Conference/University/ Organisation/Web-link
A simulated exploration into the growth of modern terrorist networks	Butler, S.	June 2005	Undergraduate dissertation, Bath University
An agent-based model component to a framework for the analysis of terrorist-group dynamics	Backus, G. A. and Glass, R. J.	February 2006	SANDIA REPORT SAND2006-0860P
Emergent Clique Formation in Terrorist Recruitment	Berry, N., Ko, T., Moy, T., Smrcka, J., Turnley, J., and Wu, B.	2004	Agent Organizations: Theory and Practice, Session on Organisational Models. The AAAI Press, Menlo Park, California. American Association for Artificial Intelligence workshop
How Do Terrorist Cells Self-Assemble? Insights from an Agent-Based Model	Genkin, M. and Gutfraind, A.	07/07/2011	Social Science Research Network
Modeling and simulating terrorist networks in social and geospatial dimensions	Moon, I. and Carley, K. M.	September 2007	IEEE INTELLIGENT SYSTEMS 22:5, Pages 40-49
Pandemonium in silico: individual radicalization for agent-based modeling	Cioffi-Revilla, C. and Harrison, J. F.	2011	Paper prepared for the Annual Convention of the International Studies Association, Montreal, Canada, March 16–19, 2011
Simulation of the dynamic interactions between terror and anti-terror organizational structures	Raczynski, S.	2004	Journal of Artificial Societies and Social Simulation, 7:2
Terrorism: Mechanism of Radicalization Process, Control of Contagion and Counter-Terrorist Measures	Cherif, A., Yoshioka, H., Ni, W. and Bose, P.	10/05/2010	arXiv:0910.5272v2
Understanding Islamist political violence through computational social simulation	Watkins, J. H., MacKerrow, E. P., Patdli, P. G., Eberhardt, A. and Stradling, S. G.	September 2008	Defense Threat Reduction Agency, Los Alamos National Laboratory
Understanding why: dissecting radical Islamist terrorism with agent-based simulation	MacKerrow, E. P.	2003	Los Alamos Science, 28

Table 2: Additional Extremism studies included after secondary screening

Title	**Author(s)**	**Date**	**Journal/Conference/University/ Organisation/Web-link**
Comparing extremism propagation patterns in continuous opinion models	Deffuant, G.	2006	Journal of Artificial Societies and Social Simulation, 9:3
Extremism propagation in social networks with hubs	Franks, D. W., Noble, J., Kaufmann P. and Stagl, S.	August 2008	Adaptive Behavior 16:4, Pages 264-274
How can extremism prevail? A study based on the relative agreement interaction model	Deffuant, G., Amblard, F., Weisbuch, G. and Faure, T.	October 2002	Journal of Artificial Societies and Social Simulation, 5:4
The role of network topology on extremism propagation with the relative agreement opinion dynamics	Amblard, F. and Deffuant, G.	2004	Physica A: Statistical Mechanics and its Applications, 343, Pages 275-238

Table 3 below describes some of the key elements of these studies, including the software used, any data used to calibrate parameters, number of agents, units of analysis, and the theories used or tested within the models (where stated).

Table 3: Key elements of the included studies

Title	Author(s)	Software used	Data used	No. of agents	Units of analysis	Size of model (area)	Length and no. of runs	Theories used
A simulated exploration into the growth of modern terrorist networks	Butler, S.	Repast	None	3200	Number of agents polarised and time taken	2D lattice 60x60	400-800 steps, 15 repeats	Deffuant (2000) opinion dynamics; group theory
An agent-based model component to a framework for the analysis of terrorist-group dynamics	Backus, G. A. and Glass, R. J.	No model built	None	N/A	Legitimacy of groups and group membership	N/A	10,000 steps	Weisbuch et al (2002) opinion formation theory; group reinforcement
Emergent Clique Formation in Terrorist Recruitment	Berry, N., Ko, T., Moy, T., Smrcka, J., Turnley, J., and Wu, B.	Own software	Sageman (2004)	200	Number of relationships or cliques formed	Not stated	500 days	Sageman (2004) expat cliques – looked at clique formation
How Do Terrorist Cells Self-Assemble? Insights from an Agent-Based Model	Genkin, M. and Gutfraind, A.	Repast	Pew Global Attitude Survey; 7/7 bombing network data	21,382	Fraction of radicals, number of radical dyads and triads	Not stated	100 steps, 15 repeats	Hopfield social network to explain dyad and triad assembly
Modeling and simulating terrorist networks in social and geospatial dimensions	Moon, I. and Carley, K. M.	Not stated	Open source data	916	Critical locations, critical agents	45 cells representing world-wide network	30 steps, 3 runs	Spatial proximity; social distance

Pandemonium in silico: individual radicalization for agent-based modeling	Cioffi-Revilla, C. and Harrison, J. F.	Mason	None	Not stated	Level of grievance in population	20x20 grid	1200 steps	Own theory of radicalisation; Jager and Amblard (2007) opinion dynamics; grievance
Simulation of the dynamic interactions between terror and anti-terror organizational structures	Raczynski, S.	PASION	None	500	Number of active terrorists	Not stated	3650 steps, 50 runs	Interaction and structure creation
Terrorism: Mechanism of Radicalization Process, Control of Contagion and Counter-Terrorist Measures	Cherif, A., Yoshioka, H., Ni, W. and Bose, P.	Not stated	None	600 – 1250	Rate of militancy in population	Not stated	2000 steps	Own theory of radicalisation
Understanding Islamist political violence through computational social simulation	Watkins, J. H., MacKerrow, E. P., Patdli, P. G., Eberhardt, A. and Stradling, S. G.	Repast	Census and socio-demographic data from countries that were modelled	Not stated	Number of rebellions	Algeria, Egypt, Iraq	31 years	Relative deprivation; Hafez (2003) authoritarian regimes and violence
Understanding why: dissecting radical Islamist terrorism with agent-based simulation	MacKerrow, E. P.	Own software	Pew Global Attitude Survey; Countries' census and socio-demographic data	Not stated	Not stated	Middle Eastern countries	Not stated	Social grievance; Peyton Young's social bargaining theory (1998)

Comparing extremism propagation patterns in continuous opinion models	Deffuant, G.	Not stated	None	400 or 2500	Opinion level	Lattice grid	Up to 10,000 steps	Bounded confidence; relative agreement model
Extremism propagation in social networks with hubs	Franks, D. W., Noble, J., Kaufmann P. and Stagl, S.	Not stated	Own data on social networks	1000	Opinion level	N/A	2,000 steps, 50 runs	Relative agreement model; social networks
How can extremism prevail? A study based on the relative agreement interaction model	Deffuant, G., Amblard, F., Weisbuch, G. and Faure, T.	Not stated	None	200 or 1000	Opinion level	N/A	Run until stabilised, 10 or 50 runs	Relative agreement model
The role of network topology on extremism propagation with the relative agreement opinion dynamics	Amblard, F. and Deffuant, G.	Not stated	None	200 or 1000	Opinion level	N/A	50 runs	Relative agreement model

3.3 The state of the art

A number of agent-based modelling programmes exist, from the relatively user-friendly Netlogo for which extensive documentation and tutorials are available (Netlogo 2012), to the more powerful Repast which requires the user to have more programming skills (Repast 2012). Repast is the tool most commonly used in those studies which explicitly mention their software, being used in three of the studies in this review (Butler 2006, Genkin and Gutfraind 2011, Watkins et al 2008). Organisations also create their own software, and this is seen in some of the studies selected for this review (MacKerrow 2003). Others do not state the software that is used to produce their models, and some of the studies unfortunately do not get as far as building a model at all (Backus and Glass 2006). It is therefore difficult to draw any conclusions as to the usefulness of any particular software for the creation of agent-based models in the research area in question. Sensitivity-testing involves rerunning models to sample the parameter space of all possible values of the variables included in the model, in order to assess whether patterns are generated merely by a very specific set of parameters due to the severe sensitivity of the model. The importance of sensitivity testing is understood by Butler (2006:83), who sets out to ensure that Axelrod's assessment for a model to embody validity, usability and extendibility is met. Moon and Carley (2007) employed a sensitivity analysis and parameter-space exploration, varying the input parameters in an attempt to ensure model validity. However, despite the fundamental need for a sensitivity analysis (Gilbert 2008), it was not adopted in all of the studies reviewed here, and many of them remain entirely abstract, as will be seen below.

3.4 Data use and parameters

As previously mentioned, any research on terrorism or radicalisation will suffer from the dearth of high-quality data in this field, and the studies here are no exception. In order to create a good agent-based model with predictive properties for theory-testing and falsification, real world data is a necessity, either to justify the initial conceptualisation or to validate any results which are generated. None of the studies identified attempted to produce their own data through interviews, questionnaires or the like, and some used no real world data at all, leaving their models entirely abstract (Backus and Glass 2006, Butler 2006, Cherif et al 2010, Cioffi-Revilla and Harrison 2011, Raczynski 2004). Berry et al (2004) use Sageman's conclusions from his empirical data to inform their model, while in their study of terrorist networks, Moon and Carley (2007:40) took the novel approach of extracting data from open source documents using the AutoMap text analysis tool (AutoMap 2014) to discover the names, locations, activities and relationships between known terrorists to create a simulated network. Three of the studies used socio-economic, demographic and attitudinal data to

recreate as authentic a landscape and population as possible, all due to their case study approach: Watkins et al (2008) recreated the political climate in Egypt, Algeria and Iraq; MacKerrow (2003) simulated a large geographical area consisting of North Africa and the Middle East to test radical Islamist terrorism; and Genkin and Gutfraind (2011) used the July 2007 London bombings terrorist network for their insight into the self-assembly of terrorist cells. The use of Gallup Polls and Pew Global Attitude Polls in the latter two studies respectively ensured a more realistic expression of extremist attitudes within a population of agents, improving the credibility of the models. The majority of studies included in this review did not use real world data, to either build or validate their models, and of those that did only one fully met the initial inclusion criteria (Genkin and Guttfraind 2011). The reality is that, while data exists to inform models of radicalisation and recruitment to terrorist groups, albeit limited, it has currently been under-utilised, if at all, in the agent-based models which address this research area. One unfortunate side effect of researchers not using the data that exists is that the precise parameters used across different models vary, as do the distributions from which they are sampled. This, combined with the fledgling state of the field and lack of commonality between the models and their aims, leaves one of the questions that this review aimed to answer with a negative outcome. That is, were common sources of data used to calibrate models, or common parameters employed which can be standardised for future research?

3.5 Theory usage

A wide range of theories were used in the retained studies, some of which were created by the authors themselves: Cioffi-Revilla and Harrison (2011) based their work upon Cioffi-Revilla's tripartite interpretation of the radicalisation process involving grievance, indoctrination and a loss of killing inhibition. The paper theorises and tests the first of these concepts, grievance, with the promise of incorporating the remaining two elements at a later date. It is stated that Jager and Amblard's (2007) theory of opinion dynamics would be used for the indoctrination phase of the model, and both the concepts of grievance and opinion dynamics are at the heart of many of the papers included in this review (see section 3.6). Cherif et al (2010) also use their own theory of radicalisation, describing it as a step-by-step process starting from susceptibility within a general population and progressing all the way up to a foot-soldier or leadership role within an organisation. It is similar to Silber and Bhatt's (2007) conclusions as to the radicalisation process undertaken by the cases they reviewed in-depth from the USA, moving from a pre-radicalisation stage through to self-identification, indoctrination and jihadisation. It is important to note here that the latter two studies are descriptions of radicalisation rather than theories: they do not explain the process or characterise anything.

The remainder of the papers use multiple theories in combination within their models, or model theorisations. The creation of social networks is the focus of many of the papers, including Berry et al (2004), who use Sageman's (2004) notion of expat cliques as the basis for their model, while Moon and Carley (2007) use the concepts of spatial proximity and social distance within their work. Genkin and Gutfraind (2011) use the Hopfield social network (Hopfield 1982) to determine part of the theory behind their model of the formation of radical dyads and triads within a population. The concept of opinion dynamics is the foundation of multiple papers, while notions of homogeneity or heterogeneity in agents are also widely tested. One of the most extensively adopted theories within the models, however, is that of grievance (including relative deprivation). The theories employed will be discussed in more detail in sections 3.6 and 3.7 below.

3.6 Themes within the simulations

3.6.1 Homogeneity or heterogeneity of agents

The allocation of various attributes to agents within the models allows for a large degree of heterogeneity to be achieved within the simulated populations. Heterogeneity is always the preferred state when attempting to create a lifelike simulation and is a benefit of ABMs over purely mathematical approaches, which use the approach of having homogenous agents. By having a number of attributes which can be manipulated under different experimental conditions, it is possible to discern which of these has the greatest impact upon model outcomes. This level of control is one of the benefits of agent-based modelling as a technique, and is employed by many of the studies reviewed here.

Notions of homophily within groups are not new, and indeed these are some of the foundations of agent behaviour and interactions in the models. It is often written into the model that agents are more likely to interact or share opinions if they have similar attributes and beliefs, and this informs the outcomes when the model is run: Berry et al (2004) find that having a more diverse heterogeneous population of agents within their model leads to weaker friendships being formed between them, which directly affects the number and type of cliques that form. Genkin and Gutfraind (2011:28) also find that a more diverse population 'can have a strong negative effect on radicalization' when they increased the number of attributes their agents were assigned. Their results suggest that, in order for a terrorist cell to develop or radicalisation of other agents to occur, there must be a degree of similarity between these agents; in a population of more heterogeneous agents, the likelihood of similar agents meeting, interacting, sharing beliefs and forming groups is lower. This finding accords well with current research on radicalisation and terrorism which invariably seeks to discover the

commonalities between members of a radical or terrorist group, whether it be their age, religion, life experiences, nationality or a host of other socio-economic, demographic or psychological factors (Berebbi 2003, Jenkins 2011, Leiken and Brooke 2006, Piazza 2006, Silber and Bhatt 2007). Debates persist as to the importance of each of these factors, as well as whether a ‘profile’ of a potential recruit to a terrorist organisation, or a person susceptible to radicalisation, can be found or indeed exists (Horgan 2008).

3.6.2 Relative deprivation and grievance

The notion of grievance as an explanation of radical beliefs and terrorist acts has been widely examined within the field, and the assumption is that grievances can be brought about by certain life events which may increase an individual’s vulnerability to radicalisation. Crenshaw (1981:383) talks of the ‘perceived injustice that gives rise to anger or frustration’, which has been seen in places such as Sri Lanka and Palestine, where populations feel oppressed. Grievance theory underpins some of the models within this review, and relative deprivation is seen as a contributor to the feeling of grievance within an agent. Gurr’s (1970) theory of relative deprivation is popular, and initially used by Watkins et al (2008) in their model. However, when running the model they quickly found no linkage between relative deprivation and violence, and moved instead to Hafez (2003) who states that it is the lack of political participation and repression within authoritarian regimes which produce violence, not relative deprivation. The results of the model suggests that a reduction in political participation within the countries simulated caused political moderates to join radical groups and use violence in an attempt to be heard.

Grievance theory is also at the heart of the model produced by Cioffi-Revilla and Harrison (2011), which simulates traumatic events meant to represent economic or social loss. These events increase the sense of grievance felt by the agent, and this level decays over time. However, if the events happen closer together in time the level of the agent’s grievance heightens, and may reach a ‘tipping point’ at which they are now candidates for radicalisation. One of the more interesting simulations within the paper is that of grievance ‘echoes’ within the population, allowing the sense of trauma to pass to other agents in contact with the initially affected agent. In reality this mirrors, for example, the sense of the suffering of the Muslim Ummah often invoked in Islamist radical statements, which they purport to defend even though they themselves may not be personally affected (Bartlett, Birdwell and King 2010). Unfortunately, until the researchers complete their integrated model of radicalisation, rather than focussing only upon grievance, it is difficult to conclusively state the effect of these traumatic events on the agents as a whole. MacKerrow (2003) adopts a complicated system of social grievance in his model to determine the propensity for an agent to take action, and

therefore potentially become a terrorist. The metric of social grievance is calculated by taking into account socioeconomic disadvantage, repression by the regime under which they live, cultural penetration, media influences and a measure of inherited allegiances. He uses real world data from the census, interviews and the World Bank as proxies for many of these measurements, but unfortunately does not provide any simulated results generated by his model. Nevertheless, it is perhaps the most comprehensive attempt at creating a realistic 'grievance' measurement within the models reviewed here.

3.6.3 Friendships, networks and group size

The denotation of strength of ties between agents, including acquaintance and friend, allows the modeller to impart an artificial ceiling on the number and/or strength of relationships that any one agent may have. This is an attempt to model the reality that a person would not, and indeed could not, cultivate a strong relationship with every other person they meet who shares some, or all, of the same attributes as they do. Berry et al (2004:5) use homophily, chance and time to determine the strength of an agent's relationship with another, also allowing negative values to develop if homophily is low; negative value relationships are removed from the agent's social network if this occurs. Their model constantly assesses the strengths of relationships between agents, allowing for new relationships to alter the strength of existing ones and allowing relationships 'which are not consistently reinforced to die out over time', in a situation reminiscent of reality. They find that by allowing fewer acquaintances in the model, friendships (a relationship of a higher strength) are more easily established, allowing stronger cliques to form. They also find that if random interactions between agents are set at a higher percentage, rather than interactions between networks of stronger association, the formation of friendships is hindered, again affecting clique formation. All of this mirrors the conclusions of the empirical research carried out by Sageman (2004), among others, who discuss the importance of small groups of close friends, or the 'bunch of guys' theory, for the formation and maintenance of radical groups. Indeed, the importance of the creation of strong bonds between group members in the process of radicalisation and the formation of terrorist groups is abundantly discussed within literature in the field (Munton et al 2011). These bonds allow the constant reinforcement of radical beliefs, commitment to the group and its aims, and are a hindrance to leaving the group. Importantly, through such social networks an individual can be exposed to radicalising settings and radicalising agents (Bouhana and Wikström 2011). Genkin and Gutfraind (2011) found that allowing a greater number of significant ties between agents led to a significant decrease in radicals within their model – the small, homogenous groups required for radicalisation or cell formation did not occur due to

the plethora of friendships formed, which meant time had to be more evenly distributed between multiple agents rather than concentrated.

The influence of friends is seen in Genkin and Gutfraind's model when the rate of peer pressure which they embedded within the program was manipulated: increasing the peer pressure rate (effectively the amount by which an agent was influenced by another agent's beliefs) strongly increased radicalisation to both extremes within their model – to violence and to pacifism (2011:26). A similar polarisation effect is seen in Butler's model, this time when the effect of mass media is introduced. In effect, agents are forced to choose sides, in this case between animal rights activists and pro-test beliefs. While Butler is quick to note that such polarisation is highly unlikely in large societies, where such biased media is uncommon, it could be a possibility in smaller groups, such as a town or city, where the population are constantly subjected to the propaganda of either side (2006:74). The effect of media propaganda and misrepresentation, or indeed their role in the formation and spread of radical opinions, has become more widely researched in the field of radicalisation and terrorism in the past few years due to the fears of 'internet radicalisation' (Jenkins 2011, Neumann and Rogers 2007, Silber and Bhatt 2007). Indeed the effect of the media in polarising opinion to the point of violence has been seen recently in the protests over the creation of an anti-Islamic film which has spread rapidly across North Africa and the Middle East, targeting Western embassies despite their condemnation of the film.

Population and limitations on group size have been tested within the models with interesting, but not unexpected results. Genkin and Gutfraind (2011) found a small positive correlation between a higher population size of agents within their model and the strength of radical dyads, but also tested the effect of attrition rates, finding that greater rates of out-migration led to a significant decrease in the number of radical dyads and triads formed. This is to be expected, given the breaking of group bonds when a member leaves the immediate geographical area, and therefore the network within this model. While this may appear to provide grounds for counter-terrorism measures, it does not necessarily serve as a useful assumption, as networks of radical and terrorist groups have been seen which span a large geographical area and continue to function successfully (Moon and Carley 2007). Cherif et al (2010) have noted the importance of the size of population in the success of terrorist organisations in their model, concluding that the pool of potential recruits must be maintained at a large enough level for the organisation not to collapse. When the size of the radical or terrorist group is restricted, it seems to limit the number of potential recruits, with Butler finding that a higher percentage of Animal Liberation Front activists became violent when the size of violent groups was unrestricted (2006:79). This was despite their being no limit on the

number of violent groups which could form. Restricting group size once again reflects reality in notable cases, with smaller, semi-autonomous radical or terrorist groups reflected in the organisation of Al-Qa'ida since the September 11th attacks in 2001 (McCauley and Moskalenko 2008).

Two interesting findings, both mirroring historical and current reality, come from the result of network and time manipulation within the models. Raczynski (2004) focuses upon the interaction between terrorist, counter-terrorist, and terrorist-supporting organisations. While much of the model is not relevant to the questions asked within this review, two findings are. That is, they find that the enabling of terrorist support organisations had a significant effect upon the number of terrorist attacks, but not the maximum number of terrorists within the model. Without the help of terrorist support organisations, the number of acts within the model only numbered 6, but with their support it jumped to 31. This reinforces the prominence of the position of organisations or diasporas which support terrorist organisations within research and counter-terrorism initiatives (Precht 2007) – without the backing of such groups, be it financial, operational or even psychological, the model suggests that the success of terrorist organisations would be significantly reduced. Butler (2006) draws our attention with his finding that, when running the model for a longer period of 'time', the number of violent groups within a population plummets, which he attributes to extremists within an organisation harming its appeal and therefore weakening its support base and potential pool of recruits. He draws analogies with the situation in South Africa in the 1960s, where the African National Congress lost popular support after a massacre and were driven underground, strengthening their opposition groups. It would appear that, in order to maintain the support of the population, the extremist element within an organisation must be restrained to an extent, which has been observed in both Palestine in the case of Palestinian Islamic Jihad (Jaeger et al 2010), and in the case of the IRA in 1990 (Bloom and Horgan 2008).

3.6.4 Opinion dynamics

The field of opinion dynamics is one which, upon initial inspection, appears to be of interest to the study of radicalisation and terrorism. Understanding and correctly coding the way in which opinions are spread between members of a population is fundamental to achieving a valid and realistic agent-based model in this research area, and many of the studies in this review draw upon these, and similar, theories within their models. Butler (2006) uses Deffuant et al's (2000) model to include thresholds governing whether exchanges of opinion are made. More of Deffuant's work is seen in the following section on the extremism papers included in this review, and it is indeed seminal in achieving an understanding of this area. Cioffi-Revilla and Harrison (2011) base the indoctrination phase of their theory of radicalisation on the model of

opinion dynamics put forward by Jager and Amblard (2005), extending it to include demagogues, or extremist preachers, whose opinions are unchanging and who incite extremism among others. However, this part of the model remains untested in their paper. MacKerrow uses Peyton Young's social bargaining theory (1998) to determine whether an interaction between agents will lead to a compromise on beliefs in which the 'agent with the lower social status "absorbs" more of the other agent's allegiance values' (2003:189). Finally, in their theorisation of an agent-based model of terrorist group dynamics, Backus and Glass (2006) use opinion-adjustment logic to define the outcome of interactions between agents. They base this upon the opinion formation theory of Weisbuch et al (2002), which revolves around the concept of overlapping tolerance between the beliefs of these agents allowing interaction to occur.

The theory of opinion dynamics is not one that this author has come across within the fields of terrorism and radicalisation despite extensive reading. While it may appear useful when conceptualising and coding an agent-based model within this research area, allowing the transference of statistical data of opinions and beliefs (derived from surveys and interviews with target populations) to the models themselves, the theoretical foundation for the transmission of beliefs between agents requires further scrutiny. The notion of lasting opinion change after one interaction with another agent is not plausible when assuming the need for prolonged exposure to an ideology in order to adopt it. It is this prolonged exposure and lasting change which is likely necessary for radicalisation to occur – anything else is likely to be merely superficial, with individuals temporarily acting as though part of a radical group, but not necessarily sharing the radical beliefs necessary to commit acts of violence for their cause.

3.7 Extremism papers

The central role of opinion dynamics within several of the studies reviewed here nevertheless remained, and it was therefore considered that several papers on extremism which utilised the theories of opinion dynamics alongside a simulation methodology should be included within the review for their insight into this area. Deffuant et al (2002) created their relative agreement model, which allows interactions between agents to modify both the agents' opinions and their uncertainties about them. By introducing extremists into the model (those with much lower uncertainty about their own opinions), they show how a population can go from holding moderate opinions to extremes within a relatively short period. By varying the uncertainty levels of agents within the population, convergence either to the centre, or to one or both extremes, results. The researchers note that 'some aspects of the… model seem relevant as a metaphor for social dynamics. The fact that extremism tends to prevail more easily when the population is initially very uncertain corresponds to common sense

expectations' (2002:section 7.2). This resembles the reality of Germany in the 1930s, when the economic downturn led to the rise of the Nazis, and analogies can even be drawn with the rise of extremist Islamist movements in the past decades. The role of such uncertainty within a population, as described by Deffuant et al (2002), can be explained by thinking about how this uncertainty (socially or economically) contributes towards the systemic factors required for the emergence of radicalising settings within the population. In a recent study by Meadows and Cliff (2012), they found that in order to see a convergence within the population to extremes of belief, instability and uncertainty were necessary, using the examples of systemic factors such as wars and economic crises. However, Meadows and Cliff make the important point that the influential nature of leaders within a community cannot yet be taken into account using the relative agreement model: a lesser uncertainty weighting can be given to extremists, but an influence weighting is yet to be included. Such variables are vital in order to consider the role played by those with influence over others. As yet, these models have not been created to take this into account.

This model, and others regarding opinion dynamics, is often an extension of the bounded confidence model in which an agent is given a threshold either side of its opinion, outside of which it will not listen to the opinions of other agents. This threshold is in effect a flexibility of opinion: most of us will countenance an opinion which is close to our own, even if it doesn't match ours entirely, but will not be willing to entertain one which is far from our own – an animal rights activist is unlikely to accept that of a pro-test agent for example. Deffuant (2006) continues his work on extremism propagation patterns, again building on the bounded confidence and relative agreement models and testing different network types to ascertain their impact upon the results of the model. He finds that convergence to a single extreme opinion 'takes place when the [extremists] remain clustered and isolated as long as possible from the moderates. In this case, the extremists remain influential, without being influenced by the moderates' (2006: section 8.3). Amblard and Deffuant (2004:1) concur, finding that 'the drift to a single extreme appears only beyond a critical level of connectivity' – when a greater level of random interaction is included in the model, this drift decreases. Franks et al (2008:264) create a similar model, again concluding that 'opinion convergence to a single extreme occurs only when the average number of network connections for each individual is extremely high.' These models are initially based upon random meetings of pairs of agents, before this is replaced by a more complex social network – whether only allowing agents to talk to those in direct proximity (mimicking neighbours), or gradually building up connections between them.

We are reminded yet again of the critical role played by social networks in these models, and Franks et al (2008) come to a particularly important conclusion regarding the social influence of certain agents, finding that when the most influential agents, known as hubs, are extremists, then all convergence is towards these views, even if there are twice as many extremists of another view. This in part echoes the role of charismatic leaders, who are known to be highly successful in recruiting large numbers of followers to radical and terrorist groups, and whose influence forms a significant part of research within this field (de Poot and Sonnenschein 2011, Precht 2007, Hamm 2013). Such propagators of radical narratives are crucial to the process of radicalisation, as prolonged exposure to them within a radicalising setting is what a vulnerable individual would need in order to be radicalised. However, the role of connectivity could be equally important when testing the role of community leaders in the spreading, and indeed the suppression, of radical ideologies within their communities.

3.8 Research gaps and future directions

There currently exists no definable field of agent-based modelling and radicalisation or terrorism research, and representatives from a great variety of academic arenas have made a foray into the area. The difficulties this creates become obvious the moment a synthesis of information is attempted: the plethora of theories, disciplines, data (or lack thereof) and techniques is symptomatic of a field in its infancy. There has been no systematic testing of the range of theories which exist to explain the radicalisation or terrorist group formation processes, and no methodical use of the data already in existence to validate any model findings. The use of relevant theories from differing fields, such as opinion dynamics, is promising for the development of better models in the future, but a more comprehensive foundation is necessary in order for these models to be improved, used, and correctly corroborated. The creation of models by the counter-terrorism and security community is indicative of the direction in which the field is likely to move: agent-based modelling has been extensively used for warfare simulation (for example Ilachinksi 2004) and allows the simulation of various counter-terrorism measures in order for the security forces to make a more informed choice before acting. In order to create and test well-informed counter-radicalisation and counter-terrorism policies, a technique like agent-based modelling could be invaluable: it allows the measures to be tested and manipulated in an artificially created environment with a multitude of heterogeneous agents designed to represent the population of a given area, offering a chance of avoiding the ethical, financial and legal difficulties which would ensue were they to be tested in real life. However, for this to be successful, the need for comprehensive, empirically-based theories which can be correctly coded and modelled is paramount. This may not be immediately forthcoming. We must also note that, as a technique,

agent-based modelling is only as good as the models that are constructed. However, it is worth noting that at present, policy makers are often reliant upon thought experiments which share the weaknesses of agent-based modelling but have many other weaknesses, and do not allow formal testing of theories in the same way.

3.9 Conclusion

The theories tested and results gleaned from the studies within this review have their foundation in, or support, some of those found within the wider research field of radicalisation and terrorism, as discussed above. From the use of grievance as a driver of opinion and action to the importance of homophily when exchanging beliefs and forming groups, these studies have used an innovative and flexible technique, agent-based modelling, to combine micro-theories in order to produce models of macro behaviours. The differences between the focus of the studies has meant that similarities between them are not always readily forthcoming, and indeed common parameters which this review hoped to uncover remain elusive. However, it is perhaps the use of theories from outside of the field which have come to light that is of most interest to researchers in this case: the role which opinion dynamics has played in bridging the gap between theory and mathematical modelling has been highlighted, but its current shortcomings in not requiring a prolonged exposure in order for opinion transformation to occur must be addressed. Nevertheless, the focus upon network type and group size reveals valuable insights into the role that these dynamics play. It is imperative to note that the fledgling nature of the field means that a coherent body of research in the area in which this scoping review was interested remains elusive. Nevertheless, agent-based modelling provides a useful and very different tool to researchers within the area of radicalisation and terrorist group formation, one which allows theories to be tested and situations simulated without the need for time-consuming, expensive and possibly dangerous data collection. Models will undoubtedly continue to be developed as modelling power increases, and a greater understanding of its uses is gleaned. For now, it remains a relatively untested technique but with great potential.

4. An agent-based model of the urban environment

As outlined in previous chapters, the ecological and systemic factors underpinning the process of radicalisation must be investigated if one is to achieve an understanding of the process which is sufficient to design counter-measures and implement them in real-life, complex social systems. Therefore, in order to build an agent-based model of the radicalisation process – or any model that involves social interaction that occurs in the midst of people's routine activities – it is necessary to construct a model of the environment in which radical and non-radical agents will interact. In the case of this thesis, this environment will be an urban one, as opposed to a more abstract, geographically undefined environment such as the internet. The need for accurate geographical representation of an environment will necessarily depend upon the purpose of the model – those which explore the impact of street segmentation in a specific city upon burglary patterns, for example, will require the street network to be present, often using geographical information system (GIS) data where available. For those that focus upon theoretical concepts that do not require spatial definition, an abstract grid system is often sufficient (Elffers and Van Baal 2008). The role of specific environmental topology is not the focus of this research, but there is much that can be learnt from various models of the urban environment in order to build our own within an agent-based model of radicalisation, and this chapter aims to evaluate the nature of such models to build upon the most useful concepts of environment, movement and intention, in the process establishing the current state of the art when creating an urban model. This chapter will draw upon material gathered during a systematic review of agent-based models of crime by Groff, Thornton, and Johnson (forthcoming). The methodology and results of this review are reproduced in greater detail below.

4.1 Systematic review of ABM for criminology

The aims of the review were to summarise the state of the art in criminological agent-based models, to identify areas where strong evidence has been discovered, and to identify gaps which are limiting our ability to create models which reflect extant conditions and offender decision making.

4.1.1 Systematic review inclusion criteria

Based upon the aims of this review, the initial inclusion criteria employed were:

- That the research must include an agent-based model about urban crime or report the results of such a model.
- That the text was written in English (due to available resources).

4.1.2 Search terms and search strategy

The variety of terms referring to computer simulation and agent-based modelling were described in section 3.2.2. To accommodate this, and in order to explore as many urban crime types as possible, the following search terms were decided upon:

agent based | cellular automata | complex system | complexity science | computer simulation | emergence | individual based mod*| simulation

AND

anti social behavio? | assault |auto theft | burglary | crime | delinquency | disorder | homicide | incivilities | property | rape | robbery | theft | violen?

A database search was conducted using these search terms in the MetaLib search engine which encompasses FRANCIS, GEOBASE, JSTOR, PubMed, SCOPUS, Web of Science and Zetoc.

The terms disorder, property, rape and violen? proved problematic, throwing up thousands of physical science hits, with the initial search revealing 285,119 possibilities. It was therefore necessary to add the term 'crime' after these in order to narrow down the search to relevant material.

As well as this traditional 'backward search' strategy, a forward search strategy was also adopted after identifying the most influential articles in the agent-based modelling of crime (those with the highest citation counts) which were:

- Brantingham and Brantingham (2004) – 53 citations
- Groff (2007a) – 65 citations
- Groff (2007b) – 35 citations
- Liu and Eck (2008) – 45 citations
- Liu, Wang, Eck and Liang (2005) – 45 citations

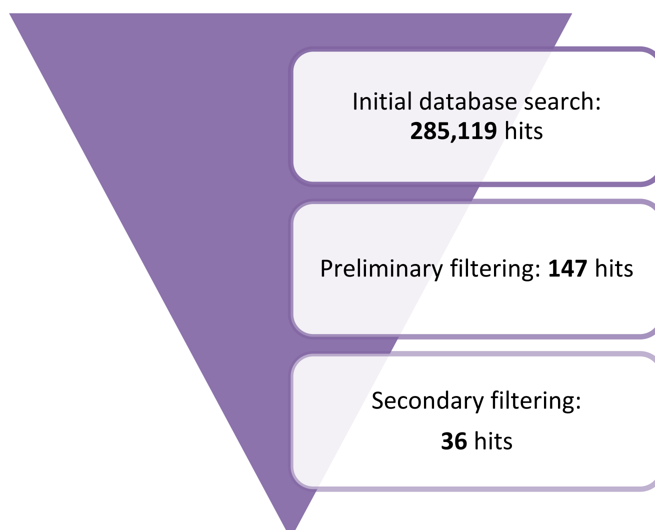
All articles which cited any of these 5 articles were added to the primary filtering exercise for consideration.

4.1.3 Selection process and criteria for final inclusion

The first filtering exercise involved reading the titles and, if deemed relevant, abstracts of all pieces, and removing duplicates. It was also decided that only pieces which use autonomous agents would be included. This reduced the list of potential pieces to 147 items, which were then reviewed by one of three reviewers (Groff, Thornton or Johnson) to ensure that they met

the inclusion criteria. Any paper which raised questions as to its inclusion was reviewed by a second author before a decision was made, and this left 36 items from which to conduct an in-depth review (see appendix 1 for a list of these items).

Figure 2: Search process and filtering for urban crime systematic review



The review sought to identify a number of important details and parameters from the models in order to inform our understanding of the state of the field of agent-based modelling in criminology. Table 4 provides a summary of some of the key aspects of ABMs reviewed. In each case, the numbers shown indicate how many studies focused on (for example) a particular crime type, utilised a certain type of movement algorithm, or included a particular fraction of offender agents. These are discussed more fully in the remainder of this chapter.

Table 4: Key aspects of the ABMs reviewed

Crime type	**Theory tested**	**Landscape**	**Number of victim agents**
Burglary – 13 Robbery – 7 Assault – 4 Other – 3 Unspecified – 9	RAT* – 23 CPT *– 9 RCP *– 8	GIS street network – 13 Abstract space (grid) – 8 Abstract street network – 3 Not explicit – 5	Between 1 and 200,000 (median 300)
Movement	**Software**	**Agent decision-making**	**Number of offender agents**
Purposive – 18 Completely random – 6 Biased random – 6 Unspecified – 4	Repast – 9 LEADSTO – 6 NetLogo – 4 Matlab – 2 SPACES – 2	Pure rational choice – 12 Bounded rationality – 9 PECS – 8 BDI – 3	1% - 1 2% - 1 2.5% - 2 5% - 2 10% - 2 20% - 3

* See below for explanation of acronyms

4.2 Urban models in criminology

Agent-based modelling is becoming increasingly popular in the field of criminology, especially with those studying theories that consider the role of the built environment upon crime. As seen in table 4, Routine Activity Theory (RAT), Crime Pattern Theory (CPT) and the Rational Choice perspective (RCP)[3] (not itself environmentally focussed) are some of the most popularly tested and modelled concepts (Johnson and Groff 2014). This is partly due to their more advanced theoretical development which allows for the necessary level of complexity required to model them, and partly due to the voluminous nature of the data available and event based nature of the crimes which they are modelled alongside – burglary and street robbery (the most popular crimes modelled in table 4). These patterns of criminal events provide the stylised facts against which modelled outcomes can be compared to test their sufficiency. To illustrate the kinds of patterns identified, consider that it has been established that crimes such as burglary have a strong spatial dimension with spatio-temporal clustering and repeat victimisation found in communities across the world (Johnson et al 2007). Consequently, criminological simulation models are often validated by determining the extent to which they can produce spatial hot spots of crime, and simulation experiments may involve observing the effect on simulated outcomes of varying parameters that control policing numbers or patrol routes, numbers of criminals, or the attractiveness of certain targets.

Birks, Townsley and Stewart (2012) modelled the impact of behavioural rules derived from RAT, CPT and RCP upon simulated burglary patterns within a grid system containing offenders and targets (houses), and found that enabling the mechanisms of all three theories led to the emergence of more focused spatial patterns of crime and repeat victimisation – patterns that better resembled real world patterns than models based on the individual theories alone. Additional work in 2013 by the same authors focused on inter-personal victimisation confirmed the generative sufficiency of these three theories by creating similar outcomes to their previous model (a more detailed discussion of all the models in this section is presented below). Further work on burglary patterns has been completed by Malleson et al. (2012), with a specific geographical focus upon the city of Leeds, UK. By creating complex facsimile models of specific areas of the city using GIS mapping alongside crime and residency data, Malleson created the architecture of burglary agents based upon a framework of their intentions at any period of time (Malleson et al 2012). This then allowed a simulation of burglar behaviour

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[3] Crime Pattern Theory (Brantingham and Brantingham 1993) states that the journeys individuals take from activity node to activity node create space in which their awareness of potential crimes which could be committed develops. Certain spaces may be crime generators or crime attractors, and crimes happen in patterns due to combinations of these factors and an individual who has decided to commit a crime coming together. Rational Choice perspective (Cornish and Clarke 2014) states that offenders make decisions based on rational choices at the time – maximising their perceived reward.

which predicted certain crime patterns, which was then compared to real data and found to be similar.

Bosse, Gerritsen and colleagues have built a variety of models focussing upon the biological and psychological frameworks of criminals as well as their offending patterns with assaults and burglary. Again using RAT they have simulated the interaction between offenders and targets (Bosse, Elffers and Gerritsen 2010), testing the effectiveness of different policing strategies in preventing hot spot formation. Complex agent decision-making processes have also been created in other models to replicate those found in the criminal population using frameworks such as the Belief-Desires-Intentions architecture (BDI), which is discussed in detail below (Bosse, Gerritsen and Treur 2009; 2011). Groff's models of street robbery used RAT to investigate the relationship between time spent away from home and robbery rates, allowing both the spatial and temporal aspects of the crimes to be explored (Groff 2007a; 2008). Taking a slightly different perspective, Dray et al (2008) looked at the heroin drought in Australia, combining drug availability and market economics with the movement and desires of drug users, police and outreach workers. From this sample we can already see the variety within models of environmental criminology, with their focus upon specific geographical locations or abstract grids, different crimes, and the movement and intentions of either criminal or victim agents. These issues will now be discussed more systematically.

4.3 Landscapes – how important is realism?

A great many agent-based models are almost solely focussed upon building a realistic artificial environment, using GIS layers to recreate street networks, land use patterns, and even incorporating 3D imaging technology through which the environment can be visually navigated. However, we must question whether such detail is required when creating a model, only incorporating the level of complexity which is absolutely necessary – the notion of parsimony extends to all areas of an agent-based model. Elffers and Van Baal (2008:19) 'make a plea for being content with very modest artificial spatial backgrounds', being concerned that adding layers of GIS information may not only serve no useful purpose in the process of theory testing, but may in fact 'give misleading results that are tied to the geography, without being recognized as such' (ibid:32). It is necessary to therefore assess the context of the model being developed and the theories being tested in order to determine the need for GIS layered landscaping and other such complex geographical tools. As seen in table 4 above, there is an almost equal split between those using GIS layers to incorporate the street network and other features, and those that use abstract representations of the urban landscape (whether an abstract street network, or a grid system or lattice). For example, in her models of street robbery, Groff (2007a; 2008) uses the street network of Seattle, Washington in order to

simulate the movement of offenders and targets through the network and highlight areas of criminal activity, while Dray et al (2008) use an abstract grid.

4.4 Conceptualising intention: BDI and PECS

One of the greatest challenges faced by those who wish to build an agent-based model containing human agents is the necessary complexity required in order to create a realistic representation of their decision-making capabilities. Two particular frameworks have been created which attempt to rationalise the process of decision-making, and both have been used in the agent-based models of crime reviewed within this section. The BDI framework (Bratman 1987) incorporates the beliefs, desires and intentions of an agent to form a decision about making an action, and has been used by Bosse, Gerritsen and Treur (2009; 2010) within their models of episodic criminal behaviour. In order to simplify the explanation of the architecture, Elsenbroich and Gilbert (2014) use the example of Schelling's (1971) segregation model in which an agent's perception of its neighbours, whether they are of the same colour as itself or different, forms the agent's 'belief' about its environment. The 'desire' element of the framework would be the rules regarding any tolerance threshold for the agent about the percentage of same coloured neighbours within its neighbourhood. The 'intention' element is then to move if this threshold is reached.

The BDI architecture assumes that agents have a set of goals they seek to achieve (whether this is the acquisition of food or money, or the purchase of drugs etc.) and that they prioritise amongst these goals. For example, if an agent has long- and short-term goals (child-rearing and acquiring food to survive), the short-term goals will be prioritised. The BDI framework assumes rational or practical reasoning amongst the agents (Singh 2005), which is both a strength and a weakness. While perfect rationality amongst agents is relatively easy to programme and test for (often using a rational choice equation to maximise the utility of an action), it has been shown numerous times that such a level of rationality is not accurately reflected within human behaviour (Axelrod 1997). The RCP school of thought within criminology has certainly accepted that 'bounded rationality' is a much more realistic concept – humans or agents can only make decisions based upon the information available to them (which may be imperfect), and even then sometimes go against logic in their actions, instead relying on emotional responses or previously employed strategies, for example (Cornish and Clarke 2014). While bounded rationality can be incorporated into a BDI framework, it can be more difficult to programme in potentially irrational emotional responses. One way of doing this is to introduce imperfect knowledge or to make judgements more stochastic, rather than relying upon purely rational decision-making.

The PECS framework (Schmidt 2000; Urban 2000) is a more complicated agent architecture, comprising of the physical conditions, emotional states, cognitive capabilities and social status of an agent at any one point in time. It was designed to improve upon the BDI framework and claims that by '(t)aking into account a close interrelation between the components Emotion and Cognition, it is possible to model furthermore the most complex form of human behaviour called emotional intelligent behaviour' (Schmidt and Schneider, 2004). Whether a model of crime would need such complexity is questionable, but when considering the radicalisation process it is possible to perceive the role that such an achievement could play. In allowing different intensities among the motivations of an agent, it is possible to create a 'personality' – those who are more emotional, those who are more rational, varied intelligence levels, and even the complex social dynamics which pervade in society.

PECS differentiates between reactive and deliberative behaviours, the former consisting of instinctive behaviours that the agent will not question, the latter requiring a conscious pursuit of the agent's goals (Schmidt 2005). Reactive behaviours consist of instinctive and learned behaviours (such as reacting to a baby's cry or braking when driving a car if a child runs into the road), as well as drive controlled and emotionally controlled behaviour (the drive for food to maintain life and emotions which can affect behaviour if felt strongly enough). Deliberative behaviours are those on a higher mental plane – constructive and reflective behaviours. These allow plans to be created and carried out, and then success or failure to be assessed and learnt from. Malleson (2010) uses the PECS framework within his models of burglary in order to determine the action of simulated burglars depending upon their motivations at particular times of the day.

His focus remains upon reactive behaviours, using three state variables controlling the desire or need for drugs, sleep and socialising. Combining the level of the state variable, the time of day and a function accounting for personal preference, the strongest motive determines the actions an agent engages in. This may be deciding to sleep, going to work to earn money, or searching for a property to burgle in order to then purchase drugs. This decision-making is then complemented by further assessments of the desirability of particular targets based upon levels of collective efficacy, calculated using census data, amongst others. In his model, Malleson did not use guardian agents, preferring instead to use collective efficacy as a (static) measure of desirability of an area.

This simplistic use of the PECS framework certainly makes it more accessible to those who have not used it before, and illustrates how it can be used to decide upon the driving actions of an agent on a daily basis. Once an action has been decided upon, the agent must attempt to complete that action, and this often involves movement from one place to another. How this

movement occurs, however, varies markedly depending upon the model in question, and it is interesting to ascertain whether any commonalities or 'best practices' regarding the movement of agents within an urban model can be discovered from the review of the literature.

4.5 Agent movement

Many models of computational criminology base the movement patterns of agents upon the tenets of certain theories, such as RAT. They then compare observed patterns for such models against those produced by models of purely random movement. There remain nonetheless significant differences in how researchers have implemented models of movement, the timing of movement, the level of randomisation and the extent to which realistic movement patterns have been attempted. For example, as part of an agent's routine, Groff (2008) assigns an agent 4 different activity nodes intended to represent a home location, a main activity such as work or school, and two other locations such as recreation spaces. No reason is provided for the use of four activity nodes, but the activity spaces are assigned depending upon the distributions of the population in terms of jobs and activities in Seattle, which she used as her example location. If an agent is unemployed and finds employment, or vice versa, their activity space can then change to adopt or drop an employment node. The pathways to and from these nodes are then spaces in which agents can be victims of street robbery. The agents move in a deterministic fashion between the nodes and replicate unique time patterns which have been assigned to them, giving them time to spend at work, in transit and at home and leisure locations. Groff's focus is upon RAT and testing the premise that the more time spent away from home, the more likely an agent is to become a victim of crime. She therefore varies the percentage of time spent away from home and indeed provides support for routine activity theory.

Birks, Townsley and Stewart (2012) use 5 activity nodes per agent in their model but, like Groff, give no empirical reason as to why this number was chosen. An activity space is then formed as agents use transport nodes to move between activity nodes, and it is within this activity space that an awareness of potential targets is produced. In order to mimic reality, one of the activity nodes is designated as a home location, to which there is a high probability (0.8) that the agent will return once it has visited another node. This was chosen in order to 'reflect the anchor-point-based navigation thought to be typical of human navigation (Golledge and Spector 1978)' (ibid:233). If the agent does not return home, it choses another activity node and continues its journey. In his model of burglary in Leeds, Malleson (2010) effectively assigns his agents 3 or 4 activity nodes to move between: a home location, a work location (if employed), a socialising location, and the location of the drug dealer from which they purchase

items. They navigate the road network, which is imported from a GIS map of the area, to an impressive level of complexity: routes are calculated to include areas which are suitable only for motor vehicles or pedestrians for example. Dijkstra's shortest-path algorithm is used by agents to reach their destination in the quickest time possible. Malleson also employs a 24 hour architecture within which movements (or not in the case of sleeping) are conducted, all depending upon which motivation is highest at any one time. Wang (2009) provides his agents with 4 routine activity nodes, consisting of a bus stop, an office and two coffee shops, between which to move.

Thus far we have focussed upon the movement of 'victim' agents (or the burglar in Malleson's model), but one class of agents – when included – which require their own movement rules within a model of urban crime are the 'police'. Police patrol strategies have been the subject of a number of models in order to investigate optimal patrol strategies, either in abstract or in real environments using GIS layers. These models naturally vary in design depending upon the aims and resources of the authors, with Wang (2009) implementing 3 types of patrol: random; community policing (patrols shrunk to one area); and hotspot policing (concentrating intensively in high crime areas). Dray et al (2008) again test the effectiveness of random patrols against hotspot patrols, while also incorporating problem-oriented patrolling as a third strategy. The random patrol strategy targets any area of the grid, hotspot policing focuses on areas with high risk values, while problem-oriented patrolling simulates police working in partnership with drug outreach workers to target areas of risk as assessed by both agents. This last strategy is particularly interesting due to the complex interaction between the agent classes allowing a truer representation of police movement on the ground. Jones, Brantingham and Chayes (2010) compare random patrols to 'cops on the dots' – their phrase for hotspot policing where their police agents move randomly but biased towards areas which are highly attractive to criminals. All of these models concur that hotspot patrolling is significantly more effective at reducing crime rates than random patrols, with Dray et al (2008) also finding that problem-oriented patrolling is even more effective than hotspot policing. Similarly to Johnson (2009), Fonoberova et al (2012) implemented a much more simplistic model on a grid system, with law enforcement officers having a limited field of vision and only arresting those within it, rather than adopting any specific patrolling patterns. Nevertheless, by naturally moving towards criminal agents, again this mimicked a crude hotspot strategy.

Within urban models of crime, 'offender' agents tend to move depending on the attractiveness of their target (either human or building agents), which is contingent upon their ability to sense the environment and their decision-making process, to which we now turn.

4.5.1 Awareness space

Developed from RAT, one of the central tenets of CPT (Brantingham and Brantingham 1993) is that offenders build up an 'awareness space' around their travel to and from regular destinations, their 'routine activities'. These awareness spaces are then those in which crimes are considered most likely to occur as offenders are familiar with them and the targets within them. Within the cognitive architecture of an agent, therefore, an awareness space can be developed in which targets may be located. Wang, Liu and Eck (2008) use cognitive maps to build their agents' awareness of their environment during the model, with accumulated reward values of certain areas being updated the more time an agent spends within that area. Routine activity paths are developed during the model that then define the awareness spaces of the agents. Birks, Donkin and Wellsmith (2008) take a similar approach to this in their cops and robbers model, with grid cells representing spaces in which a numeric value of the agent's awareness is attached. The more time the agent spends in a cell, whether moving or committing an offence, the more their awareness of the cell and the opportunities within it grows. This is developed in later models (Birks, Townsley and Stewart 2012; 2013) where the effect of increased awareness spaces in areas of routine activity and travel between them is seen in the spatial clustering patterns of crimes committed by the agents. The experimental condition, in which the development of awareness space is activated, is compared to the control condition, in which awareness of all space is uniform and unchanging. Within these awareness spaces offender agents become conscious of potential targets (either human or building agents), but which target they choose to attempt an offence against depends upon how attractive that target is.

4.5.2 Target attractiveness

The attractiveness of a target to an offender agent will depend upon a number of criteria, including the level of guardianship in the vicinity of the target, the level of reward gained (or perceived) at the target, and the equation used to guide decision-making (discussed in detail in the next section). Guardianship was a concept used in a number of the models surveyed, and in many cases this was represented by the presence of other agents in the model. Groff (2007a; 2008) uses police agents in her models, with their proximity to a target reducing its attractiveness to offender agents. This formal guardianship is present in Dray et al (2008) who also incorporate another guardianship agent in the form of outreach workers whose role is to search for and assist drug users. Wang, Liu and Eck (2008) use place manager agents in their model to deter robbers from targeting a building, and their effectiveness in responding to a crime if it does occur makes it more or less attractive for an offender agent to return. Both Yonas et al (2011) and Malleson (2012) use a measure of collective efficacy amongst the

population as a guardianship device, with offender agents seeing areas of high collective efficacy as less attractive. Yonas et al look at the simulated witness response rate within an area – how likely the witness is to report a crime – and this then affects the likelihood of arrest and of an offender agent repeating their activity. Socio-demographic data from the census alongside other attributes are used by Malleson to create a community cohesion variable within his model, with areas of greater cohesion less attractive to offenders for fear of being caught.

The level of a target's attractiveness may be uniform or may fluctuate depending upon the selection of variables introduced by the modeller. Furtado et al (2009) have fixed targets which fluctuate between being vulnerable or not vulnerable to offender agents, while Pitcher and Johnson (2011) have homes with varying levels of attractiveness in their model. The level of occupancy in the home varies depending upon the time of day in Malleson's (2012) model, and therefore the level of guardianship and consequently attractiveness to the offender agent also varies. Wang, Liu and Eck (2008) and Groff (2007a; 2008) incorporate continuously updated risk levels at a location depending upon the presence and, in the former case, the efficacy of guardianship agents, which affect the attractiveness of a target to the offender. Wilhite and Allen (2008) model the number of criminals within an area (the target here being residence and criminal activity within the neighbourhood) affected by the levels of self-protection, neighbourhood protection and city protection. Varying these levels of protection across model runs varied the attractiveness of an area to the criminal agents.

Groff (2007a; 2008) has the offender agents in the models calculate the level of reward they would gain in order to determine the attractiveness of an agent. For example the wealth of potential targets for street robbery within the vicinity is assessed in order to determine which target will present the highest reward in monetary terms. This selection presumes a level of rational choice within the agent, and Groff combines this calculation with a level of error introduced to take into account other factors which affect decision making, but that are not explicitly modelled, to represent bounded rationality.

4.5.3 Agent decision-making

The BDI and PECS frameworks for agent decision-making, discussed in section 4.5, are complex architectures for multiple layered decisions, but much of the decision-making within the models surveyed here is based upon simpler equations calculated within the models using rational choice and bounded rationality. Perfect rational choice calculations presume that the agent will take into account all information available to it and make the decision which best optimises its outcomes by maximising utility. Bounded rationality however allows a level of

error which may be included in this decision-making, and allows for imperfect decisions to occur. This more accurately reflects real life decision-making, where humans rarely have complete information, or the ability to assess things optimally, and are often influenced by factors such as emotional and cognitive biases which can lead to sub-optimal decisions being made.

Of the 36 models analysed in table 4, 12 used perfect rational choice equations, 9 used bounded rationality, 3 used BDI and 8 used PECS (all written by Malleson and colleagues). The rest did not specify enough detail to determine which framework they used. The calculations for decision-making varied in complexity, but the use of bounded rationality using error terms is encouraging, with agent-based modelling being particularly suited to the use of such stochasticity. Groff (2007a) makes the argument for the use of bounded rationality as it is well known in criminology that decisions are made by criminals based on a multitude of variables that they deem important, as well as others that are not necessarily under their control. The lack of a totally flexible and accurate incorporation of bounded rationality into the BDI architecture has been discussed above, but a level of stochasticity within an agent's decision-making process is surely desirable in order to achieve a more realistic representation of this process.

4.6 Social networks and influence

The majority of the models considered in Groff, Thornton and Johnson (forthcoming) focus upon the interaction between lone offenders and targets, rather than groups of offenders. In that sense, social networks and influences upon offender agents to develop a criminal propensity or to act are not part of these models. However, we have seen the importance of friendship groups in section 3.6.3 as well as opinion dynamics influencing those within a social network in section 3.6.4. Moreover, Eisenbroich and Gilbert (2014) dedicate a chapter of their book on modelling norms to the creation of a model of the effect of social networks upon juvenile delinquents. Within this model the attitude of the juveniles towards delinquency is altered using opinion dynamics depending upon the opinions of those within their networks. Therefore those with many delinquent friends are more likely to be delinquent themselves. They utilise the social circles model allowing individuals to have dynamic, highly clustered and size-limited social networks which intersect with the networks of others, producing ever changing influences. This led to a model of clusters of delinquents who still interact with non-delinquent elements of the population – as in reality. The importance of social networks and their influence upon the individuals within them will need to be reflected within the model of radicalisation created in Chapter 5.

4.7 Creating the people, creating the environment

There is a vast range of parameters within the models considered regarding the number of agents, victims and offenders, the size of the environment and the software used. Finding the state of the art and the norm therefore is difficult, as each model is designed to reflect the creator's needs. There is a multitude of software available for modellers to use, with 4 of the studies considered using Netlogo and 9 using Repast. Models can be run on more generic software such as Matlab, and authors had their own preferences, with Bosse and colleagues using LEADSTO throughout their work. The size of the world within the model varied according to the use of the model – those who required GIS data to be spatially correct for their theories often modelled a city or a neighbourhood, while the more abstract models would use for example 100 x 100 squares (Birks, Townsley and Stewart 2012; Fonoberova et al 2012; Jones, Brantingham, and Chayes 2010). Again a large amount of the models considered within the study did not state the size of the model environment, making accurate recreation difficult.

The number of agents within the models varied between 4 and 250,000, with some using demographic data from the area they were simulating if necessary and others giving no reason for their choice. The number of victim and offender agents again varied hugely, with some modellers giving exact numbers, some giving percentages of the agents within the models (between 1% and 20%), and the vast majority giving no justification of why they chose the numbers they did. Those models that simulated exact geographical areas often used crime and population statistics from those areas for their agent parameters, while others varied the number of total agents, criminal agents or victim agents as part of their model testing.

4.8 Transfer of concepts

Having reviewed a number of agent-based models of urban crime, it is important to assess which concepts can be transferred into a model of radicalisation and used in the following chapters. Netlogo will be used as the modelling software and while this supports the importation of GIS files, such detail will not be necessary within the model created as the landscape will not be based upon an actual area. It is not necessary to create an accurate representation of a space for the model as the IVEE theory is not based upon geographical specificities or movement patterns in an urban area (unlike certain theories of burglary for example), and instead a landscape representing a generic urban area will be used, with housing areas, work locations and leisure spaces. The lack of realistic spatial representation also means that there are no population statistics to populate the model, so a set number of agents will be created with 1% of them set as radical agents, to represent the criminal population within the model (the same as Birks, Townsley and Stewart 2012). This could be

varied if necessary or desirable. It was decided that a complex agent architecture like BDI or PECS was not necessary to use within the model, as sub-models controlling the movement, communication and opinion dynamics of the agents will be created which will be sufficiently complex for the IVEE theory. These models will be described in the following chapter.

The movement of agents within the model will directly affect their potential exposure to any radicalising settings which emerge, therefore it is important to make this as realistic as possible using empirical data where available. While Groff (2007a; 2008) and Birks, Townsley and Stewart (2012) have opted to assign a certain number of routine activity nodes to their agents, this limits the agents' movement to such an extent that it was decided that this would not be replicated. Allowing agents to only visit 3 or 4 settings would not be realistic and would adversely affect their potential exposure to settings, so instead it was decided that only two settings would be assigned to agents: a home location and a work location (if employed). The rest of the settings were all potential destinations for radical and non-radical agents within the realm of religious allowance – Muslims would not visit a Church or a pub, and Christians would not visit a mosque in the model, replicating relatively (though not entirely) realistic decision-making. In order to replicate movement which was as realistic as possible, different movement patterns would be given to those who were employed and unemployed. Transport for London (TFL) data (TFL 2011) on movement patterns on public transport in London provides the empirical basis for movement patterns of agents within the model, the time they remain at locations, and differences in movement and remain patterns between employment statuses (described in section 5.2 below). The activity space of the agents within the model would be limited to the boundaries of the landscape itself – while this is not realistic, the model does not need a more complex level of activity space in order to test the theory.

Within a number of the models reviewed, agent decision-making was based upon bounded rationality, and this will be incorporated into the model here, with various error terms introduced throughout in order to introduce a more realistic measure of agent choice, as well as encouraging the necessary level of stochasticity. Social networks will be created within the model upon which certain decisions will be made – whether or not to deradicalise more quickly or slowly, for example. While social networks were not used within the criminology models reviewed in this chapter, they are an important part of the exposure and individual vulnerability sections of the theory being modelled, so will need to be included. The level of complexity required within these networks is debatable, as they do not form the main focus of the model, but they must still be represented so a potential proxy for a more complex social network is to include those sharing the same home location within the model. This would then allow the opinions of those sharing the same immediate social network to be taken into

account. Opinion dynamics would be incorporated when coming into contact with radical agents, so that depending upon the agent's level of individual vulnerability, they would be more or less affected by the radical agent and the narrative, and their attitude level would increase accordingly (and decrease upon deradicalisation).

The attractiveness of targets for radical agents is one of the most important calculations within the model as this will encourage or indeed suppress the emergence of radicalising settings which is the main focus of the model. Some of the models reviewed used guardian agents to affect the attractiveness of a target, but since collective efficacy and social organisation are theorised to affect the emergence of radicalising settings, these will encourage the informal guardianship of places through their effect upon individuals within the community being modelled. Factors contributing to the attractiveness of certain settings as targets to radical agents will need to include the levels of collective efficacy and social disorganisation within the community which would affect certain variables belonging to the agents in the model. It would make sense for the level of monitoring within a setting to be calculated dynamically on each time step to reflect the agents within that setting, rather than be static as it may be with the presence of formal monitoring such as CCTV or a security guard present for a certain number of hours per day. There may also need to be consideration of the type or number of agents within the setting which may make it more or less attractive to a radical – there would be no point trying to find agents to radicalise in an empty setting, or one in which the agents will not be vulnerable to or interested in the narrative. All of these transferable concepts will be incorporated into the agent-based model which is described in Chapter 5 below.

5. An agent-based model of radicalisation

5.1 Agent-based modelling

While initial forays have been made by researchers into the realm of agent-based modelling and radicalisation, the scoping review suggests that there is much to do in order to develop a theoretically sound model of such a complex process. Agent-based modelling provides an ideal tool with which to develop and refine the theory of radicalisation focussed upon here, with particular focus upon the factors affecting the emergence of radicalising settings. Consequently, a model is developed that allows each of the three parts of the theory of radicalisation discussed in section 2 to be represented through sub-models controlling the agent's movement, decision-making processes and interactions with their environments and other agents. These sub-models will be informed by existing literature and theories on these topics, and empirical data will be used to calibrate the parameters, where possible. The aim of the model is to attempt to affect state change within a setting from a non-radicalising to a radicalising setting. The interaction between the sub-models is intended to allow the process of radicalisation to be simulated, affecting state change in a sample of the agent population from non-radical to radical. It will also allow analysis of which simulated variables might theoretically help or hinder this process – it is as important to explore (theoretically) what might protect against the spread of radicalisation in a setting as it is to find those factors that contribute towards it.

5.2 The ODD protocol

Developing an agent-based model requires that the theory to be tested is formalised in such a way that it can be encoded in a model. This process alone is valuable since the theory is critically assessed in the process. For example, logical inconsistencies and any substantial omissions will be identified as part of this stage of modelling, and indeed developing the model alone helps to test the theory which is being modelled (Epstein 2008). However, the process can be conducted in a number of ways. In order to standardise the way in which agent-based models are described by their creators, and allow them to be interpreted or replicated more correctly by their readers, Railsback and Grimm (2012) have created the ODD (Overview, Design Concepts, Details) protocol, containing the overview, design concepts and details of the model which has been built. This systematically takes the modeller through the details of the model that require expression, allowing both the modeller and the audience to gain a deeper understanding of the purpose of the model and its mechanisms. Table 5 below highlights the various elements of the protocol to be followed, and the text that follows articulates the ODD protocol for the current simulation model.

Overview

1. Purpose

The purpose of this model is to simulate the process of radicalisation using the tripartite theory of individual vulnerability, exposure and emergence, and specifically to test the influence of factors that theoretically may impact upon the emergence of radicalising settings in order to refine the theory. Under which conditions does radicalisation flourish, or indeed is prevented?

2. Entities, state variables, and scales

The entities involved in the model will be: 1) the agents themselves, split into radicals and non-radicals; and 2) the 'built' environment in which the agents move around and interact (collections of buildings and open spaces). Agents will have access to information that is specific to them and to some global information. The global environment can be affected by the actions of agents and these effects will be captured by global variables such as levels of social disorganisation or collective efficacy. In turn, the global variables will affect the behaviour of agents.

Table 5: The ODD protocol (adapted from Railsback and Grimm 2012)

<table>
<tr><th></th><th>Elements of the ODD protocol</th></tr>
<tr><td rowspan="3">Overview</td><td>1. Purpose</td></tr>
<tr><td>2. Entities, state variables, and scales</td></tr>
<tr><td>3. Process overview and scheduling</td></tr>
<tr><td>Design concepts</td><td>4. Design concepts
• Basic principles
• Emergence
• Adaptation
• Objectives
• Learning
• Prediction
• Sensing
• Interaction
• Stochasticity
• Collectives
• Observation</td></tr>
<tr><td rowspan="3">Details</td><td>5. Initialization</td></tr>
<tr><td>6. Input data</td></tr>
<tr><td>7. Submodels</td></tr>
</table>

The variables that radical and non-radical agents will possess are detailed in Table 6. Variables owned by the buildings within the model are also represented. A more detailed description of these variables and their calibration is provided in section 5.3, including Table 7 showing the provenance of the data used to set these parameters.

Table 6: Agent variables

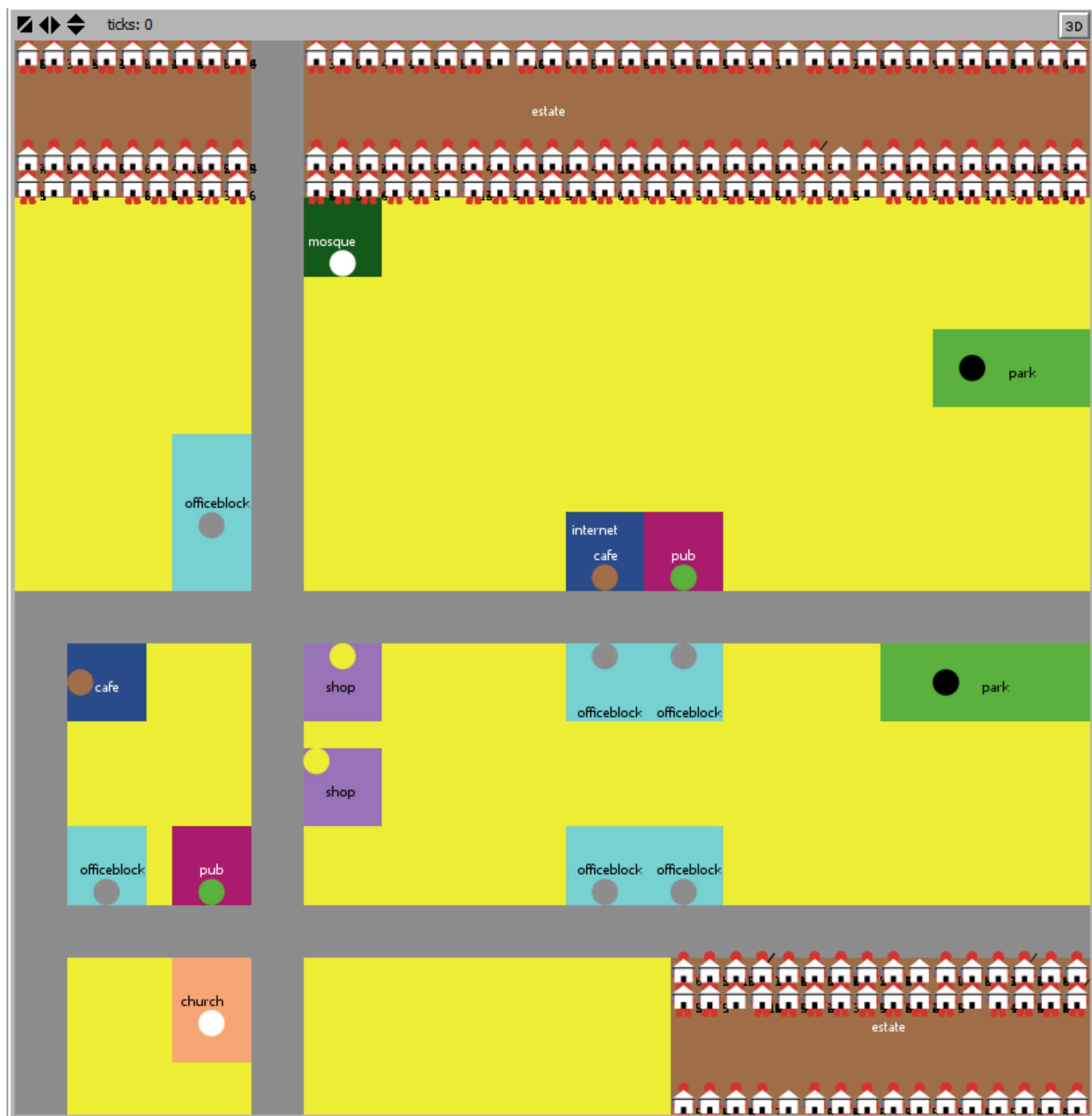
Variable	State/value	Detail
BUILDINGS		
Leisure/work/church /mosque/pub	True/false	Set to whichever the building is e.g. work if an office block, leisure if a park, shop or (internet) café (static)
Av-attitude-of-visitors	real number	Calculates the average attitude of non-radical agents who are in a building (dynamic)
Av-notice-of-visitors	real number	Calculates the average notice level of non-radical agents who are in a building (dynamic)
Av-report-of-visitors	real number	Calculates the average report level of non-radical agents who are in a building (dynamic)
Level-of-monitoring	real number	Calculates the level of monitoring in a building depending on which agents are present (see equation below) (dynamic)
Radical-visits	integer value	Shows the number of visits by radical agents (dynamic)
HOUSES		
Radical-here	1 or 0	Set to 1 if a house is a radical agent's home location (static)
Av-visitor-attitude	real number	Calculates the average attitude of non-radical agents at a house
NON-RADICAL AGENTS		
Age	integer value between 15 and 65	This is the age of the agents from 15-65 (static)
Gender	Male/female	Split evenly across agents within the model (static)
Religion	Christian/Muslim	Set at 20% Muslim, 80% Christian (static)
Target	One of buildings/ houses	Chosen by the agents depending upon select-target sub-model (dynamic)
Employment	Employed/unemployed	Set at 30% unemployed for age 25+, 40% unemployed for age 15-24 (static)
Home-location	One of houses	Randomly allocated to each agent from one of the houses at the start of the model (static)
Work-location	One of work buildings	Randomly selected from one of the work buildings at the start of the model for employed agents (static)
Initial-attitude	real number	Selected randomly from a Poisson distribution of between 2.8 and 4 (depending upon age) at the start of the model (static)
Attitude	real number	Changes as contacts with radicals occur. Attitude increases as a function of the level of individual vulnerability. When it reaches 20, an agent is considered radicalised (dynamic)

Individual-vulnerability	real number	Selected randomly from a Poisson distribution with mean 5 (static)
Network-attitude	real number	Average attitude of others who live in the same house (dynamic)
Num-of-encounters	integer value	Number of encounters with a radical agent (dynamic)
Last-encounter	integer value	Number of ticks (time units) since the last contact with a radical agent (dynamic)
Places-visited	integer value between 0 and 3	Number of places visited. Set to send agents home after max. 3 places visited then reset to 0 (dynamic)
Remain	integer value between 0 and 600	Number of ticks in which to remain in the current location. Starting number will vary depending on location (dynamic) – see section 5.3
Notice-level	integer value	Set to between +2 and -2 (drawn from a uniform random distribution) of the level of social organisation in the model (static)
Report-level	integer value	Set to between +2 and -2 (drawn from a uniform random distribution) of the level of collective efficacy in the model (static)
RADICAL AGENTS		
Age	integer value between 15 to 65	This is the age of the agents, randomly allocated from range = 15-65 (static)
Religion	Muslim	Chosen to represent Al-Qa'ida-inspired radicals (static)
Target	One of buildings/ houses	Chosen depending upon select-target sub-model (dynamic)
Employment	Employed/unemployed	Set at 30% unemployed for age 25+, 40% unemployed for age 15-24 (static)
Home-location	One of houses	Randomly chosen from one of the houses at the start of the model (static)
Work-location	One of work buildings	Randomly selected from one of the work buildings at the start of the model for employed agents (static)
Attitude	20	Set to 20 and unchanging (static)
Contacts-with-non-radicals	integer value	Number of contacts with non-radicals (dynamic)
Places-visited	integer value between 0 and 3	Number of places visited. Set to send agents home after max 3 places visited then reset to 0 (dynamic)
Remain	integer value between 0 and 600	Number of ticks in which to remain in the current location. Starting number will vary depending on location (dynamic)

The global environment includes time steps indicating measures of days and years, and allows the introduction of global variables (e.g. changes in the level of social disorganisation and collective efficacy which affect levels of monitoring and agent behaviours).

The simulated study area is a stylised location of 40x40 patches (see figure 3 below). The spatial scale is represented at the micro level of place with individual buildings being specified on a patch-by-patch basis, allowing each patch (and therefore building) to have its own characteristics (variables). Patches represent housing areas, work areas, leisure areas, places of worship and the spaces in between. No attempt was made to accurately represent a geographical area as this level of detail is not necessary for the function of the current model – theory testing and refinement (see Elffers and Van Baal 2008).

Figure 3: A screenshot of the model environment



Considering the temporal scale of the model, the model will run for 100 days (unless there are no radical agents left within the model), with each tick representing one minute of simulated time. This duration of simulated time (100 days) will be used as it is clear that, due to the prolonged exposure needed for particular narratives to be promoted and adopted, a sufficient amount of time would need to elapse for the

radicalisation process to be simulated. In terms of the temporal scale employed (one minute), this will allow the daily routines associated with patterns of (un)employment, leisure and sleep to be simulated and to reflect the characteristics of each agent upon the initialisation of the model (described in more detail below).

3. Process overview and scheduling

The main processes executed within the model are the 'select-target', 'communicate', and 'move' procedures, which are executed by both the radical and non-radical agents, and which can affect, and are affected by, the variables within the 'built' and global environments (details of these sub-models are given below). These also update many of the variables connected to the agents, which can then trigger other actions or interactions.

The scheduling of the model begins with the agents at their home location and selecting a target. The target chosen will depend upon their employment status and the time of day. Agents then move to their targets either immediately (if employed) or at a randomly selected time (if unemployed). They remain at that location for a given amount of time (discussed in section 5.3) and have the opportunity to communicate with other agents who are in the same building, potentially increasing their attitude towards radical action. Once their time in that building expires, they select another target to move to (for more information on the 'select-target' procedure see below), which may be their home location. If the time is 8am, employed agents will move to work. If the time is 10pm and agents are not yet at home, they move to their home locations. During the night, any non-radical agents which have had contact with a radical agent during the day may 'consider-opinions' and the time until they deradicalise (if they are partially radicalised) may be altered. The order of which agent executes which command upon each time step is random, therefore varying which agent goes first. Agents' attributes are updated on each time step, and buildings perform calculations to assess the level of certain variables of the agents within them at each tick. The agents will follow a 24 hour day time schedule, with the 'go' procedure the same on each morning of the model. Part of the 'go' procedure is shown below:

```
to go
 tick
 tick-clock
 ask buildings [ calc-av-visitor-attitude  calc-av-visitor-report
                 calc-av-visitor-notice  calc-level-of-monitoring  ]
```

```
ask houses [ calc-av-visitor-attitude-houses  ]
ask radicals [ if hours = 8 and minutes = 1 [select-target]
               if hours = 22 and minutes = 1 [set remain 0]
               ifelse remain > 0 [communicate] [move]  ]
ask non-radicals [ if hours = 8 and minutes = 1 [select-target]
                   if hours = 22 and minutes = 1 [set remain 0]
                   if hours = 1 [consider-opinions]
                   ifelse remain > 0 [communicate] [move]  ]
```

Design concepts

4. Design concepts

- Basic principles: This section is concerned with the concepts, theories, hypotheses and approaches which affect the way the model is designed. The IVEE theory of radicalisation has been discussed extensively above, and will form the basis for most of the model. Therefore, each non-radical agent will have a measure of individual vulnerability which contributes towards their likelihood of being influenced towards radical ideologies. Equally, these agents are exposed to settings through self and social selection, which in the model is simplistically operationalised through employment patterns and leisure settings, varied amounts of time spent at these locations, and settings which are not suitable for those with certain socio-demographics (for example, Muslim agents do not go to the pub or the Church, while Christian agents do not go to the Mosque). Social networks are created through attachments to those sharing the same home location, and are simplistically mimicked through an agent analysing the attitudes of those with which they share a house and potentially, depending on the level of attachment to those social networks, altering their own attitude if it has been affected by contact with a radical agent. This model assumes that there are radical agents and that they are good at what they do, rather than factoring in levels of persuasiveness of the radicals or their message. The emergence of radicalising settings is hypothesised to be affected by levels of collective efficacy and social (dis)organisation (described below), and therefore a combination of the two of those as experienced by non-radical agents contributes to the levels of monitoring in a setting, making the setting more or less attractive to radical agents. This model will be the first of its kind to systematically implement this theory of radicalisation in an ABM, and is one of the first agent-based models which attempt to simulate the radicalisation process (see Chapter 3).

  Two other important concepts or theories incorporated into the model are routine activity theory and opinion dynamics. The agents within the model have daily routines

which they follow to a certain extent through the 'select-target' procedure – those who are employed go to work in the mornings, they then have a likelihood of returning straight home or of going to a leisure setting etc. Those who are unemployed will spend more time at home, will most likely not leave the house first thing in the morning, will have more time for leisure settings etc. (details regarding how these routines were selected is provided below). These routine activities will then put agents into contact with various different settings at set or (semi-)random times, allowing them to potentially be exposed to a radicalising narrative if a radical agent is present and they come into contact with them.

Opinion dynamics is incorporated into the model during the 'communicate' procedure which allows radical agents to expose non-radical agents to the radicalising narrative. It was decided that, rather than making it impossible for non-radical agents whose attitude is very far away from the radical's attitude to be affected, that all non-radical agents should be able to be affected but as a function of their level of individual vulnerability and their initial attitude. This mimics the concept of confidence in belief which is used within opinion dynamics, where those who are less confident in their belief are more likely to have their belief changed (Deffuant 2006). Agents with a higher level of individual vulnerability will be more likely to be influenced by radical agents. Therefore, an agent with a (high) level of individual vulnerability of 7 (recall from Table 6 that this has a Poisson 5 distribution, and large values are more rare), for example, will have a greater increase in attitude upon having contact with a radical agent than one with a low individual vulnerability of 3. If that non-radical agent also happened to have a high level of initial attitude, it would take less time for their attitude to reach the radical threshold (set at 20) than an agent with a low level of initial attitude and a low level of individual vulnerability, who would radicalise more slowly and would require a greater degree of attitude change.

- Emergence: The model's important results and outputs are the emergence, or indeed lack thereof, of radicalised agents and radicalising settings. By assessing the number of potential radicalising settings, the number of radical agents left at the end of a model run, the number of converts and pre-radicals (those on the cusp of becoming converts), and the mean attitude of the population of non-radical agents, we are able to see the effects of the levels of social (dis)organisation and collective efficacy within the model.

- Adaptation: The agents will have various adaptive behaviours. They will be able to adapt their beliefs or opinions based upon their individual vulnerability and exposure to a radicalising narrative in an appropriate setting. These newly acquired beliefs can then be adapted according to the attitude levels within their household. Their movements will be adaptive depending upon changing levels of belief in the radicalising narrative, in order to seek out and spend more time with those who promote the narrative – if a non-radical agent becomes a pre-radical (their attitude is between 16-19), they will seek to spend more time with radical agents. Finally, the radicalising agents' movement will be adaptive depending upon whether settings exist in which the level of monitoring is suitably attractive to them: moving from public to private places or indeed leaving the model altogether will be a decision they will have to make. This is an example of direct object-seeking, in which 'agents choose among alternatives by explicitly considering which is most likely to increase some specific objective' (Railsback and Grimm 2011:41). One such decision will be to remain in the same place and risk being arrested (see below), or move to a more private setting and continue with the goal of spreading the radicalising narrative.

- Objectives: For the radical agents, the objective is to spread the radicalising narrative while remaining undetected by the authorities. This will mean that they will initially seek out public settings with low levels of monitoring. This targeting strategy will be based upon presumed knowledge of religious or other buildings in the area which would be of interest. A more private setting may be more appropriate in order to remain undetected if the perceived level of monitoring within the community does not allow the narrative to be promoted in public with an acceptable level of risk of detection. For non-radical agents, the objective is merely day-to-day functioning. For converts and pre-radical agents, one of their objectives would be to incorporate meeting radical agents within their daily routines.

- Learning: For this model, a measure of 'learning' by the agents is not needed.

- Prediction: For this model, a measure of 'prediction' by the agents is not needed.

- Sensing: Agents will be able to sense the levels of social disorganisation or collective efficacy within the environment, and the levels of 'notice' and 'report' of non-radical agents are based upon this (see section 5.3 for more detail), with an error term to represent bounded rationality as it adds uncertainty to the information. Radical agents

will be able to sense the levels of monitoring in buildings, again with an error term, in order to evaluate whether to target these buildings or not. Non-radical agents will be able to sense the attitudes of others within their households in order to consider their opinions if they have been exposed to a radical agent.

- Interaction: The interaction between radical and non-radical agents will be a key feature of the model. The very aim of the radical agent will be to interact with those who are vulnerable to the radicalising narrative, while the environmental conditions within the model will make the likelihood of this convergence within a setting more or less likely. Interaction between agents will be direct, and an agent will be able to interact with any other agent as long as they are sharing the same physical space. In order to simulate a realistic belief adoption process, the relative agreement model of opinion dynamics has been altered to incorporate a measure of individual vulnerability rather than the 'confidence in belief' aspect which such models typically include. Also added are the need for prolonged exposure to the radicalising narrative in order for its full adoption (as attitude increase is a function of individual vulnerability), and the need for non-random interactions between those who have already met and where the narrative has already been partially adopted in the case of pre-radical agents.

- Stochasticity: Stochastic processes will be used at various times and in various procedures within the model. The assignment of multiple initial agent variables will be random (see the section on initialisation), including their 'home' position, their work location (if employed) and the leisure settings they choose to visit (within the socio-demographic bounds mentioned above). The chance of meeting and communicating with other agents will be random to the extent that their patterns of movement must coincide plus a random element (with there being only a chance of meeting a radical agent even if they are at the same location). Other examples of stochastic elements within the model include the chance of an agent taking account of the collective attitude of their social network, and the level of similarity between the measurements of social organisation and collective efficacy and the 'notice' and 'report' variables owned by non-radical agents.

- Collectives: A simplified social network is included within the model based around a shared home location of the agents. This informs the non-radical agents' decision to deradicalise more quickly or slowly if they have been exposed to the radicalising narrative, but has no other function.

- Observation: In order to observe the internal dynamics of the model as well as its system-level behaviour, data upon radical and non-radical agents will be written to files and analysed statistically. This will include the number of radical agents remaining at the end of the simulation run, the length of the model run (as it will end if all radical agents leave the model), and the final number of radical agents and non-radical agents who have become converts or pre-radicals during the running of the model.

Details

5. Initialisation: The initial conditions of the model are stated in Table 7 in section 5.3 which details all of the parameters used within the model (refer back to Table 6 for information as to which parameter applies to which class of agent). The model will be run multiple times in order to stabilise the outcomes and take into account any outliers in single model runs. Moreover, the initial values of some of the variables of theoretical interest will be varied systematically to enable the effects of so doing on model outcomes to be estimated. The initial conditions regarding levels of social organisation and collective efficacy will be the same across a number of runs (the number being determined by the amount needed to stabilise the outcomes) in order to see the effects of this variable, before changing the setting to sample the parameter's range in order to simulate multiple different community types (for example a community with high social organisation and collective efficacy versus one with low). Evidence for the influence of parameter settings will be discussed in section 5.3.

6. Input data: No file input data will be required for this model.

7. Sub-models: The model will consist of the interaction between three major sub-models: 'select-target', 'move' and 'communicate'. Other sub-models, which will interact with the outcome of the above three major sub-models, are also described below. The description of each of these sub-models is simplified to facilitate the reader's understanding, with greater detail on the parameters and justification for their selection provided in section 5.3.

- 'select-target': this procedure is used by agents to decide which building they will visit and when. Depending upon their employment status, religion, and attitude level, agents will go to work, visit leisure locations, or remain at home. This is the procedure which contains the radical's decision to choose the most attractive target or relocate, and also contains provisions for pre-radicals and converts to spend more of their time at home locations of radicals rather than other leisure locations without radicals (for more information see table 7). Figures 4a and 4b below diagrammatically represent the select-target procedure for non-radical and radical agents respectively.

Figure 4a: The 'select-target' sub-model for non-radical agents

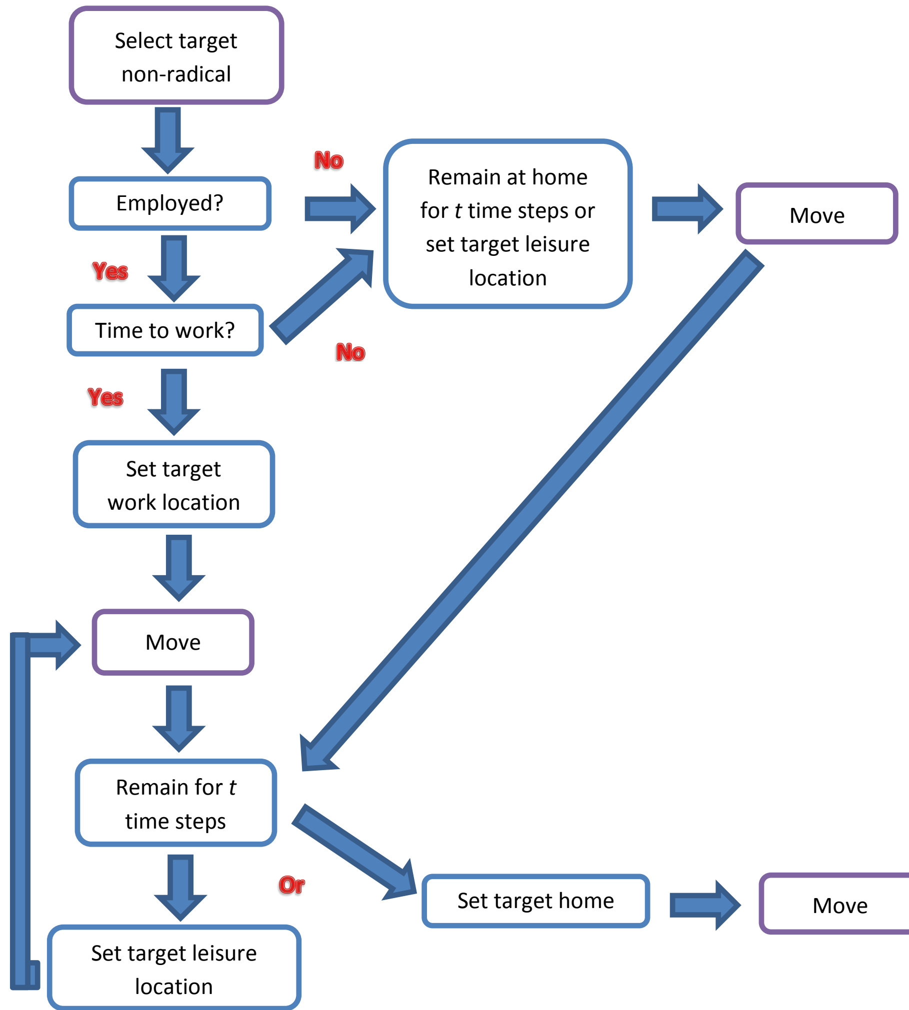
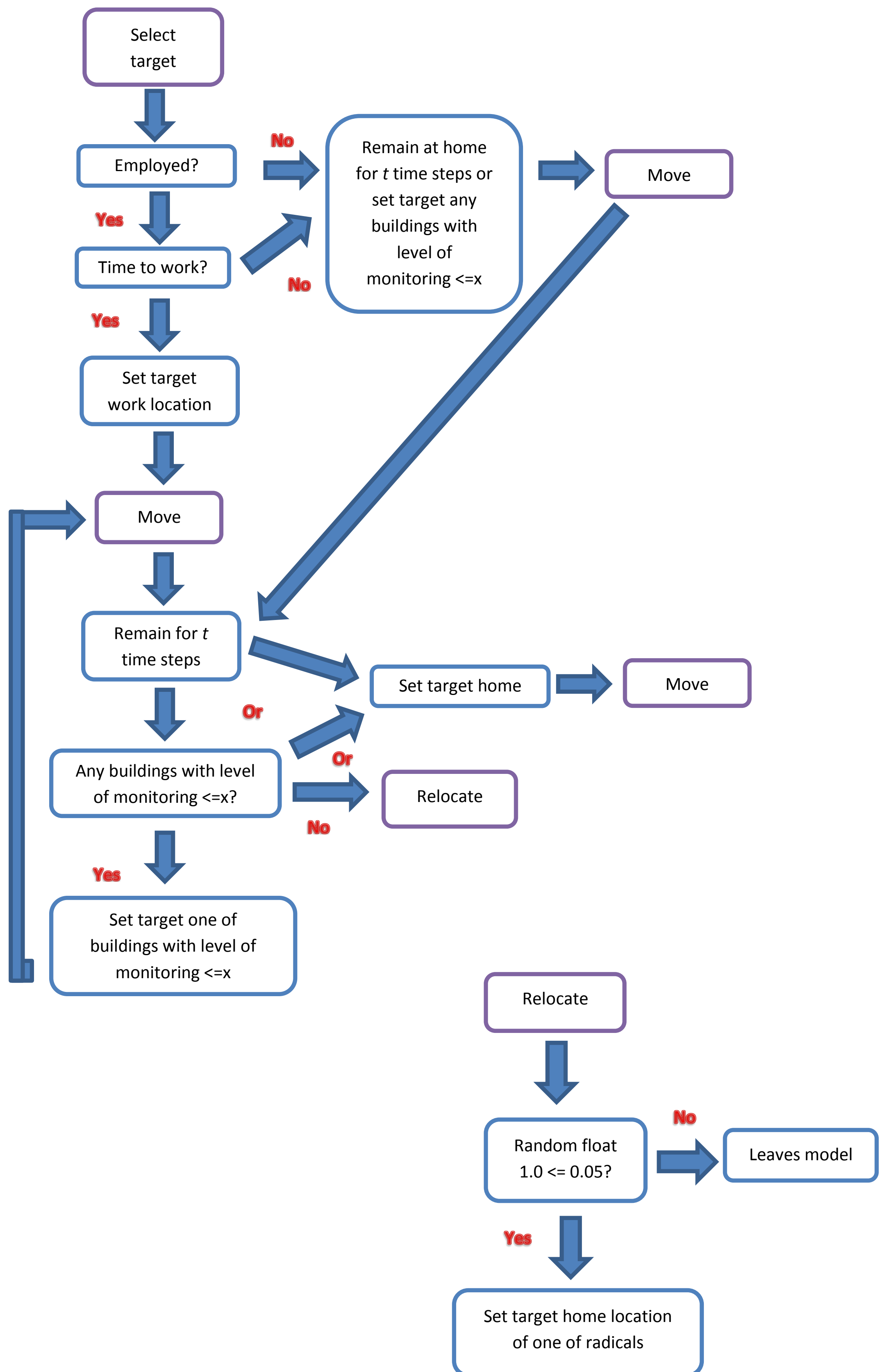
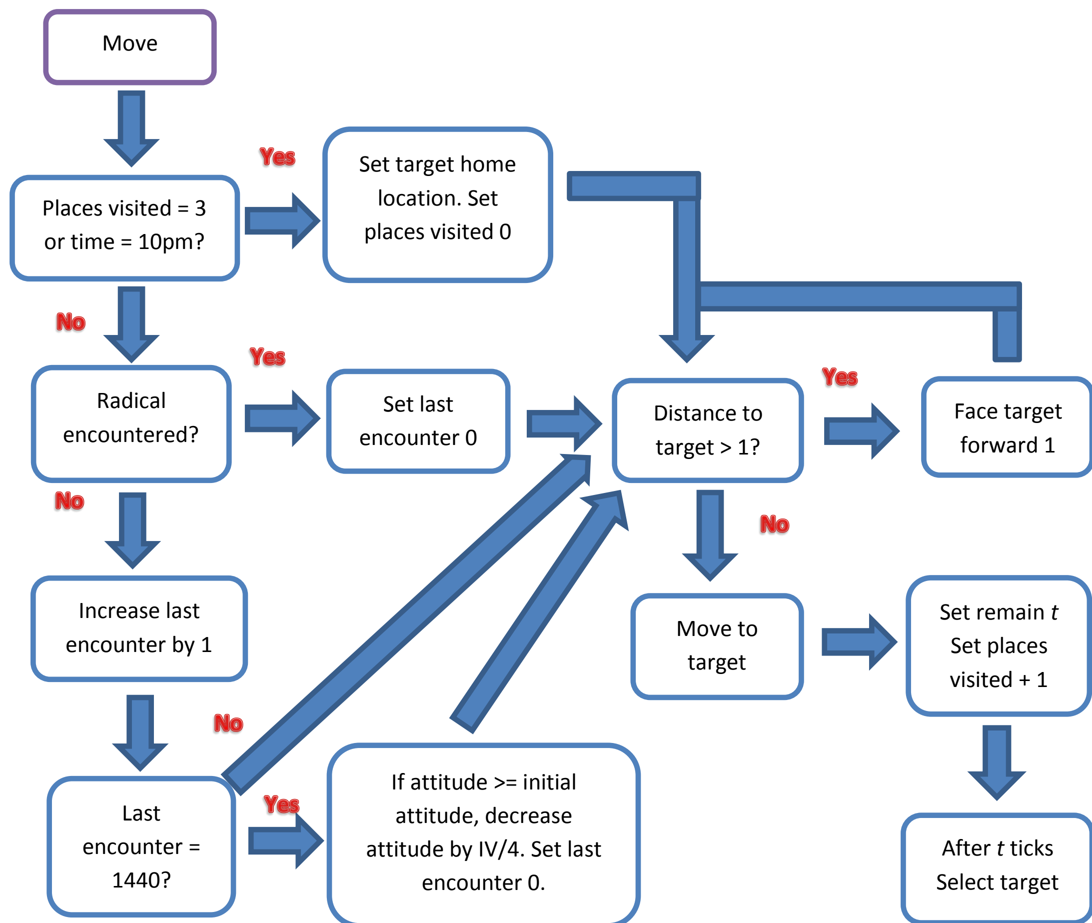


Figure 4b: The 'select-target' sub-model for radical agents



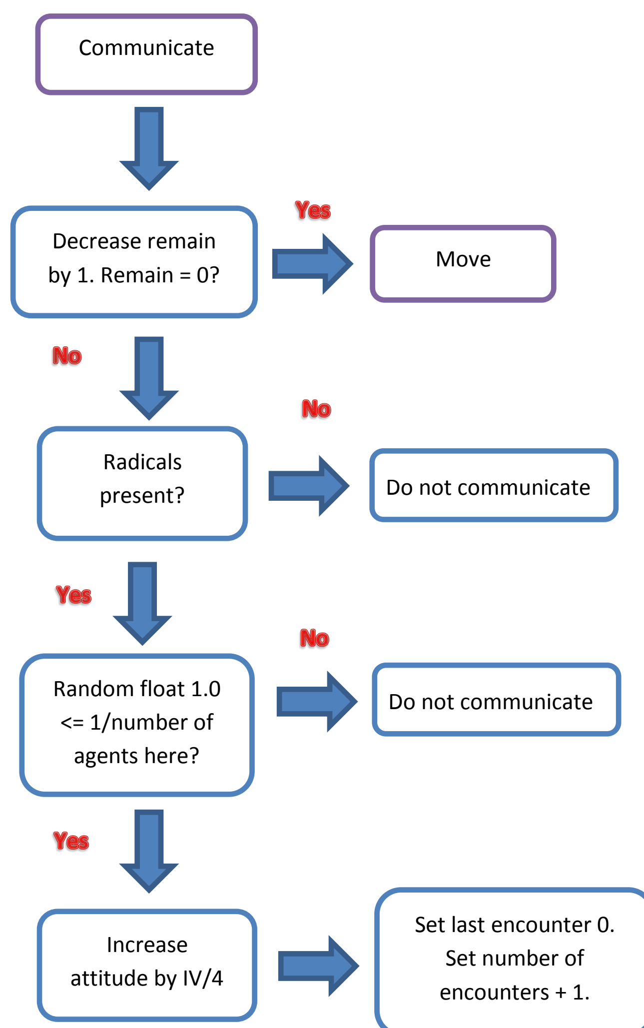
- ‘move’: once a target is selected the agent must move towards it. Once they reach their target, the time which they remain there is determined by the nature of the target (for example at work locations the agent remains for 8 hours, at leisure locations an agent will remain for a mean of 111 minutes – see section 5.3 for parameter justifications). If the target is the home location of a radical, they will remain for as long as the radical remains there, and will communicate with them meaning that their attitude level will increase. Figure 5 diagrammatically represents the move procedure.

Figure 5: The ‘move’ sub-model for non-radical agents



- ‘communicate’: this only happens when the agents are stationary and gives non-radicals the chance to interact with radical agents. Agents only interact once while in a building to ensure that artificially high levels of attitude increase do not occur. In future more complex models, it might be possible to simulate more complex movement dynamics within and outside buildings. Agents have a chance of interacting depending upon the number of agents in the building, to reflect the fact that people do not meet every person in a building. If non-radical agents do interact with radical agents, their level of attitude will increase by a factor of their level of individual vulnerability. Figure 6 diagrammatically represents the communicate procedure.

Figure 6: The ‘communicate’ sub-model



- ‘consider-opinions’: uses the average attitude level of non-radical agents in the house in which an agent resides as a threshold to decide the rate at which to potentially deradicalise (the influence of the narrative decreases over time within the model anyway depending upon the attitude of the agent – see section 5.3). If the average attitude in the house (towards the radicalising narrative) is much higher than that of

the agent, it will deradicalise more slowly. However if the average attitude is much lower, the agent will deradicalise more quickly. Included is a measure of attachment so that not all agents will be influenced by their social network to the same extent – those more attached to their social network will be more influenced than those less so.

- ‘relocate’: once a critical threshold of the level of monitoring within a setting is reached, the radical decides whether to move to another setting with a lower level of monitoring (which could include their home location or the home location of another radical agent), or to remove themselves from the area (and therefore the model) altogether.
- ‘calc-av-visitor-attitude-houses’: calculates the average attitude level of non-radical agents in the house.
- ‘calc-av-visitor-attitude’: calculates the average attitude level of non-radical agents in a building.
- ‘calc-av-vis-notice’: calculates the average ‘notice’ level of non-radical agents in a building.
- ‘calc-av-vis-report’: calculates the average ‘report’ level of non-radical agents in a building.
- ‘calc-level-of-monitoring’: calculates the level of monitoring in a building by averaging the mean notice and report levels in the building and taking into account the attitude level of the visitors – it doesn’t matter how high the levels of social organisation and collective efficacy are if the attitude of the visitors is sympathetic to the radical narrative.

During both the move and communicate procedures, if the non-radical agents have not had contact with a radical agent for a day, they will begin to deradicalise. If the non-radical agents are converts or pre-radicals, this will increase to 3 days without contact (these parameters are not based upon empirical data as unfortunately none exists, but these can be varied within the model to test their impact). Their attitude decrease is the same amount as their attitude increase was upon contact with the radical agents, again reflecting the theory that higher levels of individual vulnerability will more rapidly increase and decrease attachment to a narrative.

The code for the ‘consider-opinions’ sub-model (including notes in red) is given below in order to give the reader an understanding of the modelling language required in Netlogo:

```
to consider-opinions ; proxy social network used if you have had contact with a radical
  set network-attitude (mean [av-visitor-attitude] of houses-here)
  if attitude > initial-attitude ; only happens if you have had contact with a radical
  [if random-float 1.0 <= 0.5 ; attachment term so that in 50% of cases you will take into
consideration the opinions of your social network
    [if (attitude - 2) >= network-attitude
     [set last-encounter 1440] ; deradicalise now if your attitude is much higher than that of your
social network (since deradicalisation happens if last-encounter reaches 1440)
    if (attitude + 2) <= network-attitude
     [set last-encounter 0] ; deradicalise further in the future if your attitude is much lower than
that of your social network (reset last-encounter to 0 so deradicalisation happens later)
    ]
  ]
 end
```

This procedure is intended to mimic the role of a social network and the effect of that network upon the potential attitude change of an agent. While it is possible to model complex social networks based upon frequency of contact, similarity and homophily, such complexity was not incorporated into this model as the exposure of an individual to radicalising settings was not the main focus. Nevertheless, a measure of the influence of a social network was deemed necessary and therefore a proxy measure was introduced. Within the ‘consider-opinions’ procedure, agents are asked to use other members of their home location as their social network, mimicking a family or friendship unit. While this is not a perfect measure, it is intended to be indicative of the effect of salient others upon one’s opinion. The mechanism by which the effect of the attitude of a social network would alter an individual’s own attitude is by attachment – if the individual has a strong attachment to their social network, they are more likely to be influenced by their attitudes (Sageman 2004). Therefore an attachment term has been introduced, by which in only 50% of cases is an agent affected by their social network. There is no empirical basis for this percentage, and in the future a large-scale study on the attachment of individuals to their social networks would be needed in order for a realistic parameter. If an agent meets the attachment threshold, they then calculate whether their attitude is significantly higher or lower than the average attitude of their social network (+ or – 2 or more). If their attitude is significantly higher, they are set to deradicalise immediately by the amount that they radicalised. If their attitude is significantly lower, they are set to deradicalise more slowly (the amount of time steps needed before deradicalisation is reset to zero).

5.3 Calibrating the parameters from the existing literature

The literature reviewed in chapters 2, 3 and 4 informed the selection of parameters to be used within the model. While much of the data on radicalisation is qualitative, rather than quantitative in nature, it is still possible to use it to inform the values chosen, and the distributions from which they will be sampled. It is equally possible to draw from the literature on ABMs and criminology where appropriate in order to calibrate parameters. Table 7 details the parameters and their chosen values, while the text that follows describes them in more detail.

Table 7: Parameters upon model initialisation

Parameter name	Parameter value(s)	Data provenance
Number of houses	165	None
Number of buildings	6 office blocks, 2 parks, 2 shops, 2 pubs, 1 café, 1 internet café, 1 mosque, 1 church	None
Number of radicals	1% of population	Birks et al 2012
Number of non-radicals	500	None
Age	15 + random 50 (uniformly distributed)	Social norm
Gender	50% male, 50% female	Census 2011
Number of Muslims	20%	None
Number of Christians	55%	None
Number of non-religious	25%	Census 2011
Unemployment rate	40% for under 25s, 30% for over 25s	Office for National Statistics 2014
Buildings not attended by Muslims	Pub, Church	Social norm
Buildings not attended by Christians	Mosque	Social norm
Maximum places to visit before returning home	3	Groff 2007a; 2008
Time spent in locations (remain)	Home up to whole day, work 8 hours, recreation average 111 mins*	TFL 2011

Chance of unemployed leaving house at 8am	14%	TFL 2011
Chance of unemployed not leaving house	25%	TFL 2011
Chance of selecting home after work	67%	TFL 2011
Chance of pre-rad selecting rad home	50%	None
Chance of encounter at location	1/number of people at location	None
Attitude level radicals	20	None
Initial attitude	Age 16-19 random poisson 4 Age 20-24 random poisson 3.4 Age 25+ random poisson 2.8	Citizenship survey 2009 (see below)
Individual vulnerability	Random poisson 5	None
Amount of attitude increase upon meeting	IV/4	None
Social network attachment measure	50%	None
Time to deradicalise	1440 ticks (if attitude < 16) or 4320 ticks (if attitude >=16) or overnight if social network demands	None
Tolerance to deradicalise faster/slower	If social network attitude is -2 or +2 of individual attitude	None
Amount of attitude decrease on deradicalisation	IV/4	None
Level of Social Organisation (global)	0-10	None
Level of Collective Efficacy (global)	0-10	None

Notice level	+2 to -2 of Social Organisation (uniformly distributed)	None
Report level	+2 to-2 of Collective Efficacy (uniformly distributed)	None
Level of monitoring for target attractiveness	Unknown	
Chance of leaving model upon relocation	5%	None

*depending upon purpose of trip

The number of non-radical agents is set to 500 to represent either a small area of a city or part of a town. The number of radical agents is set to 1% of the population (this can be varied if necessary), as Birks, Townsley and Stewart (2012) use this percentage within their model to represent the criminal population. There are no data available about the number of individuals actively attempting to radicalise others within the population, which is why the criminal population is used instead. The number of houses and different buildings is again merely a representation of the facilities within one part of a town or city. The age of the agents within the model is between 15 and 65 to represent the working age of the UK population, with 50% male and 50% female agents as the census suggests.

For this model, the population are set to be either Muslim, Christian or of no-religion, with 20% of the agents within the model being Muslim, 25% having no religion (this figure is from the 2011 UK census) and the rest being Christian. This is for simplicity, and these percentages could again be varied to represent a more strongly Muslim or Christian area of the UK if necessary. The employment rate is based upon data from the Office of National Statistics (ONS) concerning the percentage of economically active adults in the UK population, while the slightly higher level of youth unemployment also reflects these statistics. The types of buildings which Muslims (pubs, church) and Christians (mosque) will not go to are based upon commonly known religious sensitivities.

Rather than allocate the agents totally fixed activity nodes and restricting their movement to journeys to and from only these, as seen in section 4.5, it was decided that assigning them a home location and a work location (if employed) and then allowing them free movement between leisure locations (within the realm of religious sensitivities) would be sensible. This builds upon the foundation of the use of activity spaces by Groff (2007a, 2008) and develops it by adding movement according to religion. It may be that in subsequent models this is developed further. In this model, agents have a maximum of 3 different locations to visit before returning home, but their chance of returning straight home after visiting one location varies by location, with most trips taken involving only a single location. Agents have a 67% chance of returning home after work (TFL 2011), while pre-radical agents have a 50% chance of selecting a radical's home location to reflect the extra amount of time they would spend in their presence once they had been exposed to the narrative several times and were trusted by them. The relatively low percentage of unemployed people leaving the home at the same time as employed people (14%) was designed to reflect those who may be, for example, dropping children off at school (referred to as escort activities by TFL), while 25% of unemployed people would not leave the house at all per day (TFL 2011).

Transport for London's 2011 survey also provides data on the time of day that journeys with specific purposes are typically taken. These data motivate the choice of time that agents leave their homes; employed agents leave their house at 8am while the majority of unemployed agents leave later. It is also possible to vary the time spent at locations depending upon the purpose of the trip. The TFL data suggest that 50% of recreation activities are for shopping with a mean time of 91 minutes, while 36% of recreation activities are for leisure activities with a mean of 167 minutes, and 14% are for escort activities lasting an average of 39 minutes. Using these data it is possible to produce a typical profile of agent movement. It is also possible to introduce a level of stochasticity since not all journeys occur at the same time each day or endure for the same length of time. The precise times that journeys begin or activities continue at a location are sampled from a normal distribution with the values discussed used as their means. One more variable within the model that influences agent movement is whether it is a weekday or weekend. For simplicity, all employed agents attend work on a weekday, with weekends dedicated to leisure activities. Empirical data are again used to inform parameter calibration. In particular, the TFL data suggest that 22.7% of people do not leave their home at all during a weekend day (TFL 2011), while the time people leave the home varies and the activities will correspond to this.

People do not interact with every other individual present at a location. The number of people they interact with, and the likelihood of interacting with a specific individual, will depend on many factors. In the absence of empirical data on encounter rates, the chance of meeting and interacting with a radical in a building is set to the reciprocal of the number of agents in the building. This may be too high in certain buildings (where there are few other agents), but not high enough in others (where there are many other agents), but it seems to be a reasonable heuristic that will hopefully even out over the running of the model. In future research, this chance (of encounter) could be calibrated to vary depending on the building type and/or other factors.

The initial attitude level of radicals is set to 20 (the maximum) and does not vary over the course of the simulation, while an originally non-radical agent is considered to have been converted if their attitude reaches the same level. A pre-radical is defined as an agent whose attitude is 16 or more, and they change their 'select-target' procedure accordingly, looking to spend more time with radical agents. The level of initial attitude allocated to non-radical agents at the start of the model is drawn (randomly) from a Poisson distribution (with mean 2.8 to 4 depending upon the agent's age), to reflect the fact that the vast majority of people would be skewed towards non-radical views while a small percentage of the population would indeed sympathise with such ideologies. The distribution is varied by age as polls suggest that

while 85% of those aged 25 and over would always reject violent extremism as a protest, this falls to 75% for those aged 20-24 and 62% for those aged 16-19 (Citizenship Survey 2009). The level of individual vulnerability is drawn (randomly) from a Poisson distribution (mean 5), though there is no evidence to suggest levels of this vulnerability within the general population and a large-scale study would be required to estimate this parameter accurately.

The amount that an agent's attitude increases upon contact with a radical is based upon the level of individual vulnerability an agent possesses – higher levels of individual vulnerability lead to quicker radicalisation. Specifically, an agent's attitude increases by one quarter of their level of vulnerability upon each contact with a radical. They deradicalise by the same amount if they have not had contact with a radical agent within the past day, or overnight if the 'consider-opinions' procedure demands so. This reflects the need for frequent and sustained exposure to the radicalising narrative in order for radicalisation to occur. In the case of pre-radical agents, the time required without contact with a radical in order for deradicalisation to occur increases to 3 days.

The level of social organisation and collective efficacy each varies from 0 to 10 within the model, and is controlled by a slider. These are global variables which impact upon the non-radical agents: the parameter 'notice' is a proxy for social organisation in the model, while the parameter 'report' is a proxy for collective efficacy. Varying the levels of social organisation and collective efficacy allows different communities to be simulated and experiments to be run to assess their impact upon the emergence of radicalising settings. In order to introduce a level of bounded rationality, agents 'sense' these levels of social organisation and collective efficacy and set their own levels of 'notice' and 'report' respectively to up to a value of 2 higher or 2 lower than the slider. In his model, Malleson (2010) uses a particular urban area which allows certain socio-demographic and communal statistics, taken from the UK census, to contribute towards a realistic measurement of collective efficacy. However, in his model collective efficacy is an area level attribute and no actual mechanism of collective action is simulated.

In the current model, the mechanisms through which collective efficacy are assumed to operate are modelled explicitly. That is, agents contribute directly to dynamic levels of collective efficacy at a location and other agents 'perceive' this, with radical agents setting their target accordingly. This requires that agents – rather than areas – are allocated characteristics and collective efficacy *within* a setting emerges. For example, while the agent-level parameters 'notice' and 'report' are linked to the slider levels of social organisation and collective efficacy in the model, they are still stochastic in that the agents' levels can be above or below these sliders. This could mean that all the agents within a setting at a certain time may have levels below the slider input, or indeed they may all be above. The average level

emerging from the setting is then perceived by the radical agent and informs their decision as to whether or not to target that setting at that time. This is a simplistic representation of collective efficacy, and a much more complex representation would be necessary if the dynamics of collective efficacy or social organisation were to be mapped fully. Johnson and Groff (2014) have begun to lay out what would be required for social disorganisation theory (including measures of collective efficacy) to be thoroughly tested using agent-based modelling, but that is not the purpose of this model. The outcomes of this model are therefore based upon the way in which collective efficacy is represented here; there will be many other ways in which it could be represented in other research. Nevertheless, this model goes further than existing models by Malleson and colleagues in representing some of the explicit mechanisms of social organisation and collective efficacy at the agent level. Census data cannot be used for such calibration. Moreover, the abstract nature of our model requires that measurements of social disorganisation and collective efficacy are equally abstract, hence the scale used. Due to the relationship between the calculation of the level of monitoring in a building and the target selection, it is not possible to set the level of target attractiveness without discovering more about how a radical would select a setting and what would prevent them from doing so. This is one of many parameters in the model which either cannot be determined, or has been set without reference to empirical data. This highlights the need for new qualitative research with (former) radicals to answer these and other questions. For this research, reported in chapters 6 and 7, it was crucial to create an interview schedule based around the requirements of the IVEE model, and to not rely upon existing (secondary) interview data which often fails to gain data on important ecological processes and mechanisms.

5.4 Remaining modelling requirements and potential future research avenues

As discussed, one of the strengths of agent-based modelling is the requirement that the mechanisms and concepts of the theories used within the models are specified explicitly in order to create models of agent behaviour. As predicted, the process of creating the model of radicalisation has required the theory used (IVEE) to be stated in such a way that deficiencies in our knowledge of data required to parameterise the theory have been exposed. Table 7 shows the parameters needed to initialise the model, and the data provenance column shows how far we have to come in order to fill in those gaps in knowledge. While some parameters, such as the number of houses, buildings or agents, do not require specific empirical data as this is not a facsimile model, others are vital if we are to improve the model. In order to populate the model of radicalisation with more empirically sound parameters, further steps must be taken to discover as much of this information as possible. Such information will inform

understanding of radicalisation more generally and hence this chapter serves to illustrate how the steps involved in agent based modelling not only complement but can inform research that adopts other more traditional research methods (Tubaro and Casilli 2010).

In the text that follows, consideration is given to the ideal *requirements* for the model with its focus upon the emergence of radicalising settings. This is accompanied by an outline of what would be *desirable* if a more realistic and detailed, interactive model of individual vulnerability, exposure and emergence were to be created in the future. These requirements informed the construction of an interview schedule (see chapters 6 and 7) that was subsequently created and used with those who have undergone the radicalisation process, or who have worked to deradicalise others and have professional experience in the area (see Chapter 6). The details of the model which are deemed desirable but not an immediate requirement are not addressed within this body of research, but would form the basis of further work into this area in the future.

5.4.1 Individual Vulnerability

Currently this is a number assigned to agents. It is drawn from a Poisson distribution with mean 5, with its effect solely influencing the amount by which a non-radical agent's attitude increases upon contact with a radical agent. However, in order to create a more realistic representation of individual vulnerability within non-radical agents, there are certain things which are necessary to consider. Potential differences in the level of individual vulnerability as a factor of the age of the agents could be included. For example, those under the age of approximately 25 may have a higher level, especially if they are in a situation of increased agency as would be associated with attending university or college, or living apart from their parents. It will be important to assess the number of young people involved in the deradicalisation programmes that interview participants run, as well as the role of youth in their own process of radicalisation where appropriate. Such things could be factored into the model with census data about levels of higher education and the proportion of people aged 16-25 at college or university, for example. Census data could also be used to show household composition to indicate how many young people are still living at home with parents compared to those living alone or in friendship groups.

A measurement of moral vulnerability could be introduced to model the agent's strength of attachment to a conventional moral narrative which would disagree with terrorism. This could be a measure of attachment to, or knowledge about, a religion, with those having this being less likely to be vulnerable. This could also be made even more complex, taking into account the narrative in the model and whether it uses or manipulates any of the agents' religious

narratives (potentially leaving Muslims more susceptible to Al-Qa'ida-inspired narratives for example). It will be important to discover in the interviews whether levels of religiosity appear to have played a part in the radicalisation process, either through creating immunity to the narrative, or indeed increasing vulnerability and exposure. While data indicating such attachments or knowledge about a religion would be more difficult to obtain, census data about religious affiliation could be used alongside attendance figures for places of religious worship in certain areas and polls conducted about belief systems held by individuals.

In future models, a more complex representation of the support network of an individual could be modelled to simulate how this might affect their individual vulnerability, including such things as being new to an area through migration or education activities. Traumatic events such as bereavements, family separations and divorce leading to a narrowing of the support network and possibly to physical movement and exposure to new environments could be added to the model and given weightings in order to affect the individual, and these could even be introduced throughout the model at different times to assess their effects upon the agent.

5.4.2 Exposure

The targeting strategies used by radical agents for both the people they try to radicalise and the settings in which they try to do it need to be better understood and modelled. This requires gaining knowledge about whether there are particular 'kinds' of people that they target, whether this be personality types, those with particular socio-demographic characteristics or whether other strategies are used to identify 'high-value' targets. Equally, knowledge of the kind of setting that radicals would target in order to spread their narrative is needed. While it is known that increasingly private settings are favoured due to a greater public awareness of radicalising activity and narratives, the first contact would still need to be made with an individual and this will presumably almost always be in a public or semi-public space. After the initial meeting (or indeed meetings), a more private space is preferred, but it would also be key to note how long it typically takes for radicalising activity to move from this public space to a private one, and any difference in the activities of radical agents in these places. The increase in trust between the radicalising agent and non-radical individual must also be discovered and modelled, and these kinds of information will not be available in any format other than by direct interviews with former radicalising agents who can inform us as to their strategies. Such interviews form the basis of chapters 6 and 7 below.

The incorporation of realistic social networks within the model would be required in future models focussing upon the exposure of individuals to radicalising settings. While the current

measure of social networks and the attachment term within the model is sufficient for what is necessary within this thesis, a more complex network would be required that focuses not only upon household attachment but has a measurement of family and friendship ties, with variable influence between them depending upon a number of factors. The influence of peer groups in younger agents would be pronounced, and a measure of more frequent interaction with certain agents within the social network could be incorporated to show close friendship ties. The impact of siblings or parents who have been, or are being, radicalised could be modelled more effectively with the associated attachment parameter included. Social network calculations are included in a variety of agent-based models which are not related to radicalisation, showing the number of linkages, the influence of these linkages upon a person's opinions by using various weightings, and allowing these linkages to strengthen, weaken or even disappear altogether over time in order to mimic real friendships.

Within the model outlined in this chapter, the radical agents included are assumed to be good at their role, which is to convince others about their particular narrative. In order to create a more realistic configuration of the exposure element of the radicalisation process in future models, various alterations would need to be implemented. While the existence of radical agents in the model would need to remain, they could enter and leave the model at different times and their numbers could vary. Their levels of persuasiveness could also vary between agents, as it is known that not all purveyors of the radicalising narrative are equally successful at gaining followers. The persuasiveness of the narrative itself could also be variable, as again not all narratives are as successful, but for the purpose of the model here it is again presumed that the content of the narrative is persuasive enough for the non-radical agents to adopt it. Such complexity would certainly strengthen any model with a focus upon the exposure of agents to the radicalising setting.

5.4.3 Emergence

The emergence of radicalising settings is influenced by the level of monitoring within that setting, and the morality of the people present. Therefore in order to model factors which affect the emergence of radicalising settings, it will be important to focus upon things which affect either the monitoring in the setting or the morality of those in attendance. For simplicity, the collective morality within a setting in the model is calculated by assessing the attitude of those in the setting towards the narrative – the closer the attitude of those within the setting to the radicalising narrative, the greater the chance that the radical agent would see the setting as suitable for their activities. In terms of the impact upon the level of monitoring, as discussed above it has been hypothesised that both levels of collective efficacy and social disorganisation will affect this. Therefore, it would be possible to model a known

geographical area and use data which could give realistic measures of these phenomena. For example, data regarding factors such as religious and ethnic heterogeneity within an area, the provision of community activities and facilities, and attitudes towards authority figures including the police and government could be considered.

However, even if it were possible to understand the levels of collective efficacy and social disorganisation within an area, how these levels vary between different networks of people within the same area could also be crucial to the model. Exactly how the levels of monitoring in a setting are implemented is equally important to understand, as the focus here is not upon 'hard' monitoring such as CCTV and police presence, but upon 'soft' monitoring of the people within the setting. While it may be possible, and indeed necessary, to incorporate 'guardian' agents within the model who would monitor the setting whenever present and report the presence of radicalising agents and activities to the authorities (or others present within the setting), without such agents the model should still be able to function and represent the radicalising process. Therefore we would need to understand how monitoring worked within the setting, and the impacts of differing levels of collective efficacy and social disorganisation within an area upon this monitoring. These are difficult concepts to model and even more difficult to obtain data for, and hence we may have to rely upon the knowledge of those who have either conducted radicalising activities within different areas, or those who work to prevent the emergence of radicalising settings and to eradicate those which do exist. With this in mind, in-depth interviews were conducted (see Chapter 6) with participants who have worked in different geographical areas so that we can begin to understand the processes at work and draw comparisons where possible between varying contexts and mechanisms where they appear.

These in-depth interviews and their outcomes are described in Chapter 6 below. The interviews were based upon not only the IVEE theory, but also upon the remaining modelling requirements which have been elicited within this chapter. In that way the building of the agent based model within Chapter 5 has informed the interview schedule, the results of which will be used to inform model development in Chapter 8, and hence theory refinement. This allows us to marry the agent based modelling and qualitative approaches taken in the following two chapters in order to best meet the requirements for the rest of this thesis.

6. A qualitative investigation of the role of individual vulnerability, exposure and emergence factors in radicalisation and de-radicalisation processes

The process of building the ABM of IVEE starkly highlighted the need for more information to refine the theory, to establish the parameters of the model, and to effectively conceptualise some of the causal factors hypothesised to be involved. As IVEE is a newly-developed framework, this thesis is among the first attempts at empirical validation. As previously discussed, many of the concepts articulated within IVEE, especially those relating to emergence, have received little attention from radicalisation researchers and have rarely been included in interview protocols. To address the areas in which the model was underdeveloped and past research has been uninformative, interviews with former radicals or deradicalisation professionals were carried to try to elicit further data.

The rest of this chapter describes the framework around which the interview schedule was created and analysed, the recruitment and demographics of participants, and various issues of ethical concern. An analysis of the interviews with regard to IVEE and the radicalisation and de-radicalisation processes is then presented, with the analysis split into the tripartite framework of IVEE. Chapter 7 then goes on to discuss deradicalisation and counter-radicalisation as concepts, programmes which fall under these remits nationally and internationally, and present the results of the interviews with regard to de-radicalisation and counter-radicalisation programmes of which the interviewees had experience.

6.1. Rationale for qualitative work

Historically, research on terrorism and radicalisation has often relied upon interviews with current or former members of terrorist or extremist organisations for data collection (Alonso 2006, Bloom 2005, Horgan 2009, Merari et al 2009). Interviews allow for an in-depth exploration of the life and behaviours of individuals, generating insight into their emotions, motivations, and even the dynamics of the groups in which they may have been involved (Horgan 2009, 2012). It is rare for this methodological approach to involve an objectively large number of interviews, due in no small part to the difficulty associated with gaining access to participants. Nevertheless, interviews remain the methodology of choice for those researchers who seek to ask, and have answered, in-depth questions about individuals who have had experience of being part of an extremist group. This is for a number of reasons: the restricted pool of potential subjects, as well as confidentiality and security issues, means that focus groups with multiple participants are impractical. The often illegal nature of the actions carried

out by former or current radicals or terrorists also means that they may not be willing to discuss these unless in a confidential, one-on-one setting. In the present case, the author expected that interviewees could provide (confidential) case studies of others who they had been in contact with, which would be more likely to occur in a one-on-one interview setting (as opposed to, for example, a focus group setting). Surveys and questionnaires are other potential (semi-) qualitative methodologies which could be utilised, but these methods would have been unlikely to elicit the kind of the in-depth information which was sought. The author also anticipated the need to assess the nature of the participants' answers and immediately follow up on these answers for clarification.

Prior research in the field of terrorism studies has made use of interviews with current or former terrorists or their families, despite the difficulties in gaining access to participants. Post, Sprinzak and Denny (2003) interviewed 35 terrorists in prison in the Middle East, 21 of which were Islamist and 14 secular, in an attempt to understand their decision-making, psychology, and propensity for using weapons of mass destruction. Merari (2010) has conducted extensive interviews with individuals linked to terrorist activity in the Middle East, including the families of 36 Palestinian suicide bombers, 14 regional commanders of Palestinian militant groups, and perhaps most interestingly, with 15 attempted suicide bombers whom he contrasted with 12 other terrorists imprisoned for non-suicide-bombing related offences which he used as a control group. Bloom (2005) conducted extensive fieldwork around the globe for her research on female suicide bombers, giving insight into their backgrounds, motivations and actions.

Moving away from a focus on suicide terrorism, Horgan (2009) looked at disengagement from radical and extremist movements using in-depth case studies of 6 individuals based on interviews with them. Looking at individuals with extremist views but who have not committed violence, Bartlett, Birdwell and King (2010) conducted in-depth interviews with 20 radicals in the UK and Canada in order to try and understand differences between non-violent extremists and those who go on to commit terrorist acts. The importance of conducting interviews with terrorists or extremists is highlighted by Horgan (2012), who also raises the concern that the majority of research within the area of terrorism studies is still not based on such research methods.

Those interviews which use a theoretical framework to design and organise their questions, and analyse their results, are, however, in the minority, making the present research unusual in its theoretical and, to some extent, hypothesis-driven approach. Many interview-based studies are designed to be analysed using a grounded theory approach, in which the researcher looks to create or develop a theory from the information they receive from the interviewees. However, the nature of the interviews conducted in this thesis is such that they

are for the specific purpose of informing the ABM which was initially created in Chapter 5, and finalised in Chapter 8. This meant that it was logical to devise the interview schedule, and organise the analysis of the results, using IVEE as an organising framework, rather than a more traditional, exploratory approach. One example of a similar theory-driven approach to conducting interviews for research on criminal behaviour is that of Jacques and Wright (2011), who studied the effect of informal control on the illicit drug trade in St Louise, Missouri and Atlanta, Georgia (USA). They used the rational choice and opportunity perspectives to frame their interview schedule and analyse their results, in a similar way that IVEE is used here.

6.2 Methodology

6.2.1 Recruitment of participants

Finding former radicals or terrorists who are willing to speak about their experiences can be difficult – there are not many of them and those that are available do not always wish to recount their experiences (Speckhard 2009). Combine this with some researchers' apparent reluctance to interview participants on ideological or moral grounds and we are left with a field which, while increasingly empirically driven, is lacking data (Horgan 2012). Nevertheless, research with such participants is possible, and is arguably necessary if we are to develop an understanding of the processes that drive people to join, and indeed leave, extremist groups (ibid), or develop the propensity for committing terrorist acts. With such hard-to-reach groups, reliance on gatekeepers is often required to gain access, raising ethical and sampling issues (Berg and Lune 2014, Horgan 2012). Gatekeepers may facilitate access only to members of the community that they wish to be spoken to, preventing others from speaking, and there is no guarantee of a sample which is representative of the community as a whole.

Eighteen months were spent identifying participants and arranging interviews. A network of former violent extremists who work on deradicalisation and counter-radicalisation programmes was accessed. The network cannot be named due to the possibility of being able to identify the participants within this research, but the network had approximately 200 members at the time that self-identified as former extremists. The director of this network contacted some of those he thought would be willing to participate in this study, but it was not possible due to a variety of reasons to gain a random or even representative sample of the network members; they were spread around the world, meaning that there would be logistical problems in accessing them, and not all members were active within the network or willing to speak to researchers. Snowball sampling, a technique commonly employed in ethnographic research (Berg and Lune 2014, Bryman 2012), was subsequently employed, and some participants recommended other former extremists or deradicalisation professionals who

were willing to participate. Three additional participants were recruited through prior professional contact networks. Although participants were no longer part of terrorist or extremist organisations, and worked to combat radicalisation within their local and wider communities, they were not always overt in their activities. Some of them worked for government-funded de-radicalisation programmes and information as to their identities and activities was not available in the public domain. While the sampling approach was constrained by practical difficulties, it means that the results of the interviews are not representative of the wider study population, and indeed no claims to generalisability are made here.

6.2.1.1 Interviewees

A total of 11 individuals were interviewed. Table 8 provides a brief description of each interviewee.

Table 8: Characteristics of interviewees

Interviewee number	Gender	Location	Former ideology and time in radical organisation	Professional experience (including number of years if known)
1	Male	Milwaukee, USA	Neo-nazi (7 years)	Runs de-radicalisation, counter-radicalisation* and anti-racism programmes for vulnerable youths in the city (5 years)
2	Male	Milwaukee, USA	Hispanic gang (18 years)	Runs reintegration programmes for violent offenders released from prison back into the community
3	Male	Chicago, USA	Neo-nazi (7 years)	Runs de-radicalisation, counter-radicalisation and anti-racism programmes for youths and adults across the USA (5 years)
4	Male	Birmingham, UK	N/A	Runs de-radicalisation, counter-radicalisation and anti-racism programmes for vulnerable youths across the UK (27 years)
5	Male	East London, UK	N/A	Runs de-radicalisation programmes within the local area (4 years)
6	Male	Toronto, Canada	Islamist (10 years)	Runs de-radicalisation and counter-radicalisation programmes for vulnerable youths in the city

7	Male	Midlands, UK	N/A	Runs de-radicalisation programmes within the local area (5 years)
8	Male	Midlands, UK	Islamist (8 years)	Works on de-radicalisation programmes within the UK (4 years)
9	Male	Vancouver, Canada	Neo-nazi (7 years)	Runs de-radicalisation, counter-radicalisation and anti-racism programmes for youths and adults internationally (5 years)
10	Female	East London, UK	N/A	Works on de-radicalisation programmes within the local area (2 years)
11	Female	West London, UK	Islamist (4 years)	Runs de-radicalisation, counter-radicalisation and anti-racism programmes for youths and adults within London (7 years)

*These are defined in Chapter 7

6.2.1.2 Ethics

All participants were given an information sheet with a detailed description of the study and its aims, and signed informed consent forms and confidentiality agreements so that they were aware that they could withdraw their data at any time. The interviews were all conducted by the author of this thesis at a time and place of the interviewee’s choosing, as long as that place was considered appropriate by the researcher. Interviews were recorded by Dictaphone with the interviewee's informed consent, with the media files then immediately transferred to a laptop where they were encrypted. All data were anonymised and stored at a secure location. The interviews were transcribed verbatim by the interviewer after completion, and only the author of this thesis had access to the transcripts at any point in time. Interviewees were assigned a number by which they were identified throughout the analysis in this and the following chapters.

Other potential ethical issues arising from the interviews themselves included researcher safety, which was mitigated by ensuring that interviews were conducted either in public places or in professional office spaces from which the interviewees worked. Although none of the participants in this study were current offenders, seven of them were former extremists so it was possible that information of an illegal nature would be revealed about actions which they had conducted but possibly not been prosecuted for. However, it was not expected that any information about current or premeditated future offending would be revealed. Relating to confidentiality once more, it was hoped that interviewees could give anonymous information

on participants in their counter-radicalisation or deradicalisation programmes, but it was possible that this would include juveniles and vulnerable adults. Given this, every effort was made so that any information given by interviewees about others was fully anonymised, in both the transcriptions of the interviews and the analysis of the results. Finally, the interviewees were asked to recount details of their lives which may have proven traumatic for them, but the interviewer was aware of this and ended any lines of questioning which interviewees appeared to be emotionally uncomfortable with.

6.2.2 Interview protocol

A semi-structured interview protocol was designed (see Appendix 2), which included questions formulated to reflect the core explanatory components of IVEE. It is possible to conduct fully structured and unstructured interviews, both of which have their advantages, but in this case it was decided that semi-structured interviews allowed interviewees the freedom to express themselves and explore parallel areas of interest, and the interviewer the flexibility to follow up on any answers which were relevant, going into greater detail. Structured interviews would not allow this flexibility, while unstructured interviews would not allow the interviewer to maintain the consistency of interview questions based around the IVEE framework. The interview protocol was extensive, so as to cover all the possible areas to which interviewees could possibly contribute, though it was anticipated that participants would not be able to address all categories of questions in equal depth. The protocol was broken down into four sections: questions about the radicalisation process of the interviewee (if they were a former radical); questions about the deradicalisation process of the interviewee (if they were a former radical); questions about the involvement of the interviewee in de/counter-radicalisation programmes; questions about the radicalisation process of vulnerable individuals the interviewees had worked with. This structure was devised to allow the interviewees to discuss themselves as well as any individuals they had knowledge of in some detail. Interviewees were encouraged to provide as much information as possible, including case studies of either their own actions or those of others they have worked with in a professional capacity. The interviews lasted between one and three hours, depending upon the number of sections to which the interviewee could provide answers to, and the amount of information they offered.

The interview's semi-structured protocol incorporated questions about the factors hypothesised to affect the radicalisation process, as discussed in Chapter 2:

Factors and indicators related to individual vulnerability

1. Individual agency
2. Parental monitoring
3. Changes in lifestyle or interaction with new environments (school, university, job, migration etc.)
4. Morality (i.e. commitment to a moral framework or lack thereof)
5. Cognitive vulnerability (i.e. executive functioning, decision-making, mental health)
6. Cognitive vulnerability (i.e. adaptability and flexibility)
7. Social ties
8. Support system (e.g. family or friends, functional and dysfunctional relationships)
9. Personal preferences (e.g. avoiding places due to previous experiences of discrimination)

Factors and indicators related to exposure to radicalising settings

10. Level of monitoring in settings (i.e. guardianship)
11. Socio-demographics affecting likelihood of social selection into radicalisation settings (e.g. race, religion, age, social networks)
12. Social selection, with reference to existing social ties with someone who is radicalised
13. Personal preferences which encourage self-selection into radicalising settings (e.g. piety, thrill-seeking, musical tastes)
14. Attachment to radicalising agents
15. Exposure to radicalising narratives

Factors and indicators related to the emergence of radicalising settings

16. Levels of collective efficacy, with reference to community members' willingness to intervene and police others
17. Collective efficacy, with reference to the community's relationship with formal authorities
18. Collective efficacy, with reference to the imposition of moral norms by community members
19. Social disorganisation, with reference to the presence of community groups and areas
20. Social disorganisation, with reference to ethnic heterogeneity and religious heterogeneity in the area
21. Social disorganisation, with reference to residential segregation

22. Social disorganisation, with reference to residential instability
23. Social disorganisation, with reference to visible signs of crime and delinquency in the community
24. Generational dynamics (e.g. intergenerational tensions affecting communication with parents or elders)
25. Socio-political climate (e.g. perception of the local and national political climate)
26. Media (e.g. role of the internet and social media)

It was hypothesised that many, if not all, of the above factors would play a part in the radicalisation process of the individuals discussed by the interviewees. It was also hypothesised that the deradicalisation process, or resilience to the radicalisation process, would be related to the absence of these factors and indicators. For example, it could be hypothesised that increasing levels of collective efficacy while lowering levels of social disorganisation in an area would be beneficial for deradicalisation efforts – allowing for the willingness of the community to promote prosocial moral norms, which oppose terrorism.

A fourth section addressed the deradicalisation or counter-radicalisation programmes of which the interviewees may have had professional knowledge, in order to get a sense of what is involved in some of these programmes; what the interviewees perceive 'works', with reference to particular cultural and geographical contexts; and to draw upon the interviewees' years of experiences of what they believe works and what does not in general when attempting to deradicalise an individual.

6.2.3 Coding system in NVivo

The coding of qualitative research varies significantly depending upon the approach taken by the researcher. In the case of grounded theory, coding categories may emerge from the research itself, with the researcher noting any common or interesting themes and then coding and potentially recoding the data (Bryman 2012). In the present case, coding categories were created from the theory guiding the research. To some extent, qualitative coding is always researcher-specific – another researcher may not fully agree with the categories created, the contents of that category or indeed the coding itself, but this is why qualitative research analysis is unique. It is highly unlikely that two researchers would have exactly the same findings from the same set of data, nor did the circumstances of the research (i.e. time available; financial resources; data confidentiality) allow for coding by multiple individuals to establish agreement. Nevertheless, by using pre-created codes based upon a systematic theory, the process was designed to be as rigorous as possible.

The qualitative data analysis programme NVivo was used to code and analyse the interview transcripts. Coding categories were created to match the categories of factors and indicators listed in section 6.2.1, as well as for the questions based on deradicalisation and counter-radicalisation programmes (the full interview schedule can be found in appendix 2). The questions covered details of the interviewees' participation in the programmes, the programmes' contents and aims, and some specific questions about the UK deradicalisation programme Channel if interviewees had any professional knowledge of it, and the coding categories were created through thematic analysis of the interviewees' answers.

Each coding category was then analysed, with common themes drawn out, any outliers or unexpected results highlighted, and case studies of interest noted. The categories were then allocated to the tripartite categories of the model so that the bigger picture surrounding individual vulnerability, exposure, and emergence respectively could be teased out. This analysis forms the basis of the rest of this chapter, while the analysis of the deradicalisation and counter-radicalisation programmes forms the basis of Chapter 7.

6.3 Results

In order to present the results of this analysis along theoretical grounds, findings are organised according to the theory's tripartite structure, looking for evidence of congruence or incongruence with the theory's assumptions and premises. Likewise, findings are presented which show congruence or incongruence with IVEE's prediction regarding those factors and indicators involved in the process of deradicalisation, once again using the tripartite structure of the IVEE model as an organising framework. Within each section, the possible mechanisms at work are presented and discussed.

6.3.1 IV in the context of radicalisation

6.3.1.1 Moral vulnerability

The weak, or complete lack of, commitment to a conventional moral framework (that which rejects violence), or indeed the commitment to an unconventional moral framework which accepts violence, is a theme which appeared in all of the interviews conducted. The role of religion as that moral framework was highlighted by all participants, with interviewees talking about a lack of a religious upbringing or a lack of understanding or practice of that religion leaving individuals vulnerable to the radicalising narrative. Interviewee 7 put forward a profile of individuals who may be vulnerable to the advances of a radicalising agent:

'if it's somebody from the local mosque who's from a relatively low educational background, just knows what Islam is to him but can't quote the hadiths and the Qu'ran and can't quote various passages and evidences of scholars and all that sort of thing, then they're a piece of putty in the hands of somebody'

In his experience of working with individuals at risk of radicalisation, he also noted that *'somebody who's brought up in a strong Muslim environment, a strong theological Muslim environment, we've not had too many at all'*. These notions that a lack of knowledge of the religion as a moral framework can lead to vulnerability, but equally that a greater knowledge of it can act as a protective factor, were echoed by interviewee 8, who noted that when working with vulnerable individuals:

'there were one or two individuals that were brought up fairly orthodox, but I guess that's rare. On the whole they usually had a secular Muslim framework or a non-imposing religious framework. On the whole I would say that the majority haven't had religious instruction'

On the role of religious instruction as a protective factor, he explained that *'wherever there was strong, English speaking, well versed Muslim clerics, even if they're from Deobandi background, HT [Hizb ut-Tahrir] weren't strong'*. The implication that the more accessible religious instruction given in the native language, alongside the knowledge of the cleric themselves, led to resilience amongst the Muslim community is worth noting.

The idea of seeking the true meaning of religion later on in life, often after an upbringing which did not involve a heavy emphasis on religious education, was one factor which was highlighted as contributing to ultimately leading individuals to be exposed to a radicalising narrative in various settings. For example, not being raised with this strong moral framework led individuals to seek it according to interviewee 5: *'They were looking for the true meaning of Islam, which they believed their parents didn't have'*. Interviewee 8 echoed this sentiment, giving the example of his own experience: *'I was sort of exploring learning more about my religion in general'*, while interviewee 11 noted that one of the reasons that women were attracted to attending Al Muhajiroon circles was that: *'they would generally want to come and find out about Islam'*.

The experience of multiple conflicting moral frameworks contributing to an individual's vulnerability was something interviewee 6 highlighted when discussing his childhood:

'what I'm looking at is three value systems and where they overlap and where they contradict. The army cadet peer grouping, very security friendly, pro-government etc. A religious culture at home, at the mosque. Friends at high school, hedonistic lifestyles… I didn't know which one I was supposed to belong to, which one makes my self-identity'

Such conflicting frameworks can lead to the framework which is eventually adopted as the *dominant* one being taken to an extreme level in order to compensate for perceived previous failings. Interviewee 6 mentioned that: *'I felt I was such a bad Muslim that I had to become really good just to break even'*.

The lack of imposition of an existing moral framework affected interviewee 3 during his formative years. Discussing his parents' approach to preventing his increasingly disruptive and violent behaviour, he stated that: *'their ethic was more not to face things head on and not to talk about things… most of the time they just ignored it and they closed their eyes and they hoped that everything would turn out ok'*. This unwillingness to tackle the issue meant that when things came to a head and his parents tried to re-impose a state of conventional morality upon him, his reaction was: *'by that point I'd already been of the mental state that 'where have you been up til now, there's no way you're gonna tell me what to do now''*.

In some cases the lack of commitment to a conventional moral framework resulted from exposure and eventual commitment to an unconventional moral framework at an earlier point in the individual's life. This need not be a religiously-inspired morality, as interviewee 2 explained when discussing his childhood. Having suffered abuse at home and leaving home to live on the streets at the age of 11, a life of crime and further violence ensued as he became part of a street gang. The leader of this gang soon exposed the interviewee to a moral framework in which violence was embedded: *'he ended up killing a man and he wanted me to help him do that'*. Such indoctrination to violence on a daily basis ended up leaving the interviewee devoid of conventional morality: *'I had turned off the ability to have empathy for anyone, to have shame, guilt or even self-disgust for what I had done, which are basic deterrents which is what keep a lot of people from doing things'*. Years of violence and multiple incarcerations ensued.

In the case of some of the individuals who were vulnerable to right-wing ideologies, their parents were actually part of such ideological groups and were passing on these moral frameworks to their children. Interviewee 4 noted that in 10-12 of the 80 individuals with whom he had been tasked to intervene: *'you've got people who have literally been radicalised, for want of a better description, by their parents. So I've worked with guys whose dad was in the National Front or C18 and they're just following that'*. One high-profile terrorist case in the UK involved such a situation, with a young man and his father being convicted for right-wing related terrorist offences committed together (The Guardian 2010).

A commitment to unconventional moral frameworks was mentioned by interviewees with regard to Islamist or Al-Qa'ida-inspired narratives. Interviewee 5 gave the example of an 8 year

old child who had been referred to him for an intervention after exclaiming that: *'I think all Christians should be killed… Anyone who touches the Bible should be slain'*. When the child's mother was questioned about whether she had taught him those views, her response was: *'yes, that's what I teach him, that's what I believe'*. The indoctrination of a young child with such beliefs was also reported by interviewee 11, who mentioned that while she was still a member of Al Muhajiroun, she was called into school by her child's teacher who told her that: *'your child came out with something that oh, it's ok to kill non-Muslims'*. Interviewee 10 mentioned manifestations of ultra-orthodox Islamist teachings from youths that she had intervened with, such as: *'women teachers shouldn't teach male kids… they're taught you shouldn't mix with this person or you shouldn't mix with non-Muslims for example'*. While these may be extreme examples of overtly publicised views in young children who are particularly susceptible in their acceptance of such narratives or repetition of things heard from authority and care-giving figures like their parents, the adoption of unconventional moral narratives was something which reverberated throughout all of the interviews. Interviewee 6 mentioned a case of a young man he intervened with who *'would say things like 'well we're allowed to rob the kuffar''*.

In summary, with regards to the relationship between susceptibility to a radicalising moral change and prior commitment, or lack thereof, to a moral framework, the interviews suggest notably that a weak commitment to a conventional moral framework can lead to vulnerability within individuals who lack the information or education to contest challenges to this framework by those who appear more knowledgeable. Seeking more knowledge about these frameworks can lead individuals to stumble across extremist narratives, to which they are susceptible. The interviews also suggest that exposure to multiple moral frameworks can lead to a lack of adherence to any of them or, more worryingly, the extreme adoption of one at the expense of the others. Adherence to an unconventional moral framework was frequently reported by the interviewees, notably among young people. In several cases, the unconventional morality was transmitted by family members, who also adhered to this framework. This finding appeared consistent across ideological and geographical boundaries amongst interviewees.

6.3.1.2 Increased agency

All of the interviewees mentioned the age of those individuals who were vulnerable to radicalisation being from early teens to early twenties. Those who were involved in extremist organisations and activities themselves all began that process at such an age, usually due to an increase in independence that came with that period in their lives. Interviewee 3 notes that: *'I was pretty independent from an early age, I moved out when I was 14'*. The process of leaving

home and gaining more independence from parental influence appeared significant in other cases. Interviewee 2 mentioned that leaving home at the age of 11 led to the need to look after himself, while that independence came for interviewee 9 when he moved abroad to attend a year at boarding school in England. Being without a support system led them to look for one, leaving them vulnerable to the influences of those individuals who they became attached to. Interviewee 5 stresses the importance of an increase in agency in those that he has intervened with: *'the age of 14, 15 [is] where they start… to have more mobility out of the house, out of the home, coming into contact with dawa stalls and individuals and that type of thing'*. Interviewee 8 echoes this sentiment about his own past, stating that: *'I was probably around about 14 when I first came across then, and about 15 when I started attending their events and circles… and I became a member within a couple of years'*. This increase in agency enabled interviewee 6 to leave the country in order to participate in a programme with the religious organisation that he was affiliated with. This trip then led to his exposure to the Taliban and their extremist narratives, influencing his behaviour upon his return.

6.3.1.3 Lifestyle changes or new environments

Such lifestyle changes and new environments as mentioned by interviewee 6 were commonly discussed by all of the interviewees, either through their own experiences of radicalisation or those of the individuals they have worked with. A common new environment is that of a 6th form college (for 16-18 year olds) or university, and interviewee 5 discussed one case of particular concern:

'A young man arrived at our 6th form college having been identified, trained, groomed by HT to be a future leader… There's evidence that, and concern that, he actively sought to radicalise others within his college and has done'.

Those pupils within the 6th form college were therefore vulnerable to coming into contact with this individual, and interviewee 5 was being kept updated by the college about those who seemed to be coming under the young man's influence. Interviewee 4 touches on the difficult transition associated with moving to a new environment: *'some have left and gone to uni and aren't dealing with that so they get into this stuff'*. Interviewee 8 also found that attending university led to a widening of his participation and interest in extremist groups: *'I'd come to London and met people from the Islamic Forum of Europe… I started to attend talks at the university… I'd started to read leaflets, pamphlets, booklets by… the founder of Jamaat-E-Islami'*. In one case the transition to a new environment after moving house was implicated with one family who started to espouse right-wing sentiments. Interviewee 4, who was asked to intervene with them, noted that: *'you don't get Black or Asian people here [where the family*

moved from], so when they moved somewhere where you did, they couldn't deal with that, which meant that their kids couldn't deal with it either'.

6.3.1.4 Personal preferences

An individual's personal preferences were occasionally shown to have led to their self-selection to be in a certain space, including after experiencing discrimination such as bullying at school or racism. Experiencing bullying at school was commonly mentioned amongst those vulnerable individuals with whom interviewee 7 had intervened, and such bullying had led to them becoming withdrawn and seeking friends and social ties online, or searching for websites espousing extremist narratives in order to channel their anger. In some cases these children *'could have been bullied by Muslim kids at school'*, according to interviewee 7, leading to their vulnerability to right-wing narratives. Racism was a problem suffered by some of those who interviewee 7 had dealt with, leading them to remain within areas which were racially homogenous: *'which is perhaps down no small amount to… the amounts of racism that they suffered in the UK'*. The experience of anti-Irish racism by interviewee 9 equally led to an avoidance of social groups and spaces which his tormentors frequented. He was then drawn towards different environments, including those radicalising settings where he encountered the right-wing narratives he was later to adopt.

An interest in politics and activism was mentioned by two of the interviewees as a reason for themselves, or individuals with which they had intervened, potentially coming into contact with spaces in which extremist narratives were being promoted. Interviewee 8 mentioned his interest in religiously-inspired politics: *'I did start to attend some of those [radical Islamist] events'*. Interviewee 4 talked of some of those he had intervened with doing a politics degree at university, and when asked whether their interest in politics had been one of the things that had led them to these ideologies in the first place, his response was: *'Yeah yeah, oh yeah yeah, but it's far right politics'*.

6.3.1.5 Cutting of social ties

The cutting of social ties, whether voluntarily through self-exclusion or involuntarily, was discussed by nine of the interviewees as playing a role either in themselves or those they have worked with. Cutting his ties with his family due to extreme abuse as a child led interviewee 2 to seek out the company of those for whom violence was a lifestyle in order to gain protection on the streets. Interviewee 3 mentions that he alienated himself voluntarily from his current social group in order to ingratiate himself with those in the extremist movement. One of the individuals who interviewee 8 worked with found that: *'he embraced Islam, his parents stopped speaking to him, ended up living with a guy who was, who'd gone off to Palestine to*

join Hamas'. He mentioned that is was common amongst those with whom he had intervened to find that they had: *'either [lost] relationships with family, their family didn't want anything to do with them, they didn't want anything to do with their family as a result… [they] stopped speaking to other people'*.

One tactic which was indicated during the interviews as a strategy by extreme groups was discussed by interviewee 5: *'we also know that one of the first things that the extreme groups try to do is to split them from their diverse friendship groups'*. This sentiment was echoed by interviewee 10 who pointed out that, as individuals become more involved with the group and begin to adopt the radical narrative, *'they will quite easily drop them [their current friendship group] and mix with those they should be mixing with and they won't even mix with Muslims that are let's say less practising than them'*. Replacing existing friendships with those who only agree with the extremist narrative may then lead to prolonged exposure to such ideologies and their reinforcement, increasing the likelihood of radicalisation occurring in vulnerable individuals.

6.3.1.6 Support system and attachment

Cutting social ties can lead to a lack of a support system for vulnerable individuals, and all of the interviewees gave multiple examples of this lack either through their own experience or the experience of those with whom they have worked with. The prominence that this lack of a support system plays in the interviews should not be underestimated, whether this manifests through dysfunctional families or lack of friends and isolation, or whether inversely attachment to those who espouse extremist views has led them towards radicalisation. In those individuals who suffer from a lack of a support system, the radical group then often steps in to fill this role, creating an ersatz familial relationship (discussed in more depth in section 6.3.2.5 below).

Interviewee 7 found that within the group of individuals he had worked with, patterns could be teased out: *'way at the top of the list is dysfunctional families… one of the parents has left, one of the parents has died… because of the family makeup they have got problems'*. He described how these people were then vulnerable to the approaches of others who may have held extreme views: *'there's people who've got poor support amongst their family and they just [go to] people who'll put their arm round them and befriend them and they've moved along with them'*. The absence of a parent was mentioned by interviewee 6 as a common factor associated with the young people he intervened with, while interviewee 9 stated that while he was involved in the far-right, *'most of the kids I was hanging out with were in group homes and broken families'*. Interviewee 2 spent much of his childhood being abused by his parents before running away and going in and out of group homes, searching for a support

system amongst violent individuals on the streets. A lack of friends or experience of isolation was mentioned by interviewee 7 in relation to those he had worked with: *'Isolation is a key thing… oftentimes they are kids who struggle to integrate at school'*. Interviewee 4 echoes that with the right-wing cases: *'[this] kind of guy wouldn't have been popular at school'*.

Two interviewees mentioned examples where strong attachment to kin contributed to the risk of radicalisation amongst the children whose parents believed in such ideologies, illustrating the need to consider factors in context to understand their role. Twice interviewee 10 spoke of individuals who were being subjected to extremist influence from their mother and brother, and became at risk themselves of taking on such views, while interviewee 4 mentioned that in multiple cases it was the close relationship between the parent and the child that led to the ideology being passed from one generation down to the next**.**

6.3.1.7 Cognitive susceptibility

As research in criminology suggests (Wikström 2014; Wikström and Svensson 2010; Wikström and Treiber 2007), individuals who are cognitively susceptible to moral change (i.e. to adopt a crime-supportive moral framework) are often characterised by poor executive functioning (e.g. low self-control, high impulsivity, poor decision-making), which eventually results in involvement in crime, delinquency or substance abuse. Poor executive functioning can also manifest as a lack of adaptability to new situations or environments. This can lead to a person not being able to cope in challenging situations and relying upon the support of others for guidance. Additionally, mental health issues seem to have played some role in a significant minority of the individuals that the interviewees have worked with, with interviewee 5 mentioning a quarter to a third of those he worked with having such issues, and interviewee 7 putting it between a third and a half. For example, symptoms such as obsessive behaviour were associated with sustained participation in online forums run by extremist groups, or were associated with personality traits that led individuals to be isolated from others or vulnerable to approaches from radicalised individuals (such as not being sufficiently wary of strangers).

When considering evidence of poor executive functioning, eight of the interviewees mentioned drug and alcohol abuse either in their own background or in that of the individuals that they had worked with. Interviewee 1 described himself both before and during the time of his participation in the extremist organisation as: *'the wildest, stupidest and most violent… I was dangerous to be around'*. Interviewee 2 echoed these sentiments from his own experiences: *'I was using drugs and alcohol, I was violent'*. Regarding those individuals he worked with, interviewee 8 stated that: *'there were people who also were on drugs while we were meeting, there were people who had alcohol addictions*'. Violence and crime or

delinquency were also common themes within the interviews, with all of the former right-wing extremists mentioning violence and criminal behaviour as parts of their lives during the process of radicalisation and their joining of the group. Interviewees 6 and 8 both mentioned being involved in minor delinquency, with interviewees 4 and 7 mentioning that many of the individuals that they had worked with were equally involved in minor crime and delinquency, but not more serious crime.

A lack of adaptability to new situations or environments was illustrated by multiple interviewees with examples of identity crises, emotional vulnerabilities and culture clashes. The notion of an individual struggling to adapt to being part of multiple cultures was one which was discussed heavily by many of the interviewees, especially when it came to Al-Qa'ida-inspired radicalisation. Interviewee 6 mentioned that *'at the age of 19 I suffered an identity crisis. It is the result, I say in hindsight, of all these conflicting value systems.'* This led him to take one value system to the extreme, that of Salafi-Jihadi Islam. When discussing individuals that he has intervened with, he was quick to note that: *'every single one of them comes from issues related to identity conflicts. Every single one of them'*. Whether this reflected an inability to adapt to their situation, or a lack of commitment to a moral framework is unclear. It is interesting to note that both interviewees 1 and 3 also mentioned their own immigrant backgrounds and the feeling of identity conflict at the time of their involvement in right-wing groups. Interviewee 3 stated that: *'it was almost like I was straddling two different cultures… I didn't quite fit in'*. Interviewee 1 felt like: *'we're so great but everyone says we're bad, and everyone blames Germans, everyone blames White people*'. Regarding the inability to adapt to multiple viewpoints, interviewee 7 discussed a common trait amongst those with whom he has worked: *'you've certainly got to have the dogmatic fixed personality that listens to what they want to hear and disregards the rest'*.

This inflexibility of thought is one factor associated with certain mental illnesses (Ridley 1994), and the relatively high prevalence of mental illness amongst individuals they had intervened with is something that many of the interviewees were keen to discuss. While mental illness itself is often conflated with radicalisation and terrorism, it is important to note that it is the manifestation of the symptoms of certain mental illnesses that may lead to an increase in an individual's vulnerability to radicalisation. Interviewee 4 gave an example of this: *'So a symptom of Asperger's and autism can be obsession, fixated behaviour… some of the guys I've worked with have been on their computers all night cos they happen to have fixated on the extreme right-wing'*. Interviewee 7 mentioned the wide variety of mental illnesses that some of the individuals he has worked with have suffered from: *'Autism, Asperger's spectrum, then we've got ADHD, then we've got people who've got psychosis and got bipolar… I think it*

reflects about 30% of the work I do'. Interviewee 8 again talked about the effect of the symptoms of certain mental health issues: *'easily agitated and easily being picked on and vulnerable'*. The practitioners amongst the interviewees all discussed their frustration at having to attempt to provide, or justify not providing, ideological interventions to individuals whose mental health issues needed to be dealt with first. Interviewee 7 discussed the case of one individual who required a whole year to be persuaded to accept help for his particular condition before any real de-radicalisation work could be attempted.

6.3.2 Exposure in the context of radicalisation

6.3.2.1 Self-selection

Preferences (e.g. wants and desires) that an individual has will lead them to find themselves in certain environments at certain times. Depending upon which environment this is, they may then be exposed to radicalising agents and narratives. This is referred to as self-selection, and the interviews provide examples of the personal preferences that have led people to find themselves in radicalising settings. All of the interviewees who had been members of far-right organisations pointed to their interest in music and participation in the music scene as being highly influential in their membership of these organisations and the development of their ideological views. Interviewee 4, while not a member of a far-right organisation himself, has done de-radicalisation work with individuals who are members of such organisations and noted the same pattern. It was often the case that a preference for punk music exposed individuals to increasingly racist and right-wing ideologies. Interviewee 3 said that: *'When I first got involved I didn't know anything about politics or racism even it's not like I'd grown up a racist, it was the music, the fashion, the culture of what they were doing'*. Interviewee 9 pointed out the conjunction between music and the fashion surrounding it, noting that: *'I was standing outside of that concert and these two big skinheads came up and looked at my Doc Martins… and you know, that was sort of my introduction to the skinhead scene in Vancouver'*. Meeting a woman at a punk concert introduced interviewee 1 to racist music: *'she comes up to me with a big old school Walkman on her head and says 'check this out', and it was Skrewdriver, it was 'Hail the New Dawn''*.

In the UK right-wing scene, interviewees 4 and 7 both point to the football hooligan scene as providing an introduction to a more racist and ideological movement. Interviewee 7 pointed out that: *[the] organised football hooligan element… they organise their own violence anyway so they're halfway there'*. This introduction to violence as an expected and morally acceptable element is damaging to vulnerable individuals.

Piety was a factor for interviewees 6 and 8 when considering their selection of environments. His attendance at a certain mosque, Islamic social activities and Islamic conferences gave interviewee 6 the opportunity to come into contact with more radical elements of his organisation, while interviewee 8 noted that in his area: '*in terms of Islamic activity there was every single Islamic group there'* so he attended a different meeting each evening in order to satiate his desire for a greater knowledge of his religion.

6.3.2.2 Social selection – socio-demographics

While an individual's preferences may lead them to seek out a certain environments, their socio-demographic background will also play a part. If a radicalising setting appears in a mosque, it is much more likely that a Muslim will be exposed to it than a Roman Catholic, for example. This social selection may be based on factors such as residence, religion, nationality or age, characteristics which will influence the likelihood of members of certain groups finding themselves in certain places, given the way a given society is organised. In the case of interviewee 3, his parents migrated to a town which had many other immigrants of the same nationality, which happened to be: *'a small town of about 30,000 people where American White Power skinheads happened to be born, right across the alley from where I grew up'*. For interviewee 6 it was his father's geographical origins we came to affect his choice of religious environment: *'because he's Indian he is influenced by… the Tablighi Jamaat so I did grow up with background influences regarding Tablighi Jamaat, so for example I would go once a week with him to their programmes'*. This then led to the summer spent in Pakistan with the organisation during which he was introduced to the Taliban.

The nationality of an individual again affected interviewee 9: *'I went to a year of boarding school here in England when I was 15, I was born in England and in 1982, 83 the skinhead thing was very popular here'*. This introduction to the skinhead scene led to an interest in the music which eventually developed when back in Vancouver. The religious expectations upon young Muslims was something which another interviewee highlighted as driving them to be exposed to certain environments. Interviewee 5 noted that:

> *'what you've got is, especially interaction between male and female, young boy and girl students, through the internet, through Twitter, through Ask FM, through other platforms like that, because they are, they are accepting the view that they shouldn't be together'*.

While this religious acceptance of boundaries drove them to only mingling freely on the online space, later exposing them to radicalising narratives and sharing them amongst themselves, it also led to faith-based friendship groups at college: *'but not just on the basis of faith, on the basis of particular groups within the faith. So you'll have the Salafis hanging around together'*.

This then also allows for the opportunity of these newly created social networks to expose their members to the radicalising narrative or radicalising setting if one individual within the network is exposed to it.

6.3.2.3 Social selection – social networks

The role of social networks in exposing vulnerable individuals to a radicalising setting was consistently highlighted through all of the interviews conducted. In some cases it was the individual's family members spreading the radicalising narrative, as discussed above in the right-wing cases seen by interviewee 4 and Al-Qa'ida-inspired narratives seen by interviewees 5 and 10. In all of these cases it was not just family members, but those in authority over the individuals such as parents or older siblings. This also meant that the individuals were exposed to the radicalising narrative at a very young age and this exposure was repeated over a long period of time, becoming the normative morality in their home environment.

However, while cases of exposure through the familial social network were found, it was much more common for this to happen through friendship networks which had formed either at an educational establishment or through leisure time activities and preferences. All of the interviewees who had been part of a right-wing organisation mentioned the importance of peer groups in the punk music scene whom they met and socialised with at concerts and in some cases were bandmates with. The music scene also facilitated the maintenance of these social networks. Interviewee 3 mentioned that:

> *'It was quite easy to maintain contact with others because of the band, there weren't a lot of bands back in those days, there were maybe 5 or 6 bands, so being in the spotlight in that way kept me connected to people in the country and also internationally.'*

Interviewee 11 discussed the importance of the influence of the social network: *'the company they keep is a trigger to wanting to learn more about [the radicalising narrative]'*. When asked whether there is a domino effect, that when one child starts to gain an interest in these narratives the others in the peer group follow, she confirmed this: *'of course, of course, I mean social media has a big part to play'*. This focus on social media networks is something that was echoed by interviewee 5: *'mutual radicalisation happens through these social networking platforms'*. So not only are individuals coming across these narratives online, they are also introducing members of their peer groups to these narratives and maintaining exposure to them through social media.

One noteworthy anecdote came from interviewee 8, whose role within his extremist Islamist organisation included targeting others for recruitment. Once he had brought individuals into the movement, they would then target their friends and family members to also try and get

them to join. But at times a more ambitious recruitment policy was attempted, by targeting those of specific high value social networks. He mentioned that:

'my work at Durham University was specifically because Durham University is one of the elite universities where Arab countries send their children. If you want to influence society that's where you go. So I remember one guy who I got to join the party whose father was a General in the Jordanian army… we targeted him specifically because of that relationship'.

Those members of radical groups realise the importance of targeting individuals from high powered social networks and the influence that they can gain through association with them and their families. This particular interviewee also utilised the value of his existing social networks to gain platforms to spread the narrative of his organisation. While one mosque in his local area would not allow him to proselytise within its walls, the other mosque would accept him: *'in places where [the organisation] was able to do that, it would be [due to] individuals' personal relationships'*. These social networks literally opened doors.

6.3.2.4 Weakly monitored settings

In the previous example, it is not suggested that the mosque that allowed interviewee 8 the space to proselytise was necessarily sympathetic to the views of his organisation. Rather, it may have been the case that the mosque's authorities and members were not willing or able to monitor what was happening within that setting, and, if needed, to intervene. Settings which are weakly monitored, or indeed not monitored at all, may be exploited by extremist organisations and individuals, as they can carry out their activities without being interrupted, reported or countered. Increasingly, as public settings become more highly monitored, research suggests that radicalising activity has been displacing to private settings, such as private residences (Bouhana and Wikström 2011). Indeed, this comes up as a theme throughout the interviews, especially with those who talk about Al-Qa'ida-inspired radicalisation. Interviewee 5 said that in his geographical area, the radical Islamist group Al Muhajiroun:

'would use the dawa stall [for the use of proselytizing Islam] for talent spotting… they would say 'why don't you come down to our education centre?'... they don't do anything enough to be nicked out on the street, and so they save their nasty stuff for behind closed doors and do it there'.

The difficulty with extremists using dawa stalls is that, in the interviewee's words:

'ordinary Muslims… don't always know who's the dodgy dawa stall and who is legit… through observing, we know they don't know, they can't tell the difference, and that's because the bad guys are not overtly bad guys in the context of their dawa stall'.

Rather than conduct their illegitimate and potentially illegal activity in the open at the dawa stall, they use it as a conduit to bring potential new recruits to the organisation to private premises, at which they can expose them to the radicalising narrative. As interviewee 7 pointed out, when it comes to dawa stalls: *'it's got 90% of what it can really say under the table'*. It is only when individuals begin to attend study circles at the homes of members of the radical organisation that the full narrative is revealed over time. Interviewee 8 noted that within the organisation he was a part of: *'the serious indoctrination is always in someone's house… their activities are always literally in their supporters' house, where they'll invite people, trusted people'*. However, in his area, interviewee 7 noticed: *'in times gone by I've heard of cases where they've hired out rooms in local council buildings and had a study group. That's stopped a lot cos everybody's got on top of that'*. Improved levels of monitoring within those environments prevented the groups from spreading their narratives in these places.

As anecdotal evidence would have suggested, it seems that the online space is one in which much radicalising activity is occurring. The lack of obvious physical monitoring in this space, perceived anonymity, and the authorities' inability to effectively monitor all websites, chat rooms and social media outlets which may host such activity, leads it to become a natural space for radicalising narratives to be spread. Interviewee 4 noted that in his experience of asking individuals where they came across the right-wing narratives they came to adopt, *'there's a growing tendency online, we all know about it… I've worked with guys who've never even been to a meeting, yet they've become totally immersed in the extreme right'*. Interviewee 5 echoed this sentiment: *'you get some who've converted themselves, particularly right-wing, cos it's not that easy to get into right-wing organisations without doing the* internet'. He even went as far as to say: *'we would say that a huge amount of the radicalisation, practically all of it, is via the internet… they've come in having seen this on the internet, or having watched this on the internet'*.

Speaking of their times within extremist organisations before the 7/7 attacks on London, interviewee 11 talked of fly posting at night time being used to advertise events being held by her organisation, while interviewee 8 took advantage of one university refusing to sign up to a 'no platform' ban on his organisation to hold events and meetings there. He was originally introduced to the organisation through speakers at his secondary school faith assembly, before the 9/11 World Trade Centre attacks. When asked whether his school encouraged speakers from this organisation to talk to the students, he replied that: *'I don't think they were encouraging them to come, but they didn't see it necessarily as anything but a benevolent influence'*. Most activity was significantly more clandestine than this, however. In order to maintain contact with others within his right-wing organisation, interviewee 1 noted that: *'we*

operated with PO boxes and stolen calling cards, we'd be at payphones talking to each other'. His organisation also created CDs of neo-Nazi music and left them around secondary schools for the pupils there to chance upon and listen to. However, this was in the period before schools were so closely monitored and entrance to them was so difficult to access.

6.3.2.5 Radicalising agents

While there appear to be a small amount of cases in the literature where individuals have become immersed in the radical narrative without face-to-face contact, these cases are rare. Developing an attachment to a charismatic and credible radicalising agent remains the norm, as this attachment and credibility is what makes socialisation into the radicalising narrative possible. The kind of attachment formed to these agents is akin to a familial relationship, with the individuals interviewed seeking, and being provided with, emotional and physical support of the kind that characterises parent-child relationships. In his words, interviewee 4 stated that: *'I've seen that, so a leader or somebody high up in the movement becomes like a surrogate father'*. The trust which the vulnerable individual then had in the teacher was absolute: *'they just took everything in…they believed everything he said, you know'*. Interviewee 5 described these relationships:

> *'as a student to a teacher a lot of times, but in the case of the sort of Al Maj [Al Muhajiroun] grooming, sort of big brother stroke parental as well… you don't need to go to anyone for anything, come to us. You want help with your homework, we'll help with your homework you know, if you're short of money ask one of the brothers'*.

This all-encompassing relationship was one experienced by interviewee 6 during his time within a radical Islamist organisation: *'They're your brothers, they're your brothers that you would go to battle for, or so you think…. I was totally immersed, they became an extension of myself'*. Interviewee 8 found himself replicating the relationship with his father, who died when he was a young boy: *'[the radicalising agent] had a parental influence on me in the sense that I would go to him for advice, go to him for learning about religion. I would go to him to talk about issues I was facing, anything like that'*. In some cases a physical relationship was not even necessary for a bond to form. Interviewee 11 spoke of the influence of Anwar Al-Awlaki on school children in the area in which she works: *'his YouTube clips are played on the bus by kids… they really look up to him and you just think 'oh, ok', and they don't even need to have that physical connection with him'*.

In that particular case, it was the charisma and credibility of the radicalising teacher which was pervasive, and this is often crucial if the radicalising narrative is to be adopted. When

describing those particularly successful in spreading the Al-Qa'ida-inspired narrative, interviewee 5 mentioned that:

'individuals who appear authoritative in the Arabic language [are] massively influential… you can't underestimate the importance of the Arabic language or someone who is fluent and competent, you know, in the Arabic language, as a factor in grooming these young people'.

Interviewee 10 echoed this sentiment, adding that:

'they go to some charismatic English-speaking sheikh scholar who knows Arabic so he knows what he's talking about, and he dresses correctly so he'll become the sheikh overnight, he doesn't need to have many qualifications for them to believe exactly what he's saying.'

Even if the person spreading the narrative was not necessarily likeable on a personal level, a perceived credibility on a religious level was particularly important. Interviewee 8 noted that, when he met the leader of his organisation: *'I didn't like him… because he's obnoxious, but it was kind of like well, he kind of understands the ideas and the religion so we gave him that deference for that reason'*. In many cases, however, it was important that the person had charisma, and interviewee 7 noted that this is the case in both the right-wing and the Al-Qa'ida-inspired cases he has dealt with: *'the right-wing is getting some charismatic individuals to drive it forward. Having said that, the Islamist groups, they are reliant on different charismatic individuals to drive them forward'*. Interviewee 10 stated that in her experience: *'the leader tends to be charismatic, good looking even, someone everyone can look up to'*.

But at the end of the day, it was trust that was fundamental. In the organisation he joined, interviewee 8 pointed out that those spreading the radicalising narrative: *'were all university lecturers, PhD students, college lecturers, teachers, so they are people that you naturally implicitly trust'*. This combination of perceived credibility and trust persuaded his, and many other, parents to allow him to spend large amounts of time with these people, increasing and prolonging his exposure to radicalising ideas.

6.3.2.6 Narrative

The content of the radicalising narrative used by the right-wing and Al-Qa'ida-inspired groups, as discussed by the interviewees, is structurally very similar. Both are categorical, containing elements of 'us versus them', which serve to dehumanise the 'other'. Both are action-oriented, telling their followers not just what to believe, but crucially what to do. And finally they are both transcendental, one on a racial level and the other on a religious level, though many right-wing extremists would tell you 'my race is my religion', a sentiment which was expressed by interviewees 1 and 3.

Interviewee 1 spoke of the effect of the group narrative: *'it was really easy to fall into the whole paranoid delusions of grandeur, delusions of persecution.'* Interviewee 3 went further and stated that:

> *'all of a sudden you're taught that all the bad things that are happening around you are because of certain people or a certain group or sexual affiliation… the media was full of Jews who were supressing us, and affirmative action and Black people were destroying our culture and causing our parents not to get jobs, even though my father was never unemployed'*.

This was echoed in the Al-Qa'ida-inspired narratives seen by interviewee 5: *'we are different, this is who we are, they are the kuffar, they are the… disbelievers, they are not the same as us, keep away from them*'. Interviewee 7 talked of the strategy used by certain extremist Islamist groups: *'calling people apostates, takfiri… if they don't agree with their particular way of going around things'*. This is particularly damning in Islam as in those countries that use Sharia law, apostates face the death penalty. This in-group thought includes not only individuals, but whole political systems. Interviewee 8 showed the lengths that his organisation would go to in order to separate their followers from the rest:

> *'democracy is alien to Islam, how the idea of men making laws is alien to Islam and how God is the only lawmaker, and how all these political systems that are built on that, whether it's the parliamentary approach, is all kind of antithetical to the religion of Islam and therefore voting, taking part in that process is forbidden.'*

The action-oriented nature of the narratives included the need to establish the Islamic state through a military coup if necessary, which according to interviewee 8: *'has a plausible religious justification'*. Justification alone is not enough however, and he went even further: '*this is what your religion is telling you, this is your world view, this is what Islam has obliged upon you, it's a religious duty'*. By maintaining the narrative that action is a duty, an obligation which is justified, it encouraged young men to join the organisations who were seeking to 'do something'. Interviewee 9 built up an arsenal of weapons and ammunition in readiness to attack his supposed enemies:

> *'I used to believe there was this Jewish hive mind… ZOG [Zionist Occupational Government], trying to undermine us and, you know, if we removed it, cut it off at its head, cos they were the ones driving immigration policy and stuff'*.

Interviewee 4 talked of his experience of these action-oriented narratives at work: *'it's not 'what are we gonna do about this?' it's 'what are you gonna do about this?'… 'what are you gonna do about what's happening to Muslims around the world?''*. By focussing the attention on what the individual is obliged to do, the person spreading the radical narrative promotes that action-oriented stance.

Finally the transcendental nature of the narratives proved to be particularly attractive to vulnerable young people. The notion of becoming a hero, saving their race or religion from persecution was one frequently mentioned by interviewees. Interviewee 6 talked of watching jihadi videos with fellow extremists: *'imagining you're there, 'yeah we're with them, we're with the Mujahadeen''*. Interviewee 3 spoke of his desire to: *'save the White race'* from destruction. Interviewee 11 believed that: *'we're gonna dominate, this system is gonna dominate, this ideology is gonna dominate the whole world'*. She wanted to re-establish the Caliphate and introduce Sharia law across firstly all Muslim countries, then the entire world. The notion of single religious dominance, or answering only to Allah, and of being the religious warriors who brought this into being, came out as intensely appealing in the interviews.

6.3.3 Emergence of radicalising settings

6.3.3.1 Social disorganisation

As previously discussed, high levels of social disorganisation have been associated with factors such as religious, racial and cultural heterogeneity within an area, residential segregation along these same lines, a lack of community groups and areas, and high levels of crime and delinquency. All of these factors can contribute towards a community with sparse exchange networks and a lack of mutual trust and bonds. This in turn can lead to a lack of monitoring, formally and informally, of settings which then allows radicalising settings to emerge and be maintained. All of these factors were seen to a certain extent within the interviews conducted, though there was a variation between interviewees as to the amount that they could discuss this based upon their own experience of radicalisation, or that of the individuals that they had worked with. It is important to note that factors contributing to social disorganisation are not usually measured with qualitative data of this type, and so without the ability to be representative or to conduct comparisons here, the meaning of these observations is limited.

Cultural heterogeneity within the geographical area in which the radicalising setting was based was commonly reported by the interviewees. Interviewee 3 came from an Italian immigrant background but mentioned that: *'very close to where we lived there were Hispanic families and there were Black families'*. He also mentioned that in Chicago, the city where he now works on counter-radicalisation projects, it is: *'a very ethnic city… a lot of those neighbourhoods are full of immigrants'*. Interviewee 7 talked of the effects of heterogeneous neighbourhoods where he works: *'there's fault lines that've probably been created by historical events that actually haven't gone away, they're bubbling tensions'*. While noting that *'the areas with the biggest trouble with the Islamists is where they invest the most in community relations'*, interviewee 7 admitted that this heavy investment was due to past troubles in the area linked to racial

conflicts. He also noted that when the extreme Islamist organisations are searching for new members: *'the bigger hunting grounds by far are the multicultural areas… by far the biggest proportion of Islamist referrals that we get are in multi-ethnic areas'*. One of the arguments that interviewee 9's right-wing organisation used to gain recruits in Vancouver was that: *'immigration was starting to pick up steam, mostly Asian and East Indian'*.

This cultural heterogeneity was often reflected in residential segregation, as discussed by the interviewees. Interviewee 1 was keen to say that: *'Milwaukee for many years running is the most segregated city in the United States… there's parts of Milwaukee where a lot of times kids don't see a white person until they are 12, 13 years old'*. Such levels of segregation were echoed by interviewee 3 in his description of Chicago (very close geographically to Milwaukee):

> *'we're known as the most segregated city in America because, you know, Italians have their neighbourhoods and there are Black neighbourhoods and Polish neighbourhoods… and I think while they interact with each other they're not very close to each other'*.

This level of residential segregation was also seen in the UK. Interviewee 4 noted that: *'if you walk through a certain area of Luton you'll get some, you'll get looks, you might get probably more, definitely verbally insulted… that's happened to me about 9 times in Luton'*. This was the experience of a White man walking through predominantly Muslim areas. He noted that in his experience of growing up in a predominantly Black area: *'it was mixed, and we used to go to parties in each other's houses when we were young'*. However, he is not seeing the same mixing happening today: *'In some communities in areas like Bradford and Luton, let's say where it is a big Muslim community, I'm sorry but that ain't happening… we don't wanna mix with you'*. He recognised that religious differences meant that lifestyle segregation was enforced:

> *'the lads that I grew up with were Black guys, they would come to the pub. That can't happen and won't happen ever in a Muslim community… genders and stuff like that, there's different reasons why it doesn't happen, but then in a way, that doesn't help the situation does it'*.

Interviewee 7 worried that past mistakes were being repeated: *'if we're not careful, we'll not learn the lessons of the integration we've had certainly in the Pakistani community, whereby they lived in enclaves, they didn't integrate well'*. One particular concern was that: *'I strongly fear that failure to invest in new [immigrant] communities… increases their isolation, it means that people can weave magic'*. The magic to which he refers is the extremist narrative accompanying the Islamist groups, which faces little challenge in some of these isolated communities. In his work with vulnerable individuals, interviewee 8 noted that: *'some of them… are part of a community where they are literally, they only see other people who are of a similar kind of ethnicity and religious heritage as themselves'.*

This residential segregation may be compounded by the lack of community groups and spaces in some of these geographical areas, leading to less chance for those of different cultural backgrounds to meet and develop social bonds. Interviewee 10 noted that there is one particular geographical area in which concerns were raised that radicalising narratives were being spread. This area was characterised as having: *'lack of facilities for young people, you don't have a youth-based organisation, you don't have any sports facilities… there is a lack of… public transport, you're looking at facilities like libraries or recreational centres'*. Interviewee 7 has seen this lack of provision being used by extremist groups to stir up local unrest: *'it can be something like closing the local park football pitches on a Saturday and they don't, nobody plays football, they couldn't give a monkeys, but they can make it a grievance if they want to'*. Interviewee 5 discussed the issue of cultural acceptance of certain communal free-time activities leading to youths having less access to such opportunities: *'one of the problems that we've got in many of our Asian Muslim communities is that there isn't that tradition really of sport, music, drama'*. By not joining in with these traditions of communal free-time activities, their segregation was compounded and those social bonds not formed.

Interviewees were asked, when appropriate, about residential instability, another factor known to limit these social bonds between members of a community. However, most interviewees were unable to comment due to their limited knowledge of the areas in which their vulnerable participants lived. Nevertheless, in the case of East London where interviewees 5 and 10 worked, it was noted that there was a: *'massive population churn'* by interviewee 5. It was interesting that this contrasted with interviewees 1 and 4 who were talking of areas where right-wing radicalisation was occurring, where there were large numbers of home-owners and the population was not very transient. However, in both areas there had been an influx of immigrants who had then stayed in the area, altering the cultural and religious dynamic.

Information from interviewees about levels of crime and delinquency within areas known to host radicalising settings was again limited, but those who were able to comment were in agreement that these issues were present. When discussing right-wing groups in the Chicago area, interviewee 3 mentioned that: *'these groups tend to gravitate towards lower income areas'*. Interviewees 4, 5 and 7 noted that problems with crime and delinquency existed within their area of work, while interviewee 8 gave an interesting anecdote about the role that the extremist organisation he was a member of had played within the crime problems of certain communities: *'[the group] was an interesting phenomena, it was… tidying up the drugs problem in Whitechapel, cos we got all the drug dealers to join the party and therefore give up dealing drugs. And in Copenhagen in Denmark it was a big story that [the organisation] had*

gone into the ghetto and cleared it up'. It would appear that the organisation was deliberately targeting areas which were suffering from crime. The interviewee gave no indication as to why this was, or whether there was merely a correlation between the ethnic or social communities it was targeting to join the organisation and crime within the area in which they lived. It is possible that a low level of collective efficacy in the area attracted both the drug dealers initially and the radicals afterwards.

6.3.3.2 Collective efficacy

The level of collective efficacy within a community relates to their perceived ability to deal with their own problems. This manifests in their willingness to intervene when problems arise, the relationship that they have with the authorities, and their imposition of their own collective morality. In theory, one would expect higher levels of collective efficacy to be associated with communities that are more willing to intervene to prevent radicalising settings from emerging and being sustained, unless of course their morality is such that they support the radicalising narrative in the first place, as is observed in cases of ethno-nationalist political violence.

Community member sympathy seemed indeed to play a part in emergence in more than one area, according to interviewee 4: *'I know a couple of places where the landlord of the pub is sympathetic to them, and they let them meet there'*. This allowed the right-wing groups to meet and spread their narrative without fear of interference. While not actively supporting the extremist group, interviewee 5 spoke of a case where the local community would not intervene, this time on the grounds of religious sympathy: *'deep down they are our brothers in the cause, even though a little bit misguided'*. This was echoed by interviewee 10 who gave a more specific example of her experience with the Muslim community in the local area:

> *'[the local mosques] would probably not give any kind of space to let's say the likes of Muslims Against Crusades, cos they're the type that are hated by everybody… but I could imagine them, for example, saying if another extremist group wanted to leaflet outside their mosque after Friday prayer they'd probably say 'at least they're not in the mosque and they're just outside, that's ok, we'll let them leaflet''*.

There were other examples provided where communities were not willing to intervene with those spreading the radicalising narrative. Interviewee 5 noted that even when radical Islamist groups appear on the streets in the area in which he works, the local community appears to do nothing: *'they've never themselves done anything to challenge them or to make them leave… we have never had a single referral ever from a mosque… they're not proactive behind the scenes. I think there's a bit of fear'*. This fear of the extremist groups was one echoed by

interviewee 7 who mentioned that the right-wing groups operating in his area: *'create tension amongst the normal public because they're afraid of them… they're very intimidating'*.

However, in a lot of places where the extremist groups tried to operate, there was in fact a concerted effort by the community to prevent them from doing so. In the area in which interviewee 1 was conducting his right-wing activities, he noted that: *'there's a really strong sense of community and there was people in the neighbourhood who were like 'we want these assholes out of here''*. Unfortunately, it appears that the police did not give the community the physical backing that they required, so the organisation's activities continued. In the case of interviewee 3, within the community in which his organisation was operating, *'there were definitely concerted efforts to try and stop what was happening… The police would definitely stop us at any point they could'*. This time the role of the authorities had a more positive impact. Since a more public approach was taken to counter-radicalisation measures, interviewee 7 has noticed that '*the Muslim community are far more aware of it [the radicalising activity], and far less likely to keep their mouths shut'*. Interviewee 8 noted that when he was attempting to recruit for his organisation he faced: *'hostility all the time… Muslim communities generally despised us much more than the wider community… I remember there was one guy that pulled out a massive knife once from the mosque… and chased them out*'. In Vancouver, interviewee 9 often faced hostility when his far-right group conducted their activities:

'if the meeting was discovered, they would often, whether it was the Canadian Jewish Congress or some of the ethnic communities, they would call up the hotel and threaten to boycott them, so often meeting rooms were cancelled'.

These attempts by communities to intervene to prevent radicalising settings from appearing and being sustained often occurred in collaboration with law enforcement officials. The community's relationship with the authorities was therefore paramount in ensuring that these extremist organisations did not gain a foothold in their area. As seen above, in some cases law enforcement were ready and willing to act, in others less so. In his area, interviewee 5 noted that a robust policy by the local council ensuring that extremist groups are not given space to perform their activities has been built upon good relations with the local community: *'they refer things to us, and various sort of community centres and other places, there are very very few venues left now in the borough that will welcome these groups and individuals'*.

However, in other areas the relationship between the community and the authorities was not as positive, leading to less favourable results. Interviewee 4 noted that this distrust could be spread across the board:

'there a distrust of the police, hugely to be honest… you'll get a distrust of the police in Black communities for obvious reasons at times when you look at Stephen Lawrence… Same with Muslim communities, they'll feel arguably justified that the first Prevent was totally focussed on Muslims... But then you'll get the mistrust of police in White communities as well'.

Within his area in Toronto, interviewee 6 noted that it was common for those within the Muslim community not to cooperate with the authorities: *'[they'll] go out of their way to obstruct and obfuscate the government from doing their work… they have this distrust and we don't like the way the police do this and that'*. The picture that is painted in regard to collective efficacy illustrates the importance of paying attention to the social ecological context when trying to understand emergence. Some communities support the radicalising narrative or do nothing to stop it due to their sympathetic views. Others are too afraid to act. Some that do try to act are not given the support from the authorities to do so, while others do not involve the authorities due to their distrust of them. Nevertheless, the interviews revealed that resistance to those spreading radicalising narratives exists, whereby communal spaces are closed to them in certain areas.

6.3.3.3 Generational dynamics

Interaction between members of different generations in a family or community was something mentioned by all of the interviewees as having an impact upon the radicalisation process. Generational dynamics affected the emergence of radicalising settings in a number of ways: a lack of monitoring by the parents occurred in some cases as they believed their children were going through a phase, that more overtly religious behaviour was only a good thing, or a lack of communication between them occurred. The culture clash of East meets West amongst many Muslim immigrant families led to an identity struggle in the children, leading them to feel that they could not talk to their parents and therefore seek attention and advice from others, potentially exposing them to the radicalising narrative. The settings in which they are seeking this attention and advice are not monitored by their parents and others in their community, and this lack of monitoring by traditional moral influences put them at risk.

Interviewee 4 discussed this struggle between the old culture and the new amongst the vulnerable young people he worked with: *'some of the guys have got a kind of struggle going on cos they wanna keep their identity that their parents brought from Pakistan or wherever, but obviously they were born here so all the things are here around drug use, alcohol use'*. In his experience in East London, interviewee 5 noted that:

'they've got their parents and their grandparents who come from stricter traditions… then you've got conflict… you've got elders who are saying 'we do it in the Pakistani way… or no way at all', well they do feel isolated and out of it'.

In many cases this leads to a breakdown in communication between the parents and the children. Interviewee 5 said that: *'you find talking to young people they simply don't talk to their parents about… personal issues and things like that'*. He quoted from some research conducted by FOSIS (Federation of Student Islamic Societies) amongst young Muslims in the UK: *'they asked 'where are the things that you go to when you have questions about, not just about religion' and it was your parents, your Imam, something else, or online. It was overwhelmingly online'*. Of course the lack of monitoring in the online space has been discussed above.

In turning to religion as their main identity, interviewee 5 found that young people in his area had:

'become far more religious than their parents' generation, you find this a lot anyway, especially with the Bangladeshi community… some don't see their parents have anything to contribute to them, to their life… they're almost in denial about their Bengali roots… They're almost sort of wannabe Arabs'.

However, this newly discovered overtly religious identity did not always ring alarm bells with the older generation. In some cases it was quite the opposite. Interviewee 10 noted that:

'they see their kids growing up in this environment and seeing them praying, who wear a scarf, who get involved in religious activity and they think 'oh that's great, my daughter, my son is religious, and it's a good thing', but for me I think half the time they don't know what their kids are getting involved in, cos their kids probably don't speak to them about what their actual views are'.

This lack of knowledge about the activities in which their children are involved, or the meaning behind those activities, is something echoed by interviewee 11 when discussing the parents of the vulnerable youths which she has worked with: *'those that are sort of oblivious to what their children get up to, that's the real danger'*. This lack of knowledge may translate to their children's activities in physical spaces with radicalising teachers, or to the online space. Many interviewees agreed that the parent's generation often did not have the technological know-how to keep up with their children's online activities, meaning monitoring these activities was often out of the question.

6.3.3.4 Social media and the internet

The growing role of social media and the internet in the emergence and maintenance of radicalising settings was one which all the interviewees raised. In the past decade the rise of

the internet and the exponential expansion of the use of social media have fundamentally altered the way in which individuals communicate with each other, and the spaces in which social networks exist and are formed. The instantaneous exchange of information in a largely unmonitored space has made it possible for those who wish to propagate radicalising narratives to do so with ease and en masse (Jenkins 2011, Neumann and Rogers 2007, Silber and Bhatt 2007). It has also allowed individuals to come across information that they would not normally be exposed to, has allowed the free-mixing of individuals who would not normally be allowed, or able, to mix.

A number of interviewees mentioned the transference of physical social networks to the online space and the exposure to radicalising narratives that can then occur and be sustained. Interviewee 6 noted that: *'for some of them they have peers who they then work with online, so they might know them in real life and then talk to them online as well, so it's like a doubling effect that occurs'*. The links that social groups have with each other online was used to give information about radicalising settings according to interviewee 10: *'it takes one, one person to have a link with someone who knows what's going on and that's it. You don't even need to know people to invite them along… you go on twitter and you can see'*. Twitter in this case was used to inform individuals about the time and place of an event hosted by an extremist Islamist group. Interviewee 5 noticed that with the vulnerable young people who he works with, *'a lot of their chatter and a lot of their self, sort of mutual radicalisation happens through these social networking platforms'*.

It appears that all kinds of social media platforms are being utilised and exploited by those seeking to spread the radicalising narrative, with one child exposed to these narratives from his brother studying in Yemen while they chatted nightly on Skype, Facebook groups being used to chat, share videos and beliefs, and YouTube hosting videos of extremist cleric Al-Awlaki that youths listened to. The easy accessibility of these platforms and the perceived anonymity available to those who post material on them was a toxic combination which ensnares those who went online looking for answers. This appeared to be a common way in which individuals were exposed to these narratives: *'when they have an issue or problem, even before asking anyone they'll have a look online to see if there's anything there',* according to interviewee 5.

6.3.3.5 Socio-political climate

One group of factors which emerged from the interviews can be loosely categorised as the socio-political climate at the time, and place, of radicalisation. In the USA, freedom of speech laws allow for radicalising narratives to be spread with relative impunity, unlike in the UK

where laws against inciting racial and religious hatred are in force. Interviewee 3 pointed out the difficulty that he personally has with this situation:

> *'on the one hand I think it's a positive thing to give people the opportunity to say what they want even if it's unpopular just to be able to exercise that right, but I struggle also with wanting to silence groups who are outwardly promoting violence or racism'*.

He also mentioned how the economic climate which is faced by citizens in the USA as well as most of the Western world has led to people's sympathies towards radical and extremist groups. This was echoed by interviewee 4 who mentioned the banking crisis in the UK: *'I'm feeling as though we… are getting ripped off, so some of these guys do as well'*. Legitimising some of the grievances that people in extremist organisations are holding may well lead to fewer members of the public feeling as though they should report suspicious activity by these groups if noticed.

Feelings of victimisation by Muslim communities was another common theme, and one which interviewees noted would not necessarily encourage them to support radicalising activity, but would make them less likely to report it. Views amongst the Muslim communities in the UK of the government counter-terrorism programme Prevent are mixed, with some feeling that it was hostile towards them. Interviewee 7 noted that: *'the reason why Prevent is a damaged brand [is that] it was very much open to the accusation that it was a war on Islam… if you go for Prevent [funding] you're anti-Islam'*. This reluctance of some members of the Muslim communities to work with Prevent officers and accept Prevent funding was obviously counter-productive.

One particular case study which was of interest was the local political climate in the East London borough where interviewees 5 and 10 work. The lack of political opposition at the borough level meant that a particularly stringent approach was taken to those individuals or groups who were deemed to be conducting radicalising activity. They were afforded no space in public buildings, and private entities were encouraged to adopt the same strategy. This meant that these individuals or groups found it difficult to operate in public spaces within the borough. However, due to this approach being only borough-specific, this led to a displacement of these radicalising activities to the neighbouring boroughs that were not as willing or able to be so politically intransigent in their decisions. Therefore, while this strong level of monitoring meant that radicalising settings were prevented from emerging in one borough, they emerged in the neighbouring boroughs instead.

6.3.4 IV for deradicalisation or counter-radicalisation

As well as assessing how individual vulnerability can lead to radicalisation, interviewees offered examples of how decreasing this vulnerability formed part of the deradicalisation process, for themselves or the individuals that they worked with, or prevented radicalisation from occurring in the first place.

With regard to issues of moral vulnerability, it was found that having a strong religious framework provided individuals with a resilience to the influence of unconventional moral narratives, especially those which sought to misconstrue that religion in order to justify violence. Having a greater religious education was one way in which to strengthen this religious framework, and both interviewees 6 and 11 found this instrumental in their process of deradicalisation. In the case of interviewee 11, she found that a greater level of religious education led her to raise queries about the legitimacy of the radicalising narrative she was immersed in:

> *'I was also doing a distant study learning class to do with Islamic studies and Islamic culture, and whatever was being said was somehow being contradicting to the Qu'ran or the Sunnah and the sayings of the Prophet Muhammed peace be upon him… there were so many thoughts around are we doing the right thing and is this what real Islam is about? From what I was studying… what I found was certain textual evidence was being misquoted or mistaken'*.

Interviewee 6 stated that, at the time the September 11th attacks happened in the USA, *'I thought to myself I need to study my religion properly because I have a doubt now that something like this is legitimate in Islam'*. This search for religious study led to a move to Syria: *'I was there for 2 years studying Arabic and Islamic studies. I describe it as a self-directed deradicalisation programme'*. As is common amongst those who take on radicalising narratives, he originally had only a superficial understanding of the meaning behind the religious verses used to legitimise violence: *'I could recite verses from memory as if I knew them, but I didn't know what I was talking about'*. As he learned more about his religion and was challenged by religious scholars about his interpretation of the text, he found that a new understanding of the 'true' meaning of the verses dispelled any belief he had in the old interpretations.

By moving to Syria, interviewee 6 found that this change of environment led to his exposure to a deradicalising narrative. It also exposed him to the harsh realities of life in an oppressive Muslim country and made him confront the reality of the freedoms which existed in Canada. It took participation in a prison programme promoting non-violence to make interviewee 2 reassess his commitment to his particular narrative, and the intense environment of

confrontation of this narrative in a group setting four times a day for 90 days led to his eventual change in morality and lifestyle.

While cutting social ties with positive influences was a factor increasing the vulnerability of an individual, cutting these ties with those spreading or maintaining the radicalising narrative was imperative in the deradicalisation process for those interviewees who had undergone this process. In the case of those interviewees who had been part of far-right organisations in the USA and Canada, it was having a child which altered their lifestyle and allowed their withdrawal from the movement and the gradual cutting of ties with its members. Interviewee 9 stated that rather than continuing with the organisation, he now had to: *'focus on the survival and thriving of these two kids'* and noted the importance of this emotional bond with another human being: *'it was a thawing that happened to me… it's safe to love a child because they can't hurt you'*. Rather than continuing with a narrative full of hatred for the 'other', he moved onto one of compassion.

The role of family, friends and building, or re-building, a support system was fundamental to the deradicalisation process of those interviewees who talked about their experiences. For interviewee 2 it was the support that he received from a crisis intervention worker whilst in prison that made him re-evaluate his life. When working with radicalised individuals, interviewee 4 discussed what works in trying to get them to move away from extremist movements: *'often the protective factor nearly always is my kids, I can't carry on anymore cos of my kids, my family, my mum's elderly, you know, those are the protective factors you've gotta find'*. Building or rebuilding the relationship between the individual and their support system is also one of the approaches used by interviewee 6 in his work: *'what we try to do is we try to build their relationships back with their parents'*.

In some cases it was the intervention providers and support workers themselves who provided that support network for the vulnerable individuals. Interviewee 4 noted that: *'I keep in touch with most of them… they know that I'm there if there's a worry'*. This was echoed by interviewee 7 who stated that: *'they're difficult in as much as you can't leave, you can't ever stop putting your arm round [them]'*. In his case he found he was replacing the support system given to vulnerable individuals by extremist organisations with his own support system. This included not only emotional support but also getting individuals on the housing register, back to education, help with employment and again back in touch with family.

When addressing the issue of cognitive vulnerability, interviewees talked of becoming more adaptable and better decision-makers during and after the process of deradicalisation. Rather than viewing all those who were different with suspicion and revulsion, interviewee 1 involved

himself in a different alternative music scene which embraced diversity and encouraged tolerance amongst its members. Interviewee 9 found that having children forced him to evaluate his decision-making: *'when I'm making decisions for her, I had to make different, I chose to make different decisions and so I started to slowly fade out of [the movement]'*.

6.3.5 Exposure for deradicalisation

Examining the interviewees' experiences of deradicalisation also highlighted some of the ways in which their exposure to radicalising settings and the narrative altered during this process. While for many of them their hobbies and interests led to their self-selection to exposure to radicalising settings, these same free-time activities were used to expose them to new settings. After becoming disillusioned with the far-right music scene, interviewee 1 altered his genre: *'it's gonna be real violent but it's gonna be about Vikings and shit, it's not gonna be overtly racist'*. In changing the tone of his lyrics, he was exposed to new musical gatherings with multicultural artists, and socialising with them led him to cement his new beliefs away from the far-right narrative.

When intervening with a vulnerable individual, interviewee 8 noted that his sporting interests were used to help him move away from the radicalising influence: *'he also used to play football so he joined a different footballing group so he separated from those people'*. This was a tactic also adopted by interviewee 10: *'we've had interventions where it just has to be about them stepping away from religion and doing something else, so we've had interventions where they've gone on to do kick boxing or sporting stuff'*. Interviewee 11 echoed this need to use their interests to expose them to more positive influences and spaces: *'if they want to discuss anything, vent it off at the right people… if they do feel they want to vent their frustration they can do it in a safe place for discussion… join some mainstream campaign groups or focus groups'*. Exposing vulnerable individuals to environments where normative moral narratives are promoted, but they can still be action-oriented and maintain their interests and free-time activities, seemed to be a popular tactic amongst deradicalisation professionals.

While the role of social networks in the social selection of an individual to a radicalising environment was recognised by the interviewees, the importance of social networks in the deradicalisation process was equally important. In the case of interviewee 1, it was the breakdown of social networks with radicalising influences that helped: *'for the most part everyone in the crew was out doing their own thing and I didn't want to have anything to do with them'*. He also purposefully utilised his social networks to find positive influences to remove himself from the movement: *'there were a number of relationships with people who were in [the organisation] with me that go out that were really important'*. Having the support

of those who left the organisation beforehand or at a similar time was also instrumental to other interviewees. Interviewee 8 noted that he was not the only one to disengage at that time: *'people I was close to, people that we spoke to who were in the management of the party'* also disengaged, and they formed a network to support each other. In the case of interviewee 11, her husband was also a part of the organisation, and they left together in a mutual decision. After that she decided: *'my point was cut off from here, I don't want none of the sisters to call me'*. This total social and physical disengagement with the organisation led to the severance of the exposure to the narrative.

In the case of one vulnerable individual he worked with, interviewee 5 decided to use his positive influences within his social network to encourage and support the deradicalisation process:

> *'we sat with the young man and his father, and his father was very keen to be a positive and supportive influence in this regard… we were sort of convinced with his father's guidance, he was fairly authoritative on Islam, he would make sure he kept away from that'.*

Utilising those with authoritative knowledge of the content of the radicalising narrative was also particularly influential with interviewee 6: *'I would engage them in discussions, political discussions, radical discussions, and they would shoot me down, they would basically say 'no brother, you haven't studied', they would keep saying this'*. When consulting one particular religious scholar, he noted that: *'every time I would quote a verse he would smirk… it was like 'no brother, you're reading it wrong', and he would pick apart my interpretations'*.

This was an example of the radicalised individual developing a personal attachment to the purveyor of the counter-radicalising narrative, a mirror image of the relationship with the radicalising teacher. Interviewee 2 had a similar experience, developing a relationship of trust and understanding with the crisis intervention worker who he met in prison. Rather than giving up on him like everyone else, this man kept coming back and providing support. We have seen in the above section the importance of the relationship between intervention workers and vulnerable individuals in rebuilding their support systems.

While exposure to a radicalising narrative is important for the radicalising process, exposure to a deradicalising, or prosocial moral narrative which may also be transcendental, categorical (e.g. focused on group belonging), and action-oriented is important for the deradicalisation process. These narratives are discussed in more detail in the following chapter, but we have already seen that learning a different interpretation of Islamic texts was of importance in beginning the deradicalisation process for interviewees 6 and 11, while for interviewees 1 and 9 it was adopting an entirely different narrative, based around spirituality and an alternative

music scene. Being exposed to narratives based on tolerance rather than divide was particularly important to all the interviewees who discussed this part of their past.

6.3.6 Emergence for deradicalisation

While the factors which affect the emergence of radicalising settings are the hardest to see, there were examples given within the interviews of practices taken or factors at work which aided in the deradicalisation process, or the prevention of the emergence of radicalising settings in the first place. While cultural heterogeneity is posited by Sampson (1989) to negatively affect the development of social networks between citizens, it was noted by interviewee 8 that the hardest ethnic group for his organisation to infiltrate in order to gain recruits was the Gujarati community, who were known for being *'very inward looking'* and unwilling to mix with other groups. In this case, this social isolationism and high levels of internal monitoring prevented the emergence of radicalising settings within that community. Nevertheless, interviewee 5 insisted that building social networks between heterogeneous groups was the way to protect against radicalisation: *'any intervention should seek to build that diversity in the social and friendship life of the young person… the ones who've got these diverse friendship groups are resilient in the first place to any approaches by extremists'*.

A lack of community groups and spaces is another sign of social disorganisation within a community, and three of the interviewees discussed the need to reverse this through various initiatives. Within his area, interviewee 5 spoke of a scheme called 'Every Child a Musician', encouraging children from different ethnic groups to mix while learning musical instruments, and mingling in a monitored setting in their spare time. In Canada, interviewee 6 had also initiated different groups to build links within the community: *'one of the things that we've tried to do is sports out of the local mosque, so like whether it's hockey… the basketball might help if that's what they're into'*. Interviewee 11 talked of the importance of monitored spaces to bring individuals together to discuss potential grievances: *'you need to get some kind of critical argument or critical analysis kind of workshops going for them… or debate clubs, whatever it is'*. By bringing people together and expanding social networks in monitored spaces, it prevents people from remaining isolated and conducting potentially antisocial activities in more private spaces.

Building a higher level of collective efficacy within a community might be expected to help prevent the emergence of radicalising settings, as the community would be more willing to intervene – and confident in the effectiveness of their intervention – if they noticed radicalising activity. We have already seen how within the area in which interviewees 5 and 10 work, the local community joined with the local borough council to ensure that extremist

organisations and individuals using radicalising narratives are not allowed to hire out public spaces in which to do this. Encouraging the building and maintenance of trust with the authorities would be an important step in the process of removing or preventing the emergence of radicalising settings. This particular case was a noteworthy example of how the local socio-political climate impacted upon the emergence of these settings. Not only did the borough council refuse to give space to extremist organisations, they also took other steps. Interviewee 5 mentioned that: *'we don't really recognise self-appointed community leaders'*, preventing those who claim to represent a specific faith community from gaining access to council funds and premises. He also noted that: *'the council doesn't fund single-faith organisations'* in order to encourage community cohesion at all times. Segregation on any grounds within organisations is not encouraged by the council, and this is intended to help to promote social networks between residents and prevent one particular group feeling as though they are not benefitting from council funds as much as others.

Finally, regarding generational dynamics, it has been mentioned by more than one interviewee that one of the tactics used in deradicalisation efforts is to rebuild the relationship between parents and children, and foster an environment in which intrafamilial communication is enhanced. This was a particular focus of the efforts of interviewee 6, who encouraged the parents of vulnerable individuals to not only open lines of communication and encourage honesty and openness, but to actually fund free-time activities which might not be traditionally religiously tolerated, such as going to the cinema, as long as they were in settings in which radicalising narratives were not present and the parents knew the whereabouts of the children and their time of return. Inasmuch as the children felt more able to be honest about their activities, parents were better able to monitor their behaviour.

6.4 Discussion

From the analysis of the interviews, we can see the presence of the majority of the factors listed in section 6.2.1. Interviewees had more knowledge of certain aspects of the radicalisation process than others, and as expected the questions relating to the emergence of radicalising settings proved the most difficult to elicit information about. It was often much easier for individuals to speak from their own experience of radicalisation, where it existed, than to speak in detail for those that they had worked with, and at times interviewees were keen to stress that their answers were based on people who must all be considered individual cases, rather than generalised from. Nevertheless, patterns emerged and it was interesting to note that while there were definitely similarities between cases which spanned ideological and geographical boundaries, there were also certain nuances which were very much contextually specific. The role of the music scene in the radicalisation of far-right cases in both the UK and

North America is one example of this, while the importance of religious education as a protective factor against Al-Qa'ida-inspired radicalisation is another.

When assessing the role of individual vulnerability in the radicalisation process, the role that moral vulnerability appeared to play has to be emphasised. The lack of a strong attachment to a conventional moral framework was identified as a risk factor in eight of the interviews, and this often played a cumulative role alongside cognitive susceptibility on the part of the individual. Those with poor decision-making skills were often more easily led by those to whom they developed an attachment who were espousing a radicalising narrative. The impact of lifestyle changes or exposure to new environments (as seen by Brandon 2009 and de Poot and Sonnenschein 2011) seemed tied into the lack of support system that many of the interviewees stressed as greatly important, and it was this support system that deradicalisation professionals sought to build back up as soon as possible when working with those that had been radicalised.

The influence of social networks on the exposure to radicalising settings was illustrated strongly within the interviews conducted. Whether through family, friends, or indeed networks developed through preferences associated with self-selection (e.g. preferences for certain kinds of music, sports etc.), it would appear that social selection is a particularly powerful factor in the radicalisation process. This supports the findings by Bakker 2006, Sageman 2004 and Wiktorowicz 2004 as to the importance of social networks in the radicalisation process. The role that the radicalising agent (e.g. a teacher) plays should also not be underestimated, with those professionals who have worked with individuals influenced by Al-Qa'ida-inspired narratives particularly keen to stress the importance of charismatic individuals who are empowered by an apparent knowledge of Arabic and the Qu'ran, which is used to imply credibility to both them and the message they imbue, as reported upon previously by de Poot and Sonnenchein (2011) and Precht (2007). Interviewees also stressed the action-oriented and group-focussed nature of the narrative used by these radicalising teachers when socialising vulnerable individuals into the unconventional morality which they promote, as previously noted by Leuprecht et al (2010). The promotion of equally compelling counter-narratives by knowledgeable individuals was seen in the deradicalisation process, while replacing social networks which contained radicalising influences presented an opportunity for immediate action.

As expected, factors which affect the emergence of radicalising settings were more difficult to gain concrete information on, but nevertheless there were definitely patterns which could be found in the interviewees' answers. Signs of social disorganisation were widespread in the areas in which radicalising settings were found, and there were also examples of low levels of

collective efficacy within those communities. The role of generational dynamics, as theorised by Roy (2004), seemed particularly prominent in the Al-Qa'ida-inspired cases both in the UK and Canada, and this relates to the contextual factors of immigration and integration in both countries (Leiken and Brooke 2006). It was no surprise that the role of the internet as a largely unmonitored setting hosting radicalising narratives and encouraging exposure through social networks was emphasised by all interviewees (see also Jenkins 2011 and Neumann and Rogers 2007), and it appeared that for a small number of individuals online social networks had almost entirely replaced the need for physical contact in the case of the far-right.

Building social organisation in certain areas, promoting community cohesion through groups and activities, as well as addressing counterproductive intergenerational dynamics were identified as strategies to help create communities that were resilient to the emergence of radicalising settings. These strategies are discussed in more detail in the following chapter, where what works in deradicalisation and counter-radicalisation programmes is examined.

It is important to note that qualitative research such as this does not make claims as to the generalizability of the data acquired. No interviews were conducted with people in similar communities which had not experienced radicalisation to act as a control and we therefore have no data to suggest that radicalisation occurs in all communities with lower levels of social organisation or collective efficacy, or indeed does not occur in those communities with higher levels of these factors. Nevertheless, the research findings here provide a unique insight into the experience of the interviewees and the participants that they have to deal with during their professional careers, and this experience is further drawn upon in the following chapter.

7. Observations on deradicalisation and counter-radicalisation programmes

All of the interviewees had experience of working on programmes which involved de-radicalisation, counter-radicalisation or more general anti-violence work. This was either in a private context, through their own organisation, or through the UK government's Channel programme (discussed below). The experience of the interviewees ranged from 2 years to 27 years on such programmes, with far-right and Islamist ideologies being targeted by the interventions and work being conducted in the UK, USA and Canada. While the focus of this thesis is on the process of radicalisation, developing an understanding of this process allows us to inform its disruption through counter-radicalisation and deradicalisation programmes. It was therefore decided to ask the interviewees about the contents of the programmes they worked on, their aims and objectives, the changes they aspired to achieve and the effects of the different contexts in which they operated. This was of particular interest, as it was hypothesised that the differences in geography, and therefore differences in legal and sociocultural environments, would affect the design and implementations of the programmes.

Due to the fact that 6 of the interviewees had direct experience of working on the Channel programme, it was possible to do a more in-depth exploration of this particular initiative. The interviewees were asked to give their opinions, backed up by anonymous examples where possible, of the way the programme was run, their professional experience of training themselves and others who worked on Channel, and the programme's strengths and weaknesses. The interviewees came from different levels of management and practice on the programme, and were therefore able to provide a unique perspective of the workings of the strategy from different levels. As far as the researcher is aware, this is the first time an academic has interviewed members of the Channel programme in depth about their professional experiences. A comparison was finally drawn between the Channel programme and those which were non-governmental, contrasting their strengths and weaknesses in light of the interviewees' experiences.

Deradicalisation, disengagement and counter-radicalisation

The difference between disengagement and deradicalisation is crucial not only for designing programmes to facilitate either of these processes, but also in being able to evaluate them (Horgan 2008). There may be plenty of individuals who physically or emotionally disengage from terrorist or extremist movements, but continue to hold a propensity for terrorism, believing the ideology to be morally correct. Deradicalisation programmes must alter this

propensity, not just have an effect on an individual's behaviour (ibid; Fink and Hearne 2008; Horgan 2009; Schmid 2013). There has been a proliferation of programmes that call themselves 'deradicalisation' over the past decade, with varying aims including disengagement, rehabilitation and demobilisation (Horgan 2008). Whether these programmes seek to affect propensity change in their participants is not always clear, however. These programmes are run by governments, NGOs and community organisations, with national or local initiatives and differing oversight. In a comprehensive review of programmes to deradicalise Islamist extremists, Rabasa et al (2010) address the differences between disengagement and deradicalisation, as well as comparing the approaches of deradicalisation programmes in the Middle East, South East Asia and European contexts. When using recidivism rates as their outcome, most of these programmes claim great successes, but the authors query whether this is the appropriate measure of success. In assessing what they believe to be components most necessary for the success of a deradicalisation programme, Rabasa and colleagues note the importance of 'efforts that have affective, pragmatic, and ideological components that continue after the completion of the program' (2010: 36), in order to fulfil the emotional, social and practical needs of their participants. This may include counselling, finding housing and a job, and creating new social support systems. The credibility of the deliverer of any counter-narrative (the ideological component in these programmes) is also highlighted. Finally they stress that programmes should not just target the most overt members of a group, but those on the fringes and support members too.

Deradicalisation programmes are often aimed at those who already are members of terrorist or extremist groups, or individuals who have been imprisoned for terrorist offences, and have a rehabilitative element. Counter-radicalisation programmes on the other hand take a more preventative approach and often involve working in or with communities of interest, especially with partner organisations within that community (Schmid 2013). Indeed it can be said that '(t)he main focus of counter-radicalisation efforts is therefore not the terrorists themselves but rather the strengthening and empowering of the community from which they might emerge and which might, if neglected, be deemed potentially supportive of them' (ibid: 50). The UK government's Prevent strategy includes promoting alternatives to the radicalising narrative through partner organisations in Muslim communities (Home Office 2011). Successful counter-radicalisation programmes may seek to improve social cohesion, enhance resilience amongst communities by empowerment and capacity building, and encourage stronger lines of communication between government and vulnerable communities (Schmid 2013).

While it is beyond the scope of this research to conduct an evaluation of the programmes which the interviewees have knowledge of, it is important to acknowledge the difficulties

inherent in attempting such a feat. Horgan and Braddock (2010:268) note that, despite the myriad of programmes now calling their aims deradicalisation, ‘(n)o such program has formally identified valid and reliable indicators of successful de-radicalization or even disengagement, whether couched in cultural, psychological, or other terms’. With such a lack of clarity on both a practical and conceptual level, we return to the problem of recidivism as the primary indicator of success in a number of studies, rather than any objective measurement of propensity change. Other problems with evaluating such programmes include the government withholding data on outcomes from researchers, the short length of time many of these programmes have been running, and keeping track of former participants over a prolonged period in order to obtain measures of success, however these are operationalised (Rabasa et al 2010). We now turn to the observations on the deradicalisation and counter-radicalisation programmes from the interviewees in this thesis, beginning with an overview of the Channel programme, of which 6 of the interviewees had extensive knowledge.

7.1 Channel

Channel is a component of the Prevent strand of the UK Counter Terrorism Strategy CONTEST. It is specifically designed to ‘identify individuals at risk of being drawn in to violent extremism, assess the nature and extent of that risk [and] develop the most appropriate support for the individuals concerned.’ (Channel 2010:7). By working with a multi-agency panel consisting of various representatives from local authorities, an intervention package is designed for each individual who is referred to Channel and taken on the programme, depending on their specific needs. Referrals can be made to the Channel programme by almost anyone, including local authorities, teachers, doctors, law enforcement officials and the prison service. Individuals are assessed as to their suitability for the programme, and the intervention package put in place may include mainstream services such as housing, employment and health services, as well as counselling and faith guidance. The multi-agency panel meets on a regular basis to assess the progress of each case, and will determine if and when an individual can leave the programme.

Channel is a voluntary programme – while individuals may be referred and taken on the programme, they do not have to comply with any help or assistance offered, and may refuse to be involved in any way. According to the most up to date figures available, from 2006/7 to 2012/13 a total of 2,653 people were referred to Channel. Of these, 537 went on to be assessed as vulnerable and receive help from the programme (ACPO 2012). This is only 22% of those who were referred. The vast majority of those who were referred but not adopted onto the programme will not have been assessed as vulnerable according to the Vulnerability Assessment Framework (VAF) used by Channel. The VAF includes sections relating to an

individual's engagement with a group, cause or ideology, another relating to their intent to cause harm, and the final section assesses their capability to do harm (Channel 2012). There is a checklist of 22 factors relating to these sections, and an individual is scored from 0 to 2 on each factor. The score from each factor must then be accompanied by evidence as to why it was given.

In many cases where ideological or faith guidance is required as part of the programme, an intervention provider with expertise in this area will be employed to visit the individual. Providers generally have expertise in either Al-Qa'ida-inspired or far-right narratives. A list of accredited and trained intervention providers has been created by the Office for Security and Counter-Terrorism (OSCT), and local authorities are encouraged to choose their providers from this list. Nevertheless, some local authorities continue to use providers who are not on the list, or make use of existing expertise within their local Channel team. Six of the individuals interviewed as part of this study had first-hand experience of working on Channel. Two are intervention providers with expertise in Al-Qa'ida-inspired narratives; another is a provider with expertise in far-right narratives. The other three all worked for local authorities as part of the Channel team. All three had experience of organising interventions, and two of them provided the ideological interventions as part of this for their local authority using their own expertise.

The interviewees were asked questions about their experience of working on Channel, about the interventions which they organised and/or provided, and what they considered to be the most successful and unsuccessful parts of the programme. The experience of the interviewees varied, ranging from one who had worked with a dozen individuals who were referred to the programme and another with the experience of almost a hundred individuals. The geographical areas covered by the interviewees include London, the Midlands, North East, North West, South West and Wales. The interviewee providing far-right interventions was particularly well-travelled due to a lack of intervention providers with expertise countering this narrative. A number of themes emerged from the interviews, which are discussed below.

7.1.1 Choice of intervention providers

The choice of intervention providers was a theme which the interviewees were particularly passionate about. The lack of accredited providers with expertise in far-right narratives was of concern to interviewee 4: *'for a time there was probably only me and this other guy that's stopped doing it… police forces everywhere say we can't get anyone, so that's why I end up having to travel from Plymouth to you know, Newcastle or wherever'*. A perceived lack of competency amongst some of the providers who had been accredited was another concern:

'I've mentioned about the credibility factor, it does concern me… the guys that I've worked with, I can't picture some of the people working with them, I just can't see it happen'. This sentiment was echoed by interviewee 8 amongst the Al-Qa'ida-inspired intervention providers: *'some of them are nice but I really wouldn't, I dread to think what they would do in a tough case scenario'*. He then raised a vital point about the need for competency amongst providers: *'the net result of not convincing someone [to change their extremist ideology] is the opposite, is reinforcing their point of view, and so the consequences are worse'*. However, he also mentions that this competency would be hard to assess: *'how do you ascertain competency?... I don't think there is any formal measure or way of judging competency [amongst intervention providers]'*.

Within his local authority, interviewee 5 noted the concerns over the competency levels of OSCT-accredited intervention providers: *'the fact that we've done our own interventions would suggest our level of confidence in the providers that have been suggested to us'*. In his previous experience of being part of a political Islamist movement, he had contact with some of those intervention providers and was scathing in his opinions of them and the process by which they became providers:

> *'Pretty much anyone who put their hand up and said 'I can do this, I'm an intervention provider, give me money' had money… I suspected that they were trying to piggyback onto the Prevent agenda to push their own theological motives… some of these individuals have made up their back stories actually… It's one of those cases where I think in government where if you back a horse for long enough, you've gotta keep backing him forever'.*

When deciding what to do in this case, the local authority drew up a checklist of what they would expect to be on the CV of an intervention provider. Their assessment was as follows:

> *'we clearly saw that the people who are currently being funded wouldn't have got the job because they had nothing other than saying 'I can do it'… they hadn't come from a teaching background, a social work background, they weren't, you know, from a theological point of view recognised scholars'*

This led to the local authority choosing to adopt a different strategy from that taken elsewhere: *'there is expertise within [the authority], within our schools, within local authority, and we think the best way to do it is to utilise what we've got'*. He found that this approach was particularly positive when it came to encouraging those within the education sector in the local authority to work with them on Channel. Nevertheless, this led to a stumbling block when it came to national governmental mechanisms: *'the Home Office would not accept us as intervention providers. They would not accredit us'*. This has meant difficulties when it comes to funding provision as well as acceptance of expertise and training provision.

7.1.2 Training

The training given to intervention providers was another point of contention. Part of the problem of competency could and should be overcome by effective training programmes but the level of training received by providers varied. Not only did interviewee 4 have no training, he was asked to provide training to others: *'we were asked by OSCT to train potential new providers and new providers, so we did that, but that was just a day's training on the extreme right and the far right'*. While the competency of interviewee 4 could not be questioned, having worked for over 20 years providing counter-narratives on the far-right, it remains that he had no official training from those running Channel. As a provider of the counter-narrative for Al-Qa'ida-inspired ideologies, interviewee 8 received a much more comprehensive training programme: *'we were sent on a particular course at Al Ansar University that looked specifically at the remit of jihad… and we do have a regular seminar where we share best practice and training'*. He also mentioned skill-specific training when it came to the VAF: *'the Home Office did make an attempt to train us on how to develop that way of thinking and how to make that type of analysis on what the factors are'*. However, he remains sceptical about the amount of expertise within Channel as a whole:

> *'one of the criticisms that I have… is the absence of expertise at all levels and in all aspects of those who are supposedly working on it… the vast majority of my colleagues don't know anything about this… some people have done a sort of short course in Kings [College London] on this, on radicalisation'*.

From the perspective of those interviewees who worked for local authorities, rather than as intervention providers per se, the picture was a mixed one. Interviewee 7 noted that: *'I've had a lot of training on Islamist [ideologies]… there's a lot of in house training going on. I mean for instance I went on a mental health course'*, while when asked whether he had received training from the Home Office for Channel, interviewee 5 replied: *'no, no not at all'*. However, within his remit in his local authority, interviewee 5 adapted one of the Home Office training programmes on Channel to deliver to teachers in local schools. While this was well received by the majority of teachers, he observed that:

> *'We have had issues with individual teachers who have been extremely hostile to the Prevent agenda… who come from the political far-left who are offended on behalf of Muslims… Some of the hostility was simply expressed by a sort of sullen silence and negative body language. Other times open hostility with loud criticisms and loud accusations during the training itself… When you think these are teachers responsible for, you know, looking after young people, it's still more than we'd like to have seen to be honest'*.

The hostility from some teachers in the example above is particularly concerning to the interviewee as it may affect their desire to refer vulnerable young individuals in their care to

the Channel programme. This hostility created a real problem within the local authority in which interviewee 5 and 10 work, where it seems that the lack of relationship between the school and the local authority in the borough led to the radicalising exposure of children in a neighbouring borough.

As elaborated upon by interviewee 10:

'this young lad was picked up a couple of years ago in another borough in another school for being vulnerable to radicalisation. At that time the school didn't engage in the Channel process, didn't want to know what Prevent was, shut the door. Now this kid a couple of years down the line has moved, is come to college, same issues and concerns have come up, even? worse, worse issues and concerns have come up. So he's had a few years to develop his views and gone from being radicalised to becoming radicaliser. Now he's got a following of girls and guys who look up to him.'

7.1.3 Referrals

The main theme from the interviews regarding the referral process concerned the threshold at which an individual would be considered vulnerable and referred to the programme. The thresholds for referral differ between local authorities, with interviewee 5 noting that in Cardiff: *'their threshold was incredibly low compared to ours… they would accept somebody through association'*. Therefore, if an individual had any association with a known radical, that was enough for a referral. This threshold was one which the interviewee wanted his local authority to adopt, noting that: *'the threshold for adoption onto Channel needs to be lowered, significantly lowered'*. He worried that in his area, they sometimes had to wait until they knew an individual held radical views and espoused these in public before they could intervene, despite being aware of their views months beforehand: *'because Y has never said, stated anything explicitly, you know, extreme, violent jihadi, there is no evidence to adopt them onto Channel'*.

Mis-referrals were also an issue to some interviewees, with interviewee 7 stating that: *'a lot of the time you get people who refer things and there's no ideology to kill, they're just nuts… so obviously it's not a Channel issue'*. The low numbers of individuals who are referred to the programme who go on to be adopted was well illustrated in his geographical area: out of 36 referrals in the two months prior to interviewing him, only 2 went on to be adopted onto Channel. Paradoxically, this might have been because most individuals, rather than scoring low, were scoring too high on the VAF: *'Engagement, intent, capability. By the time they hit intent and they're scoring high, they're not with me, they're elsewhere'*. However, in the majority of cases the scores were in fact too low. Interviewee 10 noted that: *'when I first started there were quite a few mis-referrals. And we call them pre-Channel or sub-Channel, so*

they wouldn't even meet the Channel threshold. But I'd still work with them, just in case'. There seems therefore to be a disconnect in the system – while the threshold for adoption onto Channel was deemed to be too high in some areas, there were also large numbers of cases being referred to Channel that were not severe enough to be considered by the team in the local authority.

7.1.4 Suitability of Channel for individuals

These threshold issues illustrated another serious factor: the suitability of the Channel programme for certain individuals. The prevalence of mental health cases was raised by some of the interviewees, who noted that for such individuals, ideological change was not the priority. Interviewee 7 stated that: *'you've gotta sort out some hard core mental health issues before you can deliver… the mental health cases take longer to deal with than all the other cases put together'*. Interviewee 8 shared a similar experience: *'[there] was a chap who was basically having some difficulty with mental health cases… in that one initial session [it was about] coming to the realisation that there isn't really a risk here'*.

The other factor of suitability which interviewees mentioned was when dealing with individuals who have actually gone through the radicalisation process, rather than merely being vulnerable to it. From his experience interviewee 5 noted:

> *'I think one of the areas where we struggle, collectively struggle, is with the older individual who may be in their mid-20s or older, who has been exposed to this sort of thinking a long time… how effective can [Channel] actually be in genuinely turning them around when they've had a long long time of people telling them 'don't listen to anyone else''*.

He gave a case where younger individuals already appeared beyond intervention, highlighting again the limitations of the system of thresholds for referral:

> *'even though these girls might only be 17, 18, 19, it might already be too late. They already know what Channel and Prevent is, they've already been convinced that Channel and Prevent are, quote, enemies of Islam, and I have very serious doubts about the extent to which any intervention would work now… we became aware of these students a long time ago when it might have been the time, but of course again back to the threshold, it didn't meet the threshold. It didn't meet the threshold so we didn't do anything'*.

Such examples are provided in support of the interviewees' case for 'adoption by association', where instead of waiting for an individual to openly declare radical views, their association with those who do is enough to meet the Channel threshold for further investigation. According to the interviewees, by having to wait, the chance of successful intervention with these young girls may have been lost.

7.1.5 Youth intervention

Young people such as the above example make up a large amount of the referrals to Channel. Interviewee 7 confirmed that: *'60% [of people adopted onto Channel] will be under the age of 20'*. This tallies with what is known about the relationship between age and crime, and about the role of increased agency in young people for the radicalisation process. In order to intervene successfully with youths, specific strategies were adopted by the interviewees. One thing that interviewee 5 offered was that: *'sometimes the intervention will involve working with the teachers to ensure that they are observant and responsive to any issues that may arise in the classroom, without necessarily working directly with that young person'*. Interviewee 10 noted the importance of the relationship that you build with that young person:

> *'you have to have a rapport with kids and you have to build that with them… their teachers don't necessarily know [what they are talking about], and their parents don't necessarily know, then they find someone that does know and they think 'oh ok, I can talk to this adult about this and they understand what I'm trying to say'.'*

Building that relationship, the rapport, and showing that you can relate to the individual were all seen as vitally important to a successful intervention.

7.1.6 School participation

The involvement of schools in Channel was seen as crucial by the interviewees. Within East London, the investment that the local authority decided to make was in providing training for the teachers in all primary, secondary and sixth-form schools, so they would have the ability to spot some of the signs of vulnerability in their pupils and would feel comfortable working with the Channel team in referrals. The logic behind this, according to interviewee 5 who created and led the training, was: *'they spend far more time with the teacher than they do with the parents'*. In building the relationship with the schools, they found it was highly beneficial for both sides: *'the schools and colleges were much more comfortable about referring their students in when they realised that the work or the job of working with those vulnerable students, would go back to them with a bit of external support if required.'*

In order to build the relationship with the schools and colleges, interviewee 5 used his previously-existing social networks from his prior job within the local authority: *'this was made very easy for me cos I was a known person to the schools, to the head teachers… because I'd had this previous role on community cohesion… so essentially the doors were open for me'*. He noted that being able to speak to management was crucial in getting the school's backing for the Channel programme: *'I think the key thing about getting into schools was I was able to speak to head teachers'*. A unique offer to the schools made the Channel team even more of a

valuable resource: *'We offered a 48 hour response time to any concerns that they might have of anything related to extremism or radicalisation'*. By working in the schools, with the schools, and for the schools, providing training to teachers and building on previous relationships of trust, this local authority appears to have created strong and positive relationships with educators.

The ability of schools to participate in Channel was appreciated by interviewee 7 who noted that: *'we would do quite a lot of our meetings via the school'* for those individuals for whom it was appropriate. This also utilised the environment of the school: *'they expect them to do what the school tell them to do'*, something which was also taken advantage of by interviewee 10: *'I think schools are the best place to start because you've got your captive audience there'*. The notion that Channel operates on a voluntary basis, whereby individuals can refuse to take part, may dissipate somewhat in the school environment. While no suggestion was made that the children were forced to take part, the expectation to comply within school grounds certainly seemed to help.

7.1.7 Channel: successes and failures

All six interviewees with experience working on the programme were asked for their opinions and practical examples of the successes and failures of Channel, many of which have already been highlighted above. Building a partnership with schools and using existing relationships where possible, alongside having a captive audience in those places, were all examples of positive elements. The ability to empathise with the children in these settings and having the knowledge to discuss what they wanted to talk about was also essential to success. This last point touches on the issue of credibility of intervention providers, and those providers who had this credibility used it to their advantage. In terms of the individuals inspired by far-right narratives, interviewee 4 found that his fashion sense and knowledge of the punk music scene provided him with a level of credibility, as well as a talking point to break the ice. For interviewee 8, his former participation in an extreme Islamist group and considerable knowledge the Al-Qa'ida-inspired narrative offered him that credibility with those amongst whom he intervened.

The holistic approach to interventions made possible by the Channel panel was another ingredient of success highlighted by many of the interviewees. By having representatives of various arms of the local authority on the panel, it was possible to get help for individuals regarding housing, employment or benefits, substance abuse, healthcare and education, as well as any counselling or ideological intervention needed from a counter-terrorism perspective. This was particularly important in the case of individuals with mental health

issues, as highlighted above. This holistic approach also let interventions focus upon the different activities an individual could get involved in, such as sports or music, in order to remove them from the radicalising setting and the social network which was exposing them to the radicalising narrative. In conjunction with this, the ability to tailor each intervention programme to the needs of the individual rather than employing a 'tick box' approach was particularly welcomed and seen as a vital tool by all the practitioners interviewed.

Early intervention, where possible, was perceived as key to the success of the programme. However, one of the failures of Channel as experienced by the interviewees was when this early intervention was not possible and they had to work with individuals who had already been radicalised, some for a considerable period of time. Part of this failure was put down to the threshold for referral and adoption onto Channel being too high, and certainly it appears that this threshold is not geographically uniform. By having to wait until radical sentiments were expressed in public, at least one case of group radicalisation within the local school system was noted by interviewee 5. This particular case also highlighted the difficulty of Channel in schools which did not subscribe to the aims of the programme and refused to work with their local authority. Whether this was due to a general unwillingness within the school, or the lack of a strong relationship between the school and the local authority as seen in the borough in which interviewees 5 and 10 worked, is not known, but strengthening relationships with local schools can only help.

Problems with the intervention providers put forward by OSCT, whether with accreditation, training or credibility gaps, made up another set of point of failures concerning Channel so far. The fact that many of these issues can be addressed with better training or experience on behalf of those providers is positive, but it seems that issues remain with not enough being done to ensure that only those providers with genuine expertise and credibility are accredited. The seemingly inflexible position taken by OSCT on the accreditation of in-house expertise in the case of interviewees 5 and 10 also appears to be a weakness.

Despite the holistic approach available to the Channel panel, it would seem that the focus remains squarely upon theological interventions in many cases, and sometimes this may not be the most appropriate approach. Interviewee 5 mentioned that with some of those adopted onto the Channel programme: *‘what this individual needs are activities that give them an alternative to religion rather than more but slightly different religion, and I think that for a large part of the time, Channel has an undue focus on theological sort of interventions’*. While it is may seem necessary to provide an effective counter-narrative to those individuals who are immersed in the radicalising narrative, it is also necessary to prevent their continued and repeated exposure to that narrative, and this is only likely to be achieved by changing their

environment or their social networks. When interviewee 5 stressed the need to *'give him something else to do which doesn't involve him obsessing about religion all the time'*, they are expressly acknowledging the need to effect a change of environment and creation of new social networks within it.

One approach which proved divisive amongst interviewees, with some noting its strengths and others its weaknesses, was the involvement of law enforcement officials in the process. While interviewee 5 noted that: *'I think that some of the successes of Channel are… that individuals realise that… they've drawn attention to themselves, that a police officer's phoned them up… and they are then inclined to, you know, pull their necks in as it were'*, interviewee 7 commented on some of the limitations of that approach: *'if I was to turn around and say what do you consider to be a contribution towards some failures, it's the ones where we've had to knock on the door'*.

The voluntary nature of Channel has also divided opinion. Channel was designed as an early intervention programme for those whose activities had not crossed the criminal threshold, so making it compulsory was always going to be extremely difficult. However, in the words of interviewee 5: *'where they won't engage, what happens then?'* Interviewee 4 noted that: *'we've had a few failures where either they don't want to engage or they're just impossible to engage with'*, but when questioned as to whether he thought engagement with Channel should be made compulsory, his view was: *'I could swing either way with that'*. There are obvious benefits to the programme being made compulsory, but also benefits to it remaining voluntary. It would appear that while Prevent has drawn much criticism and proved divisive amongst many communities in the UK, Channel has avoided much of this negative attention. While the programme obviously has its strengths and weaknesses, it seems to have been well received by the practitioners interviewed, and indeed is being considered for adoption (with required adaption to the local context) in both the USA and Canada.

7.2 Non-governmental programmes (UK, USA and Canada)

Seven of the interviewees worked on counter-radicalisation, counter-extremism or more generic anti-violence programmes within their countries, which are not government funded and organised. The content of these programmes is described below, alongside the interviewees' perspectives on their successes and failures. Finally, the effect of local community and governmental policy issues on the programmes' implementation and outcomes is discussed.

7.2.1 Programme content

Interviewees 3 and 9 are part of the same organisation which works predominantly in the USA, but also in Canada. This organisation works with former and current extremists, as well as young people in schools to prevent them from going down that path. Interviewee 3 said the organisation aims *'to provide opportunities and avenues for people who are either already going down that path [of extremism], who are far from going down that path, who are quite young, or for people who are already enmeshed in that and are trying to get out'*. This remit is extensive, but it appears that a large part of the outreach work being done is with young people: *'we've started to develop curricula for schools that's based on diversity and inclusion'*. This involves the former radicals who are part of the organisation visiting these schools and sharing their experiences to encourage the pupils to take a different route.

Interviewee 1 runs his own community outreach programme in schools in different areas of Milwaukee, bringing together students from parts of the city who may not have the opportunity to encounter each other in their daily lives. Pupils are encouraged to be 'peacemakers' within their city. The programme has a 3 pronged approach: *'one is that we get our students to realise their intentions for peace via creative outlets. Two is we get those students out in the community doing community service. Three is we engage each school with a global mentor'*. These global mentors are other former extremists or prominent individuals who work to counter violent extremism across the world.

Interviewee 2 currently runs a re-entry programme for newly released prisoners at high risk of reoffending in the Milwaukee area. This involves a holistic approach to help them with their housing needs, employment needs, as well as extensive weekly counselling sessions to prevent any recidivism and thoughts or actions of violence. He has previously run a community outreach programme involving working with young people who were part of, or vulnerable to the influence of, gangs within the area, again taking the same holistic approach to their environmental conditions as well as counselling where appropriate.

Interviewee 6 runs a counter-radicalisation programme in his local community in Toronto in conjunction with the mosque. The twelve-step programme he designed is based on a chronological approach to Islam and more: *'I talk about the commonalities between the Abrahamic faiths… seeking common ground not fighting ground… you use your religion to separate yourself from other people or you use it to join yourself to other people'*. This programme was designed as an extension to a crime prevention programme already used by the mosque. He also provides counselling and mediation within the local community for both crime prevention and counter-radicalisation.

Interviewee 4 runs a counter-extremism programme in the UK which is mainly for school and college students, but has also involved training various professionals: *'we do a lot of police training, teacher training, youth work training, social workers'*. This training involves counter-racism and counter-extremism work, looking at far-right narratives and their counter-narratives. He uses both sociological and biological tools with the participants' permission, including DNA lineage testing which is used to show the genetic and geographical lineage of an individual. His work originally involved community and residential work with at risk youths in areas where the far-right were influential, combatting their narratives and encouraging community cohesion. He has designed a training DVD and workshop package used in schools and local authorities, including one which allows individuals to train others to deliver the package.

Interviewee 11 works for an organisation in West London which delivers counter-radicalisation programmes within the local community. This involves youth work, organising conferences, inter-faith dialogue and workshops with experts in the field. Interviewees 1 and 2 participated in a Skype conference she organised in West London for vulnerable youths *'so they were able to talk about their insights from when they were involved [in extremist groups and gangs], and young people were able to interact with that, with them'*. A follow up involving Muslim gangs in the local area is in progress. She has worked extensively with vulnerable youths and women from the Muslim community, using her own experience of being part of an extreme Islamist organisation to prevent others from following the same path.

7.2.2 Programme objectives

While all of the programmes are slightly different, whether targeting the community, individuals, youths, women or current violent extremists, there were definite similarities in the changes which they hoped to inspire within their participants. Changing the individual's value systems, improving decision-making skills and encouraging positive engagement on the issues of violence and extremism were all highlighted by the interviewees. Within his re-entry programme, interviewee 2 noted that: *'I don't let them off the hook by saying 'I don't wanna be violent anymore', I have them looking at, well, what beliefs do you want in exchange?'* The importance of committing to a new value system, as well as renouncing the old one, was also highlighted by interviewee 1 in his work in schools: *'we're shifting values, getting kids to value compassion, to value kindness, to value hard work and discipline, to value joy, and to look at other things that society kinda imposes upon us as values'*. These are both examples of building up an individual's commitment to a prosocial moral framework, an important part of decreasing their vulnerability to radicalisation.

It was not just thoughts but actions that were targeted, and interviewee 3 insisted that: *'we definitely are trying to change the way that they think and the way they act… I think by doing that we're forcing them to make their own decisions and act differently'*. The improvement of decision-making skills was echoed by interviewee 6: *'inoculating them as best as possible, decision-making, equipping them with proper decision-making skills'* was of vital importance to him. Improving their decision-making skills decreases their cognitive susceptibility to an antisocial moral change, an important component of individual vulnerability to radicalisation. Interviewee 11 also noted the importance of action, but in the right direction: *'let's get them engaged more. If they want to discuss anything, vent it off at the right people… they can do it in a safe place for discussion. If they feel that they want to go further ok, join some mainstream campaign groups'*. Practitioners aim to canalise youths' need for action through activities which encourage self-expression and engagement and identification with mainstream, prosocial narratives.

7.2.3 Programme successes and failures

When asked what they thought worked within their programmes, and what didn't work, the interviewees provided a range of examples. The ability to successfully build a relationship with their participants was key, including building trust and rapport and giving support whenever needed. Interviewee 2 noted that he:

> *'kept on coming around, and a meaningful relationship was eventually established with most of these kids… what I started thinking about was what helped me, and that [crisis intervention worker in prison] kept coming to mind. And he was never shocked at what I had to say, he was never judgemental, and so I started trying to duplicate that'.*

He was keen to stress that: *'it's a lot of support, I make myself available, I'm on call all the time, we meet people in the field if we have to'*. This was echoed by interviewee 4, who maintained contact with his participants long after they were no longer officially part of the programme. Part of the support provided is emotional, with interviewee 3 commenting that, when dealing with current and former members of extremist organisations, *'we try and show them as much compassion as we possibly can, cos we know that's, that was the magic that brought us out… It's really about building a rapport and a trust with that person, and really about them making the transition versus us forcing it'*. In the case of interviewee 4, that rapport was often built around an understanding of the fashion and music scenes in which the far-right movements have an interest. Upon meeting his participants, their realisation that he is not a typical man in a suit meant he managed to hold the attention of vulnerable youths: *'we got into this discussion about clothes, and it was nearly 2 hours later these guys were still there*

talking to me'. According to him, this particular group of youths had been declared unmanageable by other intervention workers, who had failed to relate to their interests.

In some cases the relationship was built on the basis of credibility – the fact that many of the interviewees were able to draw upon their own experiences of radicalisation, membership of extremist organisations, and then exiting the movement made them credible purveyors of a counter-narrative. Having in-depth knowledge of that counter-narrative was also important. Being able to deconstruct the notion of race using DNA tests, to show how widespread a person's geographical background is, was very effective in the case of interviewee 4. After revealing his heritage as an Ashkenazi Jew, one member of an extreme-right party told him: *'I'm going back to reflect on a lot of things, a lot of the things that I've done and why I've done them'*. This individual is now involved with interviewee 4's counter-radicalisation work.

Expertise in theological counter-narratives was a factor which interviewee 6 capitalised upon: *'I continued to come with a heavily pro-Islamic background, which is what Muslims appreciated, because I could frame everything in the context of Islamic law, Islamic theology'*. By recognising that, in order for the counter-narrative to be effective, it had to resonate with individuals with regard to their current moral framework, he noted that:

> *'You need to frame this in an Islamic context. You can imitate completely the Western paradigm, completely, word for word even, but use Islamic words for it and you'd be surprised by how different the response is… The non-Islamic approach does not work obviously in ideologically motivated violent extremism… the only way, not an alternative way, the only way is to speak in a language that they understand. It has to be one that engages religious identity and religious theology'*.

Interviewee 11 also advocated using the radicals' own moral frameworks against them, this time in terms of form rather than content: *'you have to look at the way that Al Muhajiroun operate, or AQ kind of circles, or Al Shabaab, so you have to establish a similar method of working. Workshops, discussion circles'*. Interviewee 1 takes a similar tack: *'the way we get them together first of all, and this is applying gang recruitment 101 techniques, we all wear our [organisation] t-shirts, we all rally around that logo, around that idea'*.

A change of environment was one factor of success identified by the interviewees. Referring to the high-risk prisoners he works with, interviewee 2 noted that when questioning them about their housing situation and home environment, *'there were the high risk areas of their life… we can find out how much stress there is'*. By putting offenders back in their previous environment with little or no change, the chances of recidivism in his opinion were much higher. In interviewee 4's opinion, he advocated the need for total removal from that environment in the most severe cases: *'I know in Germany and Sweden they even relocate people… so if there can*

be help with that in terms of literally relocating them… it's gonna come out cheaper than locking people up and keeping them in there'. By removing them from the environment in which radicalising settings are hosted, their continued exposure to these narratives would decrease and their chances of deradicalisation potentially improve.

Some of the interviewees advocated the need for community involvement for programmes to be a success. Bringing children together from different parts of the city, interviewee 1's organisation now has 400 different cross-neighbourhood projects running involving the children and their parents, with arguable benefits to the wider community. Interviewee 2 utilised his contacts with law enforcement, local businesses and religious communities to provide assistance for vulnerable young people and their families within his area. In her area, interviewee 11 noted that: *'interventions would work best if the community allowed it, I'm talking about the wider community… there needs to be an acknowledgement from the community that [radicalisation is] an ongoing issue'*. Without the support of the community, such interventions are unlikely to be as successful as practitioners would hope.

As with programme successes, any failures discussed by the interviewees were also diverse. When he was initially starting his work in the community, interviewee 2 utilised unconventional tactics with some of those he worked with: *'I am ashamed to say it was a lot of aggression in the beginning of my tactics'*. He was imitating those conditions which convinced him to adopt his own violent ideology, but admitted that, *'I discovered later on it was about relationships not about intimidation or any other type of tactics'*. He attributed the failure of many conventional rehabilitation programmes to a specific feature, which he deliberately keeps out of his own work: *'I've had thousands if not tens of thousands of interviews with guys and the number one reason they won't go to a… traditional meeting is because of the religiosity and the implications'*. Rather than enforce religion as part of his programme's agenda, spirituality is welcome, but not required to be part of the process.

Other programme failures reportedly involved inappropriate methods, given the problem being tackled. Interviewee 11 revealed her frustration at one intervention she was privy to: *'ok let's provide them with snooker days. You're not gonna tackle violent extremism like that'*. Her opinion was that a more direct approach was necessary: *'you need to get some kind of critical argument or critical analysis kind of workshops going for them… or debate clubs'*. She believed that allowing young people to confront the issues surrounding violent extremism head-on and tackling them in safe, controlled spaces was a much more productive approach. She also noted that *'the government really needs to engage with grassroots projects that are able to access individuals… have a grassroots approach and not top-down, because that's become very counter-productive'*.

7.2.4 Effects of local community and government context

While the Channel programme is well established in the UK, the Canadian and U.S. governments do not have an equivalent. The Canadian counter-terrorism strategy is much like that of the UK, having its own Prevent strategy which is very similar, but there is no Channel equivalent. In 2011, the United States released its strategy entitled 'Empowering Local Partners to Prevent Violent Extremism', which aimed to build upon what is already known in the country about countering gang issues and building trust within communities, using these lessons to inform CVE work. This programme is very much in its infancy, and consequently in both Canada and the United States, organisations and individuals struggle to gain and maintain funding for their work in this area. Interviewee 3 noted that: *'we've spoke with people in the White House and with different departments, but as far as formal help I think they're still sceptical'*. Even in the UK, organisations have struggled with funding due to the political climate, budget cutbacks and the realignment of the Prevent agenda much more towards counter-terrorism and away from community cohesion work. Interviewee 4 admitted that his organisation has *'always had to fight tooth and nail for funding'*, while interviewee 11 concurred: *'It's all down to funding, that's all it is, just funding issues at the moment, trying to get that pot of money'*.

Worthy of note was that interviewees from the U.S. tied these funding issues into the broader problem of the lack of governmental trust in former violent extremists. Interviewee 3 agreed that the government *'have got to watch who they're allied with'*. Indeed, he is part of a new programme which aims to develop a screening process: *'organisations can use [it] to identify how credible formers are, and I think that was one of the barriers that we thought needed to be broken down most'*. Not only do former extremists struggle to convince the government that they should be trusted and funded, but they then may have to convince the communities in which they work that this funding does not compromise their programmes or their integrity. Interviewee 11 admitted that: *'we had to keep our profile a bit low, because unfortunately tackling violent extremism is stigmatised as working with the government'*. Treading a fine line between the government and the people who they aim to help was at the forefront of many interviewees' minds.

The move away from community cohesion and towards a more stringent counter-terrorism focus in the UK 2011 Prevent strategy was hailed by the interviewees as one of the more important evolutions in CONTEST, yet this has had unintended consequences as well. Organisations that were doing good work on the ground then struggled to get funding, and while in the London borough where interviewees 5 and 10 worked it was decided that *'integration is just absolutely key to Prevent, and so we deal with it as if it was still one policy*

area', that was not the case across the country. Interviewee 7 worried that since community cohesion work was now the remit of the Department of Communities and Local Government, it was not given the priority that it deserved: *'how much money have they lost in the budgets?'* While it is largely agreed that to intertwine community cohesion and counter-terrorism is counter-productive (Richards 2011), neglecting one in favour of the other may negatively impact upon community cohesion or promote a lack of trust in the government, both processes which could then foster environments in which radicalising settings can emerge.

This chapter has provided an overview of the key features, strengths and weaknesses of governmental and non-governmental deradicalisation and counter-radicalisation programmes in the UK, USA and Canada, based on the interview findings. Many of the interviewees had direct experience of the UK governmental deradicalisation programme, Channel, and were able to give their assessment of its strength and weaknesses, as well as regional differences in its implementation. Some of the main issues of concern related to the choice of intervention providers and the training that they received. It was argued that Channel worked best as an early intervention programme, but that opportunities for intervention were sometimes missed due to the reticence of the local authority to refer individuals without evidence of public admission of their beliefs. One interviewee wanted to see referrals occur on the basis of association alone which begs the question of how one would keep the number of misreferrals manageable, given that only 22% of those currently referred to Channel are being adopted onto the programme. The programme's successes – as perceived by the interviewees – were contingent on a holistic approach to intervention, addressing a range of needs beyond the moral and spiritual, and on leveraging local partnerships to the full. The connections which interviewees 5 and 10 had with the local schools in the borough were an example of how these partnerships could provide the basis for trust and allow the programme to work, reducing apprehension through training workshops and encouraging teachers to feel able and willing to refer students, in the knowledge that interventions would be conducted with their knowledge and input.

While the Channel programme in the UK is an example of how a centralised, government-led programme can be delivered through local authority partnerships to those who are vulnerable to violent extremism, the USA and Canada do not currently have such an approach. It was interesting to compare – as much as the perspective of a small sample of interviewees allowed – the non-governmental work done in these countries and in the UK, to see what those in this sector were able to achieve without the funding and direct support of their respective governments. The changes which the interviewees' programmes hoped to achieve ranged from improving cognitive skills, such as fostering better decision-making practices, to

supporting greater community cohesion, removing an individual from the negative influence of a peer group, or directly challenging the extremist ideology and encouraging greater engagement with alternative frameworks. The programme contents varied depending upon the local context, the experience of the interviewees and the target audience, but common themes of altering value systems and creating and maintaining meaningful relationships with their participants ran through. Many of the interviewees worked with young people who were particularly vulnerable to extremist narratives and required an individual with credibility that they could trust and feel able to discuss difficult issues with. The difficulties faced by former violent extremists in the USA and Canada included proving their credibility to the government and local communities in which they worked, as well as fighting for limited pots of funding if these even existed. Some of the interviewees worked for free for much of the time, which impacted upon the programmes they could deliver. The lack of centralised government funding and accreditation in the USA and Canada was therefore an issue that the UK intervention providers did not face to such a great extent. It remains to be seen whether North America will follow the UK's lead and introduce a programme similar to Channel, but if so they may be able to learn from the successes and failures of the Channel programme and implement their deradicalisation strategy while keeping the characteristics of their own legal and social context at the forefront of their considerations.

No systematic evaluation has been conducted looking at which specific mechanisms may be responsible for the programme (intended and unintended) outcomes. The area of de-radicalisation or counter-terrorism initiatives is not one in which experimentation such as randomised control trials would be ethically possible. How could the police or government justify giving de-radicalisation programmes to one set of vulnerable participants and not another? If the outcome was that one of the control group were to go on to carry out a terrorist attack, the implications would be catastrophic. Hence, in order to test the effect of different mechanisms on programme outcomes, a methodological approach is needed which can get around the practical barriers to experimental designs.

As previously discussed, agent-based modelling is such a tool. It allows specific contexts (whether these be geographical, social, economic, legal or ethical) to be modelled at whatever level of detail or abstraction is required, and for mechanisms of change to be manipulated within these contexts. The effect of these manipulations can then be collected, analysed and evaluated, meaning that policymakers would eventually be able to alter the input into the simulation to test the efficacy of different interventions in different scenarios. This would help to mitigate the potential ethical, social, political and financial costs of implementing programmes, and, while keeping the limitations of simulations always in mind, it could help

practitioners design and select those initiatives which are potentially the most useful in any given scenario. While it is not within the scope of this thesis to test widely differing contexts and mechanisms, the information gathered from interview data can now be included into the model and the effects of the mechanisms selected for manipulation in the simulations (social organisation and collective efficacy) can be examined.

7.4 Research limitations

As with all studies which rely upon human participants, there are a range of potential limitations, which, while the author tried to anticipate them as much as possible, may have affected the answers given by the interviewees. These limitations are acknowledged and addressed here.

Reflexivity is a critical dimension of any qualitative research (Altheide and Johnson 2011). Among those issues of which the author was self-aware throughout was the very effect that the identity of the author herself might have upon the interviewing process. The fact that the author is a white, female, non-Muslim certainly led to at least two of the interviewees being initially sceptical about the extent to which they presumed that the author understood about matters of the Islamic faith. Both interviewees made a point of ‘dumbing down’ their answers and not discussing matters of religion in the initial questions which they faced, but were assured by the interviewer once they realised that a level of understanding of their faith had been shown. In essence, the author ‘passed the test’ on Islamic knowledge and they then felt comfortable proceeding in the style in which they were used to discussing the subject. Conversely, three of the right-wing interviewees presumed a much greater level of knowledge on the topic of their ideology, which may have been influenced by the fact that the interviewer was of the same ethnic profile. Two interviewees were concerned about confidentiality issues in their interviews given that the author was not a programme 'insider', but initial apprehension was relieved when they were informed that the author has security clearance at the standard that they also maintained. They then felt comfortable talking about the work they did for the UK government in the knowledge that any confidential information that they did discuss would not be used by the author in this work.

The next set of possible limitations refers more directly to the interviewees themselves. When using interview participants, researchers are naturally reliant upon them being as truthful as possible in their answers. In some cases, it appeared that participants were perhaps overstating the knowledge that they had in a certain area, and when this happened, the author probed further to get them to bring forward specific evidence to support their claims. While not accusing the participants of deliberate untruthfulness, there was on a very small number

of occasions the feeling that certain interviewees were exaggerating the role that they played or their experience in the area. This was taken account of when analysing their transcripts. This plays into a larger phenomenon of potentially trying to please the interviewer by either answering questions that they did not have the knowledge to do so, or saying what they thought the interviewer wanted to hear (Bryman 2012, Altheide and Johnson 2011). However, by and large the participants were very honest in admitting when a question was out of their area of expertise, and some were very authoritative in what they did say even when it was plainly not what the interviewer was potentially expecting to hear, or did not fit well with the line of questioning. In some cases, interviewees were discussing events which happened more than 10 years previously, so the potential problem of reconstruction of memory should be acknowledged, but again interviewees were willing to admit when they could not recall something fully. However, it is possible still that limitations existed in their recollection of events, and indeed at least three of the interviewees had been interviewed on the topic of their participation in extremist movements on multiple occasions, so they may have given answers which were somewhat pre-empted or prepared.

It was clear that at least two of the interviewees had had negative experiences working with their government on de-radicalisation programmes, and this was evident in their responses to the questions and tone in which they answered. This meant that the author felt that some of their answers were strongly affected by these experiences, and so those answers with obvious and undue negativity were given careful consideration as to how they were included in the analysis and the final model. Finally, the authenticity of the interviewees, in terms of their backgrounds and their experience, was researched as fully as possible by the author, to ensure that the experiences which they claim to have had, both as members of extremist organisations or in their work on de-radicalisation or counter-radicalisation programmes, were real. The question as to whether the former members of extremist organisations had indeed been radicalised (rather than them being members but not in fact gone through the process of radicalisation), was tested in questions asking about their commitment to the ideology and the potential of committing a terrorist or violent act at the time. All participants who claimed to have been radicalised did indeed admit to either having carried out such an act or the willingness at the time to do so. In one case the participant had never been asked such a question, and was indeed emotional when they realised that they would have gone to such an extent had the leader of the movement asked them to do so.

8. Revising the ABM: Incorporating qualitative findings

This chapter sets out the interview findings reported upon in chapters 6 and 7 that are used to consolidate the empirical basis for the model developed and described in Chapter 5. By incorporating this information, the aim is for the model to achieve a more realistic simulation of the radicalisation process and to include more realistic parameters in doing so. Issues such as the targeting strategies of radical agents, the impact of age and religiosity on physical movement (and therefore upon exposure as well as levels of individual vulnerability), and the necessity of greater heterogeneity within the population are all addressed, allowing the finalised model to be developed and tested in differing scenarios. Simulation experiments are then carried out to test the impact of different community types (higher or lower levels of collective efficacy and social organisation) upon the levels of radicalisation occurring within the model, in alignment with the hypotheses specified in Chapter 2. This allows us to assess what is currently possible in the state of the art of agent-based modelling and radicalisation using the available data, but also highlights the remaining deficiencies in this area and outlines requirements for future data collection and parameterisation, in order to move the field forwards from this foundation.

8.1 Information garnered from the interview data

While not all of the remaining modelling requirements discussed in section 5.4 could be addressed through the interviews conducted, the interviews provided information relevant to a number of identified data deficiencies, which can now be used to inform a more realistic model. The role of youth within the radicalisation process was strongly highlighted, with multiple interviewees confirming that the majority of those they recruited and radicalised (as former members of terrorism-promoting organisations), or deradicalised (as intervention deliverers), were in their teens or early twenties. This raises two issues for the model: the level of individual vulnerability for those aged under 25 should be taken from a different distribution than the other agents, reflecting the impact that their increased agency and potentially higher levels of cognitive vulnerability have at that age. For this reason, in the model the parameter of IV will be sampled from a Poisson distribution with mean 7 for agents under 25, and a Poisson distribution with a mean of 5 for older agents. While the order of these values is informed by the interviews, the precise values are unknown.

The second point related to youth is the importance of educational establishments in the exposure of agents to radicalising narratives. This led to the decision to include a building agent that represents a sixth-form college, which agents aged 16-18 could attend during the day and mix with each other. This would then lead to a certain percentage of agents aged 16-

18 being assigned to the college as their ‘work location’, with the rest split between other work locations and unemployment. Government statistics for the UK suggest that 67.2% of 16-18 year olds are in full time education while another approximately 10% are unemployed (Department for Education 2013), leaving the rest in the model to choose a standard work location.

The interviews also highlighted the weakness of, or lack of commitment to, conventional (i.e. prosocial) moral narratives within those who had demonstrated a vulnerability to radicalisation. This was particularly evident in the lack of knowledge about Islam in those who were targeted by radicalising agents, and even in the interviewees themselves in certain cases. This raises the possibility of having a measure of religiosity within the model. In the model as conceptualised so far, agents are allocated a simple measure of religion – they are either Muslim or Christian or not religious at all. While acknowledging this is not representative of reality, it is parsimonious. However, it seems evident that a more complex measure is needed to increase the realism of the model, and hence a parameter controlling the level of commitment to the moral narrative, used as a proxy for whether the agent is practising or non-practising in their religion, was created. This level of religiosity is used within the model to determine two things: the likelihood that, and regularity with which, the agent will attend the church or mosque buildings (e.g. more observant male Muslims attending mosque on Friday and more observant Christians attending church on Sunday). Using both age and religiosity as contributors to the routine activities of an agent again builds upon and extends Groff’s (2007a, 2008) models of movement and activity spaces, giving the agents within the model a more complex and realistic estimation of their movements and timings.

Finding proxy measures for the level of attachment to a religious narrative is difficult, but the British Social Attitudes Survey (2008) found that 15% of Christians sampled reported attending church at least monthly. When combining this with data from the same survey on the importance of religion in everyday life, it is possible to create some parameters for the Christian agents in the model. Again an age difference is shown, with only 5% of 18-24 year olds stating that religion is very important, compared to the survey average of 12%. 37% of the younger age group said religion was not at all important, compared to 32% of the average (BSAS 2008). This allows us to create parameters of high and low religiosity, with medium being those who remain. Data for Muslims is not measured in the BSAS (2008), but it is possible to utilise a survey conducted in 2009 of over 480 Muslims aged 18 and over living in Britain (Field 2011) to provide one source of data to calibrate the model. An age difference was again discovered, with 30% of Muslims aged 18-34 attending a mosque weekly compared to 50% of Muslims aged 35 and over. Similarly, 45% of the younger cohort prayed multiple times

daily compared to 60% of the older cohort. The data on mosque attendance should be treated with a note of caution, with some mosques not having the provision for female attendees, and the tradition still existing for women to pray at home and for men to attend the mosque. Therefore, the statistics on those who conduct multiple prayers daily were here used to form the high religiosity parameter, while the survey's finding that one third of Muslims don't read the Qu'ran weekly will be used for the lower religiosity parameter. The medium religiosity parameter will be those who remain. While it is naturally accepted that these statistics are imperfect reflections of religiosity amongst Britain's Muslim community, they are used as an approximation here.

The importance of the mechanism of attachment, either to their social network or to the radical, was continually highlighted by interviewees as crucial to the process, so a more complex and therefore more realistic attachment term was represented within the model. In the initial model specification (Chapter 5), there was a 0.5 chance of an agent considering the composite attitude of their proxy social network (those sharing the home location) but the sheer number of cases in which it was the social network of the individual or the attachment to the radical which was decisive in the radicalisation process cited by interviewees required this to be altered. Therefore, two new agent attributes were necessary, one to control the level of attachment of a non-radical agent to its social network and the other controlling the level of attachment to the radical agent. The former also needed to incorporate generational dynamics to groups during teenage years, reflecting a diminished view of parental efficacy (i.e. the likelihood of believing their parents are right and listening to them). The role and importance of generational dynamics were highlighted in the interviews in chapters 6 and 7. To implement this, agents in the model aged 16-24 were attributed a 0.4 chance of considering social network opinion (represented as those they share a home with), with older agents having a 0.5 chance. Unfortunately there is no empirical data to set these values. The attribute controlling the attachment to the radical agent would need to be incremental depending upon the number of times the agent meets the radical and the effect this has upon their attitude. This measure of radical attachment will be a function of the number of times the person meets the radical agent and their level of individual vulnerability (as long as the non-radical agent has retained some level of attitude change from their meeting with the radical and not deradicalised totally). Therefore, an agent with high levels of individual vulnerability would not have to meet the radical agent many times to form an attachment, while an agent with low levels of IV would take longer to form that attachment.

When questioned about factors affecting the social organisation of the areas in which radicalising settings emerged, interviewees were able to give insight into certain trends. The

level of residential stability fluctuated in these areas, so it would be appropriate to include a measure of population turnover. In the revised model, once a week an agent (randomly selected) leaves the model, with another agent taking their place with a higher level of individual vulnerability upon setup than the original model agents. This is intended to mimic the impact of moving to a new area in which an agent is likely to have less support from the existing networks in that area. This would then impact upon the social networks within the model, as in reality.

Other factors which emerged from the interviews, and supported the study hypotheses, were that radicalising settings tended to emerge in wider areas that were more heterogeneous in terms of their populations, and that these areas were more segregated at the street or neighbourhood level. This finding lead to the implementation of two changes in the model. The first concerned the percentage of Muslim agents within the population. This was initially set to 20%, but was increased to 40% to produce a more heterogeneous wider area. This figure of 40% is the average number of the population who identified themselves in the 2011 Census as Muslim in the London boroughs of Tower Hamlets and Newham (Census 2011), both of which are identified as priority areas by the UK government Prevent strategy (Home Office 2011). The second change was to incorporate a measure of residential segregation. Initially, there were two housing areas within the model and any agent could choose any house to live in. However, this was altered to make each of the areas much more segregated, with one area having an 80% chance of Muslim agents locating there, and the other area having a corresponding 80% chance of Christian agents living there. This importantly allowed more households within the model to be religiously homogenous, which is much more reflective of reality. It did not prevent agents from crossing over to the other area to visit the home of a radical agent if they wished to do so, however. Neither of these two parameters was based upon comparable empirical data as the area simulated was not based upon a specific geographical location – it is not a facsimile model. Instead, they are both indicative of the types of phenomena the model includes regarding heterogeneity and segregation within a population.

One of the problems identified when creating the initial ABM was that the level of monitoring – which affects the attractiveness of a setting – was too prescriptive and based upon the setup of the model, without incorporating enough stochasticity. The attractiveness of the setting to the radical was therefore also too prescriptive. This meant that it was important to discover from those interviewees who had experience of radicalising others what it was that made particular settings attractive to them, and which strategies they used for targeting settings, as well as the strategies for targeting individuals. The interviews with Al-Qa'ida-inspired former

radicals, or those who worked with individuals who had been radicalised to this narrative, confirmed the literature in this area – they initially target public areas with larger footfall and more people to get someone's attention, often at a dawa stall or handing out leaflets outside a mosque. They then encourage these individuals to move to a more private location – their own buildings or houses. While the initial ABM already had a procedure to ensure that 'pre-radicals' (those agents whose attitude has reached 16 – 19) target the home location of radicals more often, interviewees suggested that they encouraged people to move to private locations as soon as possible. Consequently, in the model non-radicals are encouraged to go to radicals' houses earlier. The likelihood of visiting the radical's house is calculated as a function of the number of meetings between the agent and the radical, if the agent's attitude is still higher than their initial attitude but not necessarily 16. That way even if the agent's level of IV is relatively low, by having continued exposure to the radical their attachment to them could increase to the level that they are willing to meet them in private places to continue discussing the radicalising narrative. The model then incorporates a weekly meeting for those who have a high enough level of attachment to the radical to attend, mimicking the prayer groups which the interviewees described.

Another strategy for targeting places amongst the Al-Qa'ida-inspired interviewees was to select those settings where more Muslims are to be found – a direct exploitation of social selection effects. While the initial model already incorporated the mosque as a potential setting for radical agents to target, the attractiveness of a setting to the radical agents should also incorporate the number of Muslim agents who are there at any time. Therefore, there are two strategies for radical agents to use within the model. In the case of the first, locations are initially targeted due to the sheer volume of people attending them. Agents exposed to the narrative are then encouraged to move to private spaces. In the case of the second, the proportion of Muslim agents within a setting is the primary determinant of where a radical will target agents to radicalise. Each of these strategies is used within the model and tested to see which one produces the more realistic results. All radical agents in the model will adhere to the same strategy during the same model run. It is important to note that the targeting strategies discussed here are specific to Al-Qa'ida-inspired radicals, and the interviews suggested that the strategies used by right-wing radicals were different: while the former usually targeted Muslims who were either non-practising or less knowledgeable about their faith, the latter would target individuals with high levels of IV and focus on other factors – cognitive vulnerability, lack of support networks and social networks within the area. Therefore, any model of right-wing extremism would need to use this targeting strategy rather than the ones incorporated in the model here.

This leaves the attractiveness of a particular setting to the radical agent being a function of both the level of monitoring within that setting, plus the agent's selection strategy – more people or more Muslims within that setting. The calculation for attractiveness is shown in table 9 below, alongside the updated parameters for the model. The threshold of attractiveness was set at greater than 0.5 across both targeting strategies. This was varied in additional initial experiments to see the effect that this variation would cause on model outcomes, with qualitatively similar patterns discovered. No effect was seen other than in terms of magnitude of results or model timing, so this parameter has no substantive effects on the conclusions of the experiments run below.

8.2 Adjustments to the ABM

Table 9: Parameters for updated model with new incorporations in black

Parameter name	Parameter value(s)	Data provenance
Number of houses	165	None
Number of buildings	6 office blocks, 2 parks, 2 shops, 2 pubs, 1 café, 1 internet café, 1 mosque, 1 church, 1 school	None
Number of radicals	1% of population (5 agents)	Birks et al 2012
Number of non-radicals	500	None
Population turnover	1 new agent per week	None
Age	15 + random 50 (uniformly distributed)	UK working age
Gender	50% male, 50% female	Census 2011
Number of Muslims	40%	None
Number of Christians	35%	None
Number of non-religious	25%	Census 2011
Religiosity	Muslims 16-34 45% high, 22% mid, 33% low 35+ 60% high, 7% mid, 33% low Christians 16-24 5% high, 58% mid, 37% low 25+ 15% high, 53% mid, 32% low	British Social Attitude Survey 2008, Field 2011

Number of 16-18s in school	70%	UK government
Unemployment rate	10% for 16-18, 40% for 18-25, 30% for over 25s	ONS
Residential segregation measure	80% in each housing estate	None
Buildings not attended by Muslims	Pub, Church	Social norm
Buildings not attended by Christians	Mosque	Social norm
Maximum places to visit before returning home	3	Groff 2007a; 2008
Time spent in locations (remain)	Home up to whole day, work 8 hours, mosque on Friday 1 hour, church on Sunday 1 hour, prayer group on Tuesday 1 hour, recreation average 111 mins*	TFL 2011; social norm; interview data
Chance of unemployed leaving house at 8am	14%	TFL 2011
Chance of unemployed not leaving house	25%	TFL 2011
Chance of selecting home after work	67%	TFL 2011
Chance of returning home after school	80%	TFL 2011
Chance of pre-rad selecting rad home	50%	None
Chance of encounter at location	1/number of people at location	None

Attitude level radicals	20	None
Initial attitude	Age 16-19 random poisson 4 Age 20-24 random poisson 3.4 Age 25+ random poisson 2.8	Citizenship survey 2009
Individual vulnerability	Age 16-24 – random poisson 7 Age 25+ – random poisson 5	None
Amount of attitude increase upon meeting	IV/4	None
Social network attachment measure	Age 16-24 – 0.4 Age 25+ – 0.5	None
Radical attachment measure	no-of-encounters x (IV/10)	None
Time to deradicalise	1440 ticks (if attitude < 16) or 4320 ticks (if attitude >=16) or overnight if social network demands	None
Tolerance to deradicalise faster/slower	If social network attitude is -2 or +2 of individual attitude	None
Amount of attitude decrease on deradicalisation	IV/4	None
Level of SD (global)	0-10 (2 = low, 6 = med, 10 = high)	None
Level of CE (global)	0-10 (2 = low, 6 = med, 10 = high)	None
Notice level	+2 to -2 of SD (uniformly distributed)	None
Report level	+2 to-2 of CE (uniformly distributed)	None
Calculation for target attractiveness	Strategy 1: num of non-radicals x (1/level of monitoring) Strategy 2: num of muslim non-radicals x (1/level of monitoring)	None
Chance of leaving model upon relocation	5%	None

8.3 Preliminary simulation experiments

As noted, ABM offers the opportunity to conduct experiments. Such experiments have to be interpreted carefully as they are the product of the assumptions of the model and the parameters used. However, they allow one to test how outcomes would be expected to vary if the model and the theory on which it is based were valid. As the interactions between agents are complex and can (for example) produce feedback loops, such outcomes or the size of their effects cannot necessarily be reliably foreseen through thought experiments. Motivated by the theories discussed in previous chapters, the hypothesis tested by the model here is that higher levels of simulated collective efficacy and social organisation within the model will lead to a lower number of suitable settings for simulated radicalising activities to take place, and therefore that there will be a lower number of radicalised agents. In order to test this, three different community scenarios were created using varied levels of collective efficacy and social organisation: levels of 2 and 2 were run to simulate a community with low levels; 6 and 6 were a community with medium levels; and 10 and 10 were a community with high levels of both factors. The values of 2, 6 and 10 were chosen merely to represent low, medium and high values. The range of values were not tested as the model was not designed to be predictive, and is not well calibrated enough to be able to say that an input of 7 is much more important than an input of 8, for example. Equally, even though the values of social disorganisation and collective efficacy were matched on each simulation, they were kept as two separate variables for two reasons: firstly, as stated in Chapter 2, although they are related, they are separate theoretical constructs, so should be kept that way; secondly they are separate for model flexibility – if in future the model wants to simulate a community within North Korea, it would need to have a high level of social organisation but low levels of collective efficacy, for example.

The effects of two different targeting strategies for the radical agents were tested by running the model using one strategy and then the other. Recall that for the first, radicals target settings with the highest number of people (strategy 1), whereas for the second they target those with the highest number of Muslims (strategy 2). The model was initialised using the parameters from table 9 above and run 30 times for each different community setting. The number of runs was chosen to reflect the time taken to stabilise the variability within the model, and is similar to the number of runs used in other models, such as Pitcher and Johnson's (2011) model of burglary.

The model was run for 100 simulated days, or stopped before this time if there were no radicals left in the model. The key outputs of the model of interest were the number of radicals (if any) left in the model, the number of converts (if any) and the number of pre-

radicals (if any). The number of ticks (with each tick representing a minute) taken before the model finished was also measured to see if there was variability between the different simulated communities, with the prediction being that those communities with high levels of collective efficacy and social organisation may not last all 100 days until the radicals are forced to relocate from the model, due to the lack of attractive settings for them to operate in. The results of these preliminary experiments are shown in Tables 10 and 11 below.

Table 10: Results of preliminary experiment strategy 1 (30 runs per community type)

Strategy	**Community type**	**Average ticks**	**Average radicals remaining after 100 days (SD)**	**Average converts (SD)**	**Average pre-radicals (SD)**
1	Low SO and CE	98030.2	0.2 (0.48)	1.43 (1.67)	0.1 (0.30)
1	Medium SO and CE	94336.7	0.17 (0.38)	1.37 (1.77)	0 (0.00)
1	High SO and CE	79121.2	0.07 (0.25)	1 (1.00)	0.03 (0.18)

It was immediately obvious that in the majority of cases (78 out of 90 for strategy 1, 85 out of 90 for strategy 2) the model ended before the 100 days (or 142079 ticks), due to all of the radical agents leaving the model. The amount of simulated radicalisation in the model was also extremely low, seemingly due to the fact that radicals almost immediately start to leave the model. This was even more pronounced in strategy 2, where the attractiveness of the setting was partially calculated by the number of Muslims, rather than all agents, in that setting.

Table 11: Results of preliminary experiment strategy 2 (30 runs per community type)

Strategy	**Community type**	**Average ticks**	**Average radicals remaining after 100 days (SD)**	**Average converts (SD)**	**Average pre-radicals (SD)**
2	Low SO and CE	83086.5	0.13 (0.43)	1.5 (1.63)	0 (0.00)
2	Medium SO and CE	73637	0.03 (0.18)	1.1 (1.18)	0 (0.00)
2	High SO and CE	64744.9	0.03 (0.18)	0.67 (1.16)	0.1 (0.30)

Prior to using statistical tests to examine the reliability of any differences across conditions, diagnostic tests (Kolmogorov-Smirnov and Levene’s tests) were conducted to assess the normality of the data. Not surprisingly, given the large number of zeros in the counts of radicals, converts and pre-radicals, the data were not non-normally distributed.

Due to the data not meeting the assumptions of normality or homogeneity of variance, a Friedman's ANOVA was conducted to assess whether there were any significant differences in the number of converts between the three community types within each strategy. Due to the extremely low number of pre-radicals within the simulations, this variable was excluded from analyses. While no significant differences were found between the community types for strategy 1, there was a significant difference for strategy 2 (p = 0.033). Table 11 shows that the average number of converts within the simulations drops from 1.5 in the low community type to 0.67 in the high community type, reflecting our expectations.

In order to compare parallel community types between the two targeting strategies, a Wilcoxon Signed-Rank test was conducted with the following non-significant results found:

- low strategy 1 vs low strategy 2 = p-value 0.441 z score -0.163
- medium strategy 1 vs medium strategy 2 = p-value 0.271 z score -0.658
- high strategy 1 vs high strategy 2 = p-value 0.188 z score -0.894

While the average model run length was consistently lower in the strategy 2 simulations, there was no significant variation between the numbers of converts between the two target strategies. For both strategies, very little simulated radicalisation happened and the models did not typically run for 100 days. For these reasons, alterations were made to a selection of parameters to test the impact they had model on outcomes and to test the sensitivity of the model to changes in such parameters.

8.4 Experimental variations

8.4.1 Radical agent resilience

The (relocation) parameter that affected the chance of a radical agent leaving the model if no attractive settings were available had initially been set to 5%. In order to test the impact that this variable had upon model outcomes, this was changed to 1% and the models re-run. Theoretically, this parameter change is the equivalent of testing the resilience of the radicals within the model – how likely they are to relocate if they cannot find a suitable setting in which to operate. The expectation was that this parameter change would mean that the models would run for longer and that potentially more radicalisation would occur since the radical agents were less likely to leave the model so quickly. The model was set up exactly the same as before apart from this one parameter and again run 30 times for a maximum of 100 days for each community and strategy configuration, with the results in tables 12 and 13 below.

Table 12: Results of altered 'relocate' experiment strategy 1 (30 runs per community type)

Strategy	**Community type**	**Average ticks**	**Average radicals remaining after 100 days (SD)**	**Average converts (SD)**	**Average pre-radicals (SD)**
1	Low	142079	2.83 (1.02)	3 (2.26)	0.03 (0.18)
1	Medium	142079	2.93 (1.08)	3.27 (2.52)	0.07 (0.25)
1	High	138143.5	2.6 (1.30)	2.67 (2.20)	0.03 (0.18)

It is immediately obvious that as a consequence of this change, the models almost always run for 100 days (142079 ticks) and that more radicalisation is happening as the radical agents are remaining in the model for longer. Since the number of average ticks is very similar between the three community types, and the number of pre-radicals is again very low, these were not analysed further. However, upon testing the number of converts within the simulations, these were found to meet the assumptions of normality and heterogeneity of variance, so a one-way repeated measures ANOVA test was conducted in order to ascertain whether there were any significant differences between the numbers of converts in the models depending upon the community type.

Table 13: Results of altered 'relocate' experiment strategy 2 (30 runs per community type)

Strategy	**Community type**	**Average ticks**	**Average radicals remaining after 100 days (SD)**	**Average converts (SD)**	**Average pre-radicals (SD)**
2	Low	142079	2.7 (1.18)	3.47 (3.32)	0 (0.00)
2	Medium	142079	2.7 (1.06)	4 (3.20)	0 (0.00)
2	High	140736.4	2.1 (1.21)	3.63 (2.55)	0 (0.00)

The results of the ANOVA showed no significant differences between the mean amounts of converts within each strategy between different community types. In order to compare parallel community types between the two targeting strategies, a paired samples T-test was conducted with the following non-significant results found:

- low strategy 1 vs low strategy 2 = p-value 0.491 t-value -0.697
- medium strategy 1 vs medium strategy 2 = p-value 0.262 t-value -1.145
- high strategy 1 vs high strategy 2 = p-value 0.245 t-value -1.188

In order to properly understand the effect that the 'relocate' parameter change had upon simulated outcomes, comparisons were made for the effect of this variable on those adopting the same targeting strategy. The results of a Wilcoxon Signed-Rank test indicated significant results found for all comparisons.

Strategy 1

- Low 5% 'relocate' vs low 1% 'relocate' = p-value 0.005 z score -2.512
- Medium 5% 'relocate' vs medium 1% 'relocate' = p-value 0.001 z score -2.877
- High 5% 'relocate' vs high 1% 'relocate' = p-value 0.001 z score -3.002

Strategy 2

- Low 5% 'relocate' vs low 1% 'relocate' = p-value 0.011 z score -2.259
- Medium 5% 'relocate' vs medium 1% 'relocate' = p-value 0.000 z score -3.624
- High 5% 'relocate' vs high 1% relocate' = p-value 0.000 z score -4.217

We have seen that, while the targeting strategy difference was not statistically significant, and only one of the initial model variations revealed a significant difference between community types (strategy 2), all of the comparisons between the different 'relocate' parameters are statistically significant, showing that when the 'relocate' parameter is set to a 99% chance of remaining in the model if no suitable setting is found, more radicalisation is happens. This was expected and indeed if the model was run for longer than 100 days, which it could have in the vast majority of simulations, these averages would probably have been even higher. We must therefore conclude that the 'relocate' parameter has a significant effect upon model outcomes, and by making the radical agents more resilient in the second experimental setup the levels of radicalisation in the model have increased. There is no empirical data to validate the levels of resilience of radicalising agents in the real world, so while this finding is interesting within the model is it difficult to state the impact outside simulation. It does suggest that collecting empirical data about the resilience of radicalising agents is an important task for future research, however.

8.4.2 Time to deradicalise

As with the resilience of the radical agents, the parameter controlling the time for non-radical agents to deradicalise was not empirically based. Currently, if a non-radical agent has had contact with a radical agent, if they go another day without contact they will deradicalise by the same amount which they radicalised (IV/4). They may also deradicalise overnight to reflect the influence of their social network at their home location. For pre-radical agents (whose

attitude is between 16 and 19) they must go 3 days without contact with a radical agent before starting to deradicalise. This has led to the question as to whether the agents are deradicalising too quickly – one day in most cases means they have to meet radicals on multiple occasions daily which, with the realistic movement programmed in using TFL (2011) data, is not happening. While it could be argued that this in itself is realistic (there would be few people in real life exposed to radical agents more than once a day), it is debatable how quickly it would take a person to return to their initial attitude after meeting a radical.

In order to test this it was decided to run a set of simulations with the deradicalisation parameters altered, so that non-radical agents have to go two days without contact before they start to deradicalise, and pre-radical agents six days without contact. Equally, the 'consider-opinions' procedure which controls the proxy social network by taking account of the attitude of those sharing the same home location was set to run every two days rather than every day, in order to reflect these changes to the deradicalisation time. The simulations were run with both targeting strategies, all three community types, and with the radical agent resilience parameter variation in order to assess the effects against all of these. The results presented in tables 14-17 below.

Table 14: Results of altered 'deradicalisation' experiment, strategy 1, 'relocate' 5% (30 runs per community type)

Strategy	Community type	Average ticks	Average radicals remaining after 100 days	Average converts (SD)	Average pre-radicals
1	Low	96574.67	0.33	3.88 (2.85)	0.20
1	Medium	94079.07	0.20	4.13 (3.29)	0.07
1	High	77570.93	0.00	3.23 (2.79)	0.13

Kolmogorov-Smirnov and Levene's tests were again run to assess the normality of the distribution of the data and the homogeneity of variance, and while the number of converts in the low and medium community groups was normally distributed, within the high community group it was non-normally distributed.

Due to the data not meeting the assumptions of normality or homogeneity of variance, a Friedman's ANOVA was conducted to assess whether there were any significant differences in the number of converts between the three community types within each strategy. The low number of pre-radicals within the simulations meant it was again decided not to include them within any analysis. There were no significant differences between the community types

regarding number of converts with strategy 1, but it was important to compare these values to the values in Table 10 where the deradicalisation times were from the original parameter (1 day compared to 2 days). There is an obvious difference between the two sets of results, with Table 10 showing a lower average number of (1.4, 1.37 and 1) converts per community type.

In order to compare parallel community types between the two deradicalisation parameters, a Wilcoxon Signed-Rank test was conducted with the following significant results found:

- low derad 1 vs low derad 2 = p-value 0.001 z score -3.310
- medium derad 1 vs medium derad 2 = p-value 0.000 z score -3.592
- high derad 1 vs high derad 2 = p-value 0.001 z score -3.335

With these statistics we can determine that altering the deradicalisation parameter significantly affects the outcome of the model as it is set up here, as would be expected. By taking twice as long to deradicalise, many more non-radical agents have the chance to be exposed on multiple occasions to the radicals and their attitude, in some cases, increases faster than it decreases, leading to more of them becoming converts in the model.

Table 15 shows the impact that the new deradicalisation parameter has on the second targeting strategy of the radicals (targeting places with more Muslims), again the data was non-normally distributed, with the Friedman's ANOVA value of p = 0.065 coming close to significance between the low and high communities, but not meeting the 95% confidence interval, unlike in Table 11 where the original deradicalisation parameter was used and the value was significant (p = 0.033).

Table 15: Results of altered 'deradicalisation' experiment, strategy 2, 'relocate' 5% (30 runs per community type)

Strategy	**Community type**	**Average ticks**	**Average radicals remaining after 100 days**	**Average converts (SD)**	**Average pre-radicals**
2	Low	88687.1	0.13	3.77 (2.62)	0.13
2	Medium	88751.97	0.23	3.73 (3.17)	0.07
2	High	63061.67	0.03	2.27 (2.26)	0.03

When comparing the number of converts between the deradicalisation parameters, again there is an obvious difference between the number of converts in Table 15 above and the

number in Table 11 (1.5, 1.1 and 0.67 respectively). The Wilcoxon Signed-Rank test gave the following significant results:

- low derad 1 vs low derad 2 = p-value 0.000 z score -3.795
- medium derad 1 vs medium derad 2 = p-value 0.000 z score -3.792
- high derad 1 vs high derad 2 = p-value 0.000 z score -2.848

The simulations were run for the altered 'relocate' parameter, where radical agents have a 1% chance of leaving the model if no suitable settings exist for them to conduct their activities. The results for these simulations under the first targeting strategy are shown in Table 16.

Table 16: Results of altered 'deradicalisation' experiment, strategy 1, 'relocate' 1% (30 runs per community type)

Strategy	**Community type**	**Average ticks**	**Average radicals remaining after 100 days**	**Average converts (SD)**	**Average pre-radicals**
1	Low	142079	2.77	9.43 (3.45)	0.27
1	Medium	142079	2.63	11.17 (4.70)	0.13
1	High	142079	2.53	9.67 (4.61)	0.10

When testing the number of converts within the simulations, these were found to meet the assumptions of normality and heterogeneity of variance, so a one-way repeated measures ANOVA test was conducted in order to ascertain whether there were any significant differences between the numbers of converts in the models depending upon the community type. The results of the ANOVA showed no significant differences between the mean amounts of converts within each strategy between different community types.

Again there was an obvious difference between the average converts in this set of simulations compared to that of Table 12 (3, 3.27 and 2.67) which was the equivalent before the deradicalisation parameter change. In order to compare parallel community types between the two deradicalisation parameters, a paired samples T-test was conducted with the following significant results found:

- low derad 1 vs low derad 2 = p-value 0.000 t-value -8.722
- medium derad 1 vs medium derad 2 = p-value 0.000 t-value -8.527
- high derad 1 vs high derad 2 = p-value 0.000 t-value -7.771

We can again establish that the deradicalisation parameter change had a significant effect on the average number of converts within the simulations.

The results for the simulation running the second targeting strategy are presented in Table 17, and as with the results in Table 16 it is immediately obvious that much more radicalisation occurred when the deradicalisation parameter was doubled.

Table 17: Results of altered 'deradicalisation' experiment, strategy 2, 'relocate' 1% (30 runs per community type)

Strategy	Community type	Average ticks	Average radicals remaining after 100 days	Average converts (SD)	Average pre-radicals
2	Low	142079	2.70	11.57 (4.23)	0.07
2	Medium	140511	2.37	11.93 (4.93)	0.30
2	High	136767.5	1.63	8.57 (4.51)	0.23

The normal distribution of the data meant that a one-way repeated measures ANOVA test was conducted. The results showed that the community type significantly affected the number of converts, $F(2, 58) = 4.373$, $p < 0.05$, and showed a significant difference between the different community types ($p = 0.000$), and there is an obvious difference of 3 converts between the high and low communities, with even more between the medium and high communities.

When comparing these results to those with the previous deradicalisation parameter (shown in Table 13), an initial reading suggests a large difference, with those communities on the initial deradicalisation parameter having an average of 3.47, 4 and 3.63 radicals respectively compared to 11.57, 11.93 and 8.57 seen in Table 17 above. Since both sets of data met the assumptions of normality and heterogeneity of variance, a paired samples T-test was conducted with the following significant results found:

- low derad 1 vs low derad 2 = p-value 0.000 t-value -11.539
- medium derad 1 vs medium derad 2 = p-value 0.000 t-value -6.480
- high derad 1 vs high derad 2 = p-value 0.000 t-value -4.943

These results again show the significant effect that the alteration of the deradicalisation parameter is having upon the outcome of the model, with more than three times as many non-radical agents becoming converts when the time to deradicalise is doubled.

Comparing between the targeting strategies there is again little difference, with 3.88, 4.13 and 3.23 converts seen across community types with the 5% relocate parameter in strategy 1, and 3.77, 3.73 and 2.27 in strategy 2. We are also able to see the large difference made by changing the relocate parameter to 1% chance where these numbers rise to 9.43, 11.17 and 9.67 for strategy 1 and 11.57, 11.93 and 8.57 for strategy 2.

8.5 Discussion

The agent-based model tested within this chapter was designed to examine the simulated effect of different community types upon the level of radicalisation within an area: communities with high, medium and low levels of social organisation and collective efficacy. By impacting upon the emergence of radicalising settings, the levels of social organisation and collective efficacy would either encourage or discourage radical agents to visit and remain in those settings, or indeed encourage them to leave the area altogether if no suitable settings were available. It was hypothesised that communities with 'high' levels of social organisation and collective efficacy would have significantly lower levels of radicalisation within the model (seen as non-radical agents becoming 'converts') than 'medium' or 'low' communities. The findings of the simulations are summarised in Table 18 below. Consistent differences were seen between the high and low communities throughout almost all of the model iterations, but only in two were these significant: Table 11 showing targeting strategy 2, 5% relocate and the original deradicalisation parameter ($p = 0.033$) – in this case the change in strategy appears to be the cause; and Table 17 showing targeting strategy 2, 1% relocate and the revised deradicalisation parameter ($p = 0.000$) – in this case the deradicalisation parameter seems to be the cause. One further iteration came close to the 95% confidence interval, seen in Table 13 with targeting strategy 2, 5% relocate and the revised deradicalisation parameter ($p = 0.065$). This may be an issue of statistical power – if the experiment was run more than 30 times, a significant value may be reached.

Table 18: Summary of simulation findings

Community type	Strategy	Relocate	Deradicalise	Average converts (SD)
Low SO and CE	1	5%	1 or 3 days	1.43 (1.67)
Medium SO and CE	1	5%	1 or 3 days	1.37 (1.77)
High SO and CE	1	5%	1 or 3 days	1 (1.00)
Low	2	5%	1 or 3 days	1.5 (1.63)
Medium	2	5%	1 or 3 days	1.1 (1.18)
High	2	5%	1 or 3 days	0.67 (1.16)
Low	1	1%	1 or 3 days	3 (2.26)
Medium	1	1%	1 or 3 days	3.27 (2.52)
High	1	1%	1 or 3 days	2.67 (2.20)
Low	2	1%	1 or 3 days	3.47 (3.32)
Medium	2	1%	1 or 3 days	4 (3.20)
High	2	1%	1 or 3 days	3.63 (2.55)
Low	1	5%	2 or 6 days	3.88 (2.85)
Medium	1	5%	2 or 6 days	4.13 (3.29)
High	1	5%	2 or 6 days	3.23 (2.79)
Low	2	5%	2 or 6 days	3.77 (2.62)
Medium	2	5%	2 or 6 days	3.73 (3.17)
High	2	5%	2 or 6 days	2.27 (2.26)
Low	1	1%	2 or 6 days	9.43 (3.45)
Medium	1	1%	2 or 6 days	11.17 (4.70)
High	1	1%	2 or 6 days	9.67 (4.61)
Low	2	1%	2 or 6 days	11.57 (4.23)
Medium	2	1%	2 or 6 days	11.93 (4.93)
High	2	1%	2 or 6 days	8.57 (4.51)

In all three of these cases, differences were observed for targeting strategy 2 – that where the radical agents seek settings with higher numbers of Muslim agents. For strategy 1, where radical agents targeted locations with higher number of all agents, the differences between

community types were unreliable – for the model configurations tested there was not even a trend to support the hypothesis. It is interesting to note that there was rarely a drop in the number of converts between the low and medium communities. This suggests that the equation which governs target attractiveness has a threshold which is not reached when the social organisation and collective efficacy parameters are set to 6, but which is between the medium and high communities (between the parameters set to 6 and 10). While it may be tempting to conduct more experiments to see at which particular value this threshold is reached, this should be resisted due to calibration issues with the model – there is nothing to say what a value of 8 would mean, for example, and giving a particular value is entirely subjective. The two targeting strategies were taken from the information received during interviews with former radicals, and all model iterations were run with both strategy 1 and 2 to assess whether there was a significant difference between the amounts of radicalisation happening in the first compared to the second strategies. Statistical tests revealed no significant results however, suggesting that the strategy chosen by itself was not enough to cause a difference in the model outcome. However, as noted it is evident that the strategy adopted interacts with the level of collective efficacy in a setting.

For the preliminary experiments, very little radicalisation emerged and the model runs consistently terminated before the 100 day threshold was reached. Consequently, it was decided to vary some of the parameters to see the effect (if any) they would have upon both of these outputs. By altering the resilience of the radical agents within the model and giving them a 1% chance of leaving the model upon the absence of a suitable setting to visit, dramatic changes were seen in the model outputs. There were consistent, highly significant differences between the models and therefore it was concluded that this parameter had a significant impact upon the number of converts. It was then decided to vary the length of time over which deradicalisation occurs, from one day to 2 days for non-radical agents and from 3 days to 6 days for pre-radical agents (who were on the verge of becoming converts). This again had a highly significant effect when compared to identical model runs with the previous deradicalisation lengths, showing that this parameter had a significant impact upon simulated outcomes.

The fact that these two parameter changes had more of an impact upon the model outcomes than the targeting strategy or the community type suggests the limitations of setting parameters without empirical data. All parameters within an agent-based model which are set without such data should be subjected to sensitivity testing, where the range of their possible inputs is systematically varied in order to assess the effect of this parameter upon the model outputs. Gilbert and Troitzsch (2010:24) recognise the difficulties arising with sensitivity

testing, noting that 'even with a small number of parameters… the resources required to perform a thorough analysis can become excessive.' The fact that such large variations in the model outputs were seen when only two parameters were varied shows that these are of concern. The amount of time that would be required to run all the parameters which are not empirically based would be disproportionate to the information which would be gleaned, especially since it is already obvious that the two which have been tested have such an effect upon model outcomes.

While the model outcomes did not provide support for the hypothesis in all cases, the very creation of the model has led to a step forward in the knowledge within the field of radicalisation and agent-based modelling. Perhaps one of the most important discoveries is the identification of the sheer amount of empirical data that is still required in order to model and test competing theories of radicalisation. Without undertaking the type of explicit modelling exercise completed here it would be difficult to identify what data are missing or estimate their importance on (simulated) outcomes. The identified lacuna of data impairs model development even with the evidence-based foundations upon which it rests, but helps to identify what data might be prioritised in future work. The data collected as part of this thesis helps to fill in some of the gaps but more data are clearly required.

A further crucial discovery is that the methodology of agent-based modelling requires the theoretician to have a level of understanding of the underlying mechanisms of their theory to such a level of detail that it can be transferred into a computer programme. This necessitates not only a thorough interrogation of the theory in its entirety but also the ability of others to apply the theory and embellish it with the available empirical evidence when setting modelling parameters. Applying this to the IVEE theory within this thesis has led to such an examination, as well as the collection of available empirical data to furnish the agent-based model and the identification of the areas in which this data is absent. It has once again highlighted the deficiencies of currently available data within the realm of radicalisation studies, but has also shown that the use of multidisciplinary methods and data from surrounding fields is beneficial to the advancement of the field for just the reasons stated above.

When assessing the limitations of the model, the deficiencies in data for parameters of certain mechanisms are highlighted. While the aim of the thesis was not to build a complete and realistic measure of individual vulnerability, in order to do so an abundance of data would be required including that on varying levels of executive functioning between age groups in order to assist with the cognitive vulnerability parameters. An understanding of the average level of exposure needed in order for propensity change to occur would also be required, as the calculation within the model is currently not empirically based. The length of time needed for

an individual to return to their original state after exposure to the radicalising narrative if they were affected is unknown, and again this model parameter was not based upon empirical evidence (although its effect on simulated outcomes is clear).

The resilience level of radical agents within the model was set to 5% and altered to 1% to assess the impact upon simulated outcomes. Neither of these selections have empirical foundation as no data currently exist, but the effect of this parameter on simulated outcomes is also clear. If enough interviews with former, or indeed current, recruiters for extremist organisations were conducted and this question posed, it may be possible to gather this kind of information. Equally, questions could be fielded as to the attractiveness of certain settings in which radicals might conduct their activities – how they calculate this attractiveness and the threshold at which they are willing to operate. Such factors need to be set in the model but at present there is no empirical data on which to base the calibration. A further mechanism which was questioned during the creation of the model was that of attachment, both of individuals to their social networks and to the radical agents, where applicable. The level of attachment to a person's social network affects how they are influenced by the attitude of that network within the model, and therefore whether they potentially deradicalise more quickly or slowly. We do not know how attachment varies between individuals, or indeed age groups – generational dynamics are represented by a lower level of attachment to represent a lower belief in parental efficacy in teenagers and those in their early 20s in the model, but no data were available to validate this. A large-scale study on attachment to social networks, which includes an emphasis on parental attachment, would be needed to investigate this further. While questions have undoubtedly been answered in the creation of this agent-based model, numerous others have been raised, as was expected when using a novel methodology within a field in its infancy in terms of theorising and data collection.

The model within this thesis has generated outcomes which were unexpected, and we can in the future look for evidence within existing, or forthcoming, empirical data to support or refute these outcomes. This allows the expansion of the use of ABM, from hypothesis testing and generation to a combination of this with other types of data. Within this chapter, simulated experiments have been run in certain conditions with certain outcomes, and this is a great strength of the approach – allowing us to see 'what if' and test a multitude of scenarios to assess the impact of different parameters, which could be policies and governmental interventions for example. While the model here is on the small scale, simulating an area of a town or city, if it were scaled up to a whole city or even country, the numbers of radicals within the models would become substantial indeed.

9. Conclusion

The aim of this research was to facilitate a greater understanding of the radicalisation process and the role of systemic factors within it, using a fusion of qualitative methods and agent-based modelling. By using a recently-developed theory of radicalisation which focusses upon the interaction between vulnerable individuals, the emergence of radicalising settings, and the exposure to those settings, this thesis adopted a systemic approach to the problem which is novel in the field. Identifying the mechanisms that affect the interaction between these three components, it was decided to focus upon the emergence of radicalising settings, which presents the greatest gap in our current knowledge. The research question was what are the factors that affect the emergence of radicalising settings? In order to answer this question it was decided that a relatively untested approach within the field, agent-based modelling, would be utilised as it offers researchers the ability to control variables, test the impact of varying mechanisms and interventions, and requires a level of theoretical development which strengthens the theory tested. By forcing the modeller to explicitly state the workings of the theory, it shows where knowledge gaps exist and can identify where the theory needs to be more developed.

The IVEE theory was used to initially create a model of radicalisation, and scoping and systematic reviews identified which parameters could be populated by empirical data and where more research was needed. This then formed the basis for the interview protocol administered to former radicals and de-radicalisation professionals, the results of which were fed back into the model to give it a stronger empirical basis. The simulation experiments run on the model identified that higher levels of social organisation and collective efficacy could lead to lower levels of radicalisation by stymying the emergence of radicalising settings. It also brought to light the paucity of data in the field, given what is required to populate such a model, and pointed future research in the direction to fill these knowledge gaps. The potential strengths of agent-based modelling as a tool for policymakers and practitioners were also highlighted, as it is possible to model the impact of interventions on individuals and communities in differing contexts before implementing them. This would allow more certainty over the direction of counter-radicalisation or deradicalisation programmes before their implementation, which could save time and money, and more importantly allow us to anticipate the potential negative consequences and unintended effects (e.g. human, social, political, economic, cultural) of interventions. The overview of such programmes provided through the testimonies of interviewees and reported in Chapter 7 suggests that policymakers and intervention designers and providers would benefit from a tool that would allow them to

learn systematically from the strengths and weaknesses of other interventions before implementing their own.

The rest of this section will be dedicated to outlining the advancements in knowledge made by this thesis and the contributions to the field. The limitations of the model, in terms of data and methodological approaches, will also be discussed. Finally avenues for further work in this area will be suggested from the lessons learned within this body of work.

9.1. Advancements in knowledge and contributions to the field

- Explicit statement and modelling of mechanisms within the radicalisation process

  By choosing to ground its model in the IVEE theory of radicalisation, this thesis has gone beyond other attempts at modelling in the field, which do not adopt a systemic approach to the process, either neglecting some levels of analysis (most often situational, social ecological, and/or systemic) or failing to articulate the mechanisms which govern the interaction between factors at different levels of explanation. Chapter 2 has shown how the focus of current research on radicalisation often results in individual factors dominating the research agenda, with academics tailoring their methodologies to suit. The contention within this thesis has been that we must move away from the quasi single-minded focus on the individual and move towards a more comprehensive view of the radicalisation process, looking at how radicalising settings emerge and how individuals are exposed to them. It has also been noted that rather than focussing on correlates and indicators within the radicalisation process, we must look at the mechanisms which drive the process. It is not enough to state that a person's brother was radicalised and therefore he was, too – the mechanism of attachment must be investigated in order to understand why, for example, every individual with a radicalised family member is not affected the same way. Understanding why certain environments host and maintain radicalising settings at certain times while others do not is also crucial if we are to attempt to prevent these settings from emerging. By explicitly stating the role of such mechanisms in order to model them, this thesis has contributed to the theoretical base in radicalisation studies.

- New synthesis of methodologies in the field

  By marrying qualitative data from interviews with agent-based modelling, this thesis has introduced a new synthesis of methods into the field of radicalisation studies. The iterative process used meant that the ABM helped inform the interview questions, with the answers from the interviews then being used to inform the ABM. The limited forays

by agent-based modellers into the field of radicalisation and terrorism studies were analysed in Chapter 3, and it was evident that there was little use of qualitative empirical data within the models. Indeed the theoretical basis of the models was varied, mirroring the state of the field. Taken together, these observations highlighted the need for a model built with a strong theoretical foundation, which used empirical data based upon knowledge of radicalised individuals. By utilising theories from the field of criminology, such as collective efficacy and social disorganisation, to create the model's architecture, it was then necessary to populate some of the unknown parameters using qualitative data gained from the interviews conducted within this thesis. This circular process of the theory informing the model, the modelling enforcing the formalisation of the theory, which then informs the data collection which further informs the model and permits refinement of the theory is one of the great strengths of agent-based modelling.

- Contribution of agent-based modelling to the field

As well as demonstrating the importance of moving away from the focus upon individuals and towards a systemic approach, it has shown the value of striving to attain a higher level of theoretical formalisation, in order to open up the field to the use of more sophisticated techniques, capable of theory- and hypothesis-testing in a way that more traditional methodologies are not. The use of agent-based modelling within the field of radicalisation is currently in its infancy, but this thesis has shown the potential contribution that this methodology can make in this area. By using agent-based modelling as an explanatory tool, rather than as a predictive one, it can be used to strengthen and test the theories which are being modelled, as it forces the modeller to explicitly state and operationalize the theory's premises and assumptions. In forcing the researcher to make the implicit explicit, it can reveal the potential weaknesses of the theory and can help to guide data collection to ensure that gaps in knowledge are identified and filled where possible. It prevents researchers from making statements which cannot be computationally explained or parameterised, ensuring the most stringent controls upon variables, inputs and outputs.

Furthermore, agent-based modelling allows a control of variables which would not be possible in a field experiment. This provides policy makers with a particularly powerful tool – the potential impact of their policies can be modelled *in silico* to assess the effects before taking the risk of implementing them in practice. It must be acknowledged that simulations are just that, and hence they are affected (for example) by the assumptions on which they are based. However, they enable simulated outcomes to be repeatedly

tested in a way that is far more transparent and systematic than thought experiments, which are one alternative approach. They allow the research to say 'for the following set of assumptions and conditions, these are the outcomes that we typically observe'. So, while not without weaknesses, ABM can be a very useful tool in those areas for which other methodologies are limited in their practicality for ethical, practical or financial reasons.

- Identification of existing empirically-based parameters

  The scoping and systematic reviews conducted in chapters 3 and 4 identified which modelling parameters should be used and whether an empirical basis existed to operationalise them. The review of the existing literature in the area of agent-based modelling and radicalisation and terrorism revealed the paucity of studies within this area, and the wide range of theoretical foundations and empirical bases used in the models which do exist. A systematic review of agent-based models of urban criminology – to the knowledge of this author, the first such review ever conducted – alerted the reader to the areas in which strong empirical evidence could be found (such as the use of bounded rationality), as well as where the knowledge base was weak (the modelling of collective efficacy). This allowed those theories and datasets which were transferable to the present model to be identified and analysed, as well as revealing concepts which could be enhanced from their current status by the radicalisation model. A prime example of this was the movement of agents within the model, discussed further below.

- Identification of knowledge gaps

  In creating the architecture of the agent-based model, alongside identifying the mechanisms which needed to be modelled, the parameter list necessary to populate such a model challenged this author to uncover empirical data upon which to base the parameters. This led to the identification of the gaps in our current knowledge: while some things are known about movement patterns and decision-making processes, for example, less is known about the strength of ties between individuals and the amount (or perhaps type) of attachment necessary to enable individual socialisation into a radicalising narrative. We also have little idea about levels of individual susceptibility to moral change within the population, or which factors contributing to this susceptibility would require a greater weighting than others. In highlighting the knowledge gaps with regard to the model, future research directions are outlined.

- Addition of knowledge through interviews

  This thesis has contributed to the body of knowledge on the process of radicalisation and the working of deradicalisation programmes through the interviews conducted, the results of which were presented in chapters 6 and 7. In a field where primary data is at a premium, conducting interviews with both former radicals and deradicalisation professionals is a rare opportunity and must be maximised if such a possibility arises. Using the IVEE theory to create the interview schedule, a wide range of knowledge was gained about the radicalisation process, deradicalisation, and the role of recruiters for radical organisations. It was also possible to gain information about governmental and non-governmental deradicalisation and counter-radicalisation programmes running in the UK, USA and Canada, exploring the contexts in which they are implemented, their aims and the types of participants that are selected. Such an analysis using practitioner knowledge is unique, as is the use of interviews with former radicals and deradicalisation professionals based upon the IVEE theory, outside of a prison environment[4].

- Enhancing agent movement

  Beyond the field of radicalisation studies, the agent-based model developed as part of this doctoral project and described in its finalized form in Chapter 8 makes a contribution to improving our ability to model the movement of agents, building upon the foundations of complex movement in criminology. While Groff (2007a, 2008) and Malleson (2010) assigned routine activity nodes to their agents based upon home, work and leisure locations, with Malleson incorporating the PECS framework to send his burglars to appropriate targets, the proposed model of radicalisation went a step further. Transport for London data was used to provide a realistic representation of the daily movements of agents according to their age and employment status, as well as allocating the time spent in a given location according to the trip's function. Furthermore, it incorporated an additional layer of complexity by postulating the effect of religion and religiosity upon movement, whereby agents who are stricter adherents of their faith attend services at the mosque or church, alongside leisure locations being religiously sensitive to targeting by agents (e.g. strict Muslims not visiting the pub). All of this adds to the complexity of agent movement in the field of agent-based modelling and criminology, and can be built upon in future by those who wish to pursue and extend such complexity within their own models.

[4] Unpublished study.

- Modelling collective efficacy at the agent level

  There are many ways in which the construct of collective efficacy could be implemented in an ABM; indeed, it is important to keep in mind, when interpreting the outcome of the simulations, which assumptions were made and how, exactly, collective efficacy was implemented in the proposed model. Nevertheless, it is precisely the assumptions about how collective efficacy is understood to bring about an effect on the emergence of radicalising settings and their specific implementation which distinguish the proposed model from previous attempts to simulate such community-level effects. Notably, Malleson (2010) used collective efficacy within his model at the area level, using census data to calculate whether an area would be more or less attractive to burglars. In the present model of radicalisation, collective efficacy is understood to *emerge* in an environment and to affect a setting based upon parameters set at the agent level. This stochasticity allows for a dynamic representation of collective efficacy, which then affects model outputs through an explicit mechanism: that of making targets more or less attractive to radical agents. This is a clear step forward in thinking about and modelling collective efficacy in agent-based modelling in criminology, opening up opportunities for more complex, arguably realistic, and most importantly *testable* representations of community-level processes.

- Effect of social disorganisation and collective efficacy on radicalisation

  The main contention of this thesis is that levels of social organisation and collective efficacy can affect the emergence of radicalising settings, due to their impact on levels of monitoring within an area. The level of monitoring acts as the mechanism which influences the emergence of these settings. To the extent that a majority of residents hold moral beliefs which oppose those conveyed in the radicalising narrative, higher levels of monitoring should lead to fewer radicalising settings emerging and being maintained. By modelling these mechanisms, the simulation experiments run in Chapter 8 have shown that communities represented by the model with higher levels of social organisation and collective efficacy had significantly less radicalisation occurring than those with lower levels, under certain parameter permutations. It was noted within the chapter that much more must be learnt in terms of the attractiveness of targets to radicalising agents, but the model is unique in its attempts to demonstrate the relationship between social organisation and collective efficacy and the amount of radicalisation in an area, through the emergence of radicalising settings.

9.2. Limitations of the model

The outcomes of all simulation models are reliant upon the correct configuration of their parameters, but this is even more so when using them as a predictive tool. Since the model here was used as an explanatory tool, in order to highlight the roles of certain mechanisms and assess the workings of a theory, outcomes are not intended to be compared, as would predictions, to known or existing cases for examination. Gilbert (2008) discussed the issue of validating abstract models in which you are comparing outcomes not to existing sets of empirical data with known patterns, but where the building of the model itself is part of the knowledge creation process. It is important not to dismiss models because they are abstract and incomparable to a set of defined parameters, but to accept that if they are able to generate a similar pattern to that seen in reality, that this is an important step towards the next level of abstraction within model building. No data exist to state how much radicalisation happens in a specific place at a specific time, and the model proposed herein suffers from the cumulated limitations of the data which was available or, as the case may be, unavailable, to empirically justify the parameters used to build it. While it was possible to use TFL survey data, Census data and even statistics from the British Social Attitude Survey to ground several parameters in reality, there were still many gaps in the knowledge used to populate the model. A sensitivity analysis of all remaining parameters could have been conducted, but in some cases it was not even possible to set the boundaries of these parameters empirically – such as the effect of attitude or the time in which an individual would deradicalise – yet after testing the impact of two parameter changes it was obvious that the model was sensitive to these. It is important to note that discovering these sensitivities and the potential importance of the role of these parameters within the process of radicalisation is part of the process of creating such abstract models, so should not be seen in a solely negative light.

A further model limitation is that it is based on the author's theoretical premises and assumptions. There is no precedent for the modelling of the IVEE theory, especially when focusing upon the emergence of radicalising settings. The way in which the factors and mechanisms set out in the theory were modelled was therefore up to the author. It could be the case that a different operationalization of the theory would bring about different results. This problem of theory and variable operationalization is a well-known one in criminology in particular and in social science in general (Wikström 2007; Smajgl and Barreteau 2014). Furthermore, while concepts such as agent movement and decision-making are relatively developed and assumptions could therefore be grounded in prior work, the modelling of collective efficacy was novel and especially sensitive to the author's executive decisions. Depending upon how the construct is coded and calibrated by different modellers with a

different theoretical focus, other simulations could again produce different outputs. Consequently, one aim for future work could be to try to agree particular formalisations for mechanisms or concepts that are commonly used. Mechanistic approaches (like the one taken here for Collective Efficacy) are probably to be preferred, rather than simpler approaches such as that used by Malleson.

While this thesis only represents a first step towards explicitly stating and then modelling the systemic, causal mechanisms involved in the process of radicalisation, it has nevertheless served to identify how many gaps in our knowledge remain. The simulation experiments run have shown how radical resilience and the time it takes for an individual to deradicalise can both have large effects on the outcome, suggesting that much more needs to be learned in order to build an even more accurate simulation of the process. Data limitations will remain an issue in the field of radicalisation studies for the foreseeable future, but adopting a more systematic – *mechanistic* – approach may, as demonstrated here, open up new and fruitful lines of enquiry. While more can be learned about individuals who have radicalised, there is only a small pool of willing interviewees from which to draw, and concerns about privacy and security for both researcher and participant can be expected to continue to affect data collection. This thesis has identified a range of different data required to populate model parameters and steer future research.

9.3. Avenues for further work

While the present research deliberately focussed upon the mechanisms of emergence of radicalising settings, it remains to begin developing more realistic representations of individual (vulnerability) and social ecological (exposure) level factors and mechanisms to model more fully the process of radicalisation and expand our understanding of possible avenues of prevention. While a semi-realistic representation of exposure was achieved through attention to movement patterns, the lack of complexity within the modelled social networks, attachment to members of these networks, and efficacy of radical agents are all still to be addressed. In future research, it might be useful to select a particular geographical area in which to base the model, in order to refine the exposure element of the theory, by adopting an in-depth case study approach which could be empirically validated using interviews with residents of that area or, in data-rich cases, historical documents. A targeted interview strategy with those who exhibit high levels of individual vulnerability would also be necessary in order to garner the requisite data to improve the modelling capabilities of this aspect of the IVEE theory, as past interviews have not tended to focus upon the biosocial, cognitive and selection mechanisms hypothesised to be in play, and are, therefore, not sufficient to provide the required data. In this endeavour, it might be particularly worthwhile to exploit

accumulated knowledge in neighbouring problem areas, such as delinquency studies and the broader socio-neurocognitive field. One way to further improve the proposed model might be to introduce elements of homophily-based selection in the radicalising agents' targeting strategy, whereby they would target vulnerable individuals or settings based on such shared factors as age, nationality, ethnicity, language and so on, which could provide the basis for a stronger attachment (and therefore more effective and/or efficient exposure) between agents. Another potentially fruitful avenue would be to examine whether there is a distance to crime decay when considering the areas in which radicals target settings. Within the model implemented here, for simplicity's sake, the agents operate in the area close to their home location, but whether this is an accurate representation of reality needs to be tested. Again this could be achieved through interviews with former recruiters for extremist organisations and could be supplemented with police data where it is available.

Finally, it should also be restated that the present model chose to simulate face-to-face exposure to radicalising influence. It did not attempt to simulate exposure through internet or social media settings, which are increasingly emerging as key radicalising settings in people's environments. Future models can improve upon the personal interaction element of the present effort by introducing an online exposure component and creating an even more realistic architecture.

9.4. Theoretical reflection

Overall, more research is needed within the field of radicalisation studies with the focus upon the causal factors and mechanisms involved in radicalisation, in order to separate mere indicators (which make up those ever-elusive 'profiles' of vulnerable individuals) from the genuine causal processes which should be the main target of intervention strategies. By embracing cross-disciplinary research which leverages scientific tools such as agent-based modelling to create, test and reformulate theories and hypotheses, the field will be significantly strengthened.

This need for a focus upon mechanisms and theoretical strength is not one confined to the study of radicalisation or terrorism. The question of 'what makes a good (enough) theory?' within social science is one which has been debated for some time. Bunge (2004) argues for a focus upon explanatory mechanisms within theory in order to understand how something works, and it is that understanding rather than a generalised description which this thesis has sought to argue for. The field of analytical sociology has sought to 'explain complex social processes by dissecting them, accentuating their most important constituent parts, and constructing appropriate models to understand the emergence of what is observed (Wan

2012: 1545), and it is this approach which we must ensure is undertaken in the field of radicalisation and terrorism studies if we are to move towards a more nuanced *understanding* of the *mechanisms* involved in how a person comes to be radicalised or involved in terrorism.

This is no easy task, however. Generalised, and generalizable, descriptions of phenomena are much easier to create, rather than challenging oneself to uncover the workings of a system and its constituent parts. Only by understanding that humans are part of complex multi-layered systems (individually, socially and ecologically) can we move forward towards unwrapping the layers of those systems and the mechanisms behind their workings. We must be careful not to stray too far into systems theory, which puts the system before the individual, but to use a systems-based ontology to understand an individual's place within the complex processes of society. Bunge has been keen to stress that 'the mechanisms that construct a social system or keep it going are *material processes driven by human (inter)actions*' (Bunge 1999:61). Such human interactions, both with other humans and the social and environmental systems in which we live, give rise to multiple complex phenomena of which radicalisation is only one, though one which currently receives significant attention in national and international media.

While the difficulty of operationalising theory into its mechanisms and constituent parts has been discussed within this thesis, it is nevertheless necessary to do in order for a theory to be considered 'good enough', and for it to be sufficiently testable, tested, and refined for others to build upon in the future. We must not presume, however, that a lack of knowledge or detail about a certain mechanism means that a theory cannot be good or useful. Sometimes the mere identification of a mechanism and its place and role within a theory is a good enough starting point. It is important to realise that 'description of mechanisms can be in more or less detail and at different levels' (Wan 2013:1553). We do not need to be able to fully describe a mechanism to acknowledge its existence, or its potential importance. We must merely be able to identify it as a mechanism, something which is able to change or bring about alterations to a system's structure. Indeed 'for a mechanism to be explanatory it is not required that the entities, properties and activities that it appeals to are themselves explained' (Hedström and Ylikoski 2010:52). To give an example from both another field of enquiry and history, Darwin's theory of evolution acknowledged the presence and importance of natural selection and survival of the fittest, but did not understand the inner workings of genetics or mutations (Lieberson and Lynn 2002). This understanding would develop in time as his theory was built upon and scientific knowledge advanced. This does not make Darwin's theory incorrect or useless, for he was able to identify the mechanisms which researchers could then seek to give more detail.

In order for mechanisms to be usefully identified, narrow definitions of one's problem are preferable. Rather than trying to explain why terrorism happens, for example, this thesis has chosen to try and go some way towards explaining the process of radicalisation, with a particular focus on the role of the emergence of radicalising settings. By defining radicalisation narrowly as the development of a propensity to commit terrorism, this thesis has not sought to explain how and why anyone has ever become a terrorist or committed terrorist acts. Not all of those who are radicalised go on to commit terrorism, and not all terrorists have been radicalised. This definition has also not gone beyond the propensity for terrorist acts. While acknowledging that not all terrorist acts are violent (one may be convicted for possessing certain articles without necessarily going on to do anything with them), this thesis has not sought to further muddy the waters in 'understandings' of violent versus non-violent radicalisation, for example. By focussing on the use of situational action theory and the role of moral rule breaking, the definition was kept narrow, useable and therefore useful.

When a tool such as agent-based modelling is used to show the mechanisms involved in a system, such narrow definitions and rich understanding of the place and role of these mechanisms are preferred. Within the field of criminology, Sampson, Winship and Knight (2013) have highlighted the importance of understanding causality, especially if we are to translate theory into useful public policy suggestions. The move towards understanding mechanisms is also reflected in the realist evaluation work by Pawson and Tilley (1997), who argue the importance of understanding not only the mechanisms in play in a system in order to evaluate it, but also the nuances of various contexts and how these work together to form an outcome. They again highlight the necessity of having a narrow definition of the outcome in question in order to best understand the mechanisms at play. If the outcome we are seeking to explain is too large and complex, it is much more difficult to understand and map the mechanisms involved.

However, while agent-based modelling gives the user control over the variables and the variation of mechanisms in a way which would not be achievable in reality, we must nevertheless be cautious about the outcomes, especially when calls for prediction and policy implications are put forward. The great strength of this modelling approach is to give users a tool which can allow policy-makers the luxury of running unlimited simulations on thousands of scenario combinations. But the outcomes are only as good as the understanding of the theory which is input into the model. Identifying mechanisms is not the same as possessing the knowledge to fully form them computationally and be able to write the formula for how they would impact upon a system if they were changed. While agent-based modelling can point towards the importance of certain mechanisms or variables which have a large effect upon

model outcomes, in the case of radicalisation we must resist the call to attempt to predict while we do not have the understanding of the intricacies of these mechanisms. We are only at the point of theory refinement, not even theory testing proper. In order to bring us to the point of better understanding of the theory of radicalisation used here (IVEE) and the role of certain mechanisms within it, we require much more data to test and verify the model, the types of which were highlighted above.

The need for explanatory mechanisms in social science theory, especially when attempting to model complex behaviours such as radicalisation, is clear, and agent-based modelling is a tool which can only encourage such an approach. By requiring these mechanisms to be identified, placed properly within the system being modelled and articulated as fully as possible, it allows not only theory refinement and testing, but also identifies where data is lacking and where our understanding of mechanisms is lacking. One critique of many theories is that allusions are made to things like mental events and processes ‘without trying to grasp them as complex biological, psychological and social processes’ (Wan 2012:1552). While it is important to be able to identify mechanisms such as the role of mental health issues in cognitive vulnerability, in order to model them correctly we must develop these complex understandings. This thesis is not alone in acknowledging the importance of tools which allow the modelling of theories and mechanisms in social science, with Axtell (2000), Bruch and Atwell (2013) and Epstein (2008) all explaining the benefits of agent-based modelling to explain social systems, as discussed in Chapter 3 above.

9.4.1. What this means for the understanding of radicalisation

If we are to accept the need for a mechanistic approach, what does this mean for efforts at understanding radicalisation? Currently very few theories of radicalisation take such an approach, and many are more descriptive or ‘metaphors’ than real models of the process (Horgan 2014). The modelling process within this thesis has shown the importance of formalising theories, and the fact that the process of that formalisation helps to test and strengthen the theory, showing where information is not available and where conceptual clarity is lacking. How far would we have to go to achieve this formalisation within some of the theories in the field of radicalisation?

Those theories or models which may have the furthest to go are those based on descriptive progression through ‘stages’ of radicalisation, such as Silber and Bhatt (2007), Moghaddam (2005) and Borum (2003). These kinds of theories suggest descriptive stages of a radicalisation process, but are not mechanistic in their outlook. They do not offer us testable hypotheses from which to derive outcomes. How could we formalise such theories or models? Rather than

focussing upon linear and temporal progression, it would be necessary to identify which mechanisms exist and interact to push individuals (or groups) from one stage to another, or drive their presence to join and remain in a certain stage. While Siber and Bhatt identify factors such as discrimination and the use of Islam in helping them to manage a crisis, they do not go into any detail about the mechanisms by which discrimination would affect a person to act, or the wider societal creation of supposedly discriminatory conditions. Equally Moghaddam does not weave wider societal considerations into the 'staircase' which individuals choose to move up. Rather than focussing upon 'pathways' and 'stages' or 'steps', a process such as radicalisation is inherently more complex, with multiple actors usually involved (whether in the creation and promotion of radicalising narratives, or social networks which an individual is part of). Multiple levels of analysis are also required, far removed from the individual and their potential 'pathway' in order to understand the process. From these multiple levels of analyses, we must draw out the mechanisms within them, and those responsible for the interaction between them, leading to such a complex process. Without this formalisation, we are unable to test these theories empirically.

Those theories or models of radicalisation which already attempt to account for multiple layers of analysis (looking beyond the individual) are a step further forward. These more complex socio-psychological theories can only be strengthened by a detailed focus upon the mechanisms involved. Sageman (2008) focuses on three cognitive factors within the individual (framing, moral outrage and resonation with personal experience), alongside their interaction with other individuals in a network which acts to mobilise the person. By widening the focus to social groups, Sageman is considering an important layer of analysis. McCauley and Moskalenko (2008) summarise twelve mechanisms through which radicalisation to political violence happens, grouped on the individual, group and mass levels. This goes further than Sageman but still does not draw out important social, communal and ecological factors. It rather talks about social constructs such as desire for martyrdom without discussing how these levels of analysis are connected, or how important issues such as community cohesion, societal tensions etc. can affect the wider system of which an individual is part, and potentially cause them to act. Taylor and Horgan (2006) identify a set of process variables including setting events, personal factors, and the social, political and organisational context which need to be considered. This perhaps comes closest to the interplay between levels of analysis which is required, with significant interest in the context in which radicalisation occurs and the psychological and environmental context which the individual experiences. A systemic attempt to represent a model of terrorist involvement (much wider than that of just radicalisation) identified a range of cognitive-social factors including risk-taking and reduced social contact. These systems diagrams (Taylor and Horgan 2006: 590-591) represent a strong and clear

attempt at modelling the importance of context, whether on an individual, social-ecological or even wider level), and could be built upon to further tease out the intricate mechanisms involved and formalise the model in a computational manner for an ABM allowing hypotheses to be created and tested.

Where does this leave the IVEE model, used within this thesis as the foundation for the agent-based model of radicalisation which was created? The modelling process allowed us to see where further formalisation was required, and highlighted the important role of certain mechanisms which should be further emphasised. Concepts such as cognitive vulnerability potentially play a huge role in the radicalisation process, but need greater clarity and formalisation before we are able to make use of them and understand which data to collect in order to test their importance. The building of the model hinted at the significance of concepts such as trust between parents and their children, and the role of intimate familial relationships in radicalising and deradicalising individuals. Not enough is known about the mechanism of attachment here, and the role it can play. It could also be argued that much greater formalisation of collective efficacy and social disorganisation is required in terms of its impact upon the system which can then have an effect upon the development of individual propensity. We simply do not know enough still about the emergence of radicalising settings to thoroughly understand how they are brought about, are maintained, and the impact that this has upon the radicalisation process as a whole. Perhaps the swift move towards ensuring individuals are in private spaces, or the rise of the availability of radicalising narratives on the internet, somewhat negates the effects of collective efficacy and social disorganisation. If radicalisation is not happening in a physical public sphere, how much of an impact can these things have?

This leads us to a final point about the exploration of possible future applications of agent-based modelling and radicalisation. If much of the radicalisation process is happening online, could we extend the model to take this into account? This is certainly possible. The settings in which exposure to radicalising narratives happen would be significantly reduced, and exist almost exclusively within the privacy of the home. Questions then arise as to the efficacy of governmental organisations in removing this content, and equally how this content affects individuals differently. It is known that some people are more responsive to visual media, others to the power of words. What are the mechanisms by which individuals develop attachment to others online without necessarily ever meeting them? How does trust function when face-to-face contact is no longer (and indeed rarely ever) happening online? While there are those who go on to meet people they have encountered on websites and chatrooms,

increasingly it is apparent that forming bonds with individuals online is enough to encourage vulnerable youths to make journeys to dangerous theatres of war, such as Syria.

Would the model developed here be adaptable to situations such as prison? Or indeed to the complications of lone actor terrorism? It would arguably be much easier to model the former than the latter. An enclosed physical environment would be easy to model, and there are fixed, simple behavioural rules within a prison setting. Inmates can only go certain places at certain times, can only interact with certain individuals, and are very aware that they are being formally monitored at all times. Guards, as guardians, are trained to spot radicalisation (though whether they would actually be able to identify it is another matter), but tend to err on the side of caution and over report rather than ignore behaviours. The high level of vulnerability of inmates within a prison would mean that this part of the model would have to be uniquely highlighted. It would also be interesting to see how the mechanism of trust between individuals would be fostered in a prison setting where trust is hard to come by. If a person must trust the individual propagating the radicalising narrative, does this mean prisons are actually places which, despite having a uniquely vulnerable population, are actually not conducive to radicalisation? The rules of movement, interaction and possible behaviours within a prison setting would be much easier to model than those which would be relevant to lone actor terrorism. Would it be possible to build a model of radicalisation of a lone actor? And would this actually be very different to that of an individual who later became part of a group? It could be argued that since radicalisation does not necessarily lead to a terrorist act, the model would not need to be different in any way. It is known that many of those who go on to be lone actors have actually had contact with others regarding their beliefs and intentions, even though much of this contact may be over the internet (Gill, Horgan and Deckert 2013). So would their process of radicalisation be vastly different than many of those who go on to join groups? Or those who never do anything with the propensity for terrorism that they have acquired? It may be that their process of radicalisation is more reliant on the internet as a medium, and this thesis has not focussed upon that. But this leaves interesting thoughts for the future, as those seeking to promote radicalising narratives become increasingly sophisticated in their use of online media and no longer require the face-to-face contact to build the trust that appears to be such an important part of the process. The field of radicalisation studies will continue to evolve by asking such questions, and seeking a mechanistic understanding of the processes involved in such a complex phenomenon.

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Appendix 1 – items included in systematic review of ABM for criminology

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Appendix 2 – full interview schedule

Your radicalisation process:

Which group/ideology were you involved in? How old were you when you got involved?

Can you tell me about your life at the time of joining or discovering the group? Family, education, work, friendship groups etc.

How was your relationship with your family and friendship group at the time?

Were you brought up with any particular religion? If so, to what extent did you practise your faith?

Had you been involved in any criminal activity or delinquency before joining the group? Was this alone or as part of a group of friends?

How did you find school? Were you engaged in class and interested in learning?

Did you find it easy to make new friends at school and outside of school?

Were you interested in doing new things and joining new groups, or happier being in situations you already knew and were comfortable in?

Were there any changes in your environment at the time? School, work, migration etc.

How did you discover the existence of the ideology/group? How did you get involved with them?

What was it about the message that proved particularly persuasive to you?

Was anyone you knew involved in this group, or similar groups?

Where did you initially get involved with the group?

Where did you participate in group activities? Always the same places?

Were activities conducted in public or private spaces? Was there a sense of secrecy? Level of monitoring

Did anyone in the community find out about the group's meetings or activities and try to prevent you? If so, who, what did they do, and did it work?

What was your relationship with others in the group? Recreating/replacing family ties?

Did you share similar interests with others in the group, either socially, leisure or politically?

What was your role within the group? How did this compare to others?

What was the reaction of your friends and family to your involvement in the group?

Can you tell me about the community where you lived at the time? Was it fairly similar in terms of socio-demographics, ethnicities, races or religions? Or were there different groups?

Was this the same community in which the group's activities were being held? If not, what was that community like?

Were there any different groups or different ideologies present in the area?

Were there other activities you could have got involved in, whether political, social or leisure?

Were there social activities to get involved in within the community, such as youth centres or clubs?

Was the community well organised and represented locally? Or did people keep themselves to themselves?

Were there community tensions or problems, such as crimes etc.?

Was the community you lived in one in which people knew what their neighbours were doing and would get involved in any local problems that existed?

Would your neighbours have intervened if they saw children causing trouble in the streets?

Were there any gangs or delinquent youths present within the community?

Were the people who acted to recruit others to your group accepted within the community? If not, what did the community do to try and stop you?

What was the relationship between members of the community and authority figures such as the police or local council? Was there trust between the two?

Did your ideological standpoint ever support committing or supporting violence or violent acts in the name of that ideology? If not violence, then law breaking such as terrorism offences?

What was your perception of the law, especially terrorism laws? Did you feel that they applied to you, or not? Was there a 'higher law' you were following, e.g. religious?

Questions for those who have acted as recruiters:

Who did you look to recruit? Were there certain personality types or characteristics you targeted?

What type of people made the ‘best’ or ‘easiest’ recruits? Who were the ‘worst’?

Where and how did you encounter these people? What kinds of settings would you target?

Are there any types of people or places that you would avoid? Why would you avoid them?

Where would you meet? How often? How would you ensure continued contact with them?

Describe the process by which you would recruit them.

What kind of relationship would you build with them? Which emotions were involved?

Did you deliberately target and try to recruit the friends or family of existing or newly recruited group members?

How did you integrate new recruits into the group?

How did you ensure their ideological commitment to the cause?

How did you deal with cases where their family and friends did not want them to be involved?

How did you deal with communities that were hostile to your activities?

How successful were you? How many people did you bring into the group, and over what period of time?

Your disengagement process:

When did you start to disengage with the group and the ideology?

Why did this disengagement start? Was it a question of morality, something about the group, external events etc.?

Was anyone else involved in trying to disengage you from the group?

Can you describe the process of disengagement? Gradual, sudden, staged etc.

How did you ensure your physical disengagement from the group? Did you have to find different places to go, did you move away etc.?

Did others disengage with you, or did you go through the process alone?

What was the reaction of others in the group to your disengagement?

What was the role, if any, of your family or friends in your decision to disengage and the process itself?

Has the group carried on since you left? Do you keep in contact with others who are still part of the group?

The de/counter-radicalisation programmes you are involved in now:

Why did you decide to get involved in de/counter-radicalisation?

How did you get involved? Were you asked, formally (government), or community/youth projects?

What kind of people/groups have you done projects/interventions with? Ideology, age, etc.

How many people have you done them with? How long have you been doing them for?

Which geographical locations have you focussed upon?

Have you had any official training? If so, from who and what was involved? What did the training focus upon? Styles, materials, etc.

Channel questions

How does the referral process happen? Who refers individuals to you? How much detail are you given about the person? Do you ever discover people that you yourself refer to the Channel process?

Do you use the Channel vulnerability assessment framework? If so, which part of the framework (engagement, intent, capability) do you find is more frequently used? Which would you consider to be the most important?

What training does an intervention provider receive?

How do you feel Channel fits within the Prevent programme as a whole?

Do you think Channel fits well with community activities?

How has the separation of these softer community activities from Prevent affected the activities you now conduct?

Do you work in schools, colleges and universities? If so, how is your relationship with them?

Are young people a particular focus of your Channel activities?

Do you have different intervention strategies with young and older people?

Which approaches do you find work best? E.g. theological, activity/sports groups, employment activities?

Are there people for whom Channel is inappropriate?

Do you think the Channel programme could be improved? If so, how?

Can you describe a typical intervention/programme? How long does it last, what do you do, with whom?

Why do you use the approaches you have adopted? Trial and error? Training courses? Official requirements? Adapting to situations?

Do you alter you interventions with varied contexts? Or is it always the same? Was it different for different ideologies e.g. far-right or Islamist?

What have you found works particularly well and in which context? Success stories.

What doesn't work well? Failure stories.

Are you attempting to alter things within the individual, family, wider community or environment? How and why?

How do you measure success in your programmes/interventions? Do you have any statistics or information which you keep?

Do you follow up with participants after the intervention has ended?

Have you seen any trends in the cases that you deal with?

Did mental illness play a role in any of the cases that you have dealt with?

Are there any commonalities in the characteristics of the individuals, the communities or the environments where you see radicalisation happening?

How have you and the programmes/interventions you administer been affected by local community policies/issues?

How have they been affected by wider governmental policies? Prevent, cuts etc.

How have you built and maintained trust/relationships with the individuals and communities that you work with?

Details of the radicalisation process of the individuals you have intervened with:

What age was the person when you first met them, and when they first encountered the message?

Had they recently changed/finished school, started university, moved to a new place or started a new job?

Were they brought up in a religion? If so, was there strong commitment to it from an early age? Did they have any reason to question it, or conventional morality?

Did they have any history of drug addiction or mental illness?

Did the individuals have any history of crime or delinquency, either alone or as part of a group? Were they easily influenced by their peers?

Did they seem to be able to adjust well to being in new situations or did they struggle to handle that?

Did they find it easy to make new friends? Did they get on well with their classmates at school/uni?

Had they recently cut any ties with old friends or family members?

What was the state of their support network around them before, and at the time of being referred to you?

How did they describe their relationship with their family? Did it seem to be at all dysfunctional? If so, how?

How did they first encounter the ideology that they adopted?

Where did they encounter it? Why were they there at the time?

Did they know anyone else involved in the group, or similar groups?

Did they have any particular hobbies or interests that may have made them be in, or seek out, such a place?

Were they actively recruited by someone (a radicalising agent), did they seek them out, or was there no-one else involved?

How did they describe the person who was spreading the narrative/message?

What was their relationship with that person? How did it develop and change over time?

What did they say attracted them to the narrative/message?

What were the main features of the narrative/message they encountered?

Did people openly recruit in the area? Did the local community know that these activities were happening?

If so, did people attempt to intervene to stop them from happening? What did they do?

Did the group always meet in the same place? If not, why did they meet in different places? Were they ever forcibly removed/prevented from meeting somewhere? What characteristics would they look for in a meeting place?

If the local community did know and did want to prevent such activities from happening, did they inform the authorities? If not, why not? Was there trust between the community and the authorities?

Was there a feeling of rules within the community that were being broken by these activities happening? If so, how were these rules enforced?

Were there many community groups or spaces within this area? For example youth clubs, societies etc.

Was the area dominated by a certain religious or racial group, or was it fairly mixed? If mixed, how did the different groups get on together? Were there inter-religious meetings for example to ensure tolerance?

Did these different groups live in separate areas within the community? Was there a sense of segregation between them? Or did they mix well spatially and socially?

Are you aware of there being a notable level of properties to rent and a high turnover of residents within the area? Or was the population relatively stable?

Were there any problems with crime or delinquency within the area, such as groups of youths on the streets, or graffiti etc?

If so, did the local community intervene to stop such activities? If so, how? If not, why not?

Was there a strong bond between different generations within the community? Did children feel able to talk to their parents about any issues they were facing?

If the younger generation were facing problems, who would they turn to for answers?