Connective Politics: An Analysis of the Role of the Internet on Social Capital and its Outcomes

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I, Javier Sajuria, 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 work.

Abstract

This thesis aims to examine the notion that the Internet is affecting the way in which we behave socially and politically. In particular, it focuses on the analysis of social capital and its potential outcomes on voting behaviour.

There are three main empirical outcomes of this thesis. First, it provides an structural analysis of online networks from three different cases, and compares the network structures of these cases with different theoretical expectations about social network behaviour. The results show that online structures follow a similar pattern that we could expect offline, emphasising the role of formal organisations in fostering bridging social capital.

Second, the thesis introduces a new instrument for measuring social capital, the Online Resource Generator. This module was fielded in the third wave of the British Election Study 2015 and contains a thorough measure of access to social capital in a general way and both online and offline. The instrument responses are used to calculate individual level positions on latent dimension representing different forms of social capital. These latent variables are estimated using Bayesian Item Response Theory, and aim to provide a valid measure of individual levels of social capital.

Third, the thesis examines the relationship between different forms of social capital and voting turnout. In particular, it focuses on the analysis of the European Parliament Election in 2014 and the UK General Election in 2015, using a multilevel approach for the latter. The main results show that online social capital is negatively associated with a higher likelihood of voting, while the combination of online and offline social capital has a positive association.

In summary, this thesis provides compelling evidence against the dystopian

claims about the internet, and shows how a balanced use of technology can improve people's individual levels of social capital.

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Chapter 1

Introducing the Study of Online Social Capital

1.1 Introduction

The main goal of this thesis is to examine critically the statement that the internet is changing the way we understand and practice politics. Since the emergence of information and communication technologies (ICTs), several researchers have sought to understand how these technologies affect the practice and theory of politics. Some have focused on the way in which they provide new platforms for the diffusion of political information, such as blogs, forums and websites (Margolis and Resnick 2000; S. Coleman 2005; Feld and Wilcox 2008; Hindman 2008; Larsson and Moe 2012), others have tried to understand how the internet provides new tools for political campaigning (Trent and Friedenberg 2008), or how technology creates new ways for political participation and good governance (Layne and Lee 2001; J. Coleman 1988; Dunleavy et al. 2006). Scholars have also focused on understanding the role of our social connections formed – or maintained – through the internet (Gibson, Howard, and Ward 2000; Kavanaugh and Patterson 2001; Shah, Kwak, and Holbert 2001; Wellman, Haase, et al. 2001; Ellison, Steinfield, and Lampe 2007; Williams 2006; Margetts et al. 2011; Bond et al. 2012). This thesis attempts to contribute to this latter line of research by examining the structure, content and political outcomes of social capital in online networks.

In particular, this research focuses on the definition of social capital as social networks able to mobilise resources and information, and that operate under norms of trust and reciprocity. This concept, discussed later in the thesis, is based on the work of Robert Putnam (1994; 2000). Unlike other scholars working in social capital (J. Coleman 1988; Burt 2005; Lin 2002), Putnam focuses on the collective political outcomes of our social connections, such as democratic performance, stability and social inclusion. Building on the ideas of de Tocqueville, proponents of Putnam's theory claim that social interactions, operating under norms of trust and reciprocity, are key for becoming aware of public affairs, and getting involved in them. Putnam explains that the only ties able to produce such outcomes are those who contain personal, face-to-face interactions. In that regard, online exchanges of information, such as those present on Twitter discussions, forums or Facebook, would not have the required features to create such outcomes.

This idea has been contested. One argument is that people connected to the internet tend to get involved in politics more than those who are disconnected (Tolbert and McNeal 2003; Cantijoch 2008) while others have found that those who interact through social network sites have similar levels of social capital than those who do not (Kavanaugh and Patterson 2001; Sebastián Valenzuela, Park, and Kee 2009). Nevertheless, there are relevant gaps in existing literature regarding the nature, content and measurement of social capital in online environments. In that regard, most analyses trying to observe the formation of social capital in online environments have assumed that it has the same features that we see in offline settings. Instead of considering how social capital would look given these new forms of communication, they have searched for signs of "traditional" social capital. In essence, they tend to assume that ties created and maintained online have the same attributes and capabilities than those created offline – e.g. that memberships in Facebook groups are equivalent to the memberships in voluntary associations or "bowling clubs". The particular purpose of my research is to analyse the structure and features of those connections formed online, to establish how they differ from the traditional concepts of social capital, and understand if and how they affect political participa-

tion.

For the purpose of this thesis, both elements — the formation of social capital mainly through online ties, and the political outcomes of this social capital — can be summarised in three different questions:

1. Can we observe the structural features of social capital in online networks?

2. How does social capital differ when it is formed and sustained online, offline, or a combination of both?

3. What is the effect of these different varieties of social capital on political participation?

To date – and to the best of my knowledge – most researchers have focused on analysing online action under the same lens they analyse offline events, that is, the lens of traditional social capital theory. This approach is problematic because it does not recognise what is particular to online action: loose, fast and ephemeral. For example, Gayo-Avello (2012) argues that there is no agreement among researchers on which are the appropriate indicators we should observe in Twitter in order to predict electoral outcomes. Elsewhere (Fábrega, Paredes, and Sajuria 2012) researchers have addressed this issue by pointing out that the number of followers or "mentions" might not be the most appropriate measure, since they do not correlate with electoral outcomes. Thus, there is a need for new theoretical and methodological approaches to understanding social connections that take place online.

In order to address the first research question, my thesis focuses on the the structure of social networks. I examine large social media datasets to observe the structural signatures of online networks. The second research question addresses the content of social capital in terms of resources. This step is studied through the use of an innovative survey instrument — the Online Resource Generator[1]. The third research question is addressed by analysing the relationship between social capital (either online, offline or a combination of both) and voter turnout, using data from

[1]This instrumnent was a joint submission with Dr Jennifer Hudson as user-generated content for the British ElectionStudy 2015

the British Election Study 2015 (2015), in particular, the European Parliament election in 2014 and the General Election in 2015. There are several explanations behind social behaviour and political outcomes, ranging from institutional approaches, sociological theory, or social movements theory. This research provides evidence to show that online interactions — and hence, online social capital — can exist in online settings, and also differ substantively from traditional interactions.

1.1.1 Rationale Behind the Thesis

Since the mid-1990s there have been three main groups arguing about the role of the internet in politics (Van Laer 2007). Utopians have argued that the internet brings new and positive options for political action (Negroponte 1995; MacKinnon 2012; Ghonim 2012), mainly because of the apparent limitless flow of information, and the irrelevance of geographical boundaries to communicate and disseminate ideas. Conversely, sceptics argue that political activities taking place online are similar to the traditional – non-online – forms of political practices (Margolis and Resnick 2000). Dystopians also claim that the alleged positive capabilities of the internet for building freedom and democracy might also be used for the exact opposite, such as controlling the content that citizens can access online – as happens in China – or monitoring people's online activities (Sunstein 2009; Morozov 2012).

In terms of political action, these views confront each other through two main theories about the effect of the internet, that is, reinforcement and mobilisation theories. In the former, the internet provides a platform for those who are already politically engaged, who can now perform new political actions (Krueger 2002; Best and Krueger 2005), but fails to bring new people to the political discussion. Supporters of mobilisation theory (Van De Donk et al. 2004; Bennett, Breunig, and Givens 2008; Van Laer and Van Aelst 2009; Ward and Gibson 2009) posit the internet is doing the opposite. According to this view, the internet is particularly important for allowing excluded and underrepresented groups to participate in the political process. The traditional balance of power requires the existence of elite groups who control the generation and flow of information (Van Laer 2007). Hence, the internet would provide free and equal access to information.

Although there is empirical evidence to support both approaches/theories, Stanley and Weare (2004) argue that this is a false dichotomy. There might be other factors that explain better the alleged effect of the internet on political action. One of them is the idea that the internet requires different skills than offline activities and, consequently, there is a generational trend in which younger people tend to acquire these skills more easily. In that regard, the internet might be operating both as a reinforcement agent - in the case of older cohorts - while bringing new, younger people into politics.

This approach is shared by Hirzalla et al. (2010) who claim that a reason for the existence of contradictory evidence between the theories is the different methodological approaches taken by researchers. Reinforcement theories are normally built on assessments of general internet use patterns such as the time a person spends online, the diversity of the activities they perform or the amount of emails they send; whereas mobilisation claims often build on internet use in specific cases, at specific moments as we see during protests, presidential campaigns or discussions about specific issues. This means that the internet might actually be having an effect, but only related to particular events. The mobilising capabilities of these new technologies might also be restricted, for now, to younger generations and in specific cases (Hirzalla, Van Zoonen, and Ridder 2010). However, this literature is silent in explaining the particular processes by which this occurs.

One of those silences refers to the role of social capital in the mobilisation/normalisation discussions. There is evidence that shows that social capital - in the shape of personal knowledge about potential participants - helps mobilisation in offline settings (Brady, Schlozman, and Verba 1999). However, the evidence on online connections as a form of recruitment (see González-Bailón et al. 2011; Bond et al. 2012), provides no explanation on how these connections are created, the resources they mobilise or the structure they take. As explained below, all of these elements are essential to understanding social capital online

On the question about the effects of online interactions, some researchers have tried to use online behaviour as predictor of civic engagement (Sebastián Valen-

zuela, Park, and Kee 2009; Gil de Zúñiga, Jung, and Sebastián Valenzuela 2012), while others have argued the impossibility of using internet data to predict electoral outcomes (Gayo-Avello 2012). What these scholars have in common is that they all treat the internet as an "independent variable", measuring the amount of time spent online, the different uses of the internet or the intensity of the use. A complementary approach would be to observe how "the internet" is a reflection of broader behaviours. People are not necessarily different online than offline, they might be platforms through which the same person aims to obtain similar goals. However, the medium does influence some of these decisions and, as such, I aim to analyse the use of the internet as a degree of the individual level through which someone creates social capital online and offline, rather than a either/or dichotomy.

The combination of internet and politics still remains ripe for further investigation. The question about how the internet can be used to bring new people into politics - i.e. to mobilise them – requires an understanding of how the internet operates. Since the inception of social media such as Facebook or Twitter, this question has evolved to ask how our social connections created, maintained and developed through the internet might affect our political decisions. Whether a person decides to participate in a protest, or vote for a candidate, we need to analyse if their online connections played a role, and how are they constructed.

1.2 Structure of the Thesis

In chapter 2 I provide a theoretical discussion of the concept of social capital. I focus on the relevance of its role on politics along with its relationship with ICTs. The chapter explains how the definition of social capital has been used to devise the empirical strategy of my thesis and its limitations. There are two main elements of the concept in which I focus: the structure of social capital networks, and the resources those networks are able to mobilise. The last empirical step investigates the relationship between social capital and turnout. The last section of chapter 2 provides a summary of the methodological steps of this thesis. Each method is discussed in detail in the empirical chapters.

Chapter 3 studies online networks created through Twitter to find the structural signatures of social capital, and compare them with different theoretical expectations of social behaviour. Chapter 4 introduces a new survey metric to study social capital, and shows the results of its application in the British Election Study 2015. Chapter 5 then uses the results of this instrument to understand the relationship between social capital and turnout. These three chapters have been designed to stand by themselves, and therefore, they provide thorough theoretical and methodological discussions. Therefore, chapter 2 operates more as a summary of the theory and methods of the thesis instead of a detailed description. Finally, chapter 6 provides a summary of the main contributions of my thesis, the limitations, and options for advancing the research field. Below, I briefly describe each chapter.

1.2.1 Chapter 2: Theoretical and Methodological Discussions about Social Capital

Chapter 2 discusses how the literature has usually struggled to find an agreed definition of social capital. The discussions from the inception of the concept in 1916 (Hanifan 1916) have resulted in the concept being transformed into an umbrella that is related to many disparate ideas. For example, some equate social capital to trust (Whiteley et al. 2013), while others use it as a synonym of civic engagement (Sebastián Valenzuela, Park, and Kee 2009), or involvement in voluntary organisations (R. D. Putnam 2000). Moreover, among those who have agreed on certain basic distinctive elements of social capital, there is disagreement with regards to the approach followed to understanding social capital. While some focus on the individual elements and gains of social capital (Burt 2005), others argue that what is relevant is what happens at the collective level (R. D. Putnam 2000; Colletta and Cullen 2000).

The chapter develops a definition of social capital as *social networks able to mobilise resources and information, based in norms of trust and reciprocity.* This definition is based on the extant literature and includes most of the elements that are common to the conceptual discussions on the topic. Moreover, this definition guides the empirical strategy of the thesis, by providing a platform for the design of

the research questions of each chapter. With this definition at hand, the chapter then discusses what cannot be considered social capital, providing several examples of how the concept has been misused in the literature.

The following two sections of chapter 2 focus on the relevance of social capital for the study of politics, and on how the internet is related to social capital. In the discussion of the former topic, I show how the literature has usually linked social capital to a range of positive outcomes. Some of them are institutional, such as democratic stability, institutional success, and trust in institutions (Warren 1998; Woolcock 1998; Welzel, Inglehart, and Deutsch 2005). Other potential outcomes of social capital take place at an individual level, such as affecting political participation decisions (J. Coleman 1988), which are particularly relevant for this thesis. I argue that social capital is a relevant ingredient for successful societies, and that it has important effects in individual behaviour.

In terms of the role of technology, the chapter reviews the literature on social capital and the internet. Since Putnam's (2000) doubts about the ability of the internet in creating meaningful social connections, several researchers (e.g. Sebastián Valenzuela, Park, and Kee 2009; Ellison, Steinfield, and Lampe 2007; Gibson and McAllister 2013) have investigated the truth about these claims. They have suggested that the internet can have an impact with relation to the structure and depth of social connections. My main argument here is that we need to move forward and start to look at how the internet can create different varieties of social capital in order to understand their relationship to political participation.

I then describe the methodological features of each of the next three chapters. I focus on demonstrating that although each of these chapters can be analysed as an independent research project, they are interconnected by the same definition and objectives. Each chapter is analysed starting by a description of their research questions and hypotheses. Then, I provide a summary of the methods of each chapter, focusing on how each method is used to answer the main research questions of the thesis.

1.2.2 Chapter 3: Understanding the Structural Features of Online Social Capital

This chapter aims to determine if the structural signatures of social capital can be observed in online networks. In particular, I focus on the study of two particular forms of social capital: bonding and bridging. This is a distinction created by Putnam (2000), and explains how the social capital based on intra-group (bonding) ties are different than the social capital based on extra-group — or bridging — ties. I use five cases — three for the main analysis and two for robustness checks — to answer the first research question of this thesis. For each case, I obtained a large dataset of tweets and use social network analysis techniques to observe its development over time. The three principal cases are the Occupy Wall Street in 2011, the Chilean election in 2013, the IF campaign against global hunger in 2013, whereas the cases used for robustness checks are the European Parliament election in 2014 and a sample of geo-located tweets in the UK during that same year.

The results of this chapter confirm the expectation that the structural features of social capital can also be observed in online networks. When compared to a set of simulations based on relevant theoretical models, the online networks show that the fundamental signatures of bonding social capital are present in the communication interactions within a Twitter discussion. With regards to bridging social capital, the evidence suggests that the role of organisations are vital in forming bridging ties amongst different social groups.

This chapter concludes that the patterns we would expect offline can also be observed within online environments. Although this is an exciting result and works against the fears that Putnam posited about the ability of online interactions for creating social capital, it is limited. I do not observe the content or the resources transmitted online, only the presence of the ties and the network structures they form.

1.2.3 Chapter 4: Understanding Social Capital using a Resource-Based Approach

Chapter 4 describes the design and implementation of the Online Resource Generator, an innovative survey instrument to measure social capital. This instrument is based on the Resource Generator (Van Der Gaag and Snijders 2005) a survey instrument designed for the Netherlands, which has been modified for the UK context (Van der Gaag and Webber 2008), but has never applied into a nationally representative survey until now. The main purpose of this chapter is to understand the extent of what technologies are affecting individual levels of social capital, and what are the differences between online and traditional social capital in terms of access.

This instrument has been applied to a subset of respondents from the British Election Study 2015, and the results are used to estimate every respondent's position on latent traits of social capital. The chapter discusses and uses Exploratory Factor Analysis and Item Response Theory to produce those estimates. I create four different scales of social capital one that measures general — or overall — social capital, one for online social capital, one for offline social capital, and a last one that measures only the level of social capital that is sustained both online and offline at the same time.

The results from the chapter show that while the use of Twitter and Facebook is positively associated with a general level of social capital, the use of the internet to access social resources does not show any significant association with the general scale of social capital. However, when that access is combined with offline sources (i.e. that the same resource can be accessed both ways), it is positively associated with the general levels of social capital. Although this result holds on average for everyone in the sample, the association is stronger for women than for men.

With regards to the different scales of social capital — online, offline and combined — the results show that there are important differences between them. For example, someone who has higher levels of online social capital is, on average, most likely to be a middle class man, who uses Facebook (but not necessarily Twitter). Someone who has a higher level in the combined scale is, on average, someone who

is also older, upper-class person, who is extroverted and uses both Twitter and Facebook. Finally, those who are higher in the offline scale are more likely to identify as black or ethnic minority, Christian, and reluctant to use Facebook and Twitter. These results show how important it is to distinguish between different forms of social capital, as they are related to different types of people.

1.2.4 Chapter 5: The Influence of Social Capital on Political Participation

The final empirical chapter provides an analysis of the relationship between social capital and voter turnout. This approach is the first step in observing how the varieties of social capital can produce different effects on political participation. The chapter focuses on two elections that took place in the UK: the European Election in 2014, and the General Election in 2015. In both cases I use measures of self-reported turnout, due to the unavailability of validated turnout data. I use data from national and supra-national elections in order to account for the differences they have in terms of turnout. The literature (Marsh and Mikhaylov 2010) distinguishes between first-order and second-order elections, and shows how they have different trends with regards to turnout. Moreover, EP and GE elections fit very well to the pattern of first and second order elections (Heath, McLean, et al. 1999).

The traditional theory on social capital and turnout explains that people with higher levels of social capital are also more likely to vote (Gil de Zúñiga, Jung, and Sebastián Valenzuela 2012). There are some theoretical mechanisms for this expectation, such as the ability of social capital networks to foster norms of solidarity civic duty, which in turn fosters a higher level of commitment with the community. However, the evidence from the UK is scarce and does not show significant associations (Whiteley et al. 2013). This chapter provides evidence that, although the general social capital scale does not show any significant association with (self-reported) turnout, there are significant associations with online and combined social capital. In particular, higher levels of online social capital reduce the likelihood to report turnout, while higher levels of combined social capital increases the likelihood. The former result can be explained as a matter of preference, where people

that depend more on the internet to have higher levels of social capital may choose other — probably non-traditional — forms of participation. However, this proposition is left untested in this thesis, mainly due to the unavailability — by end of August 2015 — of relevant data on BES respondents behaviour with regards to other forms of political participation.

1.3 Contributions

There are four contributions of my thesis that I would like to highlight at this point. First, the evidence shows that although there are differences between varieties of social capital, there are underlying trends that are common to both online and offline behaviour. Second, according to my findings, the dystopian theories about the role of the internet on social capital and political participation do not have full support. Third, this thesis highlights the relevance of a healthy combination of online and offline behaviour for increasing general levels of social capital. Fourth, this thesis bridges the gap between the theory and the measurement of social capital, providing a coherent framework that emphasises a clear conceptual definition and innovative research methods.

With regards to the first contribution, chapter 3 shows that online connections are able to replicate the structural signatures of social capital. This means that, at least at a structural level, online networks show social capital patterns. Moreover, the literature has shown the relevance of organisations in fostering the formation of bridging social capital, and that is also replicated in my findings. Networks with higher levels of brokerage are those where formal organisations (e.g. political parties, NGOs) play a central role. Conversely, networks where organisations are relegated to a secondary position show no significant levels of bridging social capital.

The evidence also shows significant differences to who holds different levels of social capital. Those differences are also reflected when analysing the relationship between social capital and voter turnout. This evidence suggests that there is a need to analyse social capital through a more nuanced approach, one that distinguishes

between the different ways of accessing and maintaining social capital. Thinking about social capital and the internet as separate variables does not fulfil the purpose, and the different ways in which it is measured throughout this thesis allows to me look at the way in which social capital is developed through the internet.

The second contribution of this thesis relates to the partial lack of support for dystopian theories. The use of technologies is not associated with lower levels of social capital, even after controlling for traditional explanations of social capital. However, with regards to turnout, online social capital does show a negative association with the probability of voting. The theory suggests that I should expect these people to be more likely to participate through other forms, but until now, this is only a hypothesis to test in the future.

Chapter 4, in relation to the third contribution, shows how having access to the same social resources[2] both online and offline at the same time is positively related to higher levels of general social capital. Chapter 5 deepens this finding by showing that higher levels of combined social capital are related to an increase in the probability of reporting turnout.

This finding is relevant as it shows that the use of the internet can be related to positive levels of social capital and political participation as measured by turnout. The key, then, is to strike a balance between engaging with others online and offline. This is consistent with the notion of social interactions as a continuum, in which the platform used to connect with others matters less as long as people are able to combine them positively. This is discussed at length in chapter 4.

Finally, as explained in chapter 2, this thesis provides a definition of social capital that is derived from the relevant literature and, based on that, devises an empirical strategy that is directly derived from that definition. In doing so, I aim to expand the field by providing a clear pathway on how social capital can be conceptualised and measured in a coherent and valid way.

In summary, this thesis suggests that technologies may affect the way in which

[2]The concept and measurement of social resources is explained in detail in chapter 3. For example, the Online Resource Generator asks about knowing someone who can provide careers advice, or someone who is good at DIY

we behave politically, but that the main essential trends remain stable. In practical terms, this thesis sits in a position against the notions of technological determinism, and argues that we need to find better ways account for the complex relationship between ICTs and political behaviour.

Chapter 2

Theoretical and Methodological Discussions about Social Capital

2.1 Introduction

This chapter aims to introduce the main debates around social capital, explore the conceptual diversity around it, and explain the elements of my own definition. This chapter also aims to be a methodological point of connection between the three empirical chapters of this thesis (chapters 3, and 4) through the review of their respective research questions. I briefly explore the methodological decisions made in the different chapters to address the main research questions of my thesis. The main argument of this chapter is that although there is now more clarity about what social capital is — and what it is not — there is still a big gap between the conceptual discussions on the concept and the way in which it is operationalised and measured.

I define social capital as *social networks, based on trust and reciprocity able to mobilise resources and information*. This is not an arbitrary decision, but as I show below, a choice made after a careful review of the literature on social capital. Focusing on networks provides the opportunity to encompass both the individual and the collective nature of social capital, which has important implications at a theoretical and empirical level.

I first review the literature on the development of the concept of social capital, focusing on the influence from the early and modern literature. I then explain why

this is concept relevant for political science, and how my thesis contributes to this discussion. Later, I discuss how technologies can influence the way in which we engage in social connections, and to a certain extent, on the political outcomes of social capital. Finally, I provide a brief summary of the different methodological strategies used in my thesis.

A small caveat about this chapter. A great deal of theoretical and methodological discussions is contained within the different empirical chapters of this thesis. This has two main implications. First, it allows the chapters to work as coherent research pieces that encompass the elements required for a full understanding of the research questions and empirical strategies. Second, and in order to avoid redundancy, this chapter is shorter than traditional thesis literature reviews and methods section, as it is mostly aimed at providing an overview rather than repeating the detailed discussions from the empirical chapters.

2.2 What is Social Capital?

2.2.1 Origins of the Concept

Answering the question of what is social capital requires that I take a short travel through the history of the concept. As I describe in more detail in chapters 3, 4 and 5, it was Hanifan who introduced the concept in 1916. In his work "The Rural School Community Center", he describes social capital as

> "...to that in life which tends to make these tangible substances (real estate, personal property or cash) count for most in the daily lives of a people, namely, goodwill, fellowship, mutual sympathy and social intercourse among a group of individuals and families who make up a social unit, the rural community, whose logical center is the school (Hanifan 1916, p. 130)".

His view stems from the notion that individuals are intrinsically designed to live within a socially embedded community. In doing so, they engage in building social capital by participating in different social activities that allow for the formation of these social connections (such as picnics, or other social events). When

individuals are able to form higher levels of social capital, this can be used to benefit the overall community through the development of social norms and community spirit (what Hanifan calls “goodwill”, “fellowship”, and “mutual sympathy”).

As the person who introduced — and perhaps invented — the term, Hanifan has a theoretical and empirical perspective. His writings are drawn from his own experience as a State Supervisor in West Virginia, US. In his writings, he describes how an active programme of meetings and social activities, all around the schools and their teachers, had several positive impacts on the community. In his depiction, he claims that social capital is at the foundation of a large array of phenomena, such as national patriotism, fundraising for local libraries, school attendance, and school performance.

Unfortunately, Hanifan’s account was left untested for several years, and his conceptual novelty was overlooked. It was not until sociologists in the 1980s picked it up that the concept gained more relevance, especially for understanding individual success within different organisations.

2.2.2 Individualist Approaches to Social Capital

Pierre Bourdieu (1986) included social capital in his work ”The Forms of Capital”, as one of the many ways in which privileged groups would create exclusion mechanisms to exercise power over others. He defines social capital as

> “... the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition (Bourdieu 1986, p. 119)”.

Unlike Hanifan, Bourdieu approaches the formation of networks between individuals from a less positive note. As with other forms of capital (human and economic), social capital is being used by elites as a way to keep their position within the power structures. These relationships operate as closure mechanisms (a concept I will revise thoroughly in chapter 3) that create advantages for the members of the network, while keeping others away from them. It is capital in the sense

that individuals can accumulate it and invest it, but also in the sense that not everyone has it. It is a scarce resource, and as with every other scarce resource, only a few privileged can access it.

At the individual level, Bourdieu's view of social capital is the same as with other forms of capital. If someone wants to improve their position, they should work to create resourceful connections. From a collective level, social capital replicates and enforces the power structures where a privileged group tries to maintain their dominant position. This idea of social capital as a tool for exclusion forms the basis of what then Putnam (2000) develops as bonding social capital. In later developments of his work, he talks about the dark side of social capital, where this particular idea gains significance.

Almost contemporary to Bourdieu, James Coleman (1988), US sociologist, developed the concept further, based on the notion of rational behaviour. His approach lies at the intersection of sociological approaches and rational choice theory. Although he is not committed to contextual explanations of human behaviour, he recognises that context matters when guiding individual decisions. Norms, trust, and notably, social networks, can not only shape decisions, but are also relevant for the sustainability and functioning of society and economy.

In Coleman's view, social capital is one of many resources available to individuals. In that way, he moves away from Bourdieu and claims that it can be available — although not exclusively owned — by different people across different social groups. An important addition to the concept is the idea that social capital is preceded by trust, and as such, it is not very easy for people to transfer their own social capital to others. If someone has a lot of connections, mainly due to contextual factors (e.g. where they live, work or study), someone would have to participate in those contexts to access the same social capital.

Like Hanifan, people need to come together in social gatherings to create social capital, and based on trust, these connections arise and form stable social networks. Whereas Bourdieu mainly emphasises the negative role of social capital as a tool for exercising power, Coleman sides with Hanifan on its relevance for communi-

ties. Social capital permits the transmission of information, which also expands the knowledge about social norms and values. Therefore, there are positive outcomes for society when social capital is present.

Both Bourdieu and Coleman fall within a group of scholars who understand and analyse social capital from a more individual perspective (a distinction I develop in more detail on chapter 3). Although both authors appreciate the role of social connections at a collective level, their main focus is on individuals investing and aggregating it. Within the individualist approaches, there has been a group of sociologists interested in understanding how the position of people within the social networks represents different levels of social capital.

Ronald Burt (2005) offers a more simple definition of social capital. For him, social capital is "the advantage created by a person's location in a structure of relationships" (p. 4). In more detail, individual levels of social capital are a function of the ability of an individual to create networks across different social groups — or as Burt calls it, "structural holes" — while in parallel, concentrating time and effort in building close connections within those groups. This is a key combination that I explore when analysing the structure of online networks in chapter 3, and is essential in understanding the double nature of social capital. On the one hand, social connections within a small group — often called bonding social capital — are relevant to create trust. However, as Burt explains, there is a saturation point of the variety of resources and information that any individual can obtain from a single group.

This is where the ability of individuals to reach other groups becomes relevant. Other groups contain new information, and those who are able to bridge between their original group and others are the ones who have access to that new information. This gives them a privileged position in comparison to the other members of the network, as long as they keep this privilege to themselves. This is what Putnam calls bridging social capital. Therefore, in order to have higher levels of social capital, individuals would balance belonging to closed networks, while at the same time, creating connections with other closed groups.

The position within a network is also something that interests Nan Lin (1999). He defines social capital as "investment in social relations with expected returns" (p. 30). Lin also focuses on the individual aspects of social capital, and particularly, on the individual gains that someone can make given their position in this network. Lin refers to himself as being part of a "neo-capitalist" tradition, to distinguish his theory from the traditional Marxist theory of capital (e.g. Bourdieu 1986).

Burt and Lin have something else in common. They understand social capital from a rational perspective. Individuals create and invest in social connections because they are expecting to gain something out this investment. These expected positive outcomes might ot come, but according to these authors, they are within the expectations of those looking to engage with others.

Coleman (1988), on the other hand, tries to reconcile the rational choice approach of network theorists with a sociological account of how context and structure matters for individual decisions. He claims that social capital is not only the product of individual self-interested decisions, but also the by-product of other rational actions. For example, parents send their kids to school with the primary goal of having them educated. However, through their interactions with other in the classroom, they increase their levels of social capital. As such, people can benefit from the formation and sustainability of social capital even when they are not necessary looking for it.

2.2.3 Collective Approaches to Social Capital

Robert Putnam's influential book, "Bowling Alone" (2000) popularised social capital outside the academic sphere and also reinvigorated the debate within academia. Unlike his predecessors on the field, Putnam's focus is not solely on the individual level, but also on the network itself. The community and its virtuous outcomes are his main preoccupations, and he claims that the US society seems to be losing them.

When discussing social capital, he defines that,

> "[W]hereas physical capital refers to physical objects and human capital refers to properties of individuals, social capital refers to connections among individuals — social networks and the norms of reciprocity and

> trustworthiness that arise from them. In that sense social capital is closely related to what some have called "civic virtue". The difference is that "social capital" calls attention to the fact that civic virtue is most powerful when embedded in a dense network of reciprocal social relations. A society of many virtuous but isolated individuals is not necessarily rich in social capital" (2000, p.19)

As we can observe, although Putnam recognises the essential role of individuals in forming social capital, he places more relevance in the connections they are able to form between each other. As he says, isolated individuals do not have access nor create social capital, because social capital only exists in the relationship with others. Therefore, his focus is on the networks that people create, rather than the individuals themselves.

Putnam's focus on communities and networks is not novel. In a previous work (R. D. Putnam, Leonardi, and Nanetti 1994), he shows how the differences at the level of community tying in different Italian regions explains the disparities on institutional success. Moreover, he claims that one of his main inspirations is the work of Alexis de Tocqueville and his impressions of the US society in the 19th century. In his book, "Democracy in America" (2002, original from 1835), de Tocqueville describes how democracy has flourished in the US since the inception of its constitution in 1787.

For the French author, the US Constitution is responsible for fostering a culture of civic virtue and participation. He talks highly about the Township Democracy, and the opportunity of different members of society coming together in the form of associations. This institutional framework is essential for the surge of closed communities that come together for collective goals.

Putnam starts from the point where de Tocqueville leaves his depiction of the US society and wonders what has happened with this society based on networks. His conclusions, which are already 20 years old, are far from optimistic. He provides thorough evidence on how the participation and involvement in association across the US has declined over time. This, Putnam claims, has impacts on other

political and social aspects such as trust and democracy.

One of the issues Putnam mentions in his book is that social capital might sometimes have negative outcomes for society. He calls it the ”dark side” of social capital, and cites examples such as the Ku Klux Klan in the US. Groups like this, or other heavily closed and exclusionary communities, foster a trustful culture inwards, but produce negative outcomes for those outside their inner circle. Based on this discussion, Putnam claims that there are two distinct forms of social capital: bridging and bonding. I explore these two notions of social capital in thorough detail in chapter 3, providing a theoretical and empirical way to connect Burt individual notions with these group-level distinctions.

Another exponent of the collectivist tradition of social capital is Francis Fukuyama (2001). He argues that ”social capital is an instantiated informal norm that promotes co-operation between two or more individuals” (p.7). In that regard, he claims that the source of social capital can be rational (as in repeated Prisoner’s Dilemma situations), or can have cultural roots in religion, tradition and shared historical experiences. Fukuyama also claims that trust, networks and civil society are not reflections of social capital, but merely outcomes of it.

This argument is a departure from other authors in the sense that he puts the emphasis on the norm of cooperation rather than on the actual connection between individuals. This is not only a theoretical distinction, but is relevant when it comes to operationalising social capital. If the methodological emphasis is on the presence of a norm of cooperation — i.e. in an institutional arrangement — this ignores the relevance of social networks and treats them as an outcome of following those norms.

I disagree with Fukuyama’s picture of social capital for two main reasons. First, networks are not simply an antecedent of social capital, but the ethos itself of the phenomenon. A simple norm of cooperation might be being polite to others, and while this can be important to create social capital, it is not until networks are created that we can claim its existence. Second, understanding social capital as a cooperation norm responds to an instrumentalist/rational approach. There is

no room for altruistic behaviour or for non-self-interested exchanges across individuals. This is not consistent with the social capital people generate at apparently irrational exchanges, such as friendship, neighbourhood, or school relations.

2.2.4 A Comprehensive Definition of Social Capital

Bridging between the different traditions of social capital — individualist, collective, rational, sociological — is not a simple task. However, even in those cases where the focus is on norms, such as in Fukuyama's work, there are common features at the core of all definitions.

The first element that all definitions share is the presence of networks and connections among people. Although social capital can be considered a characteristic of individuals, something they can accumulate and invest, it is a particular form of capital. Borrowing from the traditional goods theory, we could consider social capital as one of many relational goods (Uhlaner 1989), that is, goods that only exist as long as they are shared with others. It is only through meaningful interactions with others that people are able to build trust, exchange information and mobilise resources.

Other elements that all definitions have in common are: trust, information and resources. What is transformative about social capital and makes it different than other social connections is its ability to mobilise resources, based on norms of trust and reciprocity. The mobilisation of resources (information can be considered to be one of them) is key both in the instrumental and the non-instrumental approaches. It does not matter why you are willing to mobilise resources, as long as the ability exists at least potentially. This is fundamental to my definition of social capital, as the relevant measurement is about its existence, not its use.

Finally, another common element of social capital is the presence of norms of trust. Unlike most market transactions where trust is directed towards fair institutions that guarantee the exchange of goods, social capital operates under the basis of interpersonal trust. It is not simply that we trust institutions or rules aimed to enforce other people's behaviour, but also the trust we put in others directly that they will transfer the information and resources that we need when the time comes.

In a group of friends, there might be some informal mechanisms to make sure that the members of the group behave as everyone else expects. But it is unlikely that the trust comes from those rules. Rather, it comes from the personal knowledge of the others and their trustworthiness.

I use a simple definition of trust as an expectation, whether rational of not, of a certain behaviour, either an individual or from a group. This expectation can be justified or not in terms of previous experiences. The important element is that the expectation requires a level of certainty about the behaviour. There are different useful distinctions on the topic of trust. Uslaner (2002) talks about the differences between strategic and moral trust. Moral trust reflects a normative approach to trust in which there is no room for rational calculations about personal interests and expected benefits of trusting. Strategic trust reflects the opposite, since we only trust someone if we know that person's interests and her interests are in line with ours. As long as we know that we have a common interest, that person becomes trustworthy.

Uslaner (2012) also makes another useful distinction for social capital, between particularised and generalised trust. The first is the one that we have to any other person, irrespective of who they are, whereas the latter expresses itself to particular people,based mostly on previous experiences. Particularised and generalised trust look very similar to strategic and moral trust, but the difference lies in the distinction between motivations and objects. Generalised and particularised trust are based on who is the trustee, whereas strategic and moral trust relates to the question of why we trust.

These distinctions are useful on a conceptual level, but also show how trust can operate within social capital. In environments where generalised and moral trust is present, we could expect higher levels of bridging of social capital, where bonding social capital could be more evident in particularised trust contexts. However, it is beyond the scope of this thesis to test and develop the relationship between trust and social capital.

2.2.5 What is not Social Capital

Given that social capital represents such a central element in social life, it is usually misunderstood as things that, although related, are not essential elements of social capital. I have provided a working definition that emphasises the role of networks and their ability to mobilise resources given certain norms of trust and reciprocity. This definition is helpful to isolate those phenomena that are part of social capital than those who are not.

First, social capital is not the same as trust. This is both a conceptual and a theoretically useful distinction. From a theoretical point of view, it means that although trust is required to establish initial connections, and that through interacting with others we can build different forms of trust, we can not reduce the whole notion of social capital into trust. Trust can be applied to institutions, communities and even people we do not know and with whom we have no interactions. From an empirical point of view, it means that we cannot simply measure social capital by asking people about interpersonal trust. This is a common strategy in studies trying to use social capital as a control variable (e.g. Whiteley et al. 2013). The problem with this approach is that although related, trust is a different construct, with different causes and implications.

Second, social capital is not the same as civic engagement, civic virtue, nor political participation. As de Tocqueville pointed out, all of these things can be the outcome when people are engaging with others within a community. But that does not mean that we can simply assume that behind every participatory action lies social capital. The literature on turnout and political participation reviewed in chapter 4 shows that there are different drivers for engagement behaviour, such as cultural background, rational calculations, among others. Implying that engagement with the community is a direct reflection of social capital is an oversimplification.

Finally, social capital is not the same as participation in voluntary associations. This is a point that I stress in chapter 3 and refers to the way in which some researchers measure social capital. The assumption is that the membership in voluntary associations is a guarantee that people will construct networks and access

the resources embedded in them. Again, as with civic engagement, these two things can be closely related, but we should not confuse the simple act of belonging to an organisation with the actual and transformative nature of building meaningful ties.

Distinguishing what is social capital than what is not is relevant for the operationalisation and construct validity of the concept. This thesis focuses on the presence and structure of networks (chapter 3), their ability to mobilise resources (chapter 4), and their political outcomes (chapter 5). In that way, I provide a coherent approach to social capital that does not oversimplify the concept, both at a theoretical and an empirical level.

2.3 Why is Social Capital relevant for Politics?

Research (Burt 2005) shows that individuals with a better position in their network, particularly bridging across different groups, have access to new and relevant information. This information, in turn, puts them in the position of gatekeepers within their own close networks, it is a source of influence and power. Coleman (1988) has shown how well connected politicians can exercise power over their colleagues with regards to legislative behaviour. Social capital is also related to career success (Burt 1997b), finding a job (Granovetter 1973) or improving market relations (Adler and S.-W. Kwon 2002).

There are other outcomes of social capital that, although take place initially at the individual level, move on to produce society-level implications, such as solidarity. Putnam's account of rotating-credit associations in Italy (1994) provides an interesting example. People who engage in these associations, as they take and pay their credits, start creating norms and customs that go beyond the formal sanctions. People usually comply with their payments because they build solidarity with the other members of the network.

This process has other potentially positive externalities. As Putnam explains, "Internally, associations instill in their members habits of cooperation, solidarity and public-spiritedness" (R. D. Putnam 2000, p. 89-90). These habits then affect individual behaviour outside the networks, mainly through political participation

and civic engagement. Woolcock (1998) explains the potential causal mechanism between social capital and collective action outcomes:

> "*Ceteris Paribus*, one would expect communities blessed with high stocks of social capital to be safer, cleaner, wealthier, more literate, better governed, and generally "happier" than those with low stocks, because their members are able to find and keep good jobs, initiate projects serving public interests, costlessly monitor one another's behaviour, enforce contractual agreements, use existing resources more efficiently, resolve disputes more amicably, and respond to citizens' concerns more promptly." (p.155)

Although this list of potentially positive outcomes of social capital is extensive, the literature has provided evidence for some of them. Putnam (1994) shows how higher levels of community activity in Italy is highly correlated with institutional performance. Welzel et al. (2005) argue that across countries, social capital is positively related to higher economic growth, even after controlling for human capital. More specifically, Warren (1998) provides an account of the work of a US faith-based organisation, the Industrial Areas Foundation, in establishing networks among their membership. This is evidence of how social capital networks within civil society can exercise political power and foster collective action.

The focus on this thesis, however, is not directly focused on macro-level outcomes, but rather on individual-level decisions that relate to political action. In particular, as shown in chapter 5, I look at how individual levels of social capital can be related to voting behaviour. The rationale is that people who are well integrated in society trust others more frequently and develop notions of solidarity. Furthermore, they are more exposed to civic norms that require involvement with community issues, and might feel social pressure to act in accordance. Therefore, their willingness to engage with others outside the network is higher, and this also makes them more likely to participate in politics. This is a testable pathway, and to a certain extent, I aim to examine it in chapter 5. More specifically, I look at how social capital online or offline might have differential relationships with voting

turnout.

The relationship between social capital and political participation appears mostly as a positive one, either at the aggregate or the individual level. However, as Putnam argues when explaining the harmful consequences of bonding social, we need to acknowledge that social capital is a complex concept. As such, this thesis unpacks the concept by distinguishing the way — online, offline, or both — in which social networks are formed and resources mobilised.

2.4 The Role of the Internet on Social Capital

The focus of this thesis is not only on social capital, but particularly on how Information and Communication Technologies (ICTs) — or more simply, the internet — can affect the formation of social connections and, in turn, the political outcomes of social capital.

Originally, authors such as Putnam claimed that the internet had a negative impact on social capital[1]. He claims that online interactions are not able to transfer the contextual information that face-to-face interactions do, such as non-verbal cues and facial expressions. This, in turn, avoids people creating the trust and personal knowledge required for social capital. According to this early literature, the internet (at least in 1995, prior to the creation of social media platforms) is not able to connect people in a meaningful way and, therefore, have the ability to mobilise resources and information in the same way as face-to-face ties.

This statement has been tested empirically over time, and has also consistently proven to be wrong. Valenzuela et al. (2009) show that Facebook connections are able to foster social capital among college students; Kavanaugh et al. (2001) explore the formation of weak ties on digital communities and its impact on overall levels of social capital. They provide longitudinal evidence on how the internet can be used, increasingly, for social-capital forming activities. From the perspective of political participation, Gibson et al. (2000) present a compelling case on how social capital can act as a moderator between internet conectedness and political participa-

[1] I explore this argument in detail in chapter 3, but I rehearse a bit of it here.

tion. In particular, they show that internet connectedness can have a negative effect on political participation, except for when is moderated by social capital. Gil de Zuñiga et al. (2012) explain how information seeking in social network sites is positively related to both social capital and political participation. In Singapore, Skoric et al. (2009) argue that due to political constraints in terms of association rights, people started to use online platforms, and argue that the social capital online can reinvigorate the country's democracy. Additionally, Kobayashi et al. (2006) build a causal pathway from internet use, social capital, and political participation. In their view, the use of the internet can enhance social capital, and higher levels of social capital online are, in turn, able to predict online political participation. They also argue that this effect can have spillovers on offline participation as well.

However, the argument in this thesis is not merely whether social capital can exist online, since there is a large body of literature providing evidence to that question. My goal is to explore in-depth how technologies affect the way in which we interact and, therefore, make political decisions. The literature shows how different social and individual factors affect political participation, such as our demographic background, policy positions, interest for politics, among others. It also shows how social capital can have an impact on political participation. My main aim is to add a new layer to this literature, by providing a thorough account of how social capital is structured online, the resources it mobilises depending on the different platforms it operates, and the way in which it relates to certain forms of political participation.

2.5 Theory Driven Methods for the Study of Social Capital

In order to answer each one of the research questions of this thesis, I have designed an empirical strategy that is directly derived from my definition of social capital. I focus on the study of the structure of social capital networks, the resources they mobilise, and their political outcomes in terms of individual voting behaviour. In particular, this thesis uses a mixed methods approach, mostly quantitative. The thesis uses a combination of social network analysis, statistical methods such as

linear and generalised regression models, Bayesian methods, factor analysis, and item response theory. Additionally, I used a different set of methods to produce the questionnaire of the Online Resource Generator. For that particular process, I relied on focus groups, combined with survey experiments and discussions with survey experts (for more details, see chapter 4). Finally, chapter 3 uses the most-diverse case selection strategy (Seawright and Gerring 2008), based on the typology of collective action cases devised by Bennett and Segerberg (2013).

I am firstly interested in understanding social capital's structure and content, and particularly how it is different when formed and sustained online. Then, I am interested in showing how social capital produces different associations with political participation — particularly voting. These tasks require me to use an approach that can help me extract the fundamental elements of social capital, observe it on a long scale, and produce results that can be generalised outside the particular cases and individuals under study.

The selection of quantitative methods is justified, then, at two different levels. First, they provide the most useful tool to extract and describe relevant information about social capital at a large-N scale. Second, derived from the extant literature, it allows me to analyse associations between different variables and create general inferences, which in turn, help me build a bigger theoretical causal mechanism.

This section is organised around the three research questions of the thesis, and summarises the methods used to answer each one of them.

2.5.1 Research Question 1: Can we observe the structural features of social capital in online networks?

This research question is addressed in chapter 2, which focuses on understanding how connections established via social media — in this particular case, Twitter — lead to the formation of the structural signatures of two specific forms of social capital, bridging and bonding capital. In line with that distinction, the chapter argues that one of the key elements in the formation of bridging social capital is the presence of organisations able to foster the appearance of brokers across different social groups. A final additional research hypothesis examines the relationship between

bridging and bonding social capital looking at the potential associations between each other.

This chapter uses 5 different case studies: The Occupy Wall Street in the US in 2011, the Chilean presidential election in 2013, a campaign against global hunger called ”IF” organised by several NGOs in the UK during 2013, the European Parliament election in 2014, and a sample of geo-located online discussions that took place in the UK over a particular period in time during 2014. The first three cases were selected due to their good fit to the typology designed by Bennett and Segerberg (2013), while the last two were selected as a robustness test for the findings from the first three cases.

In each case, I extract large Twitter datasets to construct networks based on the personal communications sustained through the social media platform (eg. retweets, mentions and replies). Then, I use social network analysis techniques to explore these different networks. I focus on the calculation of two particular indicators, network closure and network brokerage. For the former, I use the average clustering coefficient of the networks, while for the latter I calculate Burt's (2005) Network Constraint Index.

Establishing whether the online networks show some structural differences in terms of social capital with what we would usually expect offline is not a simple task. First, network data is not usually randomly collected. Rather, social networks are purposive as the decision to connect with someone else is not made randomly. Second, I do not have data on the social connections for the same cases outside of the online platforms, and collecting it is a difficult task, if not impossible.

To overcome the first problem, I followed two different strategies. First, I used the Erdos-Renyi (1960) algorithm to simulate a large number of random networks based on the same number of nodes and ties as in the observed networks. The average clustering coefficients and Network Constraint Index were calculated across these networks. Second, I used a completely unrelated case in which there are no underlying reasons by which the people in the network would be connected to each other. This case consisted in the geo-located tweets from the UK, in which the only

thing that the tweets had in common was their geographical locations.

To overcome the problem of comparison against data from outside Twitter, I use simulated networks based on the observed data using two different algorithms — Barabasi-Albert (1999) and Watts-Strogatz (1998). The former incorporates the notion of preferential attachment, by which some nodes are more popular than others and they should be able to concentrate on more connections. The latter adds a new layer by adding the topological features of the network. That is, on top of preferential attachment, this algorithm considers that connections that are closer to each other are more likely to connect than those who are further away.

2.5.2 Research Question 2: How does social capital differ when it is formed and sustained online, offline, or a combination of both?

This question is the main focus of chapter 3, and is addressed through two secondary research questions. The first one explores the extent to what ICTs are affecting individual levels of social capital, while the second one compares online social capital to other forms of social capital.

This chapter introduces a new survey instrument to measure social capital, the Online Resource Generator (ORG). This instrument is derived from the Resource Generator (RG), originally designed in the Netherlands to measure social capital using a resource-based approach, and that has been modified for the UK context by Van der Gaag and Webber (2008). The RG contains a list of different social resources, such as knowing someone who can lend money, or someone with whom to discuss politics, and asks respondents if they have access to them. In order to answer the research questions, there are two main limitations of the original RG that the ORG aims to overcome. First, the original RG does not observe differences between online and offline access to social capital. Second, it contains a large number of items, which limits the possibility of including this instrument into larger, nationally representative surveys such as the British Election Study (BES).

The ORG includes a response option on how each resource is accessed,

whether online, offline, or both. The wording for these response options was tested through focus groups with students from UCL. I then took several steps to find a way to reduce the number of items from the instrument, while keeping its original diversity and validity. I applied a survey experiment to UCL students to determine if I could drop a self-assessment module included in the original Resource Generator. Although this module is not required to calculate individual levels of social capital, it might affect the individual response decisions. After concluding that the removal of those questions did not harm the responses or validity of the instrument, the next step consisted of merging some of the items. The merging process reduced the number of items from 27 to 18, and was made through subsequent consultations with the BES experts team.

The Online Resource Generator (ORG), was applied in the third wave of the British Election Study 2015 to a total of 7,040 respondents. With these responses, I compared two techniques to analyse the data and produce latent variables which represent social capital: Exploratory Factor Analysis (EFA) and Item Response Theory (IRT) with Bayesian estimation.

In both cases, I follow a two-step strategy. I first evaluated how many dimensions can be extracted from the data, and then I estimated individual positions for each respondent on each of the dimensions. In line with current research (Eijk and Rose 2014), Item Response Theory appears to be a better approach, as it avoids the risk of overdimensionalisation. Therefore, I decided to use the ideal positions estimated by the Bayesian IRT process. I calculate four continuous scales — general social capital, online social capital, offline social capital, and one for the social capital that is sustained through a combination of online and offline access (combined social capital) — and estimated an individual score for each respondent on each scale. In terms of analysis, I use OLS regressions to test the different hypotheses.

The final step consisted of two forms of robustness checks. Firstly, I correlated the first dimension obtained through the Exploratory Factor Analysis with the dimension obtained through Item Response theory. The purpose of this step was to check whether my decision to choose IRT was justified by the data, which has

been confirmed. Secondly, I compared the results of an OLS regression using the first dimension of the EFA and the same independent variables from the models using the General Social Capital scale calculates through IRT. I compare these results with the model using the IRT scale to observe if the same relationships observed in the former model hold when using the first dimension from the EFA. This test was aimed at checking the consistency of the IRT scale against another approach for estimating latent variables.

2.5.3 Research Question 3: What is the effect of these different varieties of social capital on political participation?

This research question is addressed in chapter 5, and for the purpose of this thesis, it has been narrowed down to understand the relationship of social capital with one particular form of political participation, voting. However, this relationship is not restricted to general social capital, which is what most of the literature has covered. The main contribution of this chapter is to explore how different forms of social capital can have different associations with voter turnout in two particular elections, the European Parliament (EP) election in 2014, and the UK General Election (GE) in 2015.

In the case of the EP election, I use the self-reported turnout from respondents as a proxy tor turnout. For the GE, I use the self-reported likelihood to vote in the next election as an indicative of voting intention. In the former case, the variable is binary, while in the latter, the variable is a 6-points scale from 0 (very unlikely to vote) to 5 (very likely to vote). I dichotomised this variable by leaving those who responded 5 as highly likely to vote and all the rest as not likely to vote.

The modelling strategy was also different by election. In both cases, the main independent variables were the general, online, and combined social capital scales. The control variables are discussed extensively throughout the chapter, and they refer to the traditional explanations used in the literature (Whiteley et al. 2013; Bowler and Donovan 2013; Geys 2006; Pattie and Johnston 1998; Cutts, Fieldhouse, and John 2009) to explain voter turnout. For both elections I use logistic regression models, and in the case of the GE election, the regressions are calculated with a

multilevel approach, allowing the constant term to vary across constituencies. This approach allowed me to control for any unobserved factors that might differ across constituencies which could affect the relationship between social capital and the reported likelihood of voting.

In order to provide a clearer description of the results, I estimated the marginal effects and the change in predicted probabilities for all the cases in which the relationship between different forms of social capital and reported turnout were statistically significant at the $p < 0.05$ level.

2.6 Final Remarks

This chapter introduces the definition of social capital that I use throughout the thesis. With this definition in mind, and based on the extant literature of the topic, I designed an empirical strategy that can properly answer the research questions of the thesis. My main goal is to show that some of the disjunction between the way in which social capital is conceptualised and operationalised (a disconnection that I explore in more detail in chapter 4) can be solved by providing a clear definition and a deductive empirical strategy.

Chapter 3

Understanding the Structural Features of Online Social Capital

[1]

3.1 Introduction

The definition of social capital as social networks that mobilise resources requires an initial investigation into the way these networks are formed and structured online. This chapter provides evidence of how the structural features of online networks are related to the concept of social capital.

The aim of this chapter is twofold. First, it tests the formation of the structural signatures — i.e. recognisable patterns in the structure of the social networks — of social capital online . Here the interest is in the relationship between social media and social capital formation, specifically how connections established via social media — in this case Twitter — lead to the formation of two specific forms of social capital, bridging and bonding capital. The focus of the examination is the architecture of social networks, but not the content or quality of the links between individuals. This is a first and necessary test of whether there is evidence of online social capital. Second, this chapter is a consideration of the relative importance of bridging and bonding capital. This step is of special interest since one of the ad-

[1] A scaled-down and revised version of this chapter has been published as "Sajuria, J; vanHeerde-Hudson, J; Hudson, D; Dasandi, N; Theocharis, Y; (2015) Tweeting Alone? An Analysis of Bridging and Bonding Social Capital in Online Networks, *American Politics Research*"

vantages of ICTs is to connect otherwise unconnected people, suggesting we might expect to see a different inter-play between the two types of social capital than face-to-face interactions.

Using diverse-case criteria for case selection, the primary analysis draws on Twitter data from five different events — the 2011 U.S. Occupy Movement, the UK-based IF Campaign organised by a coalition of UK NGOs around hunger and the 2013 G8 meeting, the 2013 Chilean Presidential Election, the European Parliament elections in 2014, and a dataset comprised of geographically identified UK tweets for a full month. The networks created by the transmission of information from these events are analysed to identify patterns of social capital formation within/among their structural features. The data show that, contrary to Putnam, online networks show evidence of social capital and these networks exhibit higher levels of closure than what would be expected based on theoretical models. However, the presence of organisations and professional brokers is key to the formation of bridging social capital. Similar to traditional (offline) conditions, bridging social capital in online networks does not exist organically and requires the purposive efforts of network members to connect across different groups. Finally, the data show that closure and brokerage move and grow together.

This chapter provides a discussion of the theory of social capital and Putnam's scepticism of online social capital. Alongside, I discuss the relevance and the limitations of using social networks to investigate social capital. The chapter then outlines the two key indicators of online social capital used here, and provides a brief review of the literature on network approaches to social interactions and on the role of organisations in collective action. Then, it sets out four research hypotheses derived from the theoretical discussion, and summarises the theoretical models that are used to test my hypotheses. The next section describes the methodology used to collect and analyse the data. Also, it provides a detailed account of the different methodological steps taken during the research process. The third section documents the results and provides a discussion of the main findings. The conclusion brings the chapter together and outlines fruitful directions for future research.

3.2 Theory and Hypotheses

3.2.1 Bridging and Bonding Social Capital

Bonding social capital exists in the strong ties occurring within, often homogeneous, groups — families, friendship circles, work teams, choirs, criminal gangs, and bowling clubs, for example (Granovetter 1973). Bonding social capital acts as a social glue, building trust and norms within groups, but also potentially increasing intolerance and distrust of out-group members (Tilly 1978). Bridging social capital exists in the ties that link otherwise separate, often heterogeneous, groups. For example, individuals with ties to other groups, messengers or more generically the notion of brokers. Bridging social capital allows different groups to share and exchange information, resources, and help coordinate action across diverse interests. Putnam emphasises that these are not either/or categories, but that in well-functioning societies the two types or dimensions develop together and (should) enhance each other.

Similar to other studies (Shen, Monge, and Williams 2014), I use Burt's (2005) structural notion of social capital and two associated metrics, closure and brokerage, as indicators of bonding and bridging social capital respectively. Closure refers to the level of connectedness between particular groups of members within a broader network and encourages the formation of trust and collaboration. A group is more closed when all their members have direct contacts to each other. Brokerage refers to the existence of structural holes within a network that are 'bridged' by a particular member of the network. The existence of brokers permits the transmission of information across the entire network, by bridging through the groups that are usually disconnected. Social capital, then, is comprised of the combination of these two elements.

To measure the structural features of online social capital, I use the observed values for closure and brokerage over time and compare them with different simulations based on theoretical network models to show how they compare to what I would expect offline. This provides for the first time a thorough test of how these online networks can show social capital structural features.

3.2.2 Social Capital Online?

According to Putnam (2000), computer-mediated communication makes online interactions unsuitable for the formation of social capital for four principal reasons. First, face-to-face interactions carry much more contextual information than online interactions due to the high degree of non-verbal communication that accompanies face-to-face communication. Second, face-to-face interactions can bring diverse people together, whereas online interactions take place among like-minded people, something he calls 'cyberbalkanisation'. Third, online interactions do not foster social capital because of a digital divide in access to the Internet, which allows for the interaction of members of the elite and not the public in general. Fourth, the Internet has more potential to become a form of entertainment rather than communication. The chapter takes up each of these differences in turn, and set out why, a priori, online interactions may indeed foster the development of social capital.

Putnam argues that online interactions are unable to foster social capital due to the absence of non-verbal cues and information, which form a large part of interpersonal communications. In the case of this first difference, I agree with Putnam: offline interactions lack this fundamental feature. However, to my knowledge, no study has empirically shown the extent to which non-verbal communication is necessary for the formation of social capital or social trust and cooperation that flows from it. Second, with respect to cyberbalkanisation, recent research has shown (Brundidge and Rice 2009) that Facebook groups and profiles allow the emergence of political discussions among people who disagree, particularly through the connection of two persons who have a 'friend' in common. Moreover, research by the Pew Research Internet project has shown that only 4% of social media users block, unfriend, or hide someone on the site because they disagreed with something the user posted about politics (Rainie and Smith 2012). Additionally, research on Twitter has shown that, although people are more likely to interact with others who share the same views as they do during discussions on controversial topics, they are actively engaged with those with whom they disagree (Yardi and boyd 2010). Recently, another study using Twitter data has been able to provide evidence on the

lack of political polarisation in social media (Barberá 2014a). These trends however have been observed mainly after the rise of social networking sites which, contrary to the general use of the internet which Putnam had in mind in 2001, have specific affordances that promote socialization and interaction.

Rather than reinforce cyberbalkanisation, I argue that social media has the potential to facilitate discussion amongst different groups, particularly as online ties are not bound to their immediate communities creating the possibility of communication across traditional geographical boundaries. Online ties may facilitate communication amongst different individuals and groups because some of the initial barriers to communication in offline, face-to-face communication (gender, race/ethnicity, disability) are rendered less visible (e.g. Mumsnet for parenting, HealthUnlocked for health conditions, among others).

While digital divide concerns persist, some evidence shows a closing gap in access (Judge, Puckett, and Bell 2006). Moreover, offline interactions do not provide any insurance for discussions outside of elites. The same social groups that exist offline have similar behaviours online. Other factors, such as geographical segregation, may be far more relevant for social integration than Internet access. While some scholars (Morozov 2011) concur with Putnam's assessment of the Internet's greater potential for entertainment than communication, there is some evidence to show the Internet's communicative and mobilising forces (Ward and Gibson 2009). This same assessment applies to offline organisations; joining organisations is not necessarily the same as interacting within those organisations[2].

There are no a priori reason(s) that social capital cannot exist online. But do differences in the domain, features or characteristics of online and offline interactions produce different structures of social capital? I argue here that it is plausible. For example, online ties may be based more on the transmission of information than the personal characteristics of those interacting, such as geographical location, gender, ethnicity, or even more importantly, who they know. Online ties may not be

[2]This will be a key point in Chapter 4, where I discuss the advantages of using a resource-based approach to observe social capital, rather than focusing on counting the number of members of a given organisation. Chapter 5 also analyses the trade-offs in terms of validity between self-reported and observational approaches to social capital.

as stable or durable as those created face-to-face, because of the dynamic nature of the Internet. The level of engagement required to create a tie online might be lower than the engagement required offline, which might also have consequences for the type of resources they can mobilise. Finally, the categorisation of weak and strong ties as proposed by Granovetter (1973) might not operate in the same way: the strength of an online tie may be better measured by the quantity of interactions and the frequency and quality of the information it transmits, rather than the personal characteristics of those making the connection. The aim of this chapter, however, is not to identify whether there are differences in online versus offline social capital but to first establish evidence of social capital online. Like the bowling leagues that Putnam used to illustrate social capital offline, the argument is that Twitter and Facebook discussions create social networks, operating under norms of trust and reciprocity, that are able to mobilise resources and information. In the next section, an examination of the concepts of bonding and bridging social capital is presented. Subsequently, the chapter sets out two theoretical models of social capital in online networks and, drawing on these models, identifies three hypotheses related to the formation and structure of online networks.

3.2.3 Observing Social Capital Online: Bridging and Bonding Social Capital

The concept of social capital has travelled a long way since its original inception by Hanifan (1916), who described social capital as 'those tangible substances that count for most in the daily lives of people' (p.130). Since then, according to Webber (2008), there has been two streams of development of the concept: individualist and collectivist approaches of social capital. However, these terms are heavily loaded in the sociological and political science tradition, and can better be described using the terms individualist and collectivist approaches to social capital. Individualist approaches (e.g. Portes 1998; Bourdieu 1986; Burt 2005) are concerned with the relative advantage of a person within a group, that is, how the position of a person might bring them benefits in relation to the rest of the members of the network. This approach allows me to determine how the relationships we form are able to mobilise

resources or, as Bourdieu would prefer, how much 'capital' we can acquire through our social connections. In the case of collectivist approaches, as exemplified by Putnam, they look at the aggregate benefits of social connections. This approach is less concerned about the individual gains of participating in a network and more about the societal outcomes of them.

Within the collectivist approach, Putnam makes the distinction between bonding and bridging social capital (R. D. Putnam 2000). Bonding social capital exists in tight-knit networks that foster intra-group, strong ties. Putnam calls it a 'sociological superglue', and explains that it is useful to build trust between the members of the group and increases the levels of solidarity. Bonding social capital might also be responsible for creating exclusion against those outside the group, which becomes the negative dimension of social capital. Bonding ties are the natural result of homophily (McPherson, Smith-Lovin, and Cook 2001), where people who share similar relevant characteristics — such as geographical location, religion, ideology, among others — tend to group and work together.

The other dimension of social capital is bridging ties, or the connections that people form outside their circles. This is similar to what Granovetter (1973) called 'weak ties'. Bridging social capital is responsible for coordinating action across different groups, and provides new information and resources to the more dense groups. Although both forms of social capital might be considered to be competing with one another, Putnam argues that they are not 'either/or' categories: they operate in coordination and are different measurable dimensions of measure social capital[3].

Burt (2005) introduces two key indicators of social capital: closure and brokerage. The latter refers to the existence of a gap between two social groups, known as a structural hole. Brokerage takes place when two different groups are connected by a single node (i.e. a member of the network). Being a broker allows a person to have a better overview of the network and to become the only point of contact between two or more groups; hence, she can control the flow of information and re-

[3]Bridging and bonding social capital may not be sufficiently nuanced categories for characterising online interactions, given the absence of cues that help to structure group formation in face-to-face environments. Before developing more nuanced categories, however, it is useful to determine whether traditional conceptualisations are present.

sources through that network. Burt provides evidence of this advantage by showing how managers within a company that are able to connect with other areas are more likely to get promotions and anticipate to changes.

Social network structures consider the relationships built by people over time. These relationships can be dependent on contextual elements, such as work relations or, on a more personal level, friendship. Regardless of how we connect with others the networks we build will have different structures. Some networks will be denser, with everyone in the group interacting with all of the other members (the basic definition of a cluster), while others will require someone to bridge different groups. The latter function of bridging is what Burt call 'brokerage'.

Like Putnam, Burt (2005) argues that brokerage works in cooperation with closure (J. Coleman 1988). That is, in order to broker something between two groups, each one has to host cohesive ties among their members, or some degree of closure. Conceptually, closure can mean different things depending on the network. In a group of friends, closure might mean trust, intimacy or frequency of contacts; whereas in a group of colleagues, closure might mean that they share work on the same project or the same working space. In that sense, what we understand by closure may change depending on the type of social network we are observing. The important thing to consider is that closure allows a network to build trust among its members, by providing a more protected environment for social relations. Hence, closure is essential for the creation of resources and information within a group, which in turn can be mobilised by a broker to another group.

A useful example of closure provided in the literature (Christakis and Fowler 2011) is the dynamics of military companies. A company of 100 soldiers is usually composed of 10 groups of 10 soldiers each. It is important for the efficiency of the whole company that each group of 10 becomes very close and that everyone in the groups knows each other. But within group closure is not enough for the emergence of social capital. It is also important that each group has ties with members of the other groups, i.e. what Granovetter (1973) would call 'weak ties', to transmit information and resources. Thus, it is the interplay of closure and brokerage that

provides the company with an optimal level of social capital.

Individualist and collectivist approaches differ on how levels of social capital depend on whether the analysis is at the individual or group level. We may have a community with low social capital, but there will always be some members of that community with more advantageous network positions than others. From an individualist point of view, the concern is about the individual gains that each member of that community gets from their social connections. Conversely, a collectivist approach is more interested in understanding how the whole community operates as a group. For them, what makes social capital so important for a community is not only the relative position of any of its members, but the overall level of resources and information that are present and able to be mobilised.

Putnam claims that the benefits of participating in voluntary associations are not only individual, but also bring positive outcomes at a societal level. His distinction between bridging and bonding social capital takes the brokerage and closure discussion to an aggregate level by arguing that intra-group ties build trust and mobilise diverse resources. What I call trust corresponds, mainly, to two distinct behavioural traits: strategic and moral trust. The former refers to the notion that trustworthiness is related to the expectations that we have about someone else's behaviour. Trust, then, is related to the expected reciprocity from others we usually know. The latter relates to the notion that trust does not depend on rational trustworthiness, but in more long-term traits of the person trusting. Social capital can be related with both types of trust. According to Uslaner (2012), closed communities are able to foster trust through different mechanisms, allowing for both moral and strategic trust to be created.

Burt's concepts of closure and brokerage offer a useful way of bringing the individualist and collectivist approaches to social capital together. Burt provides a conceptual definition that fits most of the elements of Putnam's categories, but also provides a path for ooerationalising them. Closure operates in the same way as bonding social capital, favouring intragroup ties, fostering the formation of trust and building dense communities. On the other hand, brokerage provides a fresh

flow of new information to the network, allows for the mobilisation of different resources, and uses the trust formed by closure to act as a tool for collective action. My approach here has been to demonstrate the similarity of Putnam's bonding and bridging capital and Burt's closure and brokerage concepts. Thus, I employ Burt's measures as indicators of bonding and bridging capital at the aggregate level. An explanation of the differences between the approaches can be found in Table 3.1.

Table 3.1: Individualist and collectivist approaches

	Focus	Intra-group ties	Inter-group ties
Individualist approach	Individual advantage of a person in a network	Closure	Brokerage
Collectivist approach	Aggregate benefits of networks	Bonding Social Capital	Bridging social capital

As mentioned above, the decision to use these concepts (brokerage and closure) as measures for bonding and bridging social capital stems from the need to provide a clear operationalisation for them. Currently, measures of bonding and bridging social capital are analysed either using social network analysis, or survey instruments such as the name generator (McCallister and Fischer 1978), the position generator (Lin 2008) and, as I use in the next two chapters, the resource generator (Van Der Gaag and Snijders 2005). Some researchers (Ellison, Steinfield, and Lampe 2011; M.-W. Kwon, D'Angelo, and McLeod 2013) have used these survey instruments to assess the presence of bonding and bridging social capital in online platforms. In my view, this kind of exercise introduces two sources of bias. On the one hand, the use of self-reported data may lead to a misrepresentation of the actual networks. On the other hand, this type of data only allows for the analysis of ego-networks (i.e. the connections of a single node), and thus excludes the possibility of observing directly the interplay among different social groups. This concern has been shared by Appel et al. (2014), who emphasize the lack of validity of most survey instruments used to measure social capital in ICTs. Asking people to recall their personal networks becomes difficult, since it is possible that they will not provide an accurate picture of their real connections. Although I used a survey-based instrument in my two following chapters, I address the third concern by designing, testing and implementing a modified version of the resource generator[4].

[4]More details can be found in the next chapters, but as a preview, I can mention here that the

In their recent article, Gibson and McAllister (2013) define bridging social capital as interacting with people from different ethnic backgrounds, ages, or countries and bonding social capital as interacting with family, close friends, or people with shared hobbies, religious beliefs, or political views. Their work uses survey-based, self-reported measures of social capital or, in other words, uses ego-centric measures derived from the respondent's view of how he or she connects to the rest of the world. They show that only bonding social capital is significantly and positively related to political participation; bridging social capital is not correlated with political activities. I argue that the use of observed networks provides an unbiased opportunity for testing the evidence coming from self-reported studies like this.

I am interested in seeing whether my approach complements Gibson and McAllister's (2013) findings, especially since I use actual network based measures of social capital, which they do not. My measure is different and is derived empirically from the structure of the network. A bridging tie is literally one that bridges between groups and bonding ties are within group links. This means that I do not have to rely on people's perceptions of whether the Internet allows them to form in-group or out-group ties; I calculate this from the actual network of ties itself. What is of interest then, is the extent to which my results complement and advance theirs.

3.2.4 The role of Organisations in the Investigation of Online Social Capital

Inspired by the classic work of de Tocqueville on 'Democracy in America' (2006), Putnam (2000) places particular emphasis on the benefits of organisational membership for the creation of social capital. According to Putnam, organisational involvement can have important benefits for the community (and for democracy in general) by providing organisation members with the necessary competencies for participation in public life, fostering the creation of social capital. Most crucially, organisational involvement has been shown to be an important antecedent not only of civic engagement and involvement in collective action (McCarthy and Zald 1977),

advantages of these instruments to other existing metrics is that they ask people about their access to resources, rather than their perceived networks.

but also for the maintenance and enhancement of strong ties — especially amongst activist groups (McAdam 1990).

Recently, the extent to which organisations are required for collective action has been questioned. Bimber et al. (2012) argue that the presence of 'organisation-less organising', such as the protests against the WTO meeting in Seattle in 1999, are becoming increasingly common. That said, they do not ignore the role of formal organisations, noting how some organisations have been thriving by adapting to possibilities brought by new technologies. They argue that organisations are flexible, adaptive and adopt new technologies over time. The key difference is that organisations are no longer considered both a necessary and sufficient condition for collective action, such as classical studies suggest (Olson 1965). Nevertheless, they also suggest that these technologies expand the range of possibilities for people to come together and act collectively.

In line with that argument, Bennett and Segerberg (2013) propose a new way to conceptualise collective action, which emphasises the role of the connections among people, rather than the fact that they come together as a collective. In their view, collective action efforts can be framed in three different ways: 1) organisationally brokered collective action, which contains *'coalitions of heavily brokered relations among organisations'* (2013: 13), namely, the role that traditional theory assigns to organisations; 2) organisationally enabled *connective* action, which refers to the presence of loosely tied organisations that allow for people to personalise their engagement; and 3) crowd-enabled *connective* action, where individuals connect by themselves using digital media platforms, and organisations play a peripheral role, if any at all.

Here is an important distinction to be drawn between the thinner view of connective action (Bennett and Segerberg 2013) and the thicker view of social capital. Connective action is merely transactional. It allows people to organise. Social capital is transformational. It results in social externalities, thickening the social glue of trust and shared norms. To be clear, my approach here is to examine the social structure of connective action, which may or may not result in lasting social capital.

In this chapter, I do not examine the content of online ties, which would allow me to assess the quality of the connections. That is a task that is being dealt with in the next two chapters. A structural approach is a necessary, but not sufficient, first step in assessing whether there is any evidence for online social capital.

These changes pose an intriguing question about the role social media can play in the generation of social capital in the context of different organisational settings. Based on Bennett and Segerberg's (2013) typology which distinguishes between different degrees of organisational involvement, I argue that the level of brokerage and closure within networks of collective action should differ depending on the involvement of formal organisations within them. When their presence is central to the collective efforts, they play a role in moving information and resources across the networks. Thus, their absence leaves an open question on whether bridging connections could emerge without them.

3.2.5 Hypotheses and Theoretical Models

Drawing on the closure and brokerage concepts set out above, I test four hypotheses with regard to the structural features of online networks and how they relate to the formation of social capital. I analyse the levels of closure and brokerage from a set of online networks and compare them with both random simulations and the most common theoretical models used to explain the formation of social networks. I use the outcome from that exercise to test the four hypotheses.

The first hypothesis is a baseline measure that aims to test whether the levels of brokerage and closure I observe online are the product of purposive efforts to interact, or if they are indistinguishable from any other random network with the same number of nodes and ties. Hence, I test the observed values I get from the online networks against random graphs. Although it is likely that they will differ, testing this hypothesis allows me to move forward and make an informed decision on whether the networks present a basic level of social connections.

Hypothesis 1 *The levels of bridging and bonding social capital formed through online interactions are significantly different than random levels.*

To construct the random graphs, I use the first variant of the Erdos-Renyi (ER) model, $G(n,M)$, which assumes that a graph is randomly selected from all the different possibilities of graphs with a fixed number of nodes n and vertices M. Each node in the graph, then, has the same probability of being connected with any other node from the same graph. I assigned the fixed number of nodes and edges (i.e. the ties between the nodes) according to the observed information. For this hypothesis I run two sample t-tests to compare the difference in means between the observed and the random networks.

Hypothesis 2 *The networks formed through online interactions are, on average, less dense and weaker than those generated by the theoretical models, which would represent face-to-face interactions.*

This hypothesis tests Putnam's argument that online ties are not able to produce social capital as face-to-face ties are. Since building counterfactuals to online networks is an almost impossible task , I test the observed values I get from the online networks against two theoretical models that are commonly used to explain social networks formation: the Barabasi-Albert model, and the Watts-Strogatz model.

The Barabasi-Albert (BA) model is based on the notion of preferential attachment. That is, it starts an initial random graph and creates new nodes, one at a time. The main assumption is that nodes are more likely to connect with other nodes that are better connected. The aim of this model is to account for the level of influence of certain nodes in the network. Those who have more links, will attract more to connect with them. Formally, the model starts with a network with m_0 nodes. Each new node is connected to $m \leq m_0$ existing nodes with a probability that is proportional to the number of links that the existing nodes already have. The probability p_i that the new node is connected to node i is,

$$p_i = \frac{k_i}{\sum_j k_j}, \tag{3.1}$$

where k_i is the degree of node i and the sum is made over all pre-existing nodes j. Heavily linked nodes tend to quickly accumulate even more links, while

nodes with only a few links are unlikely to be chosen as the destination for a new link. The new nodes have a 'preference' to attach themselves to the already heavily linked nodes.

The Watts-Strogatz (WS) model overcomes two main criticisms of the ER models. First, it accounts for the formation of triadic closure in a network — i.e. if I have three nodes A, B and C, where there are strong ties between A and C, and A and B, it is very likely that there will be a weak tie between B and C. Second, the degree distribution of ER models form a Poisson distribution, since it does not assume that highly connected nodes can link each other with higher likelihood. WS starts with a fixed number of nodes N connected with degree K (which needs to be an integer), each one connected in a circular lattice with its neighbours. Then, the model rewires each one of the edges of a node i with another node k with a probability β that each node will be selected. No self-loops (i.e. connections of a node to itself) or duplicated edges (i.e. more than one connection between the same two nodes) are allowed. The main advantage of this model is that it accounts for the small-world effect (i.e. even if most nodes are not neighbours to each other, they can be easily connected from every other one with a small number of steps) by producing higher levels of clustering coefficient than the BA model. The BA model, on the other hand, produces more realistic degree distributions.

The models use the information from the observed networks — such as the number of edges and vertices, or the average degree — to build their own networks. For each model (including the random graphs), I simulated a hundred different random iterations of the graphs and calculated their average values for closure and brokerage. I used the observed graphs as a reference for the number of nodes and edges required for the calculation of the models. For hypothesis 2, I compared the observed values against all the models.

Based on Putnam's argument that online interactions are unsuitable for the formation of social capital, my expectation is for the observed clustering coefficient to be lower and the network constraint to be higher than in the theoretical models

aiming to approximate fate-to-face interactions[5].

The details about the case selection are explained below, but I anticipate the expectations about each one here. I expect tweets about the Occupy movement to be largely restricted to like-minded people, particularly those directly involved in it given the nature of protest movements. The potential for cyberbalkanisation is particularly high for the IF Campaign and the UK geo-located sample of tweets. Within the international development literature, it has been noted that levels of public engagement (in the UK) with issues of global poverty and development are low and declining (see Darnton and Kirk 2011). As such, there is a high possibility that tweets about the NGO-organised IF campaign are likely to be restricted to those already involved with these NGOs, rather than across the public more generally. Similarly, I expect tweets about the Chilean Presidential election and the European Election to take place among those that are already more politically engaged, and may be restricted to those with similar political views.

In the case of the IF campaign and the election cases, it is also important to note that targeting social network sites is part of the campaign strategy used by organisers. As such, much of the Twitter activity in these two networks is likely to be driven by organisations and professional brokers, restricting network formation to being concentrated around these brokers. As such, I expect online network for the IF campaign to be centred around the NGOs and NGO staff members, rather than between members of the general public. The same would apply to the online network for the election campaigns, which is likely to be constrained around political parties and activists.

Hypothesis 3 *In online networks, bonding and bridging social capital operate in coordination, strengthening each other.*

To test this hypothesis, I used the observed values for each event and calculate their correlation coefficient, using both parametric (Pearson's R) and non-parametric (Kendall's tau) tests. I expect to observe positive co-variation between brokerage and closure. As Putnam explains, both forms of social capital — bridg-

[5]Both metrics are explained in detail below.

ing and bonding — should operate in conjunction to produce a positive societal outcome. In empirical terms, that requires that the presence of both should be related, but not working against each other.

Hypothesis 4 *In cases where organisations play a relevant role, there are higher levels of bridging social capital in relation to the different theoretical models.*

Bennett and Segerberg (2013) have provided a solid theoretical framework about how digital networking mechanisms embedded in the layers of networks can provide the means of coordinating actions. There are two important points here that are relevant to my analysis. First, communication within such networks can be thought of as an act of organisation in technology-enabled networks, i.e. they are used to transmit information that is relevant to organise events or actions. Second, a signature feature of this type of communication is the increased personalisation of action online; that is, a form of engagement in which new media is used to carry personal stories and other content across networks. However, not all networks are the same; it is indeed conceivable that different content is communicated — in a different way and with different organisational signatures — across a network about an electoral campaign, a spontaneously organised demonstration against bankers, and a well-organised protest march as part of an ongoing humanitarian campaign.

Following Bennett and Segerberg's typology, and this general line of argument about digitally networked action, I argue that social capital can be formed through technology-enabled interactions and observed not only through analysing tweets to detect personalised action frames, but also at the structural level. The receipt, adaptation and communication of personalised action frames that can be widely shared across different networks, and subsequently enable discussion and further involvement with a particular campaign/cause, is likely to result in the development of social capital.

However, depending on the type of network examined, I expect that different types of social capital development will be more prominent in some networks than others. For the cases analysed in this chapter, I expect to find more bridging social capital in networks where organisations play a more central role.

The expected outcomes for each hypothesis are shown in Table 3.2.

Table 3.2: Hypothesis and expected outcomes

Hypothesis	**Indicator**	**Expected outcome**
H1. Observed networks are different than random.	Average local clustering coefficient and network constraint (t-tests)	Statistically significant difference
H2. Observed bridging and bonding social capital are lower than the theoretical models	Average local clustering coefficient and network constraint	Lower clustering coefficient, higher network constraint
H3. Closure and brokerage work in cooperation	Correlation coefficient (Pearson and Kendall)	Positive
H4. Bridging social capital is higher in organisations-led networks	Average local clustering coefficient	Higher in organisation-led networks in relation to the theoretical models, and compared to the other cases

3.3 Data and Methods

I draw on Twitter data to test the four hypotheses set out above across five different cases: the Occupy Movement in the US (2011), the UK Enough Food for Everyone 'IF' global hunger campaign organised by UK-based NGOs to coincide with the UK G8 meeting (2013), the Chilean presidential elections (2013), the European Parliament election, and a sample of geo-located tweets from the UK. The first three cases have been chosen using a 'diverse-case' (most different) selection criteria around organisational presence. This approach is a departure from previous analyses of Twitter data which have focused on events similar in nature: for example the use of Twitter for protests (González-Bailón et al. 2011); political campaigns (Vaccari et al. 2013); charitable campaigns (Clements 2011) or using the entire population of tweets for a certain time period (Morstatter et al. 2013). Drawing on Bennett and Segerberg's (2013) typology of collective action, the cases (networks) represent one of three observed types: i) crowd-enabled connective action network, ii) organisationally-brokered connective action network, and iii) organisationally-enabled connective action network. Variation across the cases allows me to test my hypotheses across both spatial and temporal domains, and because the observed

cases represent varying degrees of connective action, I can generalise findings here to the wider population.

The last two cases serve a different purpose. They were chosen because of their ability to produce an acid test of the results from the first three cases. The European Election represents a good way to test against an organisationally-brokered collective action, since the highly centralised nature of these events. The UK sample of tweets, on the other hand, should present a low level of connections.

Occupy Wall Street (OWS): Crowd-enabled connective action network. Previous research (Fábrega and Sajuria 2014; Conover, Ferrara, et al. 2013) has shown that this case is a prime example of this type of political activism. OWS activists showed reluctance to allow formal organisations to play a key role in the movement. Moreover, they emphasised the role of technology as the means for connection, rather than membership to organisations. This was to be expected from a public that was openly suspicious of processes that require delegation and, hence, handing over individual empowerment to others; technology-enabled networks as a means of connection provided for them a more neutral and self-empowering affiliation (Tufekci 2014)

IF Campaign (IF): Organisationally-enabled connective action network. The IF campaign was the first campaign to be launched on Twitter by an umbrella group representing over 200 NGOs. IF organisers continuously updated their hashtags and personalised action frames based on central events, fulfilling all the requirement for an organisationally-enabled connective action network.

Chilean election: Organisationally-brokered collective action network. Like in most traditional political campaigns, the Chilean election had a group of political parties from each coalition seeking to mobilise people on Twitter towards their candidates. Basically, they were organisations looking to magnify their support and membership.

The Occupy movement started in October 2011, after a group of protesters decided to occupy Zucotti Park in New York. Their primary aim was to demonstrate against high levels of inequality and the monetary system maintaining in-

equality. From that initial occupation several occupations took place across the US and beyond. The data for Occupy were obtained through the Occupy Research project (www.occupyresearch.net), a collaborative network of researchers interested in the Occupy movement. They were gathered by R-Shief (www.R-shief.org) using the Twitter Streaming API for a period of 13 weeks, following the onset of the movement on October 2011. The data contain tweets using the different hashtags related to the movement, in particular those referring to cities where occupations took place. I focus on all tweets using the 'official' hashtag of the movement (#ows; N= 4,352,071 tweets). Focusing on them allows me to observe only those who had a minimal level of involvement in the discussions about the Occupy movement. Whereas the use of hashtags relates to a particular group of users, those who use them are those who I especially target.

The IF campaign was a coalition of over 200 UK NGOs seeking to put pressure on the G8 governments meeting in the UK in the summer of 2013. The campaign's focus was on global hunger and sought to get the G8 leaders to make commitments to tackle four underlying drivers of malnutrition – insufficient aid and investment, the problem of land grabs, the failure to tax multinational companies, and a lack of transparency around deals and investment. The data from the IF Campaign were gathered using DiscoverText (www.discovertext.com) by a collaborative team of researchers at University College London and the University of Mannheim, from 23 January to 16 October. These dates coincide with the official start and end dates of the campaign. The tweets collected tweets that contained the official hashtags used by the campaign (e.g. #IF, #IFCampaign, #BigIF, #BigIFLondon, #BigIFBelfast). Given the large number of coalition members the team decided to collect tweets using the hashtags of campaign as a whole rather than the many organisational twitter handles. They anticipated that this would allow them to gather all campaign-related tweeting, both from the official campaign, member organisations, and discussion by the public. The official hashtags were provided in advance by the campaign. Because the main hashtag — #IF — was widely used for non-campaign tweeting they unavoidably collected a high number of non-campaign

related tweets. As such the data were cleaned using DiscoverText's built in machine classifier (a naïve Bayesian classifier) resulting in a total of 101,842 units.

The data for the Chilean election were obtained through the Analitic platform (`www.analitic.cl`), which uses the Twitter "Gardenhose" API. I collected the tweets related to the two main candidates for this election, Michelle Bachelet and Evelyn Matthei. The tweets were selected based on the use of the name of the candidates, either as a mention, in hashtags containing the names, or their names without an "@" at the beginning. This approach, unlike using hashtags, has been shown to be more appropriate for the analysis of tweets during election campaigns (DiGrazia et al. 2013). The time period spanned from 7 weeks before the run-off election until 17 December 2013, which covered the entire legal campaign period for both rounds (N= 1,556,109 tweets).

One of the consequences of using full network data is the lack of random sampling during the data generation process. This decision does not allow me to use the traditional methods of inferential statistics to understand whether the relationships, differences and effects I observe in the networks are actually purposive, and not due to random processes. In this chapter, I have aimed to overcome this problem using the ER model, which provides a good theoretical test against pure chance.

I have moved one step further to provide another test to the results, by using an entirely unconnected network, a "random" case. During 14 May 2014 and 29 May 2014 I used the streamR package (Barberá 2014b) to access Twitter's streaming API and download all the geo-tagged tweets posted within the United Kingdom. This collection comprised tweets about different and seemingly unrelated events, such as football, TV shows, local politics and other news.

As a further robustness test, I have chosen the 2014 European Parliament (EP) election to compare against the Chilean election. The rationale is that if elections are a good example of organisationally-brokered collective action, I should expect similar results in the EP elections than the Chilean case. The data from the EP election were collected between 22 May 2014 and 1 June 2014, and comprises 654,462 tweets.

The datasets were filtered, leaving the username of the sender, the date of the tweet and any corresponding text. Each dataset contains the text of the tweet, date and time, the user who sent it (username and user identification number), and relevant metadata, such as location and the profile image of the sender. Then, I divided Each dataset into weekly static networks, creating a list of all usernames contained within the text of the tweets. An edge list was created using the username of the sender, and assigning a directed edge to any other usernames mentioned in their tweets. In order to account for more stable relationships among users, I filtered out any edges (ties) with a reciprocal weight less than two, i.e. at least two communications between each pair of nodes are required for the inclusion of the edge in the analysis. Descriptive statistics for the first three datasets is presented in Table 3.3.

Table 3.3: Descriptive Statistics

	IF Campaign		**OWS**		**Chilean Election**	
Week	*Vertices*	*Edges*	*Vertices*	*Edges*	*Vertices*	*Edges*
1	3334	478	40223	28480	94768	30682
2	3333	478	69799	86308	45156	9606
3	1660	220	42747	23483	87220	16445
4	1514	266	47067	36721	83333	13607
5	1221	162	60323	71216	34261	6372
6	1363	118	42168	28564	37450	9287
7	2637	284	30793	16289	68499	18115
8	3617	711	45118	35314		
9	2176	239	63185	86258		
10	380	31	53687	46380		
11	932	70	47361	36027		
12	932	70	41153	31683		
13	1028	124	25874	11585		
14	1946	111				
15	1053	116				
16	2469	255				
17	1677	523				
18	1504	190				
19	4146	728				
20	12532	3481				
21	4813	1135				
22	347	7				

3.3.1 Measures

To assess the level of closure for each network, I used the average local clustering coefficient metric. This value, for each weekly network, was calculated using an

algorithm (D. Watts and S. Strogatz 1998) that determines how close a node and its neighbours are to becoming a clique (a graph of fully connected nodes). Any graph $G = (V,E)$ formally consists of a set of vertices V and a set of edges E between them. An edge e_{ij} connects vertex v_i with vertex v_j. The neighbourhood N_i for a vertex v_i is defined as its immediately connected neighbours as follows:

$$N_i = \{v_j : e_{ij} \in E \wedge e_{ji} \in E\}. \tag{3.2}$$

Let k_i be the number of vertices, $|N_i|$, in the neighbourhood, N_i, of a vertex. The local clustering coefficient T_i for a vertex v_i is then given by the proportion of links between the vertices within its neighborhood divided by the number of links that could possibly exist between them. For a directed graph, e_{ij} is distinct from e_{ji}, and therefore for each neighborhood N_i there are $k_i(k_i-1)$ links that could exist among the vertices within the neighborhood. Thus, the local clustering coefficient for directed graphs is given as,

$$T_i = \frac{|\{e_{jk} : v_j, v_k \in N_i, e_{jk} \in E\}|}{k_i(k_i-1)}. \tag{3.3}$$

From this, I can calculate the average local clustering coefficient for all the vertices n:

$$\bar{T} = \frac{1}{n}\sum_{i=1}^{n} T_i. \tag{3.4}$$

To measure brokerage, I used an average of Burt's Network Constraint Index (2005) for each network. This metric observes the lack of structural holes within a network, i.e. the presence of brokers. As Burt explains, "constraint is a function of network size, density, and hierarchy that measures the extent to which relations are directly or indirectly concentrated in a single contact"(Burt 1997a, pp. 367-368). In particular, the measure focuses on the how much the connections of node i are concentrated in a single group of interconnected nodes. In Burt's interpretation, this means that i lacks access to structural holes, which in turn constrains i's ability to bridge across groups. This can be expressed as follows,

$$C_i = \Sigma c_{ij}, i \neq j \tag{3.5}$$

where C_i is the network constraint of i, and c_{ij} refers to the dependence of i on j,

$$c_{ij} = (p_{ij} + \Sigma_q p_{iq} p_{qj})^2, i \neq q \neq j, \tag{3.6}$$

where $p_{ij}$is the proportion of $i's$ time and energy invested in node j, so that $p_{ij} = \frac{z_{ij}}{\Sigma_q z_{iq}}$. Here, z_{ij} is the measure of the strength of the association between i and j, so the constraint of each individual level goes from 0 to 1, depending on whether i's network time and energy are invested in j. This can happen directly (p_{ij}) or indirectly ($\Sigma_q p_{iq} p_{qj}$). Network constraint, as the sum of c_{ij} across all i's connections, provides a measure on how much i is limited by it's own network in accessing new information coming from other groups (which needs to cross over a structural hole). Therefore, constraint will vary according to the size, hierarchy, and density of i's network. Constraint is higher when someone has fewer connections that are highly interconnected to each other. This level of interconnection can happen directly between the members of i's network — in a dense network — or indirectly through a single node — like in a hierarchical network. To calculate the brokerage, I average the node-specific constraint C_i across the networks to obtain $\bar{C}$.

Both metrics — clustering coefficient and network constraint — can provide good indicators of closure and brokerage. In summary, a higher value on the clustering coefficient indicates a higher level of closure, and a lower network constraint values indicate higher levels of brokerage. Previous findings (Burt 2000; Burt 2005) show that both measures are associated with higher levels of individual social capital.

3.4 Results and Discussion

3.4.1 Preliminary Results

Figure 3.1 shows the distribution of nodes and edges per week for each network. The initial weeks of the OWS movement were those in which most of the activity

on Twitter took place. There were some activity peaks afterwards, mostly explained by local events. The evolution of the conversations using the #OWS hashtag follows an interesting pattern, where the number of users (nodes) and conversations (edges) peaks at different points.

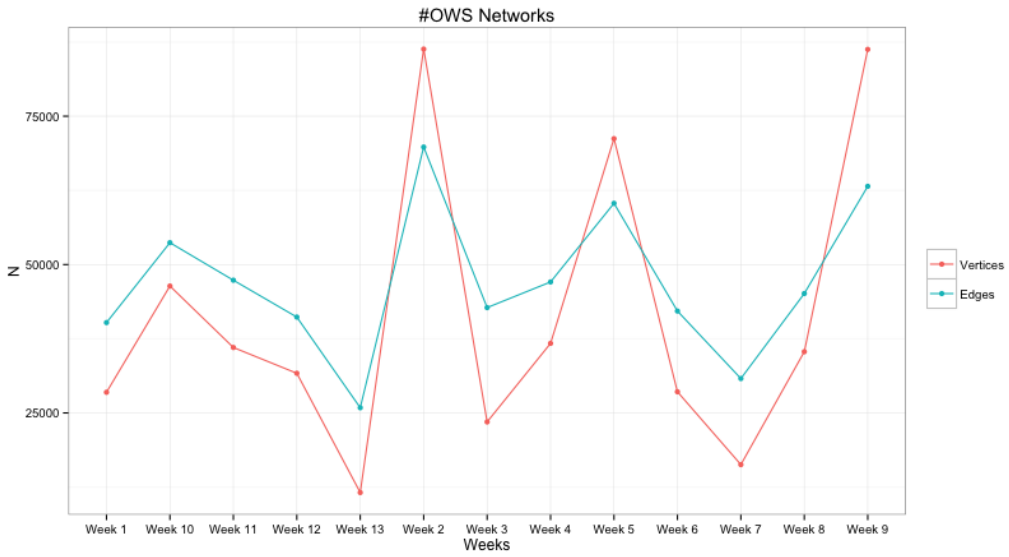

Figure 3.1: Graph of nodes and edges for #OWS over time.

In the case of #OWS, closure levels seem relatively stable and low. Moreover, they seem to be at the same points at the beginning and the end of the observed period (from 0.123 in the first week, to 0.056 in week 22). In substantive terms, this can be interpreted as low numbers of tight close groups. Classic social capital theory claims that close groups help lower the barriers for the creation of interpersonal trust. In terms of cooperation and resource mobilisation, trust is an essential requirement.

Closure does not appear to be associated with the magnitude or the impact of the movement. On the one hand, the formation of trust within online networks might not be associated with the traditional model of close, tight networks. On the other hand, given the local nature of these networks, it is possible that the formation of trust happens in other groups, offline. The latter seems more in line with a sceptical approach to the effect of technology for political action.

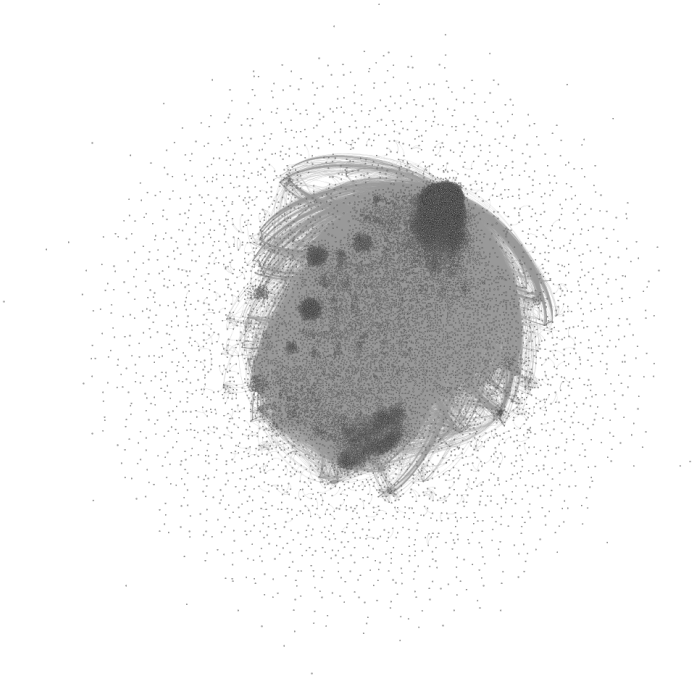

Figure 3.2: Network graph of #OWS - week 9

Figure 3.2 shows a visualisation of week 9 of the OWS network, using OpenOrd algorithm. This layout is preferred because, as Martin et al. (2011) explain, this algorithm behind allows for the display of large networks, incorporating both local and global structures, emphasising distance of groups. The week with the highest level of brokerage and closure was selected. As described above, this network shows a pattern that can be described as small clusters within a larger, yet highly interconnected network. They are consistent with the metaphor of military companies used above, in which smaller, connected groups create trust and resources, which are mobilised by brokers to other groups (e.g. 2011).

This set of preliminary network prepares the field to analyse the networks from a more inferential perspective. By looking at these results, the main questions from this chapter emerge: can I assess whether these networks are different than random? Do they conform to other theoretical or face-to-face expectations? Do the structural signatures of brokerage and closure operate in cooperation with each other?

3.4.2 Main Results

To test my first hypothesis, that the three observed networks are different from random, I compared the mean scores for closure and brokerage for the random simulations against each network. The results, shown in Tables 3.4-3.6, present strong evidence in support of H1.

In nearly every instance, the averages for closure and brokerage are statistically different between the observed networks and the models ($p<.01$). However, in a few cases, the statistical tests do not allow us to reject the null hypothesis. The calculation of closure for weeks 10-13 for the IF campaign using the BA algorithm are not statistically different. However, this time interval coincides with the period in which the number of tweets is the smallest for the whole series, and consequently, the size of the networks is also much smaller. Since BA models are calculated based on the count of vertices from the observed models, this may well explain the lack of significant differences between the theoretical model and observed networks. In substantive terms, these results show that the Barabasi-Albert and Watts-Strogatz theoretical models, in the way I simulate them, are not able to replicate the same levels of brokerage and closure of my observed networks: the particular networks created by the Twitter conversations differ significantly from the random models simulated for this study.

Table 3.4: P-values from t-tests using observed values against models - OWS

	Brokerage			Closure		
	Network Constraint			Avg. Clustering Coefficient		
Week	Barabasi	Random	Watts	Barabasi	Random	Watts
1	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000
11	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.010	0.000	0.000	0.000	0.000
13	0.000	0.000	0.000	0.000	0.000	0.000

Figures 3.3 and 3.4 show the development of closure and brokerage over time for each network. Figure 3.3 shows closure, week by week, in comparison with

Table 3.5: P-values from t-tests using observed values against models - IF Campaign

	Brokerage Network Constraint			Closure Avg. Clustering Coefficient		
Week	Barabasi	Random	Watts	Barabasi	Random	Watts
1	0.000	0.750	0.000	0.000	0.000	0.000
2	0.000	0.790	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.010	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.640	0.000	0.000
11	0.000	0.010	0.000	0.860	0.000	0.000
12	0.000	0.010	0.000	0.950	0.000	0.000
13	0.000	0.030	0.000	0.120	0.000	0.000
14	0.000	0.000	0.000	0.030	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000
16	0.000	0.000	0.000	0.000	0.000	0.000
17	0.000	0.000	0.000	0.000	0.000	0.000
18	0.000	0.000	0.000	0.000	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000
21	0.000	0.000	0.000	0.000	0.000	0.000
22	0.000	0.240	0.000	0.000	0.160	0.800

Table 3.6: P-values from t-tests using observed values against models - Chilean Election

	Brokerage Network Constraint			Closure Avg. Clustering Coefficient		
Week	Barabasi	Random	Watts	Barabasi	Random	Watts
1	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000	0.000	0.000

the different theoretical models. The data show that the levels of closure are higher (slightly) for the observed networks than for any of the models, in each of the three datasets. That is, given the number of edges, vertices, and the average degree of the networks, none of the simulated models are able to create higher levels of closure than the observed networks. This finding partially supports H2, by showing that online networks are more efficient in forming small, denser communities than what theory would expect. Up to this point, the support is partial here given the results from the IF campaign. During the middle period of the case the levels of observed closure fall below the BA simulations. Some of this variation can be explained by the drop in sample size during that period. Even after considering this, the overall

results suggest that online networks are able to produce bonding social capital and their levels of closure are not explained simply by random allocation of nodes and ties.

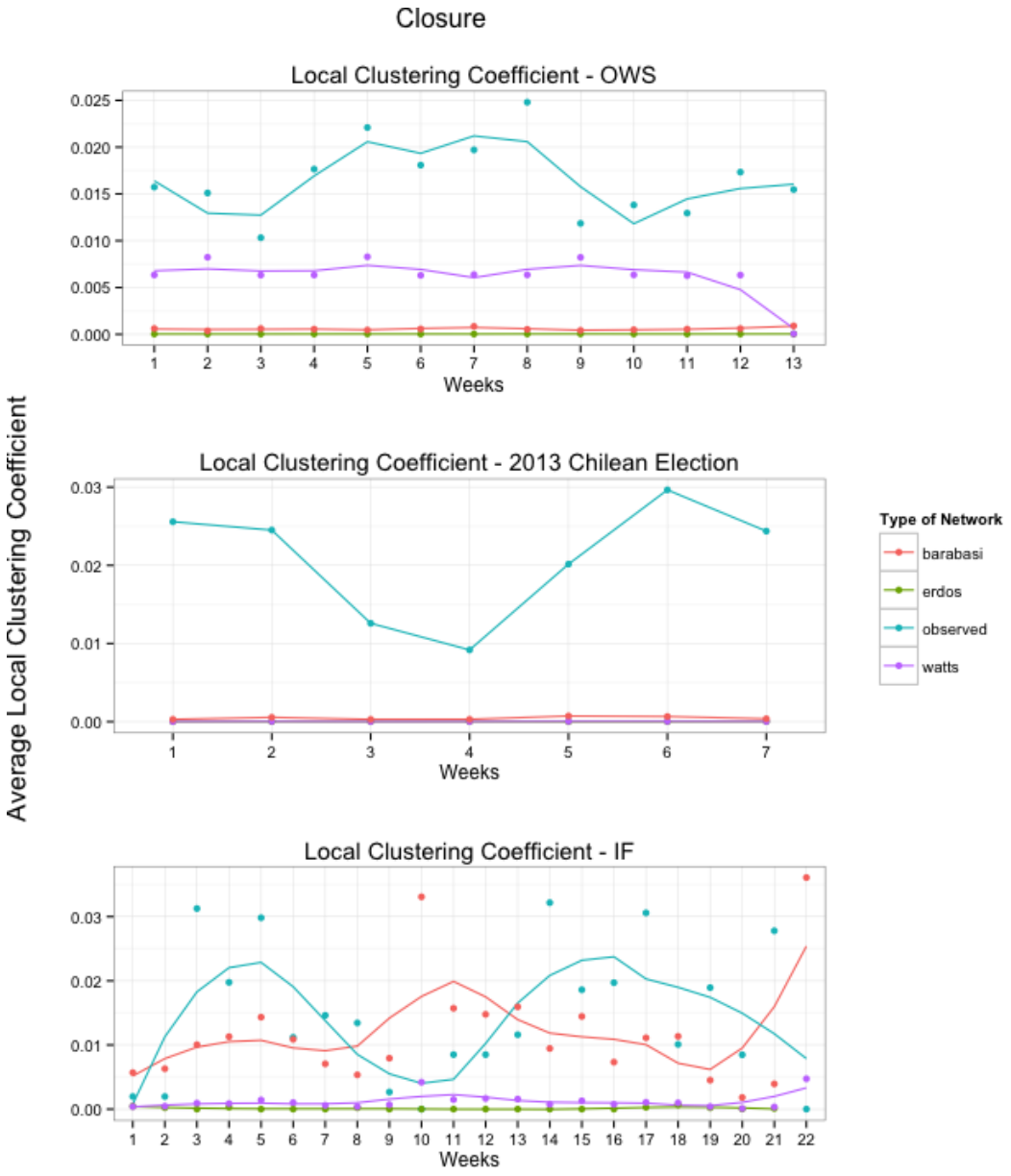

Figure 3.3: Closure for the three networks
(The lines are fitted using a local polynomial regression fitting, with $\alpha = 0.5$)

In the case of network constraint (Figure 3.3), the support for H2 is also only partial. None of the observed networks are able to produce higher levels of brokerage than the BA and WS simulations. However, in the case of Occupy, the levels of

brokerage are even lower than the random graphs. In the case of the IF campaign and the Chilean election, brokerage was consistently above the random models, which shows that the connections across structural holes present in these networks are higher than I would expect on any random network. This result shows that the levels of brokerage across the IF and Chilean election networks are higher than what we could expect from a random network.

Two points warrant further consideration. First, the presence of brokerage opportunities is lower in online networks than the theoretical simulations, which suggests that either there are less structural holes than what the theoretical models anticipate, or that the actors in the network are not being able to take advantage of their brokerage positions. Second, the difference between the OWS movement and the other cases raises questions about the nature of the events and whether differences in the presence of organisations may explain the differential findings with respect to brokerage. On top of what I have hypothesised in H4, one of the potential reasons for this difference is that the Occupy case is less constrained in two particular aspects: geography and scope of issues. As has been described by the literature (Conover, Davis, et al. 2013), the Occupy Movement reached places beyond the USA, but was highly concentrated on local events in each city. Moreover, the issues raised by the demonstrators ranged from the (rather vague) claim for more equality, to more concrete topics (e.g. the imprisonment of banks top executives for their responsibility in the financial crisis) depending on the place of the occupation (Chomsky 2012; Castells 2012). For these reasons, I performed a second set of analyses on the Occupy case.

Using the data from two cities in the US — Oakland and Boston — I calculated the levels of brokerage for each network and compared it with the simulated networks (using hashtags #OccupyOakland and #OccupyBoston respectively). The aim of this analysis is to establish whether the trend of low brokerage is something inherent to the Occupy movement, or was simply less evident in the wider, (inter)national network given its diffuse set of issue concerns and sizeable geographic constituency. I expect that the Oakland and Boston chapters of Occupy will show

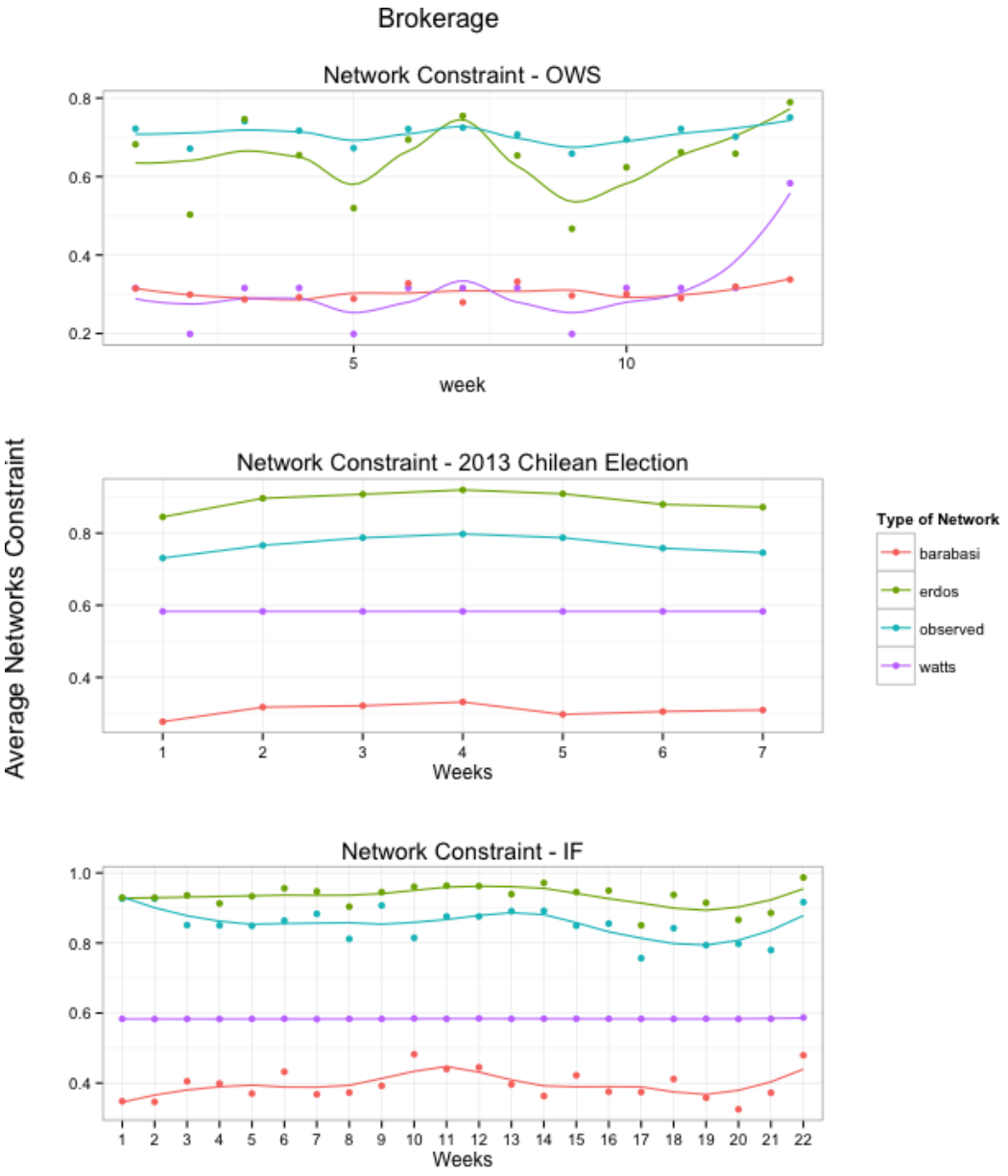

Figure 3.4: Brokerage for the three networks
(The lines are fitted using a local polynomial regression fitting, with $\alpha = 0.5$)

higher levels of brokerage (in relative terms) than the broad-based Occupy/#OWS.

Figure 3.5 shows the results for both networks. In the case of Boston, the trend was exactly the same as in the OWS networks: brokerage was lower than any of the theoretical models, including the random simulations. The difference is statistically significant and is consistent with the results from the general Occupy movement. The case of Oakland, on the other hand, shows more disparate results. The results

remain different at a $p<0.05$ level, which means that the observed values differ significantly from the simulations. The observed networks show, at points, even higher levels of brokerage than most of the models (with the exception of Watts-Strogatz), and during other weeks the brokerage is lower than the simulations.

Looking at the results more closely, the weeks where brokerage is lower are those where the number of edges is higher. This is consistent with the idea that more ties within a limited network will eventually work against the existence of structural holes. Nevertheless, this does not answer the question of why the levels of brokerage are consistently lower in the other Occupy datasets, but not in this one[6]. These results support the evidence from the OWS case about hypothesis 4, that is, that organisations play a key role in fostering brokerage in collective action networks.

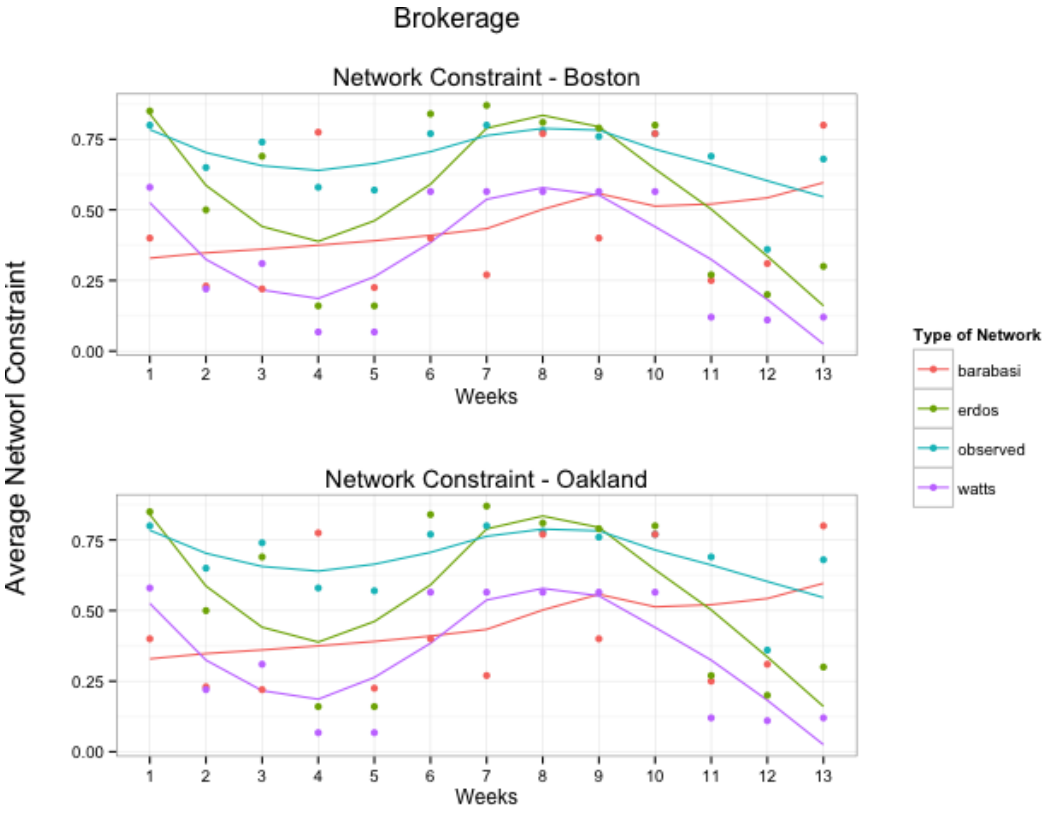

Figure 3.5: Brokerage for Oakland and Boston
(The lines are fitted using a local polynomial regression fitting, with $\alpha = 0.5$)

[6]As a plausible explanation, I could argue that Occupy movements in smaller, not mainstream cities, might benefit from more local, offline organisation. Hence, the levels of brokerage might look more dynamic and higher

In summary, I find only partial support for H2 with respect to closure: online networks are able to foster the creation of tight, small groups within the network and do so better than what would be predicted if random. With respect to brokerage, the story is twofold. On the one hand, the IF campaign and the Chilean election networks show similar results (as in closure), whereas the OWS networks do not show any more brokerage than what I might expect at random. In the case of the Occupy, this result was tested with smaller groups within the Occupy movement, but with disparate results.

My results showing differences in brokerage between OWS and the other two cases warrant further consideration. Beyond the more technical inferences about the differing results, I argue that that OWS may differ substantively from the other two cases. Both the Chilean election and the IF campaign are highly organised, well-funded and tightly focused events. Given that the main aim of campaign communications, Twitter or otherwise, is to influence attitudes, preferences or vote choice, I would expect to see organisations hiring 'professional brokers', i.e. people whose main job it is to connect the different supporters of a given candidate, transmit information from the campaigns, and engage potential supporters. Moreover, the election itself was narrow in focus with two main events: the first round and the run-off election. This means that the professional brokers not only had a goal, but also a deadline, to focus their resources and efforts. Similarly, IF was a coordinated campaign focusing on a small number of key events and issues. Each of the participating organisations, though varied in their level of resources, may have served as professional brokers whose primary aim was engaging the sector and the broader public, by transmitting relevant information across them.

On the other hand, the OWS movement was more organic in its origins. The demonstrators themselves tried to foster the idea of a 'leaderless revolution' and aimed to keep momentum for a long period of time. There were few singular events that served to focus their resources and activities and the way in which they organised, both locally and globally, was explicitly designed to foster egalitarian and horizontal interactions. Analysed at a more local scale, the results from the Occupy

show different patterns. While in some cases the trend was similar to the aggregate movement, in other cases, local networks show higher levels of coordination and inter-group interaction. Considering the results from the Boston and Oakland cases, I believe that these results support H4, that is, organisations play a key role in fostering brokerage in collective action networks.

For H3, the results are consistent with my expectations. In all three events analysed, the correlation between brokerage and closure is positive[7]. I used both parametric (Pearson's R) and non-parametric (Kendall's τ) measures of association to test the hypothesis. In this way, I aim to show that the association holds even if the distributional assumptions are different.

In the case of the IF campaign, the Pearson coefficient is 0.48, and Kendall's τ is 0.32. In the case of the Chilean election Pearson's R is 0.80 and Kendall's τ goes up to 0.62. The OWS dataset shows a significantly lower degree of correlation ($R = 0.09$, $\tau = 0$), however this is to be expected given the results from H2. The difference in the results for the OWS networks also provide an interesting test for the overall validity of my findings. One of the most common criticisms of network analysis is that the metrics used to observe the networks seem to account for the same phenomena from different angles. As such, high levels of correlation are not only expected, but would also provide evidence in support of that argument. Contrary to my expectation, the levels of brokerage and closure in the case of the OWS seem not to be correlated at all, which defies the notion that the metrics are not providing new information. This, in turn, supports the idea that closure and brokerage, while related, are different theoretical and empirical concepts.

Figure 3.6 shows the scatterplots for each network, with linear and polynomial fittings, which show how the associations between brokerage and closure behave. As explained above, the plots for the IF and the Chilean election cases present a stronger positive correlation, while the OWS has a flatter slope in the linear fitting and a less defined polynomial fit.

In summary, brokerage and closure appear to be positively correlated in all

[7] As explained above, the way in which network constraint is measured is such that higher levels of brokerage is expressed in lower levels of network constraint. For that reason, I use $1 - \bar{C}$.

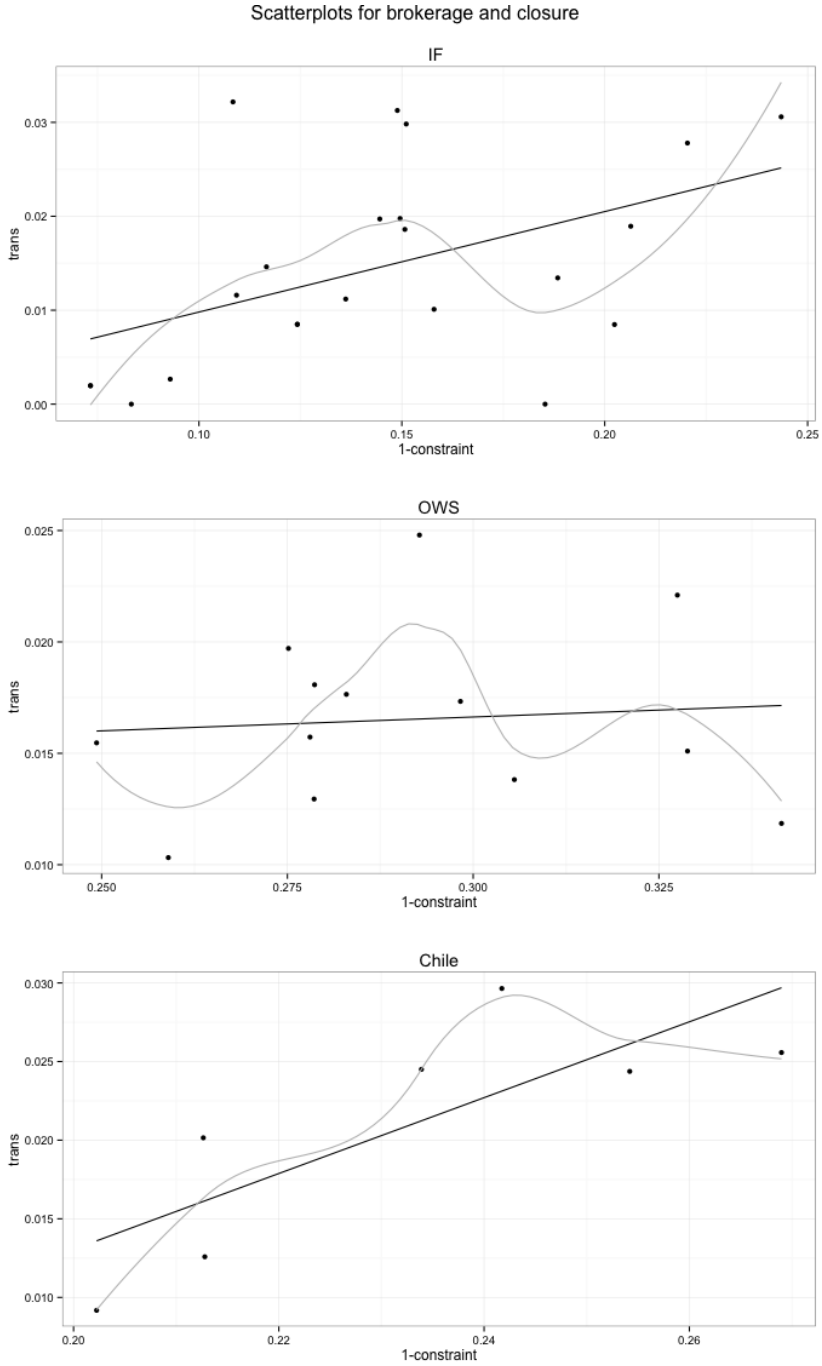

Figure 3.6: Correlations between brokerage and closure
(The grey lines are fitted using a local polynomial regression fitting, with $\alpha = 0.5$)

three cases, although it becomes weaker in the case of the OWS dataset, mainly for the above discussed reasons.

The findings from the OWS, the IF campaign and the Chilean election provide a compelling account of the formation of social capital online. The three cases

show patterns of behaviour that cannot be explained fully by the most widely used theoretical models nor respond to mere random allocation of nodes and ties. In sum, the data provide evidence of social capital formation online.

3.4.3 Robustness tests

In order to provide a further test to the main findings above, in particular with regards to H4, I have decided to perform two different robustness tests: one using geo-tagged tweets in the UK, and another one with data from the European Parliament election in 2014. I have chosen to concentrate on the comparison between observed and random simulated (i.e. ER models) networks, as this was the relevant benchmark shown in the previous analyses. I then calculated the level of average network constraint — $\bar{C}$ — for the observed and the simulated networks.

For the case of the geo-tagged tweets, the justification for this case comes from the arument that byy choosing tweets that are unrelated to any particular topic, I can provide a good comparison against more politically related networks. Based on the structural features of the UK networks, I created simulations using the ER model.

Figure 3.7 shows the results of this analysis. As I can observe, the levels of constraint are higher than what I can find in the simulated random networks. This gives further support to my main findings that show a similar difference between the observed value and the random simulations in the case of the OWS movement. The UK geotagged tweets set does not contain any professional brokers, or a single goal that unites efforts across the network. These networks are formed in an organic manner.

The networks from the European Parliament election worked as the basis for simulated ER networks, which in turn got their average constraint calculated. The average across all the observations is the one reported for each day.

The results shown in Figure 3.8 present a different picture than the previous exercise. The level of C_i of the observed networks is lower than the levels observed in the simulations. This is consistent with what I expected based on my main hypothesis. As the case selection typology used above, elections can be considered as cases where organisations and professional brokers play a key role. The level of

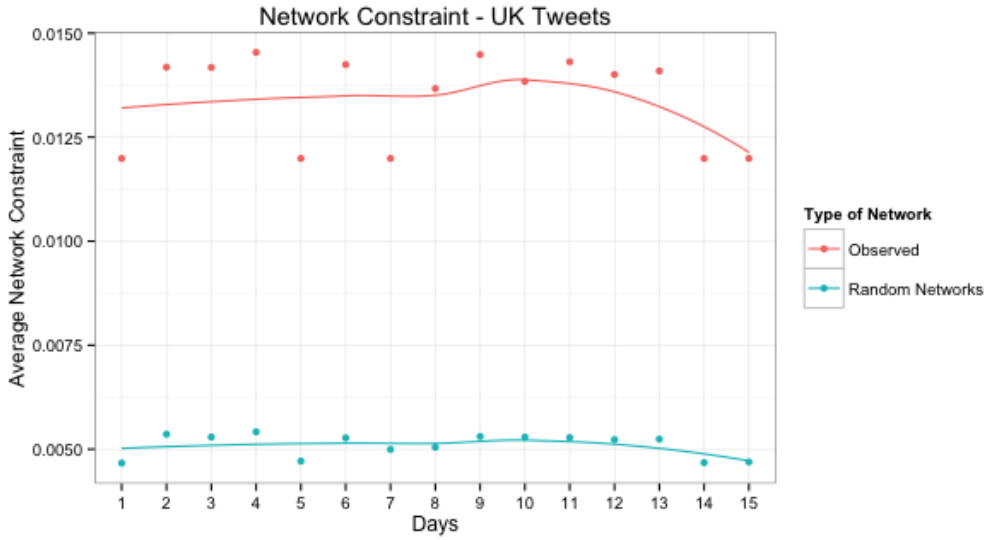

Figure 3.7: Brokerage - UK geo-tagged tweets
(The lines are fitted using a local polynomial regression fitting, with $\alpha = 0.5$)

brokerage is higher, then, than what I would expect from a purely random network.

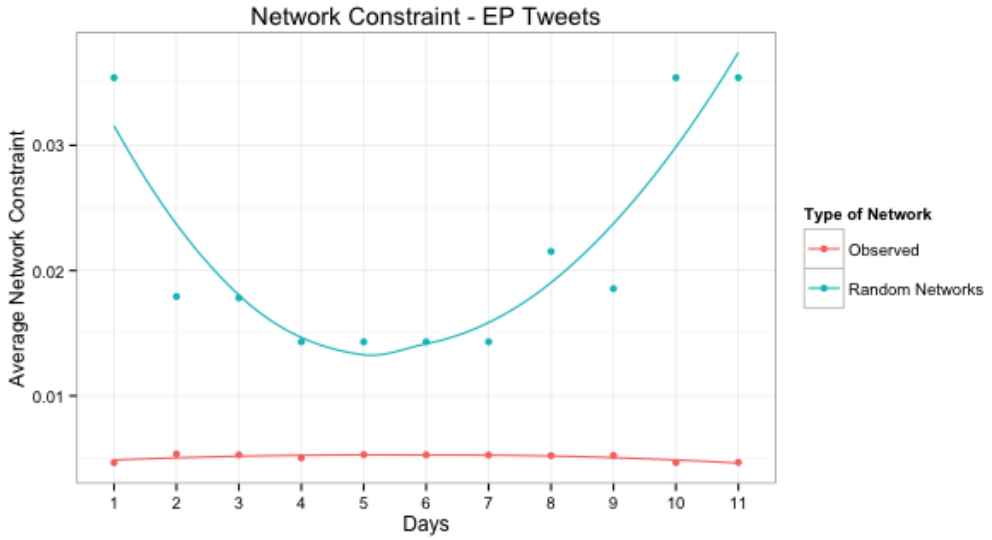

Figure 3.8: Brokerage - EP election
(The lines are fitted using a local polynomial regression fitting, with $\alpha = 0.5$)

The results form the robusteness tests provide a compelling case in favour of hypothesis 4. Figure 3.7 shows that the levels of brokerage are consistently lower than the random simulations, while Figure 3.8 shows a complete opposite result. In the first case, there are nor organisations pursuing a clear strategy, while in the case

of the election, there are a large bunch of organisations, mostly political parties, trying to get their message across and organise their followers. As the main results show, this evidence supports the idea that organisations do matter for the formation of bridging social capital.

3.4.4 General Remarks

In this chapter I have provided initial evidence of the formation of social capital in online networks, by showing that these networks do present the structural signatures of social capital. I return to Putnam's concepts of bonding and bridging social capital in reviewing my findings. With regard to bonding social capital, online interactions appear to bring together like-minded people, and create small, dense groups among them. This is evidenced by the high leves of closure across most of the observed networks. That is, the potential of ICTs to create bonding social capital is better than of the theoretical models. On the positive side, this means that online networks may have more potential than I expected to foster the creation of trust and reciprocity, based on the idea of intra-group ties. However, this may also lead to what Putnam calls "cyberbalkanisation", keeping like-minded people together, and not allowing the members of the groups to be exposed to more diverse information, while excluding those outside of them.

In terms of the bridging social capital, the results are conditional on the role of other actors. The presence of organisations and professional brokers in the networks allows for bridging across structural holes. That is, the formation of bridging social capital is possible because of the presence of people whose aim is to produce those ties. This fits with Bennett and Segerberg's typology. The alleged horizontal and spontaneous nature of online interactions might not be enough to produce, without intention, bridging social capital. Moreover, these results support Gibson & McAllister's findings about the prevalence of bonding over bridging social capital in online environments. My tests using observational networks — instead of self-reported data — provides an "acid test" for the veracity of their conclusions.

Putnam also claims that healthy societies foster the formation of both bonding and bridging social capital in coordination. One is required for the presence

and operation of the other, and as such, the interplay between them creates trust, appreciation for diversity, and communication among different social groups. My results show that online interactions are able to produce the same positive interplay. Furthermore, the evidence presented also provides support to the idea that this positive interplay requires intentionality. Online social capital seems to be in the right direction, allowing and fostering the coordination between bridging and bonding social capital. However, this is also present in events where part of the ethos of the network is the communication across people from different groups.

I have focused my attention here on the online social architecture, the networks of twitter connections and conversations, to test whether I observe evidence for patterns of bridging and bonding social capital. One thing I have not tested is whether the content of the conversations and connections provide evidence for social capital in the sense of building trust and norms. This is what I aim to address in the following chapters. There is an important distinction between the thinner, transactional view of connective action (Bennett and Segerberg 2013) and the thicker, transformational view of social capital. The crucial next step is to understand if, when, where, and how connections beget positive social externalities and help form the 'social glue' of Putnam (2000). In this light, I see this chapter as a structural contribution and as a necessary first step in this endeavor. Because social capital cannot exist in 'the ether' but requires social bonds – online or offline – I argue that I have provided the necessary, but not sufficient, first step in understanding whether social capital exists in online networks.

This chapter has attempted to provide a preliminary approach to the formation of social capital in online contexts, by analysing three different Twitter datasets. My findings suggest that the current theoretical expectations of how social connections are created and maintained are not able to explain the network structure of online social interactions.

Chapter 4

Understanding Social Capital using a Resource-Based Approach

4.1 Introduction

This chapter aims to respond the second research question of my thesis, that is, how does social capital differ when is formed and sustained online, offline, or a combination of both. I move on from analysing the structural signatures of online networks as a way of observing social capital to focus on the ability of social connections to mobilise resources. In particular, I am interested in answering the following questions:

1. To what extent are technologies affecting individual levels of social capital?

2. What are the differences between online and traditional social capital in terms of who are able to access them?

My conceptualisation of social capital is based on the existence of social networks operating under norms of trust and reciprocity are able to mobilise resources. This chapter explains the development and application of a new method to measure social capital based on the Resource Generator (Van Der Gaag and Snijders 2005). This instrument is called the Online Resource Generator (ORG).

The ORG asks respondents about their access to different social resources. Some of these resources relate to knowing someone who can lend respondents small

amounts of money, knowing a reliable tradesman, or knowing someone who can discuss politics with you (the full list is below). The ORG requires respondents to specify the ways in which they access them. This instrument provides an indicator of the levels of individual social capital per respondent. The ORG has been included as part of the third wave of the British Election Study Internet Panel 2015, and is the first time that an instrument measuring social capital from a resource-based approach has been applied to a nationally representative sample in Britain.

There are two main contributions coming from this instrument. First, this is a new approach to understanding social capital. By asking about resources, instead of recalling names or social connections, I provide a picture of access to social capital across a range of resources. This is an important departure from traditional ways of measuring social capital. As I will be discussing later in the chapter, most traditional metrics either focus on other aspects of it — such as structure — or assume that the presence of certain preconditions of social capital (e.g. trust) or potential outcomes (e.g. involvement in voluntary organisations) account for its presence. The ORG makes fewer assumptions about the ability of social connections to mobilise resources. As such, it focuses on providing indicators of the resources that are actually being mobilised through these social connections.

The second contribution of the ORG is that it provides an offline/online distinction when asking people about the resources they access. This simple addition, allows me to construct distinct indicators of what we can conceptualise as online, offline, or combined social capital.

The ORG is an instrument that aims to uncover an unobserved latent trait of social capital through the analysis of observable items. The analysis of latent traits can be done through different mechanisms. In this chapter, I discuss the use of two different options for the construction of a single indicator of social capital. These are Exploratory Factor Analysis (EFA), and Item Response Theory (IRT). As discussed below, these methods are widely used to uncover the latent dimensions behind different sets of data. In this particular case, my purpose is to provide a metric that can be used to assess the individual and aggregated levels of social capital. I discuss the

implications of using both approaches and why, in my view, Item Response Theory should be preferred when using the ORG. The results show that, in line with recent literature (Eijk and Rose 2014), IRT provides a better and more consistent approach to measure the latent variable behind the social capital items.

The chapter introduces a statistical modelling strategy to answer the main research questions, The first strategy consists of understanding whether the use of technology for accessing social resources has any implications on the overall levels of social capital. Later, I explore the differences across forms of social capital — online, offline or combined — in terms of the individual characteristics of those answering the ORG. In both cases, I use OLS regression models to study the relationships.

I conclude that the dystopian claims about the negative role of the Internet for creating and maintaining social relations are not supported by this evidence. People who can access social resources through online and offline ways at the same time have higher individual levels of social capital. Conversely, those who mostly access those resources through online ways tend to have lower levels of social capital. Moreover, the analysis of the different scales of social capital, either online, offline or combined do show significant differences between each other: Socio-economic status is a strong predictor of social capital offline, however, is negatively associated with online social capital.

This chapter starts with a discussion of the literature on the role of Information and Communication Technologies (ICTs) on the formation and sustainability of social capital. I focus on two different streams of the literature. The first one considers the internet as an either/or category in which people decide to engage with others online or offline. The second one argues that social behaviour follows stable patterns and that we need to think the offline-online divide as a continuum. The chapter then discusses the different survey measures of social capital and their different advantages and disadvantages. The next section focuses on the construction of the main variables and the models used to analyse the relationship between ICTs and social capital. Finally, the discussion section provides an overview of the

results and general remarks on their substantive implications.

4.2 Social Capital and Resources

It is important to emphasise a key aspect of my definition: the existence and transmission of social resources, defined as products or services that are mostly acquired through social contacts, such as personal support, money, professional advice, among others. In general, this thesis focuses on understanding the collective elements and outcomes of social capital. In order to get this, I use several indicators that navigate between the individual and aggregate levels.

Combining these levels, and in line with what is mentioned in chapters 2 and 3, I conceptualise social capital as social networks, operating under norms of trust and reciprocity that are able to mobilise resources and information. This last element is also relevant from a methodological perspective, as we should not only observe at the presence of social ties, but also at their ability — real or alleged — to mobilise resources. Not all social connections are meaningful in terms of social capital. The fact that we know someone is not the same as being able to ask something from that person. This ability to mobilise resources through these social ties is the core focus of this chapter.

As discussed below in the section about survey instruments measuring social capital, there are inherent advantages in focusing on resources. Beyond the practical implications, it is important to consider that social capital is more than merely social connections. It has a transformative role by providing people with access to resources that they would otherwise lack. This is beyond a utilitarian position, where people could hire any of those services if needed. Social capital is both the consequence and cause of trust-based reciprocal relationships, and as such, the resources transmitted through the networks are a reflection of that transformative process. Having an analytical focus on resources provides a great overview on how social capital operates, as well as distinguishing from the traditional notions that tend to assume too much from scarce empirical data.

4.2.1 The dichotomy: online and offline

Much of the discussion on the role of technologies on social life has been related to the potential negative of positive effects that the Internet (or recently, social media). The early literature on the effects of Information and Communication Technologies (ICTs) on social connections (and sometimes on social capital), reflected the traditional discussion between utopians and dystopians. On the one hand, utopians claim that the internet, and all related new media, are expanding — and improving — our social capabilities. Accordingly, ICTs can change the core structure of our connections (Hampton, Sessions, and Her 2011), and even increase our levels of social capital (Sebastián Valenzuela, Park, and Kee 2009; Ellison, Steinfield, and Lampe 2007).

Dystopians, on the other hand, claim the opposite. Putnam (2000) established a rather old-fashioned criticism to the role of technology in the formation of social capital, by claiming that only personal connections are able to create and foster it. Furthermore, McPherson's (2006) now famous work on social isolation attributed a negative role of the internet in sustaining core social networks. In his view, the internet is one of many of the causes of a decrease in the size of personal discussion networks. Other dystopians (Morozov 2012) emphasise that the use of ICTs can be more related to individual entertainment rather than social connection and collective organisation.

Recently, researchers (Gibson and McAllister 2013; Kittilson and Dalton 2011) have claimed that the role of ICTs on social capital cannot be conceived as a function of positive or negative effects. They have concluded that social behaviour online is not systematically nor substantively different than social behaviour offline. For example, Kittilson and Dalton argue, based on data from the U.S., that the Internet presents a new medium for the traditional patterns of social behaviour, showing that face-to0face group activities and online connections can have similar positive outcomes in terms of social capital. Moreover, Gibson and McAllister's findings from Australia support this view, by showing that social connections online can have a positive impact on political engagement, just as we would expect from tra-

ditional, face to face connections. For this group of scholars, ICTs can enhance or modify certain behaviours slightly, but the overall mechanisms remain untouched. For example, we can observe homophily in social networks, and see that bonding social capital acts as a more efficient mobiliser (see chapter 3 for a discussion on this topic).

These studies provide evidence against the notion of technological determinism, that argues that technologies change the essence of human behaviour. Instead, I argue for a middle position, where behaviour belongs to a realm that is an antecedent to the use of technologies. ICTs, in this case, can filter and feedback these behavioural traits, which in turn produces changes at the level of the outcomes. These changes are more than simple scratches on the surface of social behaviour, but cannot be considered as substantial modifications. As shown above, connecting with others may follow similar patterns, with slight alterations depending on the platform in which those interactions take place. For example, as shown in chapter 3, we observe similar patterns of homophily across online social networks that what we would expect offline.

Whether we observe a more dystopian, utopian or sceptical view, there are some things in common to all of these approaches. They all consider, at least from an empirical point of view, that the internet can be considered as a variable which affects social connections. In that regard, they all conceptualise, if not also operationalise and measure, the internet as a separate construct, which can be measured independently to the actual behaviour.

Although this approach can be helpful as an operationalisation strategy, my goal is to reconcile the Internet and social behaviour. I aim to treat them not only as separate elements in a model, but also as a combined construct. Theoretically, I could argue that there are certain behavioural traits that, in part, are independent to the platform which is developed. However, there is another part that is connected to the actual form of expression — either online or offline — and, as such, should be analysed as a combination of the behaviour and the medium. This is exactly what I argue with regards to social capital. The connections required to form social capital

can take place both online and offline, and accordingly have different outcomes, but that does not change the definition or essence of social capital. I am not arguing for dropping the analyses that include ICTs as an independent variable, but to complement them with the notion that social behaviour and technology can engage into a complex and mutually binding relationship. The strategy of this thesis is to provide measures that can account for this complexity.

Later in this chapter, when discussing the differences between online and offline social capital, I argue that we need to change the focus of the discussion and move the Internet from the side of the independent variables to a key element of a more complex dependent variable.

4.2.2 The offline-online continuum

Analytically, we can claim that there is another approach to the use of new technologies, one that does not contrast online and offline. As Wellman & Rainie (2012) explain, people do not separate explicitly the way in which they create personal connections. Simply put, we should not expect people to treat online and offline social connections as separate entities. They are all social connections, and the way in which we create and maintain them might affect some of their qualities, but should not be determine their substance. This is, for the most part, the approach that I have followed in this thesis.

This notion has been explored by Bimber et al (2012) while looking at the way in which established civic organisations manage to attract and engage their members. As they explain, organisations need to adapt constantly to their changing environment in order to survive. The use of technologies, then, is not a threat to their existence, but a necessity to continue fulfilling their role. Traditional organisations now use technology to perform their traditional duties, such as keeping their membership informed and collecting funds. Moreover, they have also used the technology to expand and transform the way in which they understand membership and their activities. This shows how these organisations, usually coined as old-fashioned, engage with technology without disturbing their key goals. Instead of threatening their existence, ICTs can be a way of subsistence.

Bennett & Segerberg (2013) explore another dimension of this situation by analysing how technologies can broker social connections, in a similar fashion to which organisations traditionally do. In that regard, new technologies can solve some of the traditional collective action problems, without the need for a formal organisation or a defined set of rules.

A similar approach has been taken by Chadwick (2013) when analysing changes in the way media operates. In his view, media outlets are evolving and incorporating new technologies as a natural extension of their work. In a nutshell, what matters for them is the content, not the platform. As such, the offline-online question is presented as a matter of degree instead of a dichotomy. The key notion of Chadwick's work is moving from the dichotomy of old media vs new media, into one that recognises *older* and *newer* media as relative terms in a scale of degrees. This conceptual shift is at the core of the movement against looking at technology, and the social relations that happen through them, as a separate entity or reality. Content, power relationships, and politics, all take place in different platforms, that can shape them, but not determine them.

Therefore, the notion of hybridity is a key one. Re-thinking our relationship with ICTs as a continuum rather than an either/or dichotomy has two main advantages. First, it produces a more accurate picture of social reality. Although it is possible for some people to adapt their behaviour according to the way in which they connect with others, the main personality traits remain the same. Understanding the role of technology as a non-deterministic influence in social life is a good option to recognise that the way in which we establish social connections may affect some of our attitudes, but that does not mean that they are essentially altered. Second, understanding this relationship as a continuum forces a methodological innovation and requires us to include the combination of online and offline forms of social behaviour when analysing them.

4.2.3 Main hypotheses

Given the discussion of the role of ICTs on the formation of social capital, a resource-based measure can shed some new light on how this relationship can be

affected or if it is affected by new technologies. As I show below, there are several reasons to prefer an instrument focused on resources, and I use that approach throughout this chapter and the next one.

I derive two different hypothesis: a dystopian and a combined — 'continuum' — hypothesis. These hypotheses are based on the notion that the internet can have different effects, depending on whether people privilege social relations through technology or without it, against the option of combining both.

The dystopian hypothesis expresses a negative, harmful effect of the internet on social capital. If new technologies isolate people from their social circles, we should observe lower levels of social capital in association with the use of the Internet. Therefore, I express the hypothesis as follows:

Hypothesis 5 ***(Dystopian hypothesis):*** *The use of the internet for accessing social resources is related with lower levels of social capital*

The second hypothesis is one that privileges a balanced combination of online and offline platforms to access social resources. According to this hypothesis, thinking about the use of technologies as a choice from offline options is not an appropriate strategy. We should, instead, think of the platforms we use to communicate with others as a continuum. Hence, the levels of social capital benefit from a balanced approach to social interactions. Privileging online or offline as our desired platform should create a negative effect on our ability to create and sustain social capital. On the other hand, forming and sustaining social capital regardless of the platform should be a more effective approach.

Hypothesis 6 ***("Continuum" hypothesis):*** *The combination of online and offline access to social resources has a positive relationship with the levels of social capital*

Both hypotheses can be tested by constructing indicators from the instrument I have designed.

4.2.4 Measuring social capital using survey instruments

The introduction of a variety of instruments to measure social capital stems from the different theoretical implications behind the concept. Since I focus on the notion of social capital as social networks able to mobilise resources, once the network structure is analysed (see chapter 4), it is time to move on to find a suitable instrument to observe and analyse the presence of social capital from a resource-based approach.

When it comes to self-reported data, social capital has been measured in several ways, depending on the conceptual emphasis. The most widely used is the Name Generator / Interpreter (McCallister and Fischer 1978), which requires respondents to recall the names of all the people with whom they discuss important issues. From there, the instrument complements the information about those relationships by asking attitudinal questions. The idea is to provide a measure of the breadth and depth of the respondent's ego-networks. The number of people given by respondents is a measure of the density of the network, while the Interpreter's questions allows the quality and conditions of those connections to be accessed. This instrument has been widely used in surveys over the time, and it is a common battery within the US General Social Survey (GSS), indeed, variations of it have been used in electoral surveys such as the BES 2015 (although not to measure social capital).

The Name Generator has been criticised for two reasons. On the one hand, it is a difficult instrument in terms of application. It takes a long time for respondents to go through the questionnaire, and it is prone to highlighting interviewer errors. Paik and Sanchagrin (2013) provide a thorough analysis of the GSS over time to show how interviewer's effects are directly related to smaller sample sizes. Moreover, the length of the overall questionnaire had a negative impact on the size of the network, where respondents would skip the Name Generator in order to finish the survey sooner.

This would not be a significant problem if the information provided by the instrument was be useful for analysing several dimensions of social capital. However, the instrument is limited in terms of the information it provides. Ego-networks can serve as a proxy for social capital, but only in certain contexts. For example, the

notion of discussing important issues with someone else can be more similar to particular forms of social capital, such as bonding connections. The focus on personal support that most name generators have, asking people about their social connections with whom they discuss important matters, captures only one side of social capital. Other resources, such as material or physical resources, are not accounted for in these instruments.

Another well-known survey instrument is the Position Generator (Lin, Fu, and Hsung 2001). This instrument is supposed to focus on social resources, arguing that this is a good approach to get a valid measure of social capital beyond its structure. However, instead of asking directly for resources, it enquires about the diversity of respondents' networks. For example, it asks respondents whether their social networks include people in different hierarchical positions within an organisation. The main idea is to capture the occupational prestige of the respondents' contacts. The assumption behind it is that people who have contacts "higher up" in the occupational prestige ladder, will also have a larger number of social resources.

Focusing on resources that people can obtain from higher hierarchical positions has some limitations. First, as Van der Gaag et al (2008) explain, the type of resources that come from these connections follow an instrumental route. It relates more to a particular kind of resource, such as getting money, helping to get a job or a particularly expensive goods or service. On the other hand, resources related to personal support (such as discussing career prospects or getting help for shopping when you are ill) might not be captured by the Position Generator. Given that this instrument assumes resources rather than observing them directly, missing this kind of information is a significant disadvantage.

Another limitation of the Position Generator is that it is heavily dependent on the context in which it is applied. It requires respondents to be embedded into easily identifiable networks, and also to be able to position themselves within it. This might be easy in organisational contexts, such as workers within a company, but it loses some information when applied to more general contexts. On the positive side, this instrument is relatively easy to apply compared to the Name Generator, and it

provides information about the diversity of social connections from a hierarchical point of view.

In terms of incorporating the use of the Internet in the measurement of social capital, there have been attempts to devise survey instruments. Williams (2006) created a set of scales called the Internet Social Capital Scales (ISCS) to measure bonding and bridging social capital offline and online. The questionnaire requires respondents to provide their level of agreement using a 5-points Likert scale to several statements about social relations. Some of the items asked about personal support (e.g. "There are several people online/offline I trust to help solve my problems"), while others include physical resources (e.g. "If I needed an emergency loan of $500, I know someone online/offline I can turn to") Williams focused on the online/offline divide, asking respondents to choose between both platforms. Another interesting feature of the ISCS is that it is designed to distinguish between bridging and bonding social capital. For Williams, bridging social capital relates to trust and emotional support (much like the position generator), while bridging social capital is represented by issues such as tolerance and community involvement. This measure was modified by Ellison et al (2007) to produce a shorter version of the ISCS, with only five questions for identifying bonding and five for bridging social capital. Since Ellison's research is focused on university context, the online/offline distinction was dropped and replaced by a mention to a university.

Although both attempts have been widely used in the literature, they have been contested (e.g. Appel et al. 2014). The main criticism is the same one I make at the beginning of this chapter: instead of focusing only on the elements of social capital, such as resources or information, this instrument concentrates mostly on social capital's sources or outcomes. It assumes causal relationships and uses indicators such as community involvement and trustworthiness as a direct indicator for social capital. This is questionable from a theoretical point of view, as these phenomena can be related to social capital, but are not necesarilly the same as social capital (more of this disucssion can be found in chapter 2. Moreover, empirically speaking, the ISCS have been recently questioned in terms of their internal validity. According to Ap-

pel et al (2014), the scales developed by Williams and Ellison do not produce valid measures of bridging and bonding social capital, and argue for the use of structural measures instead. Their main argument is that the ISCS do not produce any significant correlations with other established measures, such as the Name Generator or the Position Generator. Moreover, when compared with structural measures, such as the ones used in chapter 4, the outcomes differ.

In line with the ISCS, there have been other, less systematic, attempts to account for the presence of social capital online (Burke, Kraut, and Marlow 2011; Sebastián Valenzuela, Park, and Kee 2009). In general, all these studies ask respondents about their behaviour online, with a particular emphasis on membership in Facebook groups, or other activities related to civic engagement. As I have discussed earlier, this approach relies on the assumption that the membership in associations will directly lead to the creation of social capital, but leaves it untested.

Recent attempts (Kittilson and Dalton 2011; Gibson and McAllister 2013) have also included different questions assessing whether the Internet has been useful to respondents in creating social connections. This is a more sensible approach in light of the criticisms mentioned before. Instead of focusing on antecedents or consequences, these questionnaires emphasise the role that the Internet has had in creating social connections.

There are, nevertheless, two main limitations to this approach. First, their focus is in the utility of the Internet in establishing social connections, but does not continue to understand if these connections can be sustained over time and transmit relevant resources. That is, these questions fall short in accounting for the transformative nature of social capital, which requires long-term and meaningful relationships. Second, although their work has been useful for evaluating what types of social capital can influence political participation, their analyses focuses solely on the use of the Internet and does not cover what happens offline (e.g., there is no online/offline comparison).

My own method of measuring social capital is derived from the work of Van der Gaag and Snijders (2005). They devised an approach that combines the posi-

tive sides of both the Name Generator and the Position Generator. This instrument is called the Resource Generator and has some significant advantages to other options. The original questionnaire consisted in 40 items asking about access to several social resources. As such, it asks respondents different questions related to a list of social resources. Examples of these resources are whether they know someone who could act as a reliable tradesman, could do some shopping when they are ill, or works for a local council. It also includes a module about self-perceived abilities, such as being able to perform DIY tasks.

Unlike the Name Generator, this instrument does not rely on recalling names and answering several questions about social relationships. The focus is on concrete resources, as the creators claim, and provides an easier cognitive way of recalling information as the resources are not necessarily attached to a particular person. On the other hand, since this instrument asks for a diverse variety of resources (for a full version of the RG-UK, please see the Appendix A), it provides a good measure of the diversity of social networks. The Position Generator, which was intended to capture such diversity, is limited to the notion of occupational prestige, which mostly measures instrumental social resources. Things like personal support are not easily incorporated into the Position Generator, but can be measured without problems by the Resource Generator.

From a conceptual point of view, the Resource Generator presents a significant advantage. As I have discussed here, most of the instruments used to capture social capital make strong assumptions about the presence of it in light of what I have called the potential causes or outcomes of social capital. The Resource Generator, on the other hand, asks directly about the ability of social connections to question concrete social resources. This does not assume the presence of the network, or the operation of trust and reciprocity. In order to mobilise these resources, all these elements from the definition need to be in place. Instead of making a leap, this instrument focuses on the core of the concept.

Since its original inception, several versions of the Resource Generator questionnaire have been applied in countries such as Bolivia, Belarus, Canada, and the

UK (but not on a national representative scale). This allows for certain levels of comparability across the different cases.

In order to produce a comprehensive account of social capital, the RG needs to include resources of a different nature. Some of them should be easily obtainable, while others should require a higher level of difficulty. The idea is to account for the variety of social resources available to the respondents. Some of the resources follow an instrumental logic (such as knowing someone who can repair a broken-down car), while others provide personal support (e.g. advice on money problems).

In terms of internal validity of the instrument, this has been tested against both the Name and the Position Generators (Van der Gaag, Snijders, and Flap 2008). While these other two measures do not correlate with each other, the Resource generator does show a relationship with both. This is interpreted as a good measure of the ability of the instrument to capture both the density and the diversity of social capital networks.

The second main trade-off of the Resource Generator is that it is dependent on particular national contexts. The original instrument, applied in the Netherlands, could not be directly applied into other countries, as the list of resources is relevant only in the original setting for which it has been designed. In order to ensure comparability across the different instruments, it is important to work with the questions to reflect national differences. In the case of the UK, Martin Webber (2011) developed a thorough process to adapt the instrument to the British culture. Using focus groups, in-depth interviews and expert surveys, he developed a new version called Resource Generator - UK (RG-UK). This new instrument, as it is shown in Appendix A, contains the same number of questions as the original Dutch version, and aims to reflect equivalent resources.

The Resource Generator is then analysed using Item Response Theory to produce the latent dimensions of social capital. Van der Gaag and Snijders' work resulted in four different dimensions, covering areas such as prestige, political and financial support, personal support, and personal skills.

Table 4.1 shows a summary of the different instruments and their main criti-

cisms

Table 4.1: Summary of survey instruments measuring social capital

Survey Instrument	Main criticisms	References
Name Generator (NG)	Requires long time to recall names and relationships, provides information only on ego-networks	McAllister and Fisher 1978
Position Generator (PG)	Better for bounded settings, does not translate well into representative samples	Li, Fu and Hsung 2001
Internet Social Capital Scales (ISCS)	Issues with internal validity (Appel et al 2014), they do not correlate with structural measures of social capital	Williams 2006; Ellison et al 2007
Participation in online communities	Assumes that the act of membership is the same as interacting and forming social ties	Valenzuela, Park and Lee 2009
Use of internet as facilitator of social capital	It focuses only on the social capital created through online platforms	Kittilson and Dalton 2011; Gibson and McAllister 2013

Resource Generator	Not easily translatable from one country to the other	Van der Gaag and Snijders 2005

4.3 Data and Methods

4.3.1 Construction of the Online Resource Generator (ORG)

The starting point of the ORG is the original RG-UK questionnaire (Van der Gaag and Webber 2008), which is included in Appendix A. This instrument asks respondents if they know someone who either has a resource or can help the respondents access them (e.g. knowing someone who is in a position to hire people). Then, those respondents who say yes are asked about the nature of the relationship, that is, whether they are a member of the immediate or wider family, a friend, a neighbour, a colleague, or an acquaintance. The aim is to provide a measurement of access to social capital and also to identify the strength of the ties that mobilise it. However, the original instrument does not include a measurement on whether the contact is created or maintained online or offline. Also, it consists of 40 items divided into three sections. The first two include 13 and 14 questions each, and ask respondents about the access to social resources. The last section of 13 questions aims to produce a self assessment of the resources already owned by respondents. This last section, however, is not usually considered in the analysis of social capital by those using the Resource Generator (Van der Gaag and Webber 2008).

Initially, I introduced two modifications to this instrument. First, I added questions to provide an account of those resources that are can be accessed online, offline or by both means. The details of this modification are discussed in the next section. Second, I simplified the instrument by removing the questions on the type of relationship. Although this change limits my possibilities of observing the strength of the social connections behind social capital, it has a positive trade-off by reducing the time of application of the instrument and simplifying the task of the respondents.

An additional modification was the reduction of the number of items from the original instrument. The aim of this step was also to reduce the time of application while keeping the consistency of the RG-UK in terms of resource domains. As explained in the next sections, I worked on modifying the survey to produce a more compact, yet comprehensive version of the RG-UK which I call the Online Resource Generator (ORG). This new instrument provides two main pieces of information: whether the respondent has access to a given resource and how they access it[1].

4.3.1.1 A Measurement for Online Access

As outlined above, the first step in creating the ORG was introducing a specific question about online ways to access a resource. At this stage, I kept the original number of resources from the RG-UK. By using focus groups, I tested different wordings for the question of online and offline access to resources.

Preliminary versions of the ORG were tested in two consecutive focus groups carried out in 2013 with postgraduate students from the School of Public Policy at University College London. Each group consisted of 12 students, half of them British. They were required to complete the survey using the online tool Opinio. On average, students took 7 minutes (with a standard deviation of less than a minute) to answer the full questionnaire.

Most respondents commented that the online-offline distinctions used in the focus group were confusing. Therefore, the final wording introduced examples of both options. In the case of online, the options referred to email, Twitter and Facebook. Whereas in the offline case, the question asks whether people access the resources "in other ways" and provide examples such as "in person" or "by telephone". A final version of this wording and the items is provided in the next section. For each item, respondents are asked to answer one of the following options:

1. No, I don't know any such person
2. Yes, I know such person and could reach them by the internet

[1]This instrument was submitted jointly with Dr Jennifer vanHeerde-Hudson as a user-generated content for the British Election Study 2015.

3. Yes, I know such a person and could reach them in other ways
4. Yes, I know such a person and could reach them by internet and in other ways

In this way, and unlike the RG-UK, the answer takes only one step instead of two. Each item of the RG-UK effectively involves two steps. First, assessing whether the respondent has access to the resource and, if yes, the type of personal connection behind the resource. The ORG, instead, summarises these two steps into one.

4.3.1.2 Reduction of the Items

The next step consisted of reducing the number of items from 40 to 18. This is not an arbitrary number, but the result of the careful process described below. The last section of the RG-UK (see Appendix A) contained a module on self-assessment asking respondents about their own ability (i.e. whether they own the resource or skill). Although this module might produce interesting information with respect to respondent heterogeneity, it does not help me to assess the individual levels of social capital of respondents. The module is intended as a control for how self-abilities might affect the perception of accessing social capital. I first considered removing this section as the focus groups showed that respondents took 7 minutes to answer the full questionnaire. This was problematic considering that this instrument is designed to be applied into a bigger survey.

I tested whether the self-assessment items could be dropped without affecting responses to the first two item batteries. The position of the question at the end of the RG-UK allows me to think that it should have no effect on the actual answers, but is only useful as a post-hoc control. In order to confirm this, I tested two different versions of the instrument through a survey experiment with students at University College London.

I asked students to answer an online survey where they were randomly assigned to a control or a treatment group. The treatment consisted of the survey without the self-assessment question, while the control group received the full survey. In order to maximise the potential difference between the groups, I moved the self-assessment question to the beginning of the survey. The survey had N= 157 re-

sponses, 69 in the control group and 68 in the treatment group. No other questions were asked.

Using Item Response Theory (IRT), I analysed the results. In particular, I chose Mokken scale analysis (MSA) (Mokken 1971) to estimate the latent scales from the items. This is the same procedure followed by the creators of the RG, and is discussed in detail in the the general results section. With these results, I produced a matrix per dataset with the pairwise correlation coefficients for each pair of items.

In order to compare the results, I used two different empirical strategies. First, as a way of assessing any associations between both matrices, I ran a correlation analysis to observe the level of coincidence among them. The correlation was strong and positive (Pearson's r = 0.8). Furthermore, I performed a two sample t-test to analyse any potential differences in the mean of each column of each matrix. The result was not significant (t = -0.18, p-value = 0.855). This means that the average results of the control group are not significantly different from the treatment group. Substantively this means that the self-assessment module did not produce any effects on the self-perceived access to social resources.

Given these results, I am confident that the excluded third battery does not affect the overall responses between the groups. I therefore initially decided to keep only the first two batteries with a total of 27 items. A further step was taken to reduce and reorganise the items to produce a shorter version of the questionnaire, but keeping the diversity of resources required for the success of the RG.

As a way of ensuring parsimony and to avoid redundancy across the ORG items, I merged some of the items that corresponded to similar social resources. Table 4.2 shows the comparison between the items of the RG-UK and the ORG. As can be observed, some of the RG-UK items were merged into a single item. This procedure was made through a consultation process with the experts of the British Election Study 2015. Throughout the process, I was was conscious of keeping the original diversity of resources from the ORG, while eliminating any redundancy. Some of the questions were reworded, following suggestions from the BES team.

Most of the items were kept in their original form (e.g. "Can speak another

language fluently", "Has good contacts with the local newspaper, radio or t.v." and "Discuss politics with you"), while others were slightly modified to add clarity (e.g. "Has a profession such as a lawyer, teacher or accountant"). In some cases, two or more items could be summarised into a single question. For example, the questions about knowing a reliable tradesman and knowing someone who could fix a car were merged due to the similar nature of the resources. I took the same decision in other cases, such as knowing someone who could give you advice at work and knowing someone who could give careers advice. Both items were merged together in the ORG. Only one question was dropped — "Can get you cheap goods or "bargains" — due to the fact that such a resource could be contained in other items already (e.g. "Do your shopping if you are ill or look after your home or pets if you go away" or "Help you with small jobs around the house (e.g. DIY, gardening, disposing of bulky items").

Table 4.2: Reduction of RG-UK items into ORG items

RG-UK items (Webber 2006)	ORG items
Can repair a broken-down car Is a reliable tradesman (eg plumber, electrician)	Is a reliable tradesman (e.g. plumber, electrician, car-repairman)
Can speak another language fluently	Can speak another language fluently
Knows how to fix problems with computers	Knows how to fix problems with computers
Knows a lot about government regulations	Knows a lot about government regulations
Has good contacts with the local newspaper, radio or t.v.	Has good contacts with the local newspaper radio or TV
Knows a lot about health and fitness	Knows a lot about health and fitness
Works for your local council	Works for your local council
Is a local councillor	Is a local councillor
Can sometimes employ people	Is in a position to hire other people
Has a professional occupation	Has a profession such as a lawyer, teacher or accountant
Give you sound advice on problems at work Give you a careers advice	Give you sound advice on your work (e.g. career, other problems)
Is good at gardening Knows a lot about DIY Help you to move or dispose of bulky items (eg lifting or use a van) Help you with small jobs around the house	Help you with small jobs around the house (e.g. DIY, gardening, disposing of bulky items)
Do your shopping if you are ill Look after your home or pets if you go away	Do your shopping if you are ill or look after your home or pets if you go away
Lend you a small amount of money (eg for a local taxi fare) Lend you a large amount of money (eg for a deposit on a at or house	Lend you money (e.g. to pay a month's rent/mortgage)
Discuss politics with you	Discuss politics with you
Give you sound advice about money problems Give you legal advice	Give you sound advice on legal or money matters
Give you a good reference for a job	Give you a good reference for a job
Help you to and somewhere to live if you had to move home	Help you to find somewhere to live if you had to move home
Get you cheap goods or "bargains"	*DROPPED*

Following this process, the questionnaire was complete with 18 questions: the response options as described above. The final questionnaire reads as follows:

> The following questions are about people you know yourself. These people might be family members, friends or acquaintances, but not people you may only have heard of, or do not know personally. The questions will ask if you currently know someone with a particular skill or occupation and how you would be able to reach that person.
>
> Do you personally know anyone who knows a lot about the following things and who you could reach on short notice, say within a week? And how would you reach that person, via the internet (such as email, Twitter, Facebook) or in other ways (such as in person or over the phone)? Please answer all these questions, even if you would not need to get someone to do these kinds of things for you.
>
> Do you personally know someone who...?
>
> 1. Is a reliable tradesman (e.g. plumber, electrician, car-repairman)
> 2. Can speak another language fluently
> 3. Knows how to fix problems with computers
> 4. Knows a lot about government regulations
> 5. Has good contacts with the local newspaper radio or TV
> 6. Knows a lot about health and fitness
>
> Do you personally know anyone with the following occupations that you could reach on short notice, say within a week?And how would you reach that person, via the internet or in any other way?
>
> Do you personally know someone who...?
>
> 1. Works for your local council
> 2. Is a local councillor
> 3. Is in a position to hire other people
> 4. Has a profession such as a lawyer, teacher or accountant
>
> If you need help on short notice in the following areas, would you personally know someone who would be able to help you out within one week? And how would you reach that person, via the internet or in any other way? Please answer all these questions, even if you have never needed to ask for help in these areas.
>
> Do you personally know someone who would...?

1. Give you sound advice on your work (e.g. career, other problems)
2. Help you with small jobs around the house (e.g. DIY, gardening, disposing of bulky items)
3. Do your shopping if you are ill or look after your home or pets if you go away
4. Lend you money (e.g. to pay a month's rent/mortgage)
5. Discuss politics with you
6. Give you sound advice on legal or money matters
7. Give you a good reference for a job
8. help you to find somewhere to live if you had to move home

4.3.2 Application of the ORG in the British Election Study 2015 (BESIP 2015)

The final questionnaire was submitted as user-generated content for the British Election Study Internet Panel 2014-2017 (Fieldhouse, J. Green, et al. 2015). The module was applied during the third wave of the BESIP between September and October 2014. This section of the survey was applied to English speaking respondents only. Table 4.3 provides an overview of the descriptive statistics of the ORG respondents.

Table 4.3: Descriptive statistics - ORG respondents ($N = 7,039$). Numbers might not add up to 100% due to rounding.

Variable	%	Variable	%
Sex		**Ethnicity**	
Male	49.5	White British	88.5
Female	50.5	Any other white background	3.1
Age at end of education		White and Black Caribbean	0.2
15 or under	10.5	White and Black African	0.2
16	23.5	White and Asian	0.4
17-18	21.4	Any other mixed background	0.4
19	5.4	Indian	1.6
20 or more	31.1	Pakistani	0.6
Still at school/Full time student	7	Bangladeshi	0.7
Can't remember	1.1	Any other Asian background	0.5
Marital status		Black Caribbean	1.3
Married	54.8	Black African	0.9
Other	45.2	Any other black background	0.03
Household Income		Chinese	0.4
under £20,000	23.6	Other ethnic group	0.5
£20,000 to £29,999	16.7	Prefer not to say	0.9
£30,000 to £39,999	13.2		
£40,000 to £49,999	8.1		
£50,000 to £59,999	5.3		
£60,000 to £69,999	3.7		
£70,000 to £99,999	3.3		
£100,000 to £149,999	1.4		
£150,000 or over	0.6		
Prefer not to answer	16.7		
Don't know	7.2		

The proportion of female respondents was 50.5%, with an average age of 51 years old. Up to 91% of the sample is comprised of white people, while the other 7% is distributed across other ethnic groups, black people being the largest (1.6%). In terms of religious affiliation, 40% identify themselves as Anglicans, 20% declare no religious affiliation, 11% are Roman Catholics, 4% declare other Christian denominations, and 1.3% identify themselves as Muslim.

With regard to the ORG items, the details can be seen in Table 4.4. In general, as expected, items have different distributions. Most respondents have access to some of the resources, such as knowing someone who can fix a computer (82% of

the respondents) or finding someone who can provide some advice on work related issues (84% of the respondents). In contrast, there are other resources that proved to be more scarce across the sample, such as knowing a local councillor (30% positive answers) or having contacts with the media (23%).

Table 4.4: Online Resource Generator descriptive statistics

Variable	**Levels**	%	∑%
Reliable Tradesman	No	27.6	27.6
	Yes, internet	7.1	34.7
	Yes, other ways	36.9	71.6
	Yes, both	20.8	92.4
	Don't know	7.6	100.0
	All	100.0	
Fluent Speaker	No	38.2	38.2
	Yes, internet	10.8	49.0
	Yes, other ways	18.2	67.2
	Yes, both	24.1	91.3
	Don't know	8.7	100.0
	All	100.0	
Fix a Computer	No	17.6	17.6
	Yes, internet	12.4	30.0
	Yes, other ways	26.0	56.0
	Yes, both	38.0	94.0
	Don't know	6.0	100.0
	All	100.0	
Government Regulations	No	52.8	52.8
	Yes, internet	8.8	61.6
	Yes, other ways	11.0	72.5
	Yes, both	12.8	85.3
	Don't know	14.7	100.0
	All	100.0	
Media contacts	No	65.2	65.2
	Yes, internet	7.4	72.6
	Yes, other ways	7.0	79.6
	Yes, both	8.8	88.4
	Don't know	11.6	100.0
	All	100.0	
Health advice	No	35.0	35.0
	Yes, internet	12.2	47.2
	Yes, other ways	20.8	68.0
	Yes, both	23.3	91.3
	Don't know	8.7	100.0
	All	100.0	
Works for a local council	No	54.8	54.8

	Yes, internet	8.1	62.9	
	Yes, other ways	13.5	76.3	
	Yes, both	15.0	91.3	
	Don't know	8.7	100.0	
	All	100.0		
Knows a local councillor	No	61.1	61.1	
	Yes, internet	7.6	68.7	
	Yes, other ways	11.9	80.7	
	Yes, both	10.5	91.2	
	Don't know	8.8	100.0	
	All	100.0		
Knows an employer	No	48.4	48.4	
	Yes, internet	7.9	56.4	
	Yes, other ways	13.6	69.9	
	Yes, both	20.8	90.7	
	Don't know	9.3	100.0	
	All	100.0		
Is a Professional	No	26.3	26.3	
	Yes, internet	9.1	35.4	
	Yes, other ways	20.7	56.0	
	Yes, both	37.5	93.5	
	Don't know	6.5	100.0	
	All	100.0		
Work Advice	No	38.9	38.9	
	Yes, internet	7.9	46.8	
	Yes, other ways	15.8	62.6	
	Yes, both	26.4	89.0	
	Don't know	11.0	100.0	
	All	100.0		
Help with Small Jobs	No	24.4	24.4	
	Yes, internet	7.1	31.5	
	Yes, other ways	29.9	61.3	
	Yes, both	32.0	93.3	
	Don't know	6.7	100.0	
	All	100.0		
Shopping Help	No	21.4	21.4	
	Yes, internet	5.8	27.2	
	Yes, other ways	30.2	57.4	
	Yes, both	35.4	92.8	
	Don't know	7.2	100.0	
	All	100.0		
Small Loan	No	1440	36.8	36.8
	Yes, internet	150	3.8	40.6
	Yes, other ways	856	21.9	62.5
	Yes, both	1094	27.9	90.4

	Don't know	376	9.6	100.0
	All	3916	100.0	
Discuss Politics	No	27.0	27.0	
	Yes, internet	6.6	33.5	
	Yes, other ways	24.0	57.5	
	Yes, both	33.7	91.2	
	Don't know	8.8	100.0	
	All	100.0		
Legal Advice	No	40.3	40.3	
	Yes, internet	6.0	46.3	
	Yes, other ways	18.7	65.0	
	Yes, both	24.9	89.9	
	Don't know	10.1	100.0	
	All	100.0		
Job Reference	No	16.4	16.4	
	Yes, internet	7.7	24.1	
	Yes, other ways	23.9	48.0	
	Yes, both	42.8	90.8	
	Don't know	9.2	100.0	
	All	100.0		
Help moving home	No	36.1	36.1	
	Yes, internet	5.4	41.5	
	Yes, other ways	17.3	58.9	
	Yes, both	29.2	88.1	
	Don't know	11.9	100.0	
	All	100.0		

As Figure 4.1 shows, the distribution of positive responses is also varied. Whereas in most resources the combined option concentrates on the largest majority among the positive responses, there are some notable exceptions. Knowing a reliable tradesman tends to be a more common option offline than online. On the other hand, knowing someone with good contacts in the media seems to happen more often online. These differences are relevant as they show that the instrument is measuring diverse resources accurately.

This distribution of resources is something that other measures cannot account for. While the Position Generator claims to focus on social resources, it uses occupational prestige and hierarchical position as a proxy instead of measuring them. The ORG, as part of the family or Resource Generators, uses the resources to observe social capital directly. Also, the ORG can include into a single measurement

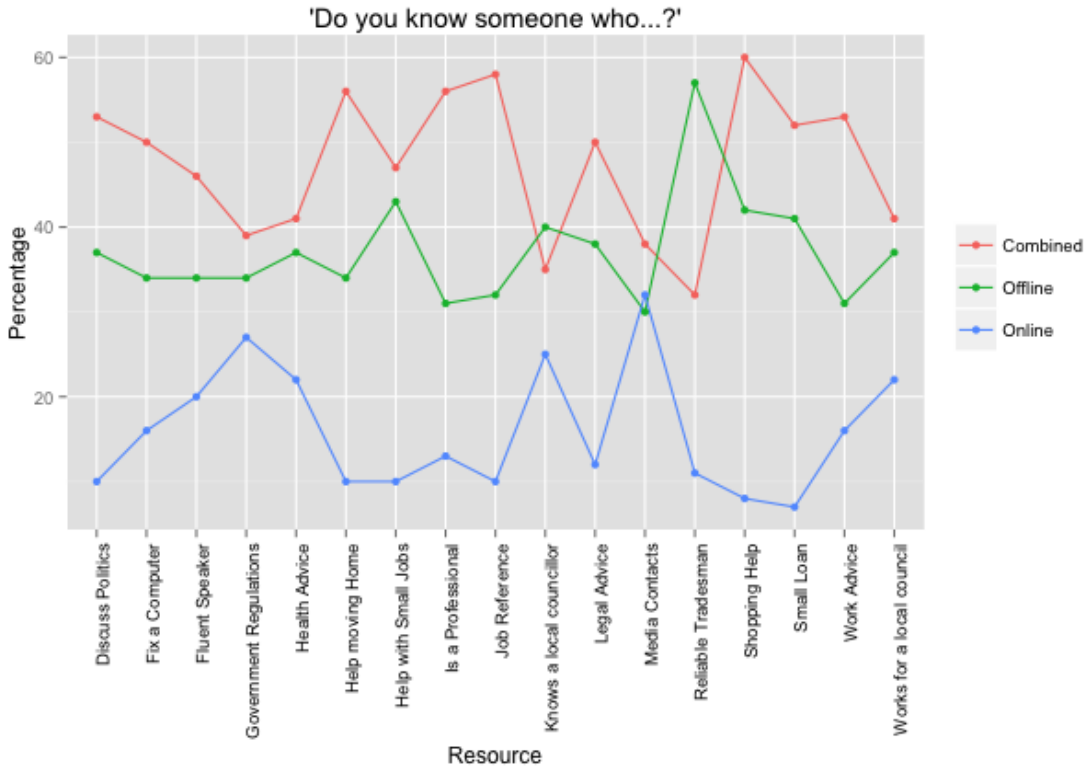

Figure 4.1: Positive responses to ORG

the diversity of resources in terms of the positive responses, the share of people who accessed them online, and the actual nature of the items. These are all advantages of this design approach.

4.3.3 Modelling the Relationship Between Social Capital and Online Access to Resources

The hypotheses of this chapter specify that the way in which people access social resources is linked to their overall levels of social capital. I am also interested in analysing the presence of one or more latent dimensions of social capital, and their relationship with technology.

I use an OLS regression to estimate the relationship between online access and social capital. This model is expressed as follows:

$$SC_i = \beta_0 + \beta_1 Online_i + \beta_2 Combined_i + \beta_3 Extraversion_i + \beta_4 Sex_i + \beta_5 Age_i + \beta_6 BME_i + \beta_7 NS-SEC_i + \beta_8 MaritalStatus_i + \beta_9 HHSize_i + \beta_{10} SocialMedia_i + e_i \quad (4.1)$$

where SC_i represents each one of the different dimensions of social capital, depending on latent analysis strategy used[2]. The *Online* variable is constructed as a proportion of the resources that are accessed only through online platforms (a full explanation of this process and its advantages and disadvantages is below). The *Combined* variable uses the same method, but the proportion refers to the responses of "Yes, I know such a person and could reach them by internet and in other ways" in relaiton to the total affirmative answers. These two variables actually measure different behavioural traits, which is confirmed by a simple correlation analysis showing a moderate negative association (Pearson R -0.35). The *Extraversion* variable is the result of the analysis of the big 5 personality traits carried out by the BES team. According to psychological research, people who are more extroverted are open to new experiences, a breadth of activities and meeting new people. Meeting new people can be related to an increase in the ability of forming social capital. *Gender* is coded 1 if the respondent is a female and 0 if the respondent is male, while the *Age* is the self-reported age of the respondents. I have also added the occupation analytical scale from the Office of National Statistics as a proxy for socio-economic status. The scale goes from 1 for high level and high paying occupations, to 8 for unemployed people. The *SocialMedia* variable is a measure of the use of Twitter and Facebook that the BES team included in the preliminary release of the fourth wave (March 2014). Other control variables include marital status (categorical variable coded as 1 for married respondents and 0 otherwise), household size and a binary indicator of whether the respondents self-identify as black or minority ethnic.

The function of this model is twofold. On the one hand, it aims to assess the

[2]As discussed below, both Exploratory Factor Analysis and Item Response Theory start by estimating how many different latent dimensions can be found in the data. This is why the number is ledt undetermined at this stage.

relationship between online and combined access to resources with overall levels of social capital. This is particularly important in order to test the main hypotheses. The second purpose is to control for those things that are usually associated with higher levels of social capital, such as demographic and psychological variables. This step is important, as it provides further validity to the instrument.

Moving on to the differences between social capital online or offline, I devised a similar empirical approach. As described below, I developed three different latent variables measuring the levels of social capital based on the different response options. Thus, I estimated the latent trait behind all the answers where respondents declared having access to the resources through online means. The same is done for those answers where respondents declared they access the resources in both ways. The empirical strategy uses the different control variables from model 4.1 to estimate how the different forms of social capital differ from each other. I also added a reference on the religion of the respondents as previous research (R. Putnam and D. Campbell 2012; Smidt 2003) shows how important certain religious behaviours in the formation of social capital are. The models can be expressed as follows:

$$\begin{aligned} OnlineSC_i = \beta_0 + \beta_1 Extraversion_i + \beta_2 Sex_i + \beta_3 Age_i + \beta_4 BME_i + \\ \beta_5 NS-SEC_i + \beta_6 MaritalStatus_i + \beta_7 HHSize_i + \beta 8 Religion_i + \\ \beta_9 SocialMedia_i + e_i \end{aligned} \tag{4.2}$$

$$\begin{aligned} CombinedSC_i = \beta_0 + \beta_1 Extraversion_i + \beta_2 Sex_i + \beta_3 Age_i + \beta_4 BME_i + \\ \beta_5 NS-SEC_i + \beta_6 MaritalStatus_i + \beta_7 HHSize_i + \beta 8 Religion_i + \\ \beta_9 SocialMedia_i + e_i \end{aligned} \tag{4.3}$$

where $OnlineSC_i$, and $Combined_i$ refer to the different latent variables.

These different approaches will allow me to analyse the way in which respondents maintain social relationships that are able to mobilise resources can be linked to their overall levels of social capital. Whether someone focuses mainly on using

technology to access social resources or if they combine different means has differential impacts on the levels of social capital. The ORG provides a first opportunity for getting this information.

4.3.4 Construction of the Model Variables

4.3.4.1 Dependent Variable: Social capital

The original RG was analysed using Mokken Scale Analysis (MSA), a form of Item Response Theory. This method allows the identification of the latent scales from the items. For every pair of items, MSA calculates an item-pair scalability coefficient H_{ij}. Items belonging to the same scale should have an item scalability coefficient greater than 0.3 (as a rule of thumb). One of the features with this approach is that each item can load only into a single scale. This method requires a large and varied number of items to work. Otherwise, the scaling process will produce small groups, and leave some of the items outside of the analysis.

Therefore, I decided to test different approaches to construct the dependent variable(s). There are two main reasons to justify this decision. First, the number of items is below the suggested threshold for using MSA (20 items, according to van der Gaag and Snijders). Second, as it was also suggested by the creators of the RG (Van Der Gaag and Snijders 2005), different populations might result in different dimensions of social capital.

I decided to use two approaches: Exploratory Factor Analysis (EFA) and Bayesian Item Response Theory (IRT). The first option is widely used to identify latent dimensions behind survey data, while IRT has been used to scale policy and ideological positions behind legislative voting, judges positions, and different forms of political text (Poole 2005; Jackman 2001; L. W. Martin and Vanberg 2008; Jeong 2008; A. D. Martin and Quinn 2002; Leimgruber, Hangartner, and Leemann 2010).

Apart from the reasons outlined above, there is another element to take into consideration, which is the risk of overdimensionalisation by using EFA(Jolliffe 2014; Costello and Osborne 2011; Zwick and Velicer 1986; Fabrigar et al. 1999; Russell 2002), that is, that the statistical process identifies more latent traits behind the data of the ones that actually are. Extracting the position on alleged latent

traits is a complex task since it might be the object of statistical constructions or confirmation bias. Therefore, I explored different alternatives and chose the most conservative option.

Exploratory Factor Analysis

My first choice for the creation of the scales is a variant of exploratory factor analysis (EFA), using a polychoric (specifically tetrachoric) correlations matrix (Olsson 1979). The advantage of this technique is that allows for the creation of theoretically latent continuous variables, using binary or ordinal observed variables. Traditional factor analysis, instead, requires all variables to be continuous. The factors created by this process were obtained using a varimax rotation of the matrix. Factor analysis had two advantages for the ORG. First, every item has a loading into different factors and this does not restrict them from belonging to a single dimension. This is more sensitive to the nature of social connections, where sometimes the same person can provide access to more than one resource. Second, I used an exploratory approach and did not decide a-piori, what number of factors should be created.

Table 4.5: Factor loadings of the ORG items (blanks represent abs(loading)<.3)

Item	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Uniqueness**
Reliable Tradesman				0.5844		0.5720
Fluent Speaker another language	0.6145					0.5305
Fix a Computer	0.3092			0.3676		0.6553
Government regulations	0.3993		0.3401		0.4785	0.4264
Media contacts	0.4158		0.5411		0.3970	0.4184
Health Advice	0.4620					0.5405
works for a local council			0.7883			0.3022
Is a local councillor			0.8106			0.2716
Knows an employer	0.5507	0.3083				0.5509
Has a profession	0.6805					0.3837
Work Advice	0.5212	0.5110				0.3203
Small Jobs		0.4919		0.6220		0.3204
Shopping Help		0.6533		0.4467		0.3125
Small Loan		0.7573				0.3385
Discuss Politics	0.4953	0.4025				0.4097
Legal Advice	0.3871	0.4717			0.3840	0.3517
Job Reference	0.5619	0.5377				0.3397
Help Moving Home		0.6698				0.3725

Table 4.5 shows the results of the factor analysis. The exploratory approach derived nine different factors, but after factor number five, no item had an absolute loading above the 0.3 level, which is a conventional sign for relevant loadings. The table contains only the loadings above an absolute number of 0.3, and interestingly, none of the items has a negative loading into the factors. This is consistent with what we should expect with regards to how social capital operates. Each resource measured by the ORG loads positively into the factors, as they theoretically imply that the respondent has a higher level of social capital when answering any of the "yes" options. It is important to note that, at this stage, the factors were calculated using a binary approach, where 0 means a negative answer, and 1 reflects a positive answer regardless of the form of access. The online/offline distinction is used to create the main independent variable.

To decide the right number of factors, I used the K1 approach (Kaiser 1960). This method specifies that only factors with an eigenvalue above 1 should be included in the analysis. The logic of this approach, according to Kaiser, is that an eigenvalue of 1 or above can account for the relevant amount of variance. Thus, in my analysis using EFA I only include include factors with an eigenvalue above 1. Figure 4.2 shows a *screeplot* with the eigenvalue per each of the first 5 factors calculated after the varimax rotation. Although the graphical representation might suggest that only the first factor is relevant given the large difference between it and the next factor, this contradicts the K1 results, since the first three have an eigenvalue above 1. According to this, I decided to use the first three factors shown in Table 4.5

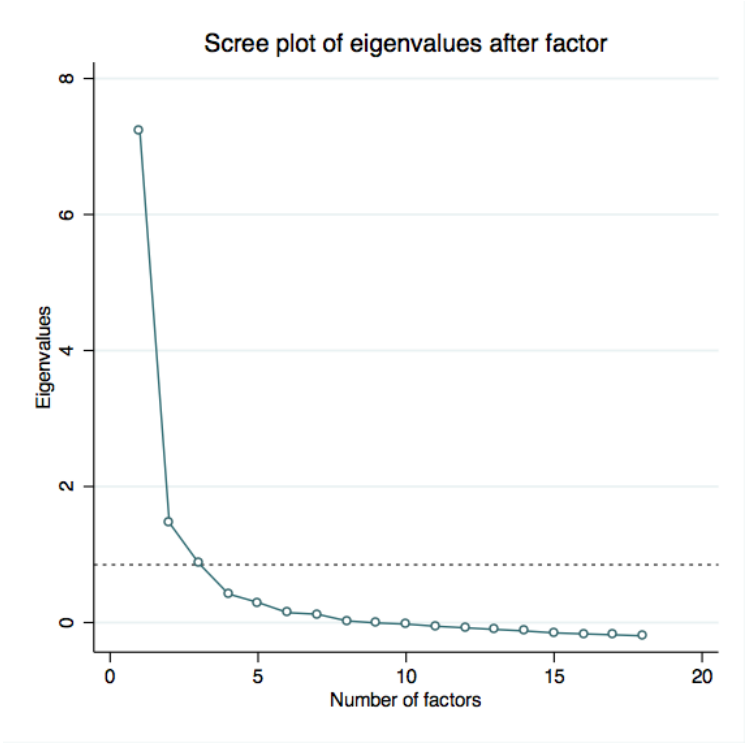

Figure 4.2: Screeplot of the factors
(Dotted line at eigenvalue = 1)

Figure 4.3 shows a correlogram of the three main factors. None of them show a high level of correlation to each other, which provides evidence that each one of the factors is relatively independent of the other. From a theoretical point of view, this means that they might be able to represent different dimensions of social capital.

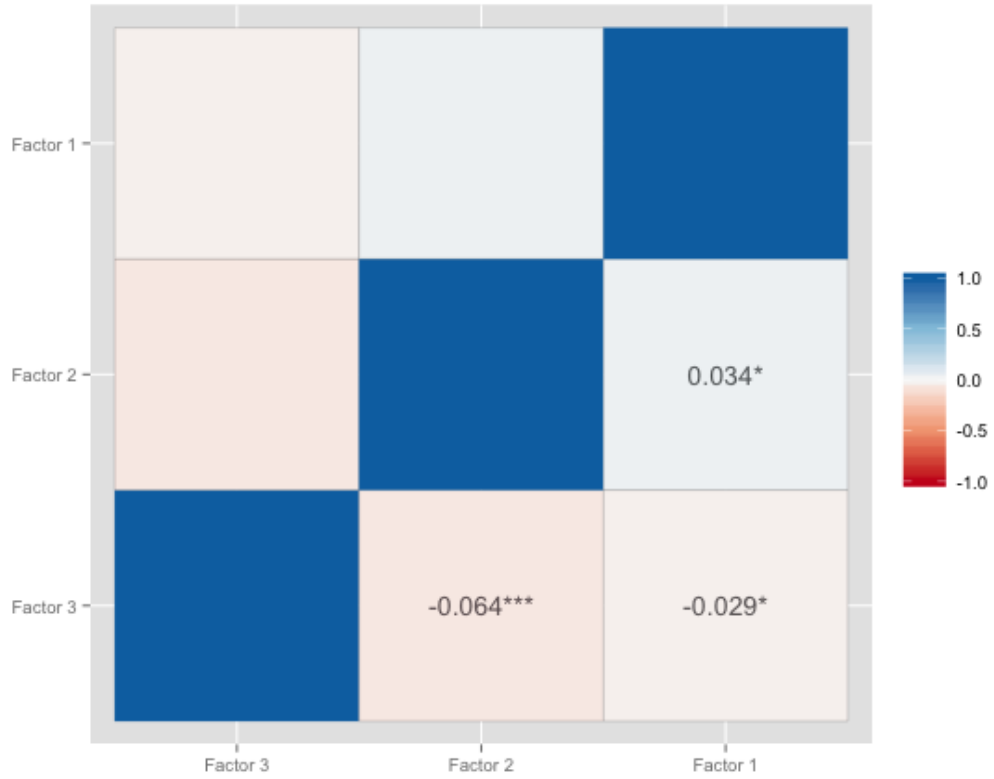

Figure 4.3: Correlogram of the factors using Pearson's R

Van der Gagg and Snijders identified four different dimensions from the original RG: education and prestige, political and financial skills, personal skills, and personal support. Compared with these dimensions, my results show a similar pattern. The data create 3 different dimensions of social capital, and two of them can be related to Van der Gagg and Snijder's dimensions, in particular one on personal support and political skills. Table 4.6 summarises the dimensions corresponding to the factors found in the BES data. In each factor, I only include the items with a loading of above 0.3.

Table 4.6: Dimensions of social capital

Social Capital Dimension	**Resources (knowing someone who...)**
i. General	1. A fluent speaker in another language 2. Can fix a computer 3. Knows about government regulations 4. Has contacts with the media 5. Can give health advice 6. Knows an employer 7. Has a profession 8. Can give work advice 9. With whom they discuss politics 10. Can provide legal advice 11. Can give a job reference
ii. Personal Support	1. Can hire people 2. Can give work advice 3. Can help with small jobs around the house 4. Can do shopping for you when you are ill 5. Can give you a small loan 6. With whom they discuss politics 7. Can provide legal advice 8. Can give a job reference 9. Allows you to stay at their place when moving homes
iii. Political/local	1. Knows about government regulations 2. Works for a local council 3. Has contacts with the media 4. Is a local councillor

The first factor can be labelled as a "General Social Capital" dimension, since it encompasses a large array of resources from a variety of types. This group includes 11 of the different items and is the one with the largest variety of resources, such as fixing a computer, having a profession, or providing a job reference. These different represent different types of resources, including technical skills, career related skills, and personal support. I have labelled the second dimension as "Personal support social capital", as it uniquely encompasses resources such as getting a job reference and offering to stay at home when moving houses. Factor 3 was labeled "Political/local social capital" given the nature of the resources included in it ("Knowing about government regulations", "Works for a local council", "Has contacts with the media", and "Is a local councillor").

The descriptive statistics for each of the dimensions can be found in Table 4.7, and they show that the distribution varies across respondents. While the General and the Personal Support dimensions have a higher average, respondents seem to

be, on average, on a lower position on the Political/Local scale within the sample. The combination of a low average in the political/local dimension and a low eigenvalue when estimating the number of factors cast doubts about the robustness of this particular scale. However, there are two items that only load in this factor ("Works for a local council", and "Is a local councillor") which makes a strong case for keeping it in for further analysis.

Table 4.7: Descriptive statistics for the social capital dimensions

Variable	n	Min	$\bar{x}$	$\tilde{x}$	Max	SD
General	7,039	-0.476	0.520	0.582	1.314	0.344
Personal support	7,039	-0.382	0.493	0.566	1.292	0.362
Political/Local	7,039	-0.324	0.169	-0.025	1.069	0.396

As explained before, the use of exploratory factor analysis can be contested, mainly due to the risk of overestimating the number of dimensions. This is a consistent threat to the validity of factor analysis, and recent research (Eijk and Rose 2014) has shown how different techniques identify the correct number of dimensions. As discussed before, one of the alternatives to factor analysis that has gained popularity within political science research is Item Response Theory, which is the approach I explore in the next section.

Item Response Theory

Van der Eijk and Rose (2014) show that exploratory factor analysis can fail to account for the right number of latent dimensions behind several items. They test different detection strategies on a large array of simulated datasets. In summary, they construct 2,400 simulated datasets with only one latent dimension behind all the variables. Then, they perform several EFA analyses, and each one of them, regardless of the identification strategy, produced more than a single dimension. As an alternative, they argue in favour of the use of Item Response Theory as a more reliable estimation procedure.

IRT has its origin in the psychometrics of educational testing. The main objective is to determine the latent ability parameter for each respondent, θ_i, based on their observed test answers. Unlike factor analysis, IRT can also calculate a difficulty parameter per question j, α_j, and a discrimination parameter for each

question as well, β_j. In this case, the difficulty parameter relates to the notion that not every resource has the same inherent probability of being accessed. Discrimination, on the other hand, refers to the heterogeneity across the respondents which affects the estimation of the positions. IRT has been widely used in political science, mainly to estimate ideal positions on ideological scales (e.g. Jackman 2001; Clinton, Jackman, and Rivers 2004; Treier and Hillygus 2009; Fiorina and Abrams 2008). Usually, this is done counting the different votes from representatives or political parties, and estimating the latent traits behind them. A similar method can be used when analysing the answers from the ORG.

In summary, the probability of a respondent answering a question Y_{ij} positively (in this case, as having access to a given resource) can be expressed as a logistic function of the ability parameter (θ_i), the item difficulty (α_j), and the item discrimination parameter (β_k):

$$Pr(Y_{ij} = 1) = \frac{exp(\beta_j \theta_i - \alpha_j)}{1 + exp(\beta_j \theta_i - \alpha_j)} \tag{4.4}$$

Now, this approach can be used with different number of latent dimensions, similar to what can be done with confirmatory factor analysis. Hence, I need a first step to estimate the number of dimensions behind the data that is different to EFA. In order to determine it, I used the Mokken Scales Analysis (MSA) technique MSA calculates the pairwise correlation between the items and assigns a value H_{ij} to each item within a scale. All items with a H_{ij} above .3 are conventionally included into the same dimension. As Table 4.8 shows, all the items in the ORG fall within the same scale. As Van der Eijk and Rose suggested, it seems that the EFA procedure is overestimating the number of dimensions behind the ORG items.

As explained above, each item has a difficulty parameter α and a discrimination parameter β. The former specifies how difficult it is for respondents to give a positive answer to that item, whereas the latter provides an indication of how relevant is the item for a higher position in the social capital scales.

Table 4.9 shows the different parameters for the general, online, and combined social capital scale. The results show that for the general scale, having access to

Table 4.8: Mokken Scale Analysis with IRT items

Resource	Scale	H coefficient
Job Reference	Scale 1	0.67
Work Advice	Scale 1	0.67
Media Contact	Scale 1	0.54
Professional advice	Scale 1	0.51
Legal Advice	Scale 1	0.49
Discuss Politics	Scale 1	0.48
Government Regulations	Scale 1	0.48
New Home	Scale 1	0.46
Health Advice	Scale 1	0.44
Fix Computer	Scale 1	0.43
Employer	Scale 1	0.42
Shopping Help	Scale 1	0.41
Small Jobs	Scale 1	0.4
Small Loan	Scale 1	0.4
Fluent Speaker	Scale 1	0.39
Council Worker	Scale 1	0.37
Councillor	Scale 1	0.36
Reliable Tradesman	Scale 1	0.34

someone who can give you advice on your work seems more determinant for having a higher level of social capital, and knowing a reliable tradesman seems the less relevant item (and also one of the items with the lower difficulty of the scale).

Conversely, the online scale shows less variance with regards to its discrimination parameters, with knowing someone to discuss politics as the resource with the higher value. Knowing someone who can do your shopping if you are ill or look after your home or pets if you go away has the same discrimination score as knowing someone to discuss politics with. Also, this is the most difficult item for the online scale. The less relevant item for the online scale in terms of discrimination is knowing someone who is a fluent speaker in another language, which is also the item with the lower α.

In the case of the combined scale, just like the online scale, knowing someone with whom you can discuss politics appears as the more relevant item. However, it is not the most difficult item. The one with the higher α in the combined scale is knowing someone with contacts in the media.

Given that IRT only identified a single dimension, the next step was to estimate

Table 4.9: Difficulty (α) and discrimination (β) parameters per item

Item	β General	α General	β Online	α Online	β Combined	α Combined
Councillor	0.45	0.29	0.26	1.59	0.66	1.24
Council Worker	0.55	0.19	0.33	1.84	0.75	1.11
Discuss Politics	0.95	-1.05	0.61	2.64	1.67	0.46
Employer	0.76	0.02	0.38	2.03	1.11	1.06
Fix Computer	0.54	-1.14	0.29	1.38	0.90	0.24
Fluent Speaker	0.63	-0.46	0.24	1.35	0.89	0.62
Government Regulations	0.89	0.28	0.27	1.60	0.95	1.28
Health Advice	0.77	-0.37	0.38	1.73	1.07	0.96
Job Reference	0.99	-1.28	0.43	2.05	1.66	0.19
Legal Advice	1.15	-0.33	0.47	2.29	1.53	1.00
Media Contact	0.80	0.74	0.25	1.78	0.88	1.59
New Home	0.98	-0.22	0.55	2.79	1.44	0.86
Professional Advice	0.89	-1.05	0.50	2.11	1.44	0.28
Reliable Tradesman	0.39	-0.69	0.25	1.72	0.62	0.84
Shopping Help	0.76	-0.97	0.61	2.92	1.66	0.69
Small Jobs	0.75	-0.85	0.48	2.32	1.46	0.77
Small Loan	0.77	-0.18	0.46	2.72	1.40	1.00
Work Advice	1.19	-0.24	0.46	2.26	1.55	1.03

the individual level of social capital per respondent. Following the IRT approach, we can estimate an ideal position for each member of the sample, given their responses to the ORG. The ideal position of each respondent is calculated using a Bayesian approach, in particular Monte Carlo Markov Chain (MCMC) techniques for spatial modelling (Poole 2005). In that way, each respondent is positioned in a standardised continuous scale. The uncertainty for each position is estimated using the posterior distribution from the Bayesian analysis.

In particular, I first estimated a general social capital scale assigning a positive response to any respondent who answered that they had access to a given resource, regardless of the platform. Furthermore, I estimated different ideal positions for those questions where respondents declared that they accessed each resource online only, one for offline only, and then another for those where respondents declared that they accessed the resources both online and offline. This step is required in order to create the dependent variables for models 4.2 - 4.3. Moreover, the online scale provides a good indicator for chapter 6, where I use it as the key independent variable when modelling different alternatives for predicting turnout.

Table 4.10 shows the summary descriptive statistics of the three scales (general, online, and combined) broken down by sex.

After analysing the outcome of the MSA procedure, I decided to use IRT in-

Table 4.10: Descriptive statistics of social capital using IRT

Variable	n	$\bar{x}$	SD	$\widetilde{x}$	Min	Max	$\bar{x}$ Male	$\bar{x}$ Female
Social Capital	7,039	0	1	0.008	−2.712	2.023	−0.03	0.03
Online Only	7,039	0	1	−0.528	−0.949	4.544	0	0
Offline Only	7,039	0	1	−0.018	−1.370	3.195	0.01	−0.01
Combined	7,039	0	1	0.057	−1.423	2.646	−0.04	0.04

stead of EFA to estimate the latent dimensions and the individual ideal points per respondent. In addition to avoiding an overestimation of the number of dimensions, this approach includes item-specific parameters. In the case of the ORG, it is consistent to assume that different resources will have different levels of difficulty and discrimination across respondents. Some of them might be more likely to take place across the majority of respondents, such as knowing someone who can fix a computer or that can help you with small jobs around the house. Other resources, such as knowing a local councillor or having good relations with the media, might be more difficult and also have different identification parameters. I argue that accounting for these particular features of the items at the moment of estimating individual positions on the latent traits is a more sensible approach than the results provided by EFA.

4.3.4.2 Main Independent Variables: *Online*, and *Combined* scales

The way in which I operationalise the online or combined distinction is based on continuous proportions ranging from 0-1. It is a construction based on the notion that someone has a higher score on the online scale if the overall proportion of resources they access through online ways is higher than any of the other two affirmative options (i.e. "Yes, other ways" and "Yes, either online or other ways"). The same applies in the case of the other scale. Namely, a higher score in the combined scale means that the respondent accesses a high proportion of the resources through "either online or other ways" in comparison to the rest of the response categories.

$$Online = \frac{Number\ of\ \text{“}yes,\ online\text{”}\ answers}{total\ number\ of\ yes\ answers} \tag{4.5}$$

$$Combined = \frac{Number\ of\ \text{“}yes,\ either\text{”}\ answers}{total\ number\ of\ yes\ answers} \tag{4.6}$$

The distribution of each of the variables is different, with the “combined” category concentrating the highest average value. In other terms, it means that most people access their social resources through either online or offline means, without specifying exclusivity of each of those options (see Table 4.11).

Table 4.11: Descriptive statistics of the access scales

Variable	Min	$\bar{x}$	$\widetilde{x}$	Max	sd
Online	0	0.145	0.000	1	0.227
Combined	0	0.449	0.441	1	0.368

With these two key independent variables I specify the general model shown above. The idea is to establish a comparison of the individual effect of each of these scales. In that way, the interpretation explains that among the social resources that respondents can access, having a higher proportion of online or combined forms of access has a different effect on the level of social capital.

As can be observed by now, the information used to create the dependent variables and these two independent variables comes from the same source: the ORG items. At a theoretical level, this battery conflates the ways of accessing social resources to the access itself. This translates into an implementation problem. This variable does not provide a full picture of the respondents' use of ICTs, rather it measures the use of technology that is mainly related to social capital, which is in itself an endogenous indicator.

The first issue lies in the theoretical endogeneity between social capital and the forms in which we access social resources. One could argue that any potential association between the online scale and social capital levels is a reverse one: that is, higher levels of social capital allow people to access resources with more liberty, without the constraints of choosing a single way to do it. This is a puzzling issue since the sole definition of social capital contains this potential endogeneity, i.e. the presence of social networks can provide access to social resources, while more resources can, in fact, lead to the formaiton of more social networks. Separating

cause and effect in this case might not be plausible. Also, adding time variation to the data, (ie. running these questions at a future wave of the BES) might not be helpful, as social capital tends to be a rather stable trait, and we might not see enough variation in such a short period of time. Access to resources like discussing politics or knowing someone in the media, although might be incorporated in a short time, belong to long trend processes. Therefore, this particular level of endogeneity needs to be accepted as an integral part of the definition.

I have tried two different strategies to accomplish a temporary solution to this problem. First, I rely on the different forms of estimating the dependent and main independent variables as a basic, yet incomplete, way of separating potential cause and effect. Second, as shown in section 4.3.4.1, I have estimated different latent variables based on the responses claiming access to social resources solely via online platforms, or combining both. This approach conflates both the form of access with the presence of social capital into a single indicator which in turn can be used as key independent variables in chapter 6.

More importantly, I have tried to account for the use of ICTs using two items that ask about the use of social media. In particular, I use two questions asking respondents whether they use Twitter or Facebook that have been included in the preliminary dataset from the fourth wave of the BES (March 2015).

4.3.4.3 Control Variables

Extraversion scale

The "Big Five" traits are the result of a large line of research on personality (Galton 1949; Altus 1952), and are believed to encompass the broad psychological traits behind human behaviour. One of the traits, extraversion, is directly related to the creation of social interactions and willingness to meet new people. The Big Five are, in part, dependent on genetical configuration, life experience and other biological phenomena. As such, they are highly stable over time. Thus, I decided to use the extraversion scale as one of the control variables for my models.

The BESIP 2015 contains a measurement of the big five personality traits. The instrument to calculate the individual score is the Ten Item Personality Measure

(TIPI) developed by Gosling et al (2003). This is a ten-questions battery which asks respondents to show their level of agreement with different ways of perceiving themselves. Following a simple form of analysis, a score from 0 to 10 can be created for each respondent on each of the big five scales.

Sex

Sex is the traditional measure in which respondents are asked for a binary response: whether they consider their sex to be male or female. Unfortunately, the BES does not contain other non-binary metrics to account for different sexual orientations or gender definitions. This is important since we would expect sexual minorities to have different levels of access to diverse social connections, especially considering any discrimination patterns (DiFulvio 2011). A good example is transexual people that cannot be distinguished using the BESIP binary measure. However, there are still grounds to believe that masculinity and femininity might play a role in the presence of social capital (R. Campbell 2013), and this can be proxied by this variable.

The relevance of this variable refers to traditional notions of how social can be distributed differently across different gender divides (for a good review of the relevant literature, see O'Neill and Gidengil 2013). In particular, there is evidence (News 2014) to suggest that women might be more likely to suffer abuse or trolling online. Hence, that might have an effect on their ability to connect with others if they spend more time online than combining online and offline access to social capital.

Age

Previous research (Burt 2005) has shown that the most prevalent social ties are present within people of the same age. Hence, we would expect those ties to change over time. Moreover, there is a documented trend towards less social connections online when age increases (Ellison, Steinfield, and Lampe 2007). This has been measured using the ISCS.

BME

Current research on black and minority ethnic populations (Morales and Giugni 2011) shows that there is a tendency for minorities to concentrate their social connections among members of their same groups. Bridging social capital is unlikely, especially in contexts with high levels of spatial segregation. Therefore, it could be expected that membership in one of these groups might show a relationship with social capital. This variable is categorical, distinguishing between black population, and other minorities compared to a white majority.

National Statistics-Socio Economic Classifications analytical scales (NS-SEC)

The BES contains the standard analytical classes of socio-economic classification of occupations developed by the UK Office of National Statistics. According to Goldthorpe (1997), these classifications of occupations provide a good measure of the socio-economic positions within modern societies. This, in turn, is related to different aspects of social behaviour and social capital. As expected, people with a higher socio-economic position might be more likely to have higher levels of social capital. These analytical classes are expressed as an ordinal scale, where 1 represents the highest level of occupation, and 8 represents those who are unemployed.

Marital Status

The relationship between marital status and social capital has been investigated in the context of mental health issues (Lindström and Rosvall 2012). I have decided to dichotomise the variable distinguishing whether the respondent is married or not.

Household Size

Coleman (1988) argues that social capital relates to social connections we make outside our family core. However, some literature suggests that the early socialisation of young kids take place in their households. Based on this evidence, this variable is included as control to account for any correlation it might have with our key independent variables. The variable ranges from 1 to 8, depending of how many people live in the same household. If more than 8 people live there, they are also

coded as 8.

Social Media Use

Apart from accounting for other uses of technology, the inclusion of a social media variable is key in my empirical strategy. In particular, one that distinguishes between Facebook and Twitter use. Research has shown that these two platforms have a different relationship with personality traits and socialisation behaviour (Hughes et al. 2012). In particular, Twitter is more widely used for informational purposes than socialisation on Facebook. Furthermore, people using Twitter for socialisation purposes are less likely to score high on the extraversion scale and benefit from the anonymity features of the platform. Facebook, on the other hand, is related to social networks that correlate offline, where people incorporate others as "friends" as well as knowing them outside of the Internet. Hence, I should expect that the use of Facebook might be closely related to a combined scale of social capital.

Religion

As explained before, religion can have a close relationship to higher levels of social capital. Putnam (2012) explains how religious affiliations can create higher levels of bonding social capital among members of the same church, but can also create isolation (i.e. less bridging social capital) from people from other religious denominations.

4.4 Results and Discussion

4.4.1 General Level of Social Capital

Table 4.12 shows the results of two different OLS regressions using the general social capital scale, SC_i, as the dependent variable. All models are tested for heteroskedasticity and multicollinearity, as it is shown in Appendix B. The results show no multicollinearity, and I used robust standard errors to correct for heteroskedasticity, where required. Model 1 reflects the modelling strategy from equation 4.1, using the online combined scales as the key independent variables, and adding the controls discussed above. I have also decided to include two interaction

terms in Model 2, to account for the local differences that the online and both scales could present depending on the sex of respondents.

Table 4.12: Regressions of general social capital

	Level of Social Capital	
	Model 1	**Model 2**
Online	−0.084	−0.100
	(0.127)	(0.084)
Combined	0.399***	0.188***
	(0.071)	(0.071)
SES scale (NS-SEC)	−0.107***	−0.108***
	(0.013)	(0.010)
Extraversion	0.089***	0.089***
	(0.010)	(0.008)
BME	0.165	0.166**
	(0.127)	(0.080)
Married	−0.052	−0.051
	(0.049)	(0.038)
Age	−0.007***	−0.007***
	(0.002)	(0.001)
Household Size	0.007	0.005
	(0.021)	(0.015)
Female	−0.045	−0.223***
	(0.048)	(0.055)
Twitter	0.145**	0.147***
	(0.061)	(0.044)
Facebook	0.118**	0.125***
	(0.052)	(0.038)
Christian	0.118**	0.115***
	(0.050)	(0.036)
Combined x Female		0.403***
		(0.094)
Constant	−0.078	0.023
	(0.169)	(0.111)
N	2717	2717
R-squared	0.160	0.166
Adj. R-squared	0.157	0.162
Residual Std. Error	0.889 (df = 2704)	0.887 (df = 2703)
F Statistic	43.035*** (df = 12; 2704)	41.387*** (df = 13; 2703)

***p < .01; **p < .05; *p < .1

Hypothesis 5 stated that the use of the internet for accessing social resources

was associated with a decline in the general levels of social capital. As can be observed in Model 1, the evidence from the ORG does not allow me to support this hypothesis, as the online scale shows no significant relationship with the respondents' levels of social capital. This finding can be interpreted as those who privilege social connections online are not worse off in terms of their levels of social capital than those who balance their social connections online and offline. This evidence also cast a doubt on the validity of the isolation theories that claim that technology might be damaging the ability of people to create social connections. This evidence holds even after controlling for the use of social media platforms, such as Facebook and Twitter, which provides further evidence to the continuum hypothesis.

In the case of hypothesis 6, the statement is that the combination of online and offline access is positively associated with higher levels of social capital. The evidence from Model 2 supports this hypothesis. The combined scale shows a positive significant association with higher levels of social capital. The empirical strategy used does not allow me to identify a causal relationship, but that is not entirely relevant for the purpose of this chapter, as the hypothesis is stated only in terms of association. Moreover, the data correspond to a panel of respondents and the questions have been asked over the span of a year. Some of the variables were recorded during the first wave of the BES, while others were applied in subsequent waves (and only in those).The demographic and behavioural variables used in the model relate to a long-term process, and I cannot expect a significant variation over such a short period of time. Therefore, I chose a more conservative approach and constructed a single pooled cross-sectional dataset with the information available until the release of the third wave.

The main topic of this thesis is to understand what the overall effects of technology are, in particular the internet and its abilities to create social connections, on the way in which we create and sustain social capital. The previous chapter has investigated the structure behind Twitter networks as a way to observe whether these connections assimilate the network features of social capital. That approach had a significant advantage in relation to survey data, as explained before, given the

self-reported nature of surveys. However, and also as investigated in the previous chapter, I need to move on to understand the content of these social connections. This is where the ORG provides an advantage.

Putnam (2002) and others (Stolle and Hooghe 2005) have documented the decline of social capital in several Western societies, although Britain seems to be the exception (Hall 1999). As my results show, there is not enough evidence to suggest a relationship between the internet and that process. The development of social capital responds to different contextual and social processes. Some cross-section signs of these processes can be identified with the strategy I have used here, and as I discuss below, they follow most of my expectations. The important conclusion to draw from this analysis is that social capital seems to remain mostly independent to new technologies. However, it seems that a virtuous combination of these new platforms with traditional forms of socialisation appears to be associated with positive levels of social capital.

Moving on to the other variables used in this model, there are some interesting results. As expected, the socio-economic status, measured by the NS-SEC analytic categories, has a positive relationship with the level of social capital (the coefficient is negative, as the highest socio-economic level is coded as 1, and the lowest, 8). The potential mechanism here is that people with higher level occupations have higher levels of education and access to higher levels of income. The literature has shown that all these variables are related to higher levels of social capital.

More extroverted people are also more likely to present higher levels of social capital, as the effect is significant. On both models, one unit increase in the 0-10 scale of extraversion is associated with an average increase of 0.09 units in the scale of social capital, keeping everything else constant. This is also consistent with the expectation that people that are more open to new experiences and to meet new people, can also create and sustain social capital.

The expectations are also met with regards to age — older people are less likely to have higher levels of social capital while BME respondents have, on average, higher levels of social capital. Household size, on the other hand, shows no

significant association.

When turning to Model 2, the results show a more nuanced picture, particularly with regards to the interaction effect. In the first model, men and women showed no significant differences with regards to their levels of social capital. Now, when I interact this with the combined scale, the differences between men and women start to appear. When the level on the combined scale is zero, women are, on average, 0.249 units below on the social capital scale than men. On the other side, the effect of one unit increase on the combined scale is different for men than women. For men, that increase leads to a 0.162 units increase, while the effect for women is much steeper at 0.439. In substantive terms, this can be interpreted as that the relationship between the combined scale and social capital takes place mostly among women. In other words, women get a bigger advantage of this combination of online and offline tools for achieving higher levels of social capital. Although the baseline model shows no difference between men and women, there is a joint effect when I interact it with the combined scale. Although not reported here, I tried interacting the online scale with sex, with no significant results. Figure 4.4 shows how the interaction term changes the slope of the effects by sex.

Finally, the religious denominations show varying results. Compared to other religious denominations and atheists, Christians show a positive significant association with social capital This is consistent with the expectations raised by Putnam (2012) in the sense that religious communities can be helpful for developing social capital.

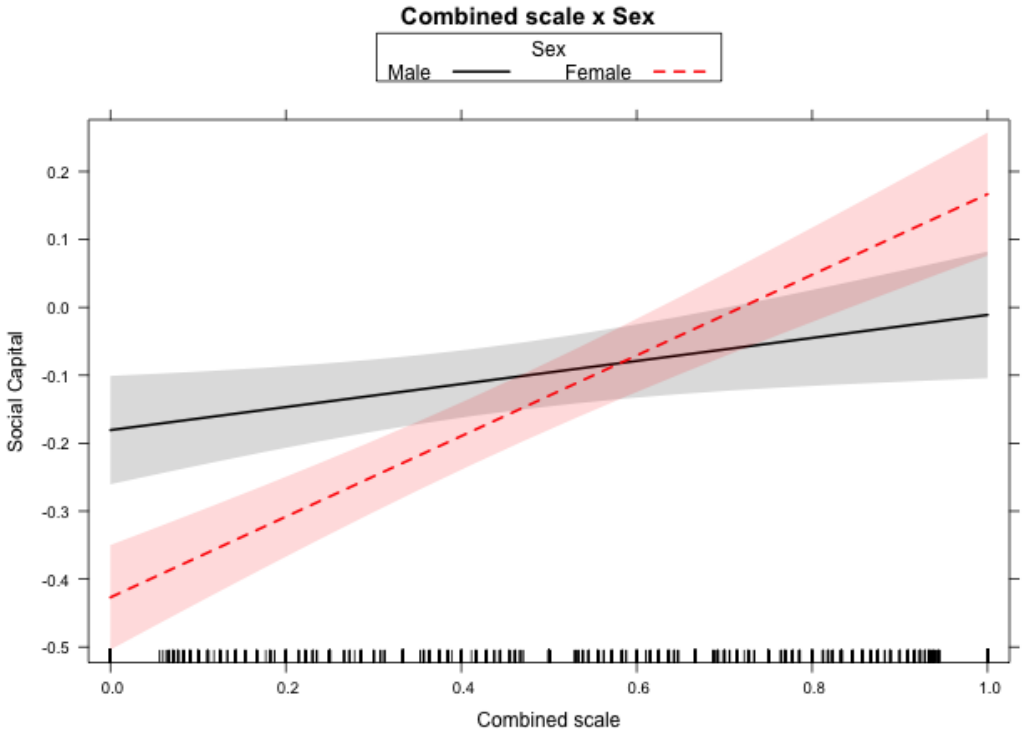

Figure 4.4: Interactions from Model 2

4.4.2 Different Forms of Social Capital

The identification of the different scales of social capital allows me to analyse how much they would differ with regards to the traditional predictors of social capital. As with the general scale, these are continuous scales derived from the IRT procedure. As such, Table 4.13 shows three OLS models using the different social capital scales as dependent variables. All the models are presented with robust standard errors to account for heteroskedasticity.

The socio-economic status shows a positive significant association with online and combined social capital. This is an interesting result as it supports what we observed in the previous results about general social capital. This means that forms of social capital that include online access to social resources behave in the same way as others. Stretching this argument, ICTs may not act as equalisers in the light of socio-economic status.

Age produces a negative significant association with the combined social capital scale, which is coincidental with the general scale of social capital. There is here

another difference between online social capital — where age has no significant effect — and the combined index. Another interesting feature is that traditional literature claims a negative relationship between the use of technology and age, which does not seem to be reflected in these results.

Table 4.13: Forms of social Capital (OLS Models)

	SC Online	**SC Combined**	**SC Offline**
SES scale (NS-SEC)	-0.025^{*}	-0.094^{***}	-0.006
	(0.014)	(0.012)	(0.011)
Extraversion	0.015	0.052^{***}	0.009
	(0.011)	(0.010)	(0.009)
BME	0.089	0.017	0.148^{*}
	(0.131)	(0.121)	(0.085)
Married	-0.036	0.001	-0.025
	(0.056)	(0.049)	(0.041)
Age	-0.003	-0.006^{***}	0.001
	(0.002)	(0.002)	(0.002)
Household Size	0.015	-0.009	0.008
	(0.022)	(0.018)	(0.016)
Female	-0.122^{**}	0.049	-0.009
	(0.052)	(0.046)	(0.038)
Twitter Use	0.023	0.247^{***}	-0.154^{***}
	(0.066)	(0.058)	(0.047)
Facebook Use	0.196^{***}	0.226^{***}	-0.199^{***}
	(0.048)	(0.048)	(0.041)
Christian	0.081	-0.008	0.065^{*}
	(0.055)	(0.048)	(0.039)
Constant	-0.051	0.063	0.102
	(0.157)	(0.143)	(0.113)
N	2797	2797	2797
R-squared	0.023	0.099	0.019
Adj. R-squared	0.020	0.096	0.016
Residual Std. Error (df = 2786)	0.954	0.907	0.970
F Statistic (df = 10; 2786)	6.591^{***}	30.537^{***}	5.505^{***}

$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

Extroverted people have, on average, higher levels of combined social capital. On the other hand, there is no relationship with the online and offline scales. This is interesting as it shows that those who privilege either online or offline platforms to

access social capital does not show any significant association with this personality trait

The sex of the respondents shows another striking difference between online social capital and the other scales. As discussed above, men and women have no significant differences with regards to the general scale of social capital. However, when it comes to online social capital women have, on average, less online social capital than men by 0.12 units. The mechanism behind this is not necessarily clear. In the theoretical discussion set up before, I have shown that there are cases where online platforms show higher levels of abuse against women. This is a testable hypothesis that could be explored in the future. More relevant, this is another distinction between online social capital and other forms of it.

Twitter and Facebook use show differences in the case of online social capital. This can be due to the research discussed earlier about the different uses of these platforms. As previous evidence has shown, Twitter has more informational uses while Facebook has more socialisation usage. In the case of online social capital, this is shown by the fact that while Facebook has a positive significant association, Twitter shows no significant relationship. This difference disappears when we incorporate offline platforms, such as in the combined and offline scales.

4.4.3 Robustness

To examine the robustness to the main results of this chapter, I have followed two strategies. First, I correlate the latent trait obtained through the IRT with the first factor obtained through EFA. In the case of factor analysis, this latent trait is obtained by trying to maximise the amount of variance that is explained by the factor, assuming that the other factors are orthogonal (as it is shown in Figure 4.3). However, in the case of IRT, I only estimated a single latent variable, so there are no comparisons with other potential dimensions that can explain more variance. This should show a strong correlation between the both.

As Figure 4.5 shows, there is a relationship between the two latent dimensions, with a positive correlation coefficient (Pearson-R=0.6, $p < 0.05$). This provides me with some certainty that the estimation processes are not fundamentally different,

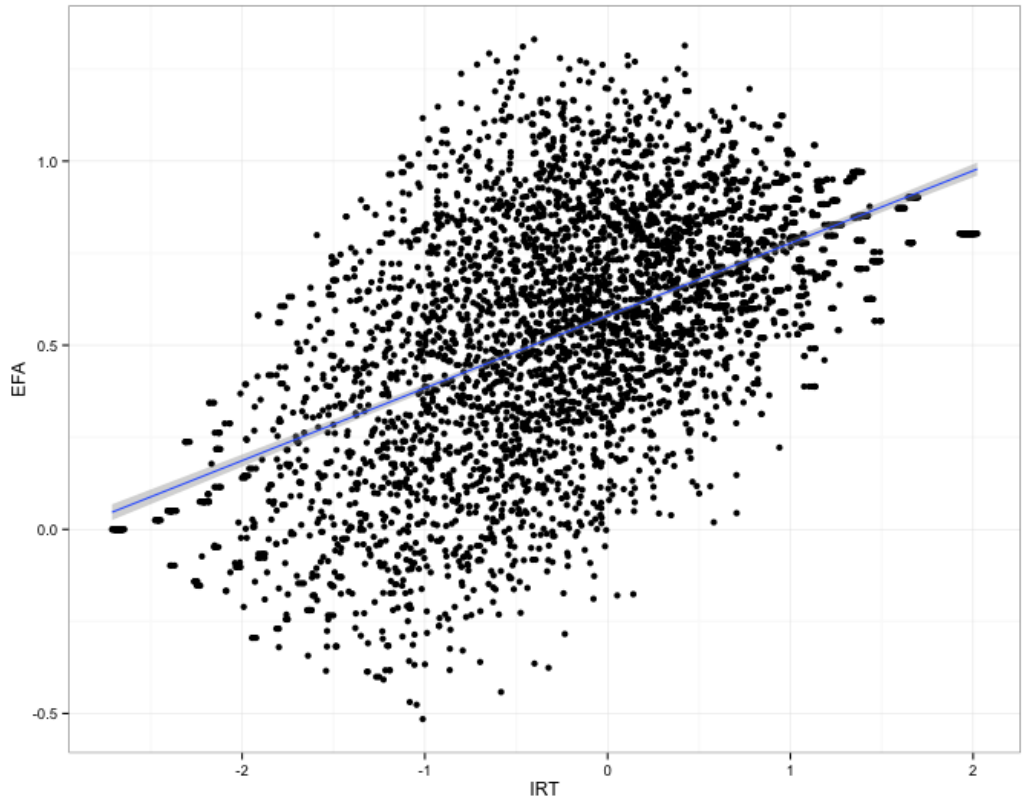

Figure 4.5: Scatterplot of the first factor from EFA and IRT estimates *(R = 0.6)*

and that both techniques approximate the ORG items with similar results. This also justifies my decision to choose IRT, as the risk of overdimensionalisation means that some of the variance might be lost in the other factors. This works in favour of a more conservative estimation of the latent dimension.

The second robustness check is comparing the first model from Table 4.12 with the same model using the first factor as the dependent variable. I am mostly interested in observing whether the main results hold. That is, that the online scale has no association with social capital, while the combined scale shows a positive association. Table 4.14 shows the results of this analysis and my expectations are met. Both the online and the combined scales have the same relationship in the case of the IRT estimated dimension and the EFA estimated dimension.

These results provide a more complete picture on the robustness and sensitivity of my results.

Table 4.14: Comparison between using IRT and EFA for estimating the general social capital dimensions

	IRT	**EFA (Factor 1)**
	Model 1	**Model 2**
Online	−0.075	0.036
	(0.084)	(0.042)
Combined	0.393***	0.166***
	(0.051)	(0.027)
SES scale (NS-SEC)	−0.106***	−0.053***
	(0.010)	(0.005)
Extraversion	0.090***	0.018***
	(0.008)	(0.004)
BME	0.172*	0.065
	(0.089)	(0.053)
Married	−0.039	−0.015
	(0.039)	(0.021)
Age	−0.008***	−0.003***
	(0.001)	(0.001)
Household Size	0.004	0.007
	(0.015)	(0.008)
Female	−0.054	−0.038**
	(0.035)	(0.018)
Twitter	0.144***	0.015
	(0.044)	(0.021)
Facebook	0.122***	0.019
	(0.038)	(0.020)
Christian	0.154***	0.008
	(0.038)	(0.019)
Judaism	0.427**	0.052
	(0.177)	(0.059)
Hinduism	−0.614**	0.015
	(0.255)	(0.165)
Islam	0.344	0.033
	(0.226)	(0.126)
Other	0.327***	0.036
	(0.092)	(0.050)
Constant	−0.078	0.652***
	(0.109)	(0.059)
N	2717	1916
R-squared	0.169	0.183
Adj. R-squared	0.164	0.176
Residual Std. Error	0.886 (df = 2700)	0.296 (df = 1899)
F Statistic	34.260*** (df = 16; 2700)	26.568*** (df = 16; 1899)

***p $<$ .01; **p $<$ .05; *p $<$ .1

4.4.4 General remarks

This chapter provides three different contributions. First, it provides an instrument to measure social capital both in online and offline settings. Second, preliminary evidence shows that ICTs are not harming our ability to create and foster social capital. Furthermore, under certain conditions such as a balanced combination of online and online ties, they actually have a positive effect. Third, I showed some of the basic differences between forms of social capital. The differences are not striking, but they exist. This is interesting as they all should be measuring different aspects of the same social phenomenon, but they differ in the way in which they are configured. A further difference, now in terms of outcomes, can be seen in chapter 5.

The first goal of the chapter was to present the design and implementation of the Online Resource Generator, while at the same time examining different approaches to estimate the individual levels of social capital among the respondents of the British Election Study 2015. The second goal was to provide a modelling strategy to understand how ICTs are related to the levels of social capital and, in particular, how online social capital differs from traditional (offline) notions of it. Hence, it sits as a transition chapter between between understanding the structural features of online social capital (chapter 3), and the analysis of the outcomes of online social capital and political participation (chapter 5).

The Online Resource Generator is a novel and well developed instrument that borrows from a fairly long tradition of measurements of social capital. The process of adaptation from the original RG to the instrument used here required several steps that included focus groups, survey experiments and experts' feedback. This allows me to be confident of the overall level of validity of the instrument. As expressed above, the ORG has the advantage of focusing on the diversity of social capital, and also avoiding obstacles of other traditional survey measures.

In terms of the estimation of the scale of general social capital, I have discussed two different, yet related approaches. Both exploratory factor analysis and item response theory are widely used in political science as a way to estimate latent traits

behind observed data. The EFA showed three different dimensions that fulfilled the different discrimination criteria — either K1 or screeplot observation. The main advantage of this approach is that the dimensions estimated are barely similar to the ones estimated originally by van der Gaag and Snijders (2005).

However, recent literature (Eijk and Rose 2014) claims that EFA has the inherent risk of overestimating the amount of latent dimensions that are present behind the data. This is not a minor point, as one of the key goal of this research is to provide a clear and valid measure of social capital from the ORG. Overestimating the number of dimensions or, in other words, estimating scales of social capital where they do not exist, is simply a statistical construction that does not have a correlate in the data. This is both risky and inconsistent.

Using IRT in combination with Bayesian estimation provides a more valid approach for three main reasons. First, Mokken Scale Analysis — a variant of IRT — provides a conservative approach to dimensionalisation. In particular, after analysing the items, there is only a single latent dimension. Second, it accounts for the level of difficulty of the items, and also incorporates a discrimination parameter for each of the items. Third, MCMC simulations provide a more precise estimation of the ideal points in the scale for each respondent.

When moving to the results from the regression models, the results suggest that the dystopian views about the role of the internet on the formation of social capital are ungrounded. Higher levels of online access to social resources do not show a significant relationship with the levels of social capital. Moreover, the interaction between the combined scale and the sex shows that women benefit more from combining offline and online platforms to access social capital than men.

The analysis of the different scales of social capital sheds some light on the differences across them. First, online social capital is not related to socio-economic status (at the $p < 0.05$ level), ethnic identification or sex. This is important, as it provides a clear cut from the other types of social capital, particularly in relation to the NS-SEC variable. The explanatory power of these models is still low, but they provide a starting ground to understanding their differences. Some of them seem

more counterintuitive than others. For example, the fact that the socio-economic measures show no association with higher levels of combined social capital provides an interesting question about how much financial resources are relevant to build beneficial levels of social capital.

The results from the chapter show how the ORG can be used to understand the relationship between social capital and ICTs. In order to move ahead, this instruments needs further external validation in other contexts and populations. Furthermore, in order to improve its internal validity, in the future I would need to check the results of the ORG against other measures of social capital. The ORG produces a general scale of social capital that can be used in comparison with other traditional measures.

Another avenue for further research relates to the different associations that the combined social capital scales depending on the sex of the respondent. In the future, I would like to explore that difference and understand the details behind the different resources men and women are more likely to access, and what are the causes of those differences.

Chapter 5

The Influence of Social Capital on Political Participation

5.1 Introduction

Earlier in the thesis, I defined social capital as social networks able to mobilise resources, based on norms of trust and reciprocity. This definition allows me to untangle the concept into three different elements. First, the networks (which have been covered in chapter 3); second, the resources that these networks are able to mobilise (which constitutes the key discussion on chapter 4), and finally, the political outcomes of social capital. The focus of this chapter is to provide a first response to the third question of the thesis, that explores the relationship between the different varieties of social capital and political participation.In particular, I focus on one particular aspect of political behaviour, voter turnout. The specific question of this chapter, then, is:

> To what extent are different levels of social capital — either general, online or combined — related to the likelihood of voting?

As described in chapter 4, I use data from the Online Resource Generator, in particular, the individual levels of general, online, and combined social capital to answer this question. This chapter uses two recent election datasets: reported turnout in the 2014 European Election, and the self-reported likelihood of voting in

the 2015 UK General Election[1].

This chapter tests three different hypothesis that are derived from the general literature on social capital and political participation. A well established stream of the research on turnout claims that social capital is positively associated with the likelihood of voting. However, the literature on the effects of ICTs on political behaviour shows different results depending on the way in which technology is being used (e.g. for information seeking or socialising), and the form of participation (traditional or non traditional). Both streams of the literature are explored in this chapter and are used to derive the main research hypotheses.

The first finding of this chapter shows that in the case of the European Election I do not observe a direct relationship between social capital and turnout. However, the interactions between social capital and civic norms show that the increase of social capital decreases the effect of those norms on turnout. The empirical implications of this finding are discussed later in the chapter. In the case of the UK General Election that took place in May 7 2015, online social capital is negatively related to the probability of voting. The interaction of online social capital and civic norms produces the same combined effect as in the case of the European Parliament election. That is, while civic norms has a positive association with higher turnout, that effect decreases when the levels of online social capital increase. Additionally, the combined social capital scale shows also a positive association with the probability of turnout.

I interpret these results separately. The online social capital scale reflects how much of the individual levels of social capital are focused only on online connections, whereas the combined scale reflects how much of those levels are due to relationships sustained both online and offline concurrently. Hence, in theory, two persons with the same levels of general social capital, but different in the way in which they acquire those connections (online or combined) may face different incentives to vote. In general, the results show that distinguishing between different

[1]Since I use data from first three waves of the British Election Study 2015, I cannot expand the empirical analysis to other forms of participation apart from voting. The BES is expected to provide data on other forms of political participation in later releases.

forms of social capital is important, as different varieties produce different associations, even at comparable levels.

The interpretation of the combined effects between social capital and norms of civic duty is more complex. As I discuss later in the chapter, there are different mechanisms by which social capital might affect turnout, and one of them is through the formation of social norms. The interaction term suggests that these two variables — social capital and norms of civic duty — might be operating at a similar level. Therefore, when the level of social capital increases, the association of civic norms with turnout decreases. I discuss this process further in the chapter.

In the chapter, I distinguish between first-order and second-order elections. This distinction refers mainly to what is at stake in every election. First-order elections are the ones where the winner becomes the national government, while second-order elections are those where any other offices are at stake. As discussed below, there are different incentives to turnout depending on the nature of the election. In the case of social capital, the evidence from this chapter suggests that its relationship with turnout is only relevant in the case of the general election. I provide a potential explanation for this difference focusing on how rational considerations might be more relevant than moral aspects in the case of second-order elections.

The chapter is structured as follows. I first review the literature on political participation with a focus on the traditional approaches to understanding turnout. Then, I move on to discuss the literature on the potential relationship of social capital. From this literature, I produce three hypotheses aimed at explaining how social capital is related to the probability of turnout, depending on the way in which people access it. The third section of this chapter discusses the data used for the analysis, as well as the modelling strategy. The next section shows the main findings from the analysis, and then I provide a discussion of the relevance of the main findings, and the potential theoretical mechanisms behind them.

5.2 Political Participation on an Online Era

One of the traditional definitions of political participation comes from the classic Verba and Nie's, "Participation in America" (1972). They state that political participation refers to "those activities that are more or less directly aimed at influencing the selection of governmental personnel and/or the actions they take" (1972, p.2). This is a very broad definition, and hence it's utility. It allows for different forms of participation. On the other hand, it creates a primary boundary between what is participation and what is not based on the aim of influencing political elections or decisions. Recent research (Lariscy, Tinkham, and Sweetser 2011) has argued that younger generations have different beliefs of what political participation entails. In their understanding, searching for political information or reading political blogs are also forms of political participation. Nevertheless, these actions do not fit with Verba and Nie's definition. They are activities, with an apparent political motivation, but they do not have any influence on decision-making or in influencing who is in office [2].

Another important feature of Verba and Nie's definition is that, paradoxically, it does not limit the range of options to those that Verba and Nie use for their own research. They explain in their book that their intention is to analyse "traditional" forms of participation, such as voting or contacting politicians. However, their definition of participation allows the inclusion of a much broader catalogue of options. The literature has moved further from that position throughout the years. For example, scholars from the field of social movements (McAdam, Tarrow, and Tilly 2003; Tilly and Wood 2013) show that people tend to incorporate new options to their repertoires of actions. Some of these options will eventually become normalised and might be considered "traditional", or "orthodox", while others will remain as unusual, sporadic or even strange. There are several elements we can consider when it comes to distinguishing among these types, such as the level of creativity and in-

[2]Excluding actions like these might be seen as a conservative approach to participation, but I prefer it as it is consistent with what the literature has been discussing on the topic. Even more innovative approaches, such as those that include the notion of self-expression as forms of participation fit within the above mentioned definition. Political participation, then, is comprised both by an aim and an activity. Without them, we can still have political action, but not in the form of participation.

novation, the resources they use, the level of commitment, and effort they require amongst others. Hence, some actions might be considered as more passive than others, such as donating to a politician compared to attending a rally or a demonstration. The level of commitment also changes individually. For example, Granovetter's (Granovetter 1978) thresholds model shows how some people are more likely than others to engage in collective action, depending on their own thresholds of how many other persons need to be involved in the action before they engage themselves.

With regards to the role of ICTs, there are at least two different pathways through which the internet can affect political participation. First, new technologies can enhance traditional forms of participation. Actions such as donating money or contacting a politician through the Internet cannot be considered as new, non-traditional form of participation. Even if they take place offline, they belong to a traditional form of engagement. In fact, it might be a modification of the classical way in which people behave politically, but in essence, it is the same action. As Bimber et al. (2012) show in their study of traditional organisations in the US, technologies can be an effective tool for them to adapt and attract new members and funds. In practice, they are not engaging people in new forms of participation, but finding new forms to perform traditional actions.

The same can happen to non-institutionalised forms of participation, such as protesting or boycotting (Bennett and Segerberg 2013). That is, people might get involved in protesting both in the streets and online. Although the latter can be considered as an extension to traditional protesting, it cannot be considered a completely new form of participation.

Second, early literature has argued that the Internet can play a negative role in increasing participation. Most of this research comes from an era prior to the explosion of social media (McPherson, Smith-Lovin, and Brashears 2006), and argues that technologies might isolate people and, consequently, remove any interest in them to participate in the community. However, and as I have been already exploring in the previous chapters, the use of tools such as Facebook or Twitter

can enhance community sense and belonging (Sebastián Valenzuela, Park, and Kee 2009; Gibson and McAllister 2013), and they can also increase the intensity and diversity of participation, adding new repertiores, such as self-expression (Gibson and Cantijoch 2013; Anduiza, Cantijoch, and Gallego 2009).

Gibson and Cantijoch (2013) explain that e-participation (as they call political participation actions that take place online) follows a multidimensional pattern, in the same way as offline political participation does. Protesting, donating money to a politician or a political cause, or voting are all participatory acts, but they can be triggered by different processes and have different outcomes. In the case of participation through ICTs, this means that we cannot encompass all modes of participation using the Internet in a single construct, and that we need to disentangle the effect of new technologies into different forms of participation across different people. As they argue, the use of technologies in general can increase "passive forms of engagement" (p. 714) among those who are more disengaged overall. With regards to voting, they provide a theoretical argument, but do not test the relationship empirically. In any case, the notion of political participation as a multidimensional construct rather than a single type of behaviour is relevant at an analytic level.

The available evidence shows that Internet users are not less participatory than non-users, but they may prefer certain forms of participation above others. The analysis of the Indignados movement in Spain (González-Bailón et al. 2011) shows how online technologies can actually increase participation in non-institutional ways. Similar conclusions have been found in the case of the UK, and Greece (Theocharis 2011). In terms of the variety of forms of participation, the evidence shows that the internet produces different outcomes. As Wellman et al. (2001) explain, heavy internet users can reach a point of normalisation, where the effect of the internet on their participatory decision decreases up to the point in which it becomes similar to other internet users.

With regards to turnout, Tolbert and Mcneal (2003) show a significant positive relationship between internet use and political participation, including voting. Their analyses are based before the advent of the main social media sites, such as

Facebook (2004) and Twitter (2006), and explore the use of the internet mainly for information purposes. A similar, but much more recent view is provided by Bimber et al. (2015). They use the BES data from 2001, 2005, and 2010 to estimate the relationship between internet use and the reported likelihood of voting. They show that when interacted with internet use, the effect of political interest, a traditional predictor of turnout, changes. The internet has a higher impact on voting the lower the political interest of the individual.

Other studies on the relationship between the internet and turnout have focused on the role of internet voting. Stromer-Galley (2003) discusses the different experiences on internet voting in the US during the early 2000s, and concludes that this mechanism is not necessarily increasing the levels of turnout or bringing new people to the polling stations. Similar conclusions are reached by Henry (2003) in her study of the 2002 local elections, in which she conducted pilot in 5 boroughs in the UK. Although there was an increase in turnout during the pilot, it was not possible to conclude if the option of remote internet voting was the cause behind it, given that most internet voters were also regular voters.

In terms of information and campaigning, Prior (2005; 2002) has explored why an increase on the availability of information online has not lead to increasing levels of political knowledge and turnout. His findings show that more information online has also come with a bigger gap between the use of information for accessing news and entertainment. In summary, he claims that more available information does not necessarily reflect on higher levels of political attention of knowledge.

Nevertheless, all of these studies show a relationship between internet use that does not focus explicitly on the formation of social capital. They study other uses of the internet that do not directly relate to the construction of meaningful, long-term social connections. Instead, they focus on the role of information, campaigning, electronic voting, and political interest. However, they are relevant to understand how the literature has traditionally addressed the relationship between the internet and turnout.

5.2.1 Traditional Approaches to Explain Turnout

Voting is one of the most studied participatory behaviours, and it is an essential element of democratic regimes. Free and fair elections, in conjunction with an active citizenry, are usually understood as necessary conditions for the existence of democracy. Thus, low turnout has been considered one of the most relevant political phenomenon in the last years. The consequences of a decreasing electorate has been associated with problems in terms of accountability, institutional effectiveness and, overall, the quality of democracy (Citrin, Schickler, and Sides 2003; Blais, Gidengil, and Nevitte 2004; Van der Eijk and Van Egmond 2007; Kornbluh 2000).

To understand voting behaviour I review the established literature that has tried to explain why people vote. The literature on turnout has been profuse in describing several mechanisms that can explain this behaviour. Such approaches include rational assessments of the personal and collective benefits of voting, sociological explanations related to party identification and other demographic elements, valence evaluations, and the relevance of community belonging (social capital).

Whiteley et al. (2013) claim that there are five different models that allow us to explain turnout: general incentives, civic voluntarism, cognitive engagement, equity fairness, and social capital. The general incentives model starts from a rational choice calculation in which voters measure the collective and individual costs and benefits of voting (Aldrich 1993; Pattie and Johnston 1998). Under this framework, people use cues such as a utility that a given party wins, or the perceived relevance of the individual vote (i.e. if the vote counts depending on whether the voter lives in a ”safe” or a ”marginal” seat).

Rational choice approaches have been trying to overcome the seemingly irrational nature of voting. As Blais (2000) describes it, this is a traditional collective action problem. Voting has little impact of benefits at the individual level, but positive outcomes at the collective level. A basic costs-benefit calculation should deem voting as a less relevant act. The response to this approach has been to include other elements to the traditional calculation, such as the pleasure of fulfilling a civic duty (Bowler and Donovan 2013). In general, this approach aims to quantify different

individual incentives that would explain a rational decision behind voting.

The civic voluntarism model combines individual resources with the actions of political parties. That is, is a mix of individual level characteristics, such as education or socio-economic status, with party campaigning. Studies aiming to understand the determinants of turnout across different countries (Geys 2006; S. Fisher et al. 2014; R. Campbell 2013; Smets 2012; Kornbluh 2000; Aguilar and Pacek 2000) have shown the relevance of demographic characteristics at the individual level. In general, the logic behind this model is that people are more likely to vote if they hold more resources that will allow them to mobilise and understand what is at stake on every election. This includes education and life experience, among others. Moreover, the same model attaches a significant value to what parties can make to bring people to the polling stations.

Campaigning efforts are relevant as long as they are effective in creating incentives people to vote (Cutts, Fieldhouse, and John 2009). As Fisher et al (2015) have shown, more competitive elections bring more campaign efforts aimed to bring people to the polling stations. In that regard, the outcome in terms of turnout does vary according to the different campaign techniques and the political parties behind them (Hirczy 1995). Similar evidence has been found in the UK with regards to the work of campaign volunteers and canvassing (Johnston et al. 2012; J. Fisher, Johnston, et al. 2013).

In general, the logic behind the civic voluntarism model is that people are more likely to vote if they hold more resources that will allow them to mobilise and understand what is at stake on every election. This includes education and life experience, among others. Moreover, the same model attaches a significant value to what parties can make to bring people to the polling stations. Campaigning efforts are relevant as long as they are effective in creating incentives people to vote (Cutts, Fieldhouse, and John 2009).

In the case of cognitive engagement, the key elements are political knowledge and attentiveness. Research (Blais, Gidengil, Fournier, et al. 2009; Lupia 1994) has shown the relevance of information in increasing turnout. People who are more

informed, in particular about politics, are also more likely to vote. There are several elements into this process. Blais et al (2009) have shown that the role of information is conditional on the visibility of information. This means that for information to have an effect, it needs to be visible for the people. This evidence has been supported by experimental research (Margetts et al. 2011) on the role of information on political participation. Is not only that information becomes available, but also that people is aware of it.

The main argument is that people who are more attentive and interested in political information, will be also more likely to engage in political activities. This is not only a resource-based argument, but one of understanding. If people are more able to understand the difference elements at play in an election, they will be more likely to engage in the electoral process. However, this particular element can have different effects depending on the mode of political participation. As I have explained above, it is not consistent to treat political participation (whether online or offline) as a single construct. The question about the influence of cognitive engagement on turnout is a matter of empirical testing. For example, Whiteley et al. focus on the interest that respondents have on the election, but another approach would be to test the overall interest or knowledge of politics. Di Gennaro et al (2006) provide some empirical test to these mechanisms, by showing that in the British context, ICTs can operate as a source of information that, in turn, increases the likelihood of turnout.

The fourth model refers to the gap between expectations and reality with regards to politics. Studies on relative deprivation (e.g. Fieldhouse and Cutts 2008) focus on the idea that those who have a bigger gap between their expectations about government (or other political actors') actions, and the actual result, will feel more compelled to participate. In particular, the evidence has shown how satisfaction with democracy has an impact on individuals' decisions to vote (Ezrow and Xezonakis 2014).

There are other alternative attempts to explain turnout. One of them refers to institutional arrangements, such as the findings by Pattie et al. (Pattie, John-

ston, and Rossiter 2012) on how redistricting decisions in the UK have an impact on constituency turnout levels, or the research by Blais and Carty (1990) that explains the relationship between proportional representation and turnout. On the non-institutional route, Fowler and Dawes (2008) establish a relationship between the presence of two particular genes and a higher propensity to vote, while Gerber et al. (2003) use experimental evidence to show how voting can be understood as a habit-forming process[3].

In summary, the diversity of explanations behind turnout suggest that this is a complex and multidimensional act. There explanations that range from strategic considerations to experience and moral grounds. The study of turnout, then, requires an empirical strategy that can account for these different explanations in a parsimonious way.

5.2.2 Social Capital and Turnout

The relationship between social capital and turnout has been theoretically proposed since the seminal work by Putnam (1994) on the state of democracy in Italy. People participating in the community life develop feelings of solidarity and civic norms, which in turn foster their propensity to participate in politics. An investigation (Van Der Meer and Van Ingen 2009) of the role of civic participation in 17 countries shows the relevance of community in forming participatory habits. Furthermore, Welzel et al. (2005) explore the 'payoffs' of different aspects of social capital in terms of civic participation and collective action. This is the main argument behind the nexus between social capital and participation. Is in this step where people get more interested and active in political issues and decide to participate in politics.

A similar argument is that higher levels of individual social capital are related to higher levels of trust and trustworthiness. That is, that people who have more social capital are also more trustful towards others and also trustworthy on the eyes of others. This might lead to the construction of social norms — such as the notion of voting as a civic duty — and feelings of solidarity. However, this link is not nec-

[3]Some of these theories cannot be tested with the BES data, such as the presence of certain genes or the effect of redistricting.

essarily grounded in the evidence. While some would argue that there is basically just one form of institutional trust that is transferable from the interpersonal to the institutional level (Hooghe 2011), others argue that different forms of institutional trust relate to different attitudes (J. Fisher, vanHeerde-Hudson, and Tucker 2010; J. Fisher, vanHeerde-Hudson, and Tucker 2011). Hence, the cognitive nature of trust matters when studying the potential relationship between social capital and political participation. However, as explained in chapter 2, understanding the nature of trust and its outcomes escapes the purpose of this thesis.

From the perspective of social capital and ICTs, Gibson and McAllister (2013) have explored the relationship between social capital formed online and political participation. Their findings show that online social capital is not always positively related to higher levels of political participation. Only online bonding ties, that is, those who are formed among closed groups of alike people, are the ones able to mobilise people into political action. Their findings are consistent with other evidence on offline settings (Teorell 2003; Leonard 2004) and raise questions about the actual mechanism behind the influence of social capital on political participation. If the underlying mechanism relies on trust, then only social capital formed in close connections should be the one relevant to political participation. Alternatively, if the mechanism operates through the formation of civic norms, then the type of ties becomes less relevant.

An alternative mechanism is based on Burt's (2005) claims about the advantages of social capital. In his view, one of the signs of individual levels of social capital is the ability to bridge across different social groups. People who are embedded in a single social network will reach a point in which the information within the network becomes redundant. For example — as Burt explains — managers within organisations that are able to cut through rigid organisational chains are able to access more and new information that is not available to other members of their networks. That way, they get more options for developing new strategies and getting promotions. Thus, having connections outside the close network (i.e. higher levels of bridging social capital), leads to access to more and new information. As

discussed above, the relationship between information and turnout is not completely clear. While some would argue that having more availability of information can lead to a higher likelihood of voting, the single presence of available information does not necessarily derive into a higher level of political knowledge, which appears as the key element behind this relationship.

One attempt to describe this relationship is provided by Gil de Zuñiga et al. (2012), who use structural equation models to show how the use of Social Networking Sites (SNS) for accessing information is associated to higher levels of social capital, which in turn relates positively with offline political participation. In their study, they group together all forms of offline political participation (e.g. contacting a politician, donating money, attending a demonstration, or voting in elections) and use it as one of the dependent variables in their structural models. This approach is problematic for understanding how social capital is related to particular forms of participation. In this case, their findings cannot be unpacked to understand if the mechanism they explore — from social capital to political participation through the search of political information — shows a significant association with turnout.

The evidence behind the relationship between social capital and turnout is less conclusive in the case of the UK. Whiteley et al. (2013) include a variable about interpersonal trust and claim it is a measure of social capital (which, as discussed in chapter 4, is a problematic approach), and they do not find any significant association between it and turnout. In this case, the lack of significant association might refer to either a lack of real relationship, or to a measurement problem.

Regardless of the lack of evidence in the UK, the theoretical argument still holds. Whether social capital fosters civic norms or leads to higher levels of information, there are at least some potential pathways that can link it with a higher likelihood of voting. The contribution of this chapter is to test this argument by providing an innovative measure for social capital and, at the same time, explore its relationship with turnout in two different elections. Therefore, the first hypothesis proposes a direct test for this:

Hypothesis 7 *Higher levels of general social capital are positively related to the*

likelihood of turnout

This hypothesis is a baseline test for the notion that social capital is related to turnout and, as such, it focuses in the general social capital scale. Coming back to the question of online social capital, I argue that the relationship is different. As shown above, the literature is somewhat consistent in reporting that the use of ICTs is positively associated with certain forms of political participation, mainly those labelled as non-institutional or those called passive (e.g. Sebastián Valenzuela, Park, and Kee 2009). The causal mechanism is not necessarily clear. On the one hand , there is evidence that those who engage in non-institutional forms of participation are also more likely to use ICTs to organise (Theocharis 2011). The use of ICTs, moderated by political interest can lead to a preference for certain forms of participation (Bimber, Cunill, et al. 2015). In the case of voting, Bond et al. (2012) produced a large Facebook experiment in which the individuals in the treatment group received news on whether their friends voted in the US presidential election in 2008. Compared to the control group, the treatment shows a significant, yet very small effect. In a study of the protests in Chile and the UK in 2011 (Sajuria 2013), I explore how protesters who relied more on ICTs for political action were also more likely to hold views about democracy that was considered as horizontal. That is, when asked about their conceptions of democracy and the mechanisms behind it, they assign more relevance to forms of deliberative democracy instead of participatory mechanisms such as voting. Although this research focuses only on protesters, it may be helpful to understand what we can expect for other sections of the population.

The association between online social capital and turnout might be different, then, than the one for general social capital. My argument is that those who engage with others mostly online — and therefore have higher levels of online social capital — are not necessarily inclined to traditional forms of participation. As it was explored in chapter 4, people with higher levels of online social capital are, on average, men on occupations which require a higher level of education, and also Facebook users. The difference in turnout can happen either because they are ex-

posed to new and different political information which is not available offline, or because they are more likely to hold different views about democracy. This means that, if they engage in political participation they might choose other forms different than voting. However, one of the limitations of this chapter is that I am able to test only half of the statement. The available data at the time of writing this chapter does not contain information about respondents' behaviour in terms of forms of political participation other than voting. For now, I can only test whether online social capital presents a negative relationship (or any relationship at all) with turnout. Based on this, my second hypothesis is as follows:

Hypothesis 8 *Higher levels of online social capital are negatively related to the likelihood of voting*

Hypothesis 7 tests the relationship between higher levels of general social capital and turnout. That is, it does not distinguish on how the social resources are accessed. Hypothesis 8 focuses on the levels of online social capital, that is, the social capital that is developed only through online social connections. Additionally, I am interested in observing those who are able to combine online and offline social capital in comparison to those who privilege online connections. The logic is that when comparing two hypothetical persons with the same level of general social capital, the way in which they reach it matters. That is, those who have a higher level of online social capital might be less likely to vote (hypothesis 8).

On that note, as it is shown in chapter 4, there are significant differences between those who are able to combine how they access social capital, whether online or offline. People with a higher level of combined social capital are also, on average, highly educated but also younger. And they also combine Facebook use with Twitter. In comparison with those who have higher levels of online social capital, people with a higher position on the combined scale might have access to different information and develop a different sense of community and solidarity than those who focus mostly on online connections. However, the theory is underdeveloped in this regard.

My approach for understanding social capital from a combination of online and

offline connections is innovative, and therefore, my expectations about its relationship with turnout. The first intuition is that combined social capital has a different relationship with turnout than online social capital. This proposition is based on the results from chapter 4 that show small, yet significant differences between the online and the combined social capital scales. The second is that balancing online and offline social capital should have a relationship with turnout similar to higher levels of general social capital scale. Unfortunately, there are less empirical and theoretical grounds to support this statement, given the lack of previous research using this approach. The theoretical argument is that the negative relationship between social capital and turnout is only reserved to online social capital for the reasons stated above. The combined scale should follow the traditional pattern that I expect between social capital and turnout. This relationship is stated in the following hypothesis:

Hypothesis 9 *Higher levels of combined social capital (online and offline) are positively related with a higher likelihood of voting*

These three hypothesis aim to uncover different ways in which social capital is related to the most traditional form of political participation: voting. At this point, my aim is to move beyond the traditional dichotomy of online vs offline behaviour. Rather, as I have explored in chapters 3 and 4, my goal is to compare those who focus mostly on online social connections to those who can hold a balance between offline and online. Also, as it is explained in chapter 4 when discussing the estimation of ideal positions based on the ORG, the design of the questionnaire allows me to unpack how do people access social resources, and in turn, how they access social capital. That is why the combined scale is not a simple sum of people accessing certain resources online and other offline. Rather, it is a measure of how balanced is the access to the same resources at the same time. This is important, as it is a departure from the traditional idea that online and offline are separate and antagonistic concepts, an idea challenged in the previous chapters).

5.3 Data and Methods

I created a cross-sectional dataset combining data from the first three waves of the British Election Study Internet Panel (Fieldhouse, J. Green, et al. 2015). I use the data obtained from the Online Resource Generator (see chapter 4 for details) in order to estimate the different scales of general, online, and combined social capital[4].

In order to test the hypotheses, I focus on the study of two different elections, the European Parliament (EP) Election in 2014 and the UK General Election (GE) in 2015. As the literature has established (for a full review of topic the see Marsh and Mikhaylov 2010), European elections are considered as second-order elections. The operational definition of second-order elections is broad, as Reif et al. (1997) explain, it refers to "all elections (except the one that fills the most important political office of the entire system and therefore is the first-order election) are national second-order elections, irrespective of whether they take place in the entire, or only in part of, the country" (p. 117). In the case of national elections, what is at stake is the most important political position: government. Whereas in the EP election, what is at stake seems to be less tangible and, therefore, affects individual decisions with regards to voting.

There are two concrete differences between first-order and second-order elections that are interesting for my analysis. First, turnout in second-order elections is usually lower than in national elections. This difference can be related to a rational mechanism in which, being less at stake, people are less interested in voting (Franklin 2004), or to contextual factors, such as support for the EU (Franklin 2007). The second difference relates to vote choice and strategic incentives. Given that is less at stake, people can be more honest with their voting preferences, or even decide to vote for smaller parties as a way to punish their main preferred option[5].

[4] A detailed explanation of the measures from the ORG can be found in chapter 4. Each social capital scale is the result of an ideal point estimation using Bayesian Item Response Theory. According to their responses to the 18 questions of the module (whether they can access a list of resources online, offline or in both ways), each respondent has a position on the latent variable for each of the scales. Usually, the scales go from -2 (minimum level of social capital) to 2 (highest level of social capital).

[5] For example, in the last EP election, UKIP gained the highest support among all UK political

These differences in terms of voting behaviour are relevant for my empirical analysis, since the evidence (Heath, McLean, et al. 1999) shows that the paradigm of first and second order elections fits well in the case of the UK. As an example, while in the GE2015 I would expect a balanced effect of both rational and moral considerations for voting, this relationship might be unbalanced in the case of the EP election, with a higher relevance for rational considerations. And given that social capital is mostly considered as one of the ways in which social and civic norms are created and developed, we could expect that it would have more impact as a moral than a rational consideration.

There is one important caveat about the limitations of the BES data I use in this chapter. For this thesis, I use data from the first three waves of the BES, which corresponds to the pre-election period (February to October 2014). During 2015, the BES team has released other waves, but in order to focus on the completion of this thesis, I made the decision of not using any further releases. This decision limits my analysis in the sense that the available data do not consider self-reported turnout for the General Election, but it does for the European Parliament election. I discuss below the implications of using these different data sources, but it is important to keep this distinction in mind when it comes to the different inferences I can make from the results. Furthermore, as of August 21st 2015, the BES team has not released any data on validated turnout.

Another important implication of the time-frame of the data is that, until the release of the sixth wave of the BES in May 2015, the survey did not contain any questions on other forms of political participation but voting. This is relevant as the literature on the role of the internet on political behaviour is not usually focused exclusively on voting (as it is shown on the discussions above). Therefore, the contribution of this chapter focuses only on the relationship between social capital and turnout, leaving other forms of political participation aside. It is my purpose to incorporate further analyses of the relationship between political participation and social capital in future research projects, as data become available.

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parties (26.6%) while in the General election they only received 12.6% of the preferences.

5.3.1 Over-reporting and Turnout

When someone responds to a survey claiming that they have voted in a previous election, or that they intend to vote in the next election, that is not necessarily an accurate reflection of their behaviour. This gap between what people report and the actual behaviour usually goes in a single direction: over-reporting. There are mainly three reasons for over-reporting. First, people who are more attentive or interested to politics are more likely to respond political surveys. Given that we can empirically link political attention to higher levels of turnout, it is possible that we get a higher reported turnout on a survey just because the respondents represent a biased sample of the population (Karp and Brockington 2005).

A second reason is simply that respondents do not remember correctly whether they voted or not. If someone is asked about past behaviour, there is a real possibility that they will not recall it properly. Therefore, this can lead to both false positives or false negatives when comparing their responses to validated voting (Holbrook and Krosnick 2010; Stocké 2007).

A third reason is that respondents simply over-report. The literature (Denny and Doyle 2008; Clarke et al. 2004) has shown that in many cases people might report that they voted even when they did not. There are several explanations for this, but the most compelling is social desirability bias. People might feel compelled to say they voted given the alleged positive social feeling about it (McDonald 2003; Cassel 2003).

In the UK context, there is scarce literature (Karp and Brockington 2005) examining the determinants of over-reporting. Heath and Taylor (1999) have conducted a long-term analysis of the difference between reported and validated turnout in the UK, concluding that the relationship between the two has been consistent and constant over the years. This means that, when using regression analysis to understand the determinants of turnout, over-reporting only affects the constant term and not the slopes of the variables.

For the purpose of this chapter, I use two different measures to proxy turnout. The first one is the recalled turnout for the European Parliament (EP) election in

2014. The second one is the likelihood to vote in the General Election in May 2015. In the first case, we observe a big difference between the reported turnout (70%) and the real turnout in the UK (34%). This is something that I keep in mind when analysing the findings on this case.

For the General Election, the third wave of the BES 2015 asks respondents to rank their likelihood to vote in a scale from 1-5, being 1 very unlikely, and 5 more likely. I have created a dichotomous variable in which 5 is coded as one (high likelihood of voting) and 0 otherwise. This allows me to obtain a more conservative measure of turnout. Using this measure, the reported turnout is 73%. The 2015 election had a turnout of 66.1%, which is slightly higher than the last General Election (65.1%). The empirical implication of this difference is discussed above and refers to the constant term in the regression models, but this remains as a caveat for the interpretation of the results.

5.3.2 Modelling Strategy

In order to analyse the relationship between social capital and turnout, I have estimated different equations for each of the elections using logistic regressions. In the case of the European election, the equations are:

$$p(Turnout) = \frac{1}{1 + exp^{-(\beta_0 + \beta_1 SC_i + X_i B + u_i)}} \tag{5.1}$$

$$p(Turnout) = \frac{1}{1 + exp^{-(\beta_0 + \beta_1 OSC_i + X_i B + u_i)}} \tag{5.2}$$

$$p(Turnout) = \frac{1}{1 + exp^{-(\beta_0 + \beta_1 CSC_i + X_i B + u_i)}} \tag{5.3}$$

where *SC* is the individual position on general social capital scale, *OSC* is the term for online social capital and *CSC* is the term one for the combined social capital scale. *B* is a matrix with the control variables that affect turnout according to the different theories outlined above. This is a way to test the relevance of social capital against the rival explanations of turnout.

For the analysis of both elections I have used several items from the BES that

operationalise the different explanations behind voter turnout. In order to provide valid measures, the variables used here are similar (if not the same) as the ones used by Whiteley (2013) for previous BES studies. The rational choice model claims that the individual rational calculations between costs and benefits matter at the time of voting. For the operationalisation of the costs of voting, I used a simple averaged index across the reported agreement to three different statements: *"It takes too much time and effort to be active in politics"* (variable *efficacyTooMuchEffort*), *"It is difficult to understand what happens in gov and politics"* (variable *efficacyNotUnderstand*), and *"Going to vote is a lot of effort"* (variable *efficacyVoteEffort*). The BES also contains a variable (*efficacyEnjoyVote*) asking for the agreement to the statement *"Voting is an enjoyable experience"*, which I use to measure the perceived personal benefits of voting.

The civic voluntarism model mixes the personal characteristics of respondents with the efforts from political parties. As a measure of the individual demographic characteristics, I included the socio-economic status of respondents measured using the occupation analytic categories (NS-SEC) from the Office for National Statistics. These categories go from 1 being the highest occupational level (*"Higher managerial, administrative and professional occupations"*), to 8, being the lowest (*"Never worked and long-term unemployed"*). I also included the education level, measured as the age in which the respondents left school (variable *profile_education_age*). Other demographic variables related to the same model that are included in my analyses are the sex of respondents, the respondents' age, and whether the respondents identify themselves as black or minority ethnic. In the case of the analyses of the General Election, I added a measure on whether the respondents were contacted by one of the parties in during the last month to account for party activities (variable *partyContact*).

The next model refers to cognitive engagement, and is focused on political knowledge and attentiveness. For measuring political knowledge, I constructed a 0-12 scale (*polKnowledge*) summing up the correct responses from different questions asking whether respondents correctly identify different political figures. For

measuring political attentiveness, I use a self-reported scale (*polAttention*) from 0-10 in which 0 means that the respondent does not pay any attention to politics, and 10 means that they pay a lot of attention.

The equity fairness model refers to the assessment of the individual situation in relation to others. In the case of voting behaviour, this model consists on an evaluation on how politicians actions affect the personal situation and how the political system operates in the benefit of others. In order to operationalise this model, I created a deprivation variable averaging individual agreement on two different statements: *"Politicians only care about people with money"* (variable *polForTheRich*), and *"Politicians don't care what people like me think"* (variable *efficacyPolCare*). The original agreement variables were on a scale from 0 to 5, which is the same scale from the resulting deprivation variable. Other variable of this model is respondents' satisfaction with democracy (with the European democracy for the EP election analysis, and the UK democracy for the analysis of the General Election), and I have added the corresponding measure from the BES.

Moreover, as suggested by the model, I also included a variable measuring social pressure. I used a question from the BES about respondents' agreement to the statement *"Most people I know usually vote in general elections"* (variable *socialPressureVote*). For the operationalisation of civic norms, I use the agreement scale to the statement *"It is every citizen's duty to vote in an election"* (variable *dutyToVote*). As a way to control for socialisation effects, I used the turnout at the first election in which the respondent was eligible to vote.

The analysis for the General Election requires some extra variables in the models (the general election equations are below). First, I added a measure of the competitiveness of the election. In the UK, general elections are contested at the constituency level, and most of the constituencies are considered as "safe seats". The more attractive elections, where voters might feel that their vote has a higher influence, occurs in "marginal seats". In order to account for this, I have added the difference in percentage of the vote share between the first and the second candidate in the 2010 election for each constituency. This is consistent with the rational

choice model. The level of competitiveness relates to the rational calculation of individuals on whether how much their vote matters.

The second addition is a binary measure of whether the respondents have been contacted by any of the political parties in the last month, with the aim to ask them to vote for them. Although the BES third wave took place before the main election campaign period, I am interested in controlling for any ”long-campaign” effects, that is, the period before the official election campaign.

In terms of statistical estimation, the strategy for the General Election is also different from the European Election one. I have estimated the General Election regressions using multilevel analysis at the constituency level, allowing the intercepts to vary by each one of them. The purpose of this is to account for any variation across the different constituencies that might be left unobserved. The final models can be expressed as follows:

$$p(Turnout) = \frac{1}{1 + exp^{-(\alpha_j + \beta_1 SC_i + X_i B + u_i)}} \tag{5.4}$$

$$p(Turnout) = \frac{1}{1 + exp^{-(\alpha_j + \beta_1 OSC_i + X_i B + u_i)}} \tag{5.5}$$

$$p(Turnout) = \frac{1}{1 + exp^{-(\alpha_j + \beta_1 CSC_i + X_i B + u_i)}} \tag{5.6}$$

where B is a matrix with the control variables, and $alpha_j$ represents varying intercepts at the constituency level.

There are two theoretical mechanisms that could explain the association between social capital and turnout. The first one relates to the formation of civic norms, while the second one refers to the higher level of information that social capital can produce. Thus, I have added a final model for each election with an interaction term between social capital and political knowledge, and another one between social capital and civic norms. These interactions are aimed to test the potential mechanisms explained above, by analysing the combined effect that the variables in the interactions may have with the probability of reporting turnout. In particular, I expect that the interaction terms should produce statistically significant

results, but remain agnostic with regards to the direction of the coefficients.

Finally, as a way to produce comparable and easily understandable results, I have also estimated the marginal effects of the different social capital variables, and the change in probabilities from the lowest to the highest level on each scale. One of the important aspects of estimating the probabilities is calculating the uncertainty around them. I have used a pseudo-bayesian approach to estimate the confidence intervals around my estimations. This is a recommended method for obtaining uncertainty levels, which is both more simple and accurate than traditional methods, such as delta method or bootstrapping (Gelman and Hill 2006).

5.4 Results and Discussion

5.4.1 General Social Capital

Firstly, I concentrate on the analysis of the general scale of social capital, which are aimed to test hypothesis 7. Table 5.1 shows the regression models using the general social capital scale as the main independent variable. Models 1-5 correspond to the European Parliament election, while 6-10 are the multilevel models for the General Election

Table 5.1: Regression Models for General Social Capital (EP and GE)

	EP turnout					UK turnout				
	Logistic models					Multilevel Models				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**
General Social Capital	0.096***	−0.007	0.182***	0.025	0.418**	0.119***	−0.111**	0.216***	−0.099*	−0.019
	(0.028)	(0.035)	(0.035)	(0.040)	(0.170)	(0.033)	(0.047)	(0.044)	(0.058)	(0.262)
Political Knowledge		0.084***		0.086***	0.089***		0.153***		0.126***	0.125***
		(0.012)		(0.015)	(0.015)		(0.017)		(0.021)	(0.021)
Political Attentiveness		0.062***		0.033	0.035*		0.188***		0.210***	0.211***
		(0.018)		(0.020)	(0.021)		(0.024)		(0.029)	(0.029)
Relative Deprivation		0.007		0.016	0.015		−0.002		−0.066	−0.061
		(0.035)		(0.039)	(0.039)		(0.049)		(0.060)	(0.060)
Costs		−0.465***		−0.571***	−0.572***		−0.841***		−0.800***	−0.797***
		(0.048)		(0.055)	(0.055)		(0.072)		(0.086)	(0.086)
Benefits		0.534***		0.554***	0.550***		0.424***		0.456***	0.443***
		(0.040)		(0.045)	(0.045)		(0.053)		(0.065)	(0.065)
Social Pressure		0.084***		0.098***	0.102***		0.173***		0.179***	0.172***
		(0.027)		(0.030)	(0.030)		(0.039)		(0.045)	(0.045)
Satisfaction with Democracy		−0.032		0.005	0.008		0.194***		0.204***	0.191***
		(0.037)		(0.041)	(0.041)		(0.047)		(0.056)	(0.056)
Civic Norms		0.415***		0.411***	0.393***		0.954***		0.983***	0.978***
		(0.034)		(0.039)	(0.039)		(0.052)		(0.062)	(0.063)
Socialisation		0.036***		0.003	0.002		0.043***		−0.031**	−0.025*
		(0.006)		(0.009)	(0.009)		(0.008)		(0.013)	(0.013)
Age			0.037***	0.020***	0.020***			0.051***	0.030***	0.028***
			(0.003)	(0.004)	(0.004)			(0.004)	(0.006)	(0.006)
NS-SEC Analytic			−0.035*	0.021	0.020			−0.119***	−0.055*	−0.064**
			(0.019)	(0.022)	(0.022)			(0.024)	(0.032)	(0.032)
Education			0.135***	0.036	0.035			0.160***	−0.078*	−0.075
			(0.028)	(0.031)	(0.031)			(0.035)	(0.046)	(0.046)
Female			−0.373***	−0.163**	−0.160**			−0.414***	−0.083	−0.110
			(0.068)	(0.080)	(0.081)			(0.085)	(0.118)	(0.118)
BME			0.032	−0.024	−0.024			0.288*	0.326	0.308
			(0.135)	(0.155)	(0.155)			(0.171)	(0.226)	(0.225)
Party Contact							0.217		0.370*	0.351*
							(0.161)		(0.191)	(0.190)
Marginality							−0.003		−0.005	−0.006
							(0.005)		(0.006)	(0.006)
General SC x Pol. Knowledge					0.010					0.019
					(0.012)					(0.017)
General SC x Civic Norms					−0.126***					−0.062
					(0.037)					(0.057)
Constant	0.863***	−5.007***	−0.984***	−3.392***	−3.253***	1.236***	−7.802***	−1.074***	−3.615***	−3.803***
	(0.029)	(0.459)	(0.253)	(0.661)	(0.662)	(0.048)	(0.641)	(0.324)	(0.981)	(0.977)
N	6052	5362	4820	4794	4794	6281	5995	5015	4792	4792
Log Likelihood	−3444.208	−2500.671	−2579.573	−2126.060	−2120.071	−3049.272	−1821.697	−2170.229	−1401.035	−1399.766
AIC	6892.415	5023.343	5173.147	4284.121	4276.142	6104.543	3671.393	4356.457	2840.070	2841.532
BIC						6124.779	3765.175	4408.619	2963.089	2977.501

***p < .01; **p < .05; *p < .1

Model 1 shows the bivariate relationship between general social capital and turnout. This model shows that the association is positive and significant at the $p < 0.05$ level, which means that increases in the levels of general social capital scale are associated with increases in the likelihood of reporting turnout. Model 2 incorporates the variables measuring the rival explanations to turnout with the exception of the demographic controls. In this case, the coefficient for the general social capital scale changes. First, it becomes negative, but most importantly, is not statistically significant. In this model, the alternative variables produce the expected results: political knowledge and political attentiveness are positively associated with probability of reporting voting in the last EP election. The rational choice variables also behave as expected, with costs of voting showing a negative significant association with the dependent variable, and the benefits of voting showing a positive significant association. Other variables also go in the expected direction. Social pressure, socialisation, and the presence of civic norms show a positive significant association with the probability of reporting turnout. Relative deprivation and satisfaction with democracy do not show any significant results. These variables are meant to control for other potential explanations, but since they do not include any of the demographic variables, it is likely to suffer from omitted variable bias.

Model 3 follows a different strategy. It includes the general social capital scale along with the demographic variables. In this case, general social capital shows a positive significant association with self-reported turnout. With regards to the demographic controls, age is positively associated with a $p - value$ below 0.01. More educated people also show a higher probability of reporting that they have voted in the EP election, while women are less likely to report it. I interpret that the relationship I observe in Model 1 between general social capital and turnout holds even after controlling for demographic variables. However, as explained before, analyses that do not use fully specified models may suffer from omitted variable bias and, hence, the interpretation of their results should be taken carefully.

The fourth is the fully specified model, that is, that includes both the attitudinal and the demographic variables as control for the relationship between the general

social capital and self-reported turnout. In this case, the significance of the association between general social capital and turnout disappears, which confirms the notion that the previous models could suffer from omitted variable bias. Furthermore, most of the results from models 2 and 3 hold, with three exceptions: the coefficients for political attentiveness, socialisation, and education are no longer significant.

Model 4 is used to test hypothesis 7. The results show that the hypothesis can be rejected. Social capital does not show a significant direct association with the probability of reporting turnout in the European Parliament election. One of the potential explanations of this results is that social capital is less relevant for second-order elections in comparison to more rational considerations. As the theory suggests, the lower stakes of second-order elections make strategic considerations, such as the perceived cost of voting, more important for the decision of voting.

In order to provide a preliminary test of the mechanisms through which social capital can affect turnout, the next model is an extension of model 4 with the interaction terms between general social capital and political knowledge, and between general social capital and civic norms. The coefficient for the interaction with political knowledge shows no significant association, while the interaction with civic norms shows a negative coefficient (-0.126, $S.E. = 0.037$). The statistical interpretation of these results is more complex than the coefficients in Model 4. The coefficient for general social capital on this model (0.418, $S.E. = 0.170$) shows that when we set the levels of political knowledge and civic norms at their minimum, a higher level of general social capital increases the probability of reported turnout in the EP election. The negative coefficient for the interaction term with civic norms can be interpreted as a combined negative relationship.

Figure 5.1 shows the graphical representation of this effect. The green line shows the probability of reported turnout at each increase of the civic norms scale at the mean of the general social capital scale. The red line shows the same relationship but with the social capital scale set at one standard deviation below its mean, and the blue line plots the same change in the probabilities, but one standard devi-

ation above the mean of the general social capital scale. In substantive terms, this means that the positive association between civic norms and self-reported turnout becomes weaker the more the level of individual social capital increases. The purpose of this interaction is to explore the theoretical mechanisms by which social capital can foster turnout. I present below, after the analysis of all the models, a more comprehensive interpretation for the interaction effects.

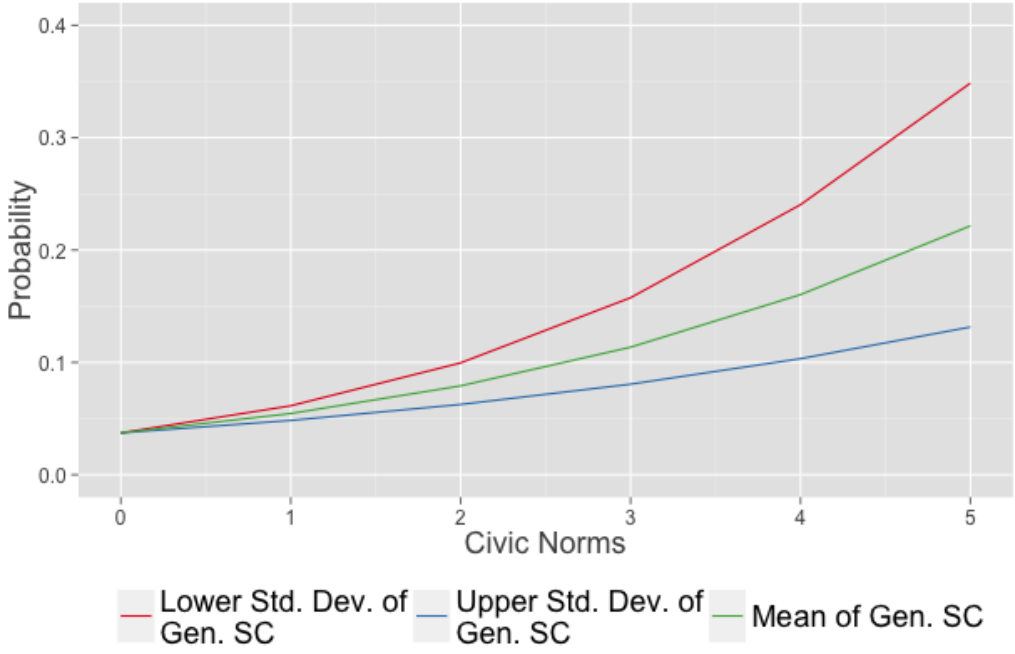


Figure 5.1: General Social capital x Civic Norms

Moving on to the British General Election models (Models 6 - 10), the results show a similar pattern than the EP election models. Model 6 is the bivariate relationship between the general social capital scale and the self-reported turnout in the General Election. The coefficient is significant and positive (0.119, $S.E. = 0.033$), which means that an increase in the levels of social capital is associated with an increase in the probability of (reported) turnout. The coefficient becomes negatively significant once I add the other alternative variables that are used to explain turnout, which may be related to the presence of omitted variable bias. Political

knowledge, attentiveness, the perceived benefits of voting, social pressure, satisfaction with democracy, civic norms and socialisation show a significant positive association with the probability of respondents reporting they they will vote in the upcoming general election. The campaign related variables — party contact and marginality — show no significant association. This result is not surprising given that at the time of the collection of the data used in these analyses, the main campaign had not started. Also, the perceived costs of voting show a significant negative association, which is consistent with the theoretical expectations.

Model 8 shows the association between general social capital and turnout controlling for the demographic variables. In this case, the coefficient for general social capital is positive and significant, which is consistent with the results from Model 6. Age, education, and socio-economic status show a significant association, while women appears less likely to report that they would vote in the next election.

Model 9 provides the full picture of the different determinants of reporting the probability of voting in the next election. In this case, the coefficient for general social capital is no longer significant at the $p < 0.05$ level. This is consistent with the results from the EP election, and shows that the evidence used in this chapter does not support the theoretical relationship stated in hypothesis 7. The change in sign and significance of the general social capital coefficients across the different models can be explained as a result of not using the full model (i.e. omitted variable bias). Although the full model is more consistent in terms of using a larger set of potential explanations for voting behaviour, omitted variable bias cannot be overruled. My proposition is that the strategy used is more adequate to overcome this potential problem.

Model 10 shows that the interaction terms do not produce any significant results, while keeping most of the coefficients for the control variables unchanged from Model 9.

5.4.2 Online Social Capital

Hypothesis 8 stated that online social capital has a negative association with turnout. Table 5.2 shows the results of the models using the online social capital scale. In this

case, the results look a bit different. I followed the same strategy used in Table 5.1, with the first five models studying the relationship with the reported election for the EP election, while the last five models use the reported probability of voting in the next GE as the dependent variable. Model 11 shows no significant association (at the $p < 0.05$ level) between online social capital and reported turnout. However, unlike the case of general social capital, the online social capital scale shows a negative association with the dependent variable. This pattern is repeated in Model 12, after controlling for the set of variables from the theoretical models described above: the coefficient is negative, but not significant. Political knowledge, attentiveness, the benefits of voting, social pressure, satisfaction with democracy, the presence of civic norms, and socialisation show a significant positive association with the individual probability of voting in the next general election. Consequently, the costs of voting show a negative significant association.

Model 13 shows the relationship between online social capital controlling for the set of demographic variables. The coefficient for online social capital remains negative and statistically non-significant while age, socio-economic status, and education show a positive significant association with the dependent variable, while women are less likely to report that they voted in the EP election.

As it was observed in the analysis of the general social capital models, the fully specified models are the ones that should concern me more when studying the relationship between social capital and turnout. Model 14 shows the full model for online social capital in the EP election. The coefficient for online social capital remains negative and non-significant, while the control variables maintain the same relationship as in models 12 and 13 with the exception of education, which is not longer significant. The interactions shown in model 15 are also non-significant, which means that there is no evidence of a combined effect between online social capital and political knowledge and civic norms. So far, the evidence from the EP election show no support for hypothesis 8, although the coefficients do show the expected direction.

Table 5.2: Regression Models for Online Social Capital (EP and GE)

	EP turnout					UK turnout				
	Logistic Models					Multilevel Models				
	Model 11	**Model 12**	**Model 13**	**Model 14**	**Model 15**	**Model 16**	**Model 17**	**Model 18**	**Model 19**	**Model 20**
Online Social Capital	−0.054*	−0.012	−0.003	−0.005	0.002	−0.184***	−0.194***	−0.083**	−0.114**	0.324
	(0.027)	(0.034)	(0.033)	(0.037)	(0.172)	(0.032)	(0.045)	(0.041)	(0.054)	(0.251)
Political Knowledge		0.084***		0.086***	0.086***		0.146***		0.120***	0.118***
		(0.012)		(0.015)	(0.015)		(0.017)		(0.021)	(0.021)
Political Attentiveness		0.062***		0.034*	0.035*		0.190***		0.210***	0.212***
		(0.018)		(0.020)	(0.020)		(0.024)		(0.029)	(0.029)
Relative Deprivation		0.007		0.014	0.014		0.020		−0.038	−0.042
		(0.035)		(0.039)	(0.039)		(0.049)		(0.059)	(0.060)
Costs		−0.464***		−0.570***	−0.570***		−0.834***		−0.781***	−0.775***
		(0.048)		(0.055)	(0.055)		(0.073)		(0.086)	(0.086)
Benefits		0.535***		0.555***	0.555***		0.427***		0.453***	0.450***
		(0.040)		(0.045)	(0.045)		(0.053)		(0.065)	(0.066)
Social Pressure		0.084***		0.100***	0.100***		0.159***		0.162***	0.167***
		(0.027)		(0.030)	(0.030)		(0.038)		(0.045)	(0.045)
Satisfaction with Democracy		−0.032		0.007	0.007		0.210***		0.203***	0.203***
		(0.037)		(0.041)	(0.041)		(0.047)		(0.056)	(0.056)
Civic Norms		0.415***		0.411***	0.411***		0.946***		0.988***	0.996***
		(0.034)		(0.039)	(0.039)		(0.052)		(0.062)	(0.063)
Socialisation		0.036***		0.003	0.003		0.044***		−0.024*	−0.027**
		(0.006)		(0.009)	(0.009)		(0.008)		(0.013)	(0.013)
Age			0.035***	0.020***	0.020***			0.048***	0.029***	0.030***
			(0.003)	(0.004)	(0.004)			(0.003)	(0.006)	(0.006)
NS-SEC Nnalytic			−0.051***	0.019	0.019			−0.140***	−0.049	−0.053*
			(0.019)	(0.022)	(0.022)			(0.024)	(0.031)	(0.031)
Education			0.153***	0.038	0.038			0.179***	−0.071	−0.070
			(0.027)	(0.031)	(0.031)			(0.035)	(0.046)	(0.046)
Female			−0.372***	−0.162**	−0.163**			−0.410***	−0.086	−0.101
			(0.067)	(0.080)	(0.080)			(0.084)	(0.118)	(0.118)
BME			−0.001	−0.030	−0.033			0.220	0.313	0.336
			(0.135)	(0.155)	(0.155)			(0.170)	(0.225)	(0.226)
Party Contact							0.203		0.362*	0.341*
							(0.160)		(0.190)	(0.190)
Marginality							−0.004		−0.005	−0.005
							(0.005)		(0.006)	(0.006)
Online SC x Pol. Knowledge					0.003					0.009
					(0.012)					(0.017)
Online SC x Civic Norms					−0.008					−0.133**
					(0.040)					(0.053)
Constant	0.858***	−5.010***	−0.875***	−3.378***	−3.372***	1.232***	−7.825***	−0.870***	−4.180***	−4.046***
	(0.029)	(0.455)	(0.252)	(0.660)	(0.661)	(0.048)	(0.637)	(0.321)	(0.976)	(0.977)
N	6052	5362	4820	4794	4794	6281	5995	5015	4792	4792
Log Likelihood	−3448.728	−2500.721	−2592.380	−2126.220	−2126.172	−3039.442	−1815.160	−2180.321	−1400.399	−1396.983
AIC	6901.455	5023.443	5198.760	4284.440	4288.344	6084.884	3658.320	4376.642	2838.798	2835.966
BIC						6105.120	3752.101	4428.803	2961.817	2971.935

***p < .01; **p < .05; *p < .1

Models 16 to 20 study the relationship between online social capital and the probability of reporting the intention to vote in the next general election. In this case, as in all the models studying the GE, I used multilevel models with varying intercepts per constituency. This means that the slopes of the coefficients are calculated at the individual level, while the constant terms change according by constituency. The purpose of this step is to account for any variations across constituency that are left unobserved by the available data.

Model 16 shows initial support for hypothesis 8: the coefficient for online social capital is negative (-0.184, $S.E. = 0.027$). This relationship is consistent even after controlling for the alternative theoretical models that explain turnout (Model 17). Political knowledge, attentiveness, the perceived benefits of voting, social pressure, satisfaction with democracy, civic norms, and socialisation show a significant positive relationship with reported turnout in the General Election. The individual costs of voting are negatively related to the dependent variable.

The next model — 18 — looks at the relationship between online social capital and turnout, while controlling for the demographic variables. Just like in the the previous two models, the coefficient for online social capital remains negative (-0.083, $S.E. = 0.041$). Age, socio-economic status, and education are positively related to the probability of reporting a high intention to vote, while, according to this model, women are less likely to report it. Although this result is not consistent with the previous literature on UK elections (R. Campbell 2006), this is not problematic as the fully specified model — 19 — shows no significant difference between men and women.

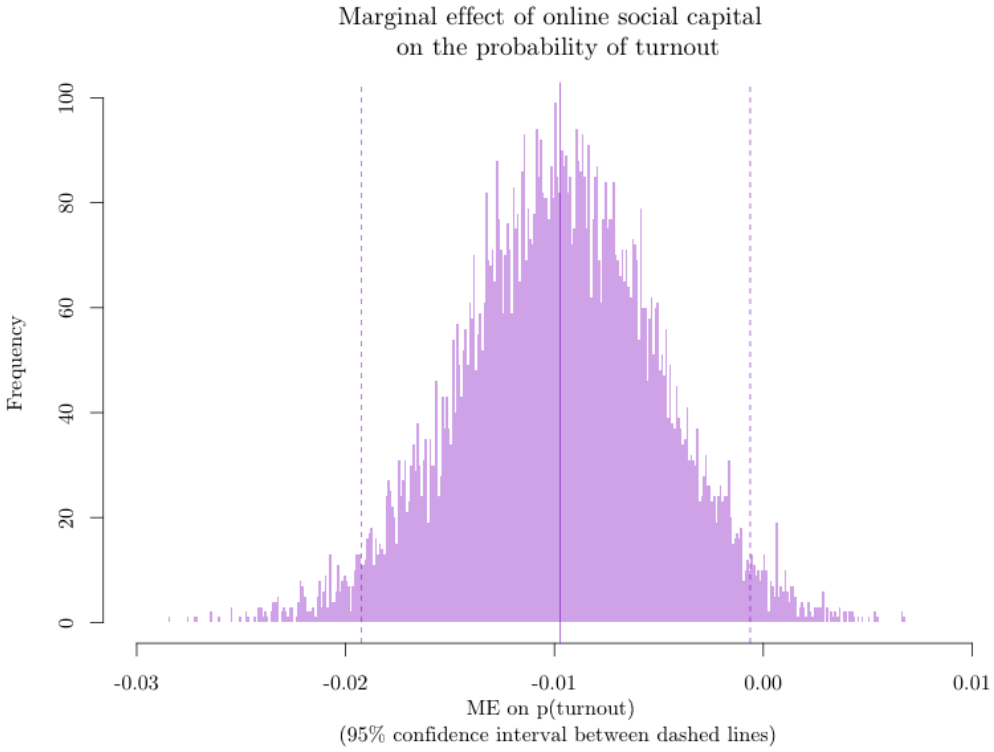
Model 19 shows the full specification of the relationship between online social capital and reported turnout for the General Election. The coefficient for online social capital remains negative and statistically significant, which suggests support for hypothesis 8. According to this result, online social capital is negatively related to the probability of voting, even after controlling tor other theoretical and demographic explanations. The difference of this result with the obtained in model 14 for the EP election could be explained by the different nature of the elections. It

seems that the hypothesised relationship between online social capital and turnout only exists in first-order elections.

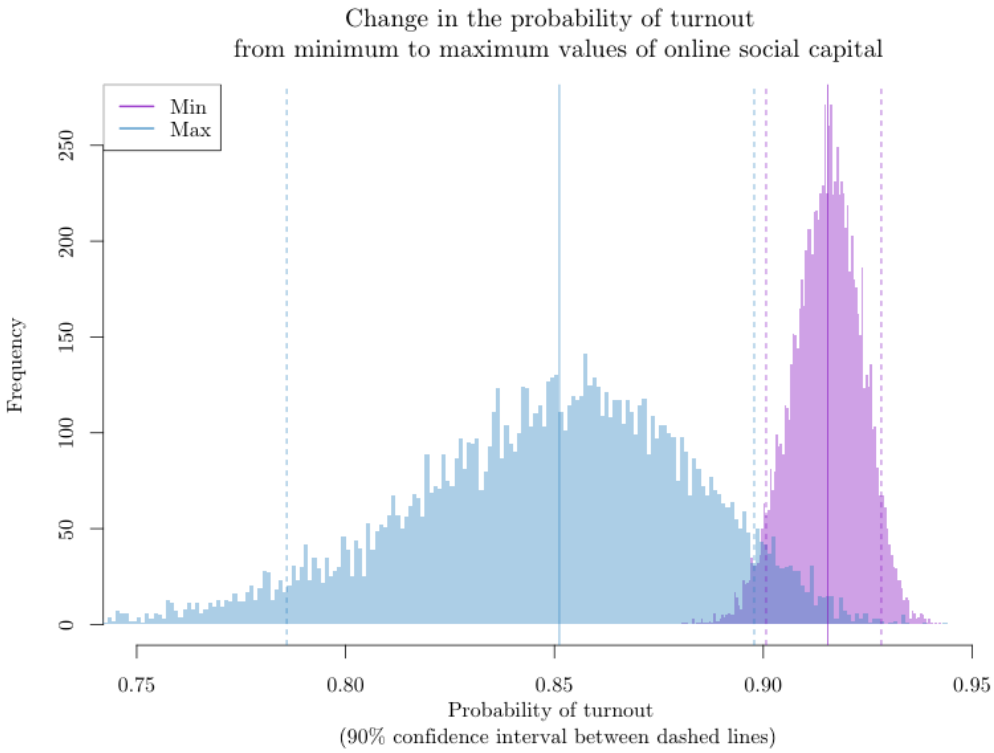
The original expectation with regards to first and second-order elections is that in the latter rational considerations, such as the costs and benefits of voting, are more relevant for the decision of voting. The lack of direct association between social capital and reported turnout in the EP election is one of the differences with the GE election models, along with a lack of significant association with socialisation and satisfaction with democracy, which are significant for the GE. These three differences are not conclusive to claim that this expectation is met, but they do provide preliminary evidence in its support.

The online social capital coefficient in model 19 cannot be directly interpreted. Therefore, I have followed two different strategies to explore the potential in a more simple way. First, I calculated the marginal effect of the online social capital scale at its mean while keeping all the other variables at their means or modal categories. The second strategy is the minimax variation in predicted probabilities between the minimum and the maximum values of the online social capital scale, while keeping the other variables at their mean or modal categories. For both cases, I estimated the 95% confidence interval around the estimation using a pseudo-bayesian approach.

The marginal effect at the mean of the online social capital scale can be seen in Figure 5.2a. The graph shows that at the mean of the scale, we can observe a marginal effect of almost -1%, with a confidence interval that excludes zero. Figure 5.2b shows that going from the minimum to the maximum value of the online social capital scale while keeping all other variables constant at their mean or modal categories leads to a decrease of 6.4% (from 0.915 to 0.851) in the probabilities of reporting the intention to vote in the next election.



(a) Marginal effect online social capital - UK General Election



(b) Change in probabilities online social capital - UK General Election

Figure 5.2: Probabilities for the Online Social Capital scale

As a caveat, I cannot directly conclude from these results that online social capital is harming voting turnout. First, I am careful not to suggest any causal explanations, due to the cross-sectional nature of the data from the ORG, and the inherent endogeneity of social capital and other social behaviours (as described in chapter 4). Instead, the interpretation is that that, on average, people who have higher levels of social capital, but that social capital is accessed mainly through online means, show a lower likelihood of voting than people who have similar levels of social capital but accessed in other ways.

Moving on to Model 20, the interaction effect between online social capital and civic norms also presents a significant coefficient. The interpretation is similar to the one in the case of the interaction term in the models for the general social capital scale in the EP election. The positive relationship between civic norms and turnout seems to become smaller as the level of social capital increases. As in Figure 5.1, Figure 5.3 compares the change in probabilities at the mean level of online social capital, and one standard deviation up and down.

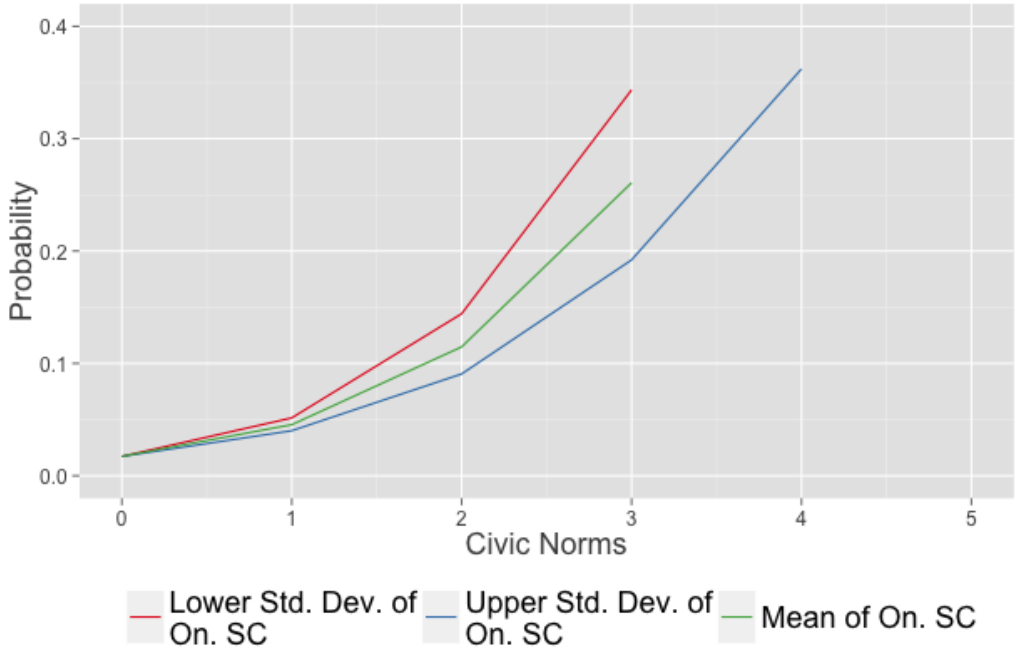


Figure 5.3: Interaction effects - UK election

In summary, the results from these models show that hypothesis 8 has partial support, but only for the General Election. In the case of the European Parliament election, there is no evidence of a direct relationship between online social capital and reported turnout. The results also show that the combined effect between online social capital and civic norms produces a significant coefficient which explains that the positive association between civic norms and reported turnout becomes less relevant a the levels of online social capital increase.

5.4.3 Combined Social Capital

Hypothesis 2b states that higher levels combined social capital scale produce a significant and positive association with turnout. Table 5.3 shows the different results from the models using the combined social capital scale. As with the previous tables, the first five models concentrate on the EP election, while the last 5 use the reported intention to vote in the General Election.

Model 21 shows that the bivariate relationship between combined social capital scale — the one that measures the individual level of social capital that is maintained only through connections that exist both online and offline at the same time — and reported turnout in the EP election is positive and significant. However, the significance of the effect is lost after including other variables that explain turnout, as shown in Model 22. As with the previous models studied above, political knowledge, attentiveness, benefits of voting, social pressure, the presence of civic norms and a higher turnout at the first election in which they were eligible to vote show a positive association with the probability of reporting turnout in the EP election. Consequently, higher personal costs of voting present a negative significant association.

Table 5.3: Regression Models for Combined Social Capital (EP and GE)

	EP turnout					UK turnout				
	Logistic Models					Multivariate Models				
	Model 21	**Model 22**	**Model 23**	**Model 24**	**Model 25**	**Model 26**	**Model 27**	**Model 28**	**Model 29**	**Model 30**
Combined Social Capital	0.099***	0.012	0.128***	0.020	0.601***	0.220***	0.143***	0.277***	0.131**	0.601**
	(0.029)	(0.037)	(0.036)	(0.041)	(0.187)	(0.036)	(0.051)	(0.047)	(0.060)	(0.298)
Political Knowledge		0.084***		0.086***	0.090***		0.151***		0.126***	0.121***
		(0.012)		(0.015)	(0.015)		(0.017)		(0.021)	(0.021)
Political Attentiveness		0.062***		0.034*	0.034*		0.181***		0.198***	0.204***
		(0.018)		(0.020)	(0.020)		(0.024)		(0.028)	(0.028)
Relative Deprivation		0.008		0.015	0.010		0.036		−0.049	−0.066
		(0.035)		(0.039)	(0.039)		(0.049)		(0.059)	(0.059)
Costs		−0.464***		−0.569***	−0.564***		−0.833***		−0.796***	−0.796***
		(0.048)		(0.055)	(0.055)		(0.073)		(0.086)	(0.086)
Benefits		0.534***		0.556***	0.561***		0.409***		0.450***	0.446***
		(0.040)		(0.045)	(0.045)		(0.053)		(0.065)	(0.065)
Social Pressure		0.083***		0.100***	0.099***		0.153***		0.150***	0.155***
		(0.027)		(0.030)	(0.030)		(0.038)		(0.045)	(0.045)
Satisfaction with Democracy		−0.033		0.006	0.001		0.207***		0.205***	0.187***
		(0.037)		(0.041)	(0.041)		(0.047)		(0.056)	(0.056)
Civic Norms		0.415***		0.411***	0.393***		0.955***		0.983***	0.976***
		(0.034)		(0.039)	(0.040)		(0.052)		(0.062)	(0.063)
Socialisation		0.037***		0.003	0.002		0.051***		−0.029**	−0.028**
		(0.006)		(0.009)	(0.009)		(0.008)		(0.013)	(0.013)
Age			0.036***	0.020***	0.020***			0.051***	0.032***	0.032***
			(0.003)	(0.004)	(0.004)			(0.003)	(0.006)	(0.006)
NS-SEC Analytic			−0.042**	0.020	0.021			−0.119***	−0.042	−0.036
			(0.019)	(0.022)	(0.022)			(0.024)	(0.032)	(0.032)
Education			0.140***	0.037	0.036			0.152***	−0.089*	−0.092**
			(0.028)	(0.031)	(0.031)			(0.035)	(0.046)	(0.046)
Female			−0.374***	−0.163**	−0.170**			−0.417***	−0.089	−0.120
			(0.068)	(0.080)	(0.081)			(0.085)	(0.118)	(0.118)
BME			−0.007	−0.030	−0.039			0.210	0.308	0.310
			(0.135)	(0.155)	(0.156)			(0.171)	(0.225)	(0.225)
Party Contact							0.188		0.273	0.277
							(0.161)		(0.189)	(0.189)
Marginality							−0.004		−0.006	−0.007
							(0.005)		(0.006)	(0.006)
Combined SC x Pol. Knowledge					0.020					−0.009
					(0.014)					(0.019)
Combined SC x Civic Norms					−0.195***					−0.098
					(0.039)					(0.060)
Constant	0.866***	−5.040***	−0.905***	−3.389***	−3.301***	1.256***	−8.305***	−0.967***	−3.719***	−3.597***
	(0.029)	(0.459)	(0.252)	(0.661)	(0.661)	(0.048)	(0.645)	(0.324)	(0.974)	(0.972)
N	6052	5362	4820	4794	4794	6281	5995	5015	4792	4792
Log Likelihood	−3444.723	−2500.488	−2585.958	−2126.011	−2115.547	−3036.314	−1819.715	−2164.193	−1399.850	−1398.604
AIC	6893.446	5022.977	5185.916	4284.021	4267.093	6078.628	3667.430	4344.387	2837.700	2839.208
BIC						6098.863	3761.212	4396.548	2960.719	2975.177

***p < .01; **p < .05; *p < .1

Model 23 adds the demographic variables to the combined social capital scale. In this case, the association is positive (0.128, $S.E. = 0.036$), while age, socio-economic status, and education are also positively associated. As with the previous models using the EP election, women are less likely to report that they voted.

The full model for the EP election — 24 — confirms the results from Model 22, showing no significant association between the combined social capital scale and self-reported turnout in the EP election. The control variables show the same relationship as in the previous models, with the exception of political attentiveness, socio-economic status, and education that are no longer significant. This evidence shows no support for hypothesis 9 and is consistent with what is observed in all models using the data from the EP election: social capital shows no relationship with reported turnout in this election.

Although the models show no direct effect between combined social capital and reported turnout in the EP election, the results from Model 25 do produce significant results. The positive relationship between combined civic norms and reported turnout decreases when the levels of combined social capital increases. This is reflected with the negative coefficient for the interaction term (-0.195, $S.E. = 0.039$), and is visualised in Figure 5.4. As with the other interactions, the positive effect of the civic norms decreases the more the level of combined social capital increases.

The presence of this combined effect of social capital and civic norms along with the same observed effect with the combination of online social and civic norms in the EP election, and general social capital and civic norms in the GE election suggest a relationship between these two variables. I propose two different mechanisms by which social capital can produce a higher probability of voting. The interaction terms were intended to provide preliminary evidence on whether these mechanisms had any empirical support. Since none of the interactions using political knowledge produce a significant result, I do not have any evidence to support the information-based mechanism. This is based on Burt's (2005) notion that social capital — particularly bridging social capital — brings new information that, in turn, might lead people to participate.

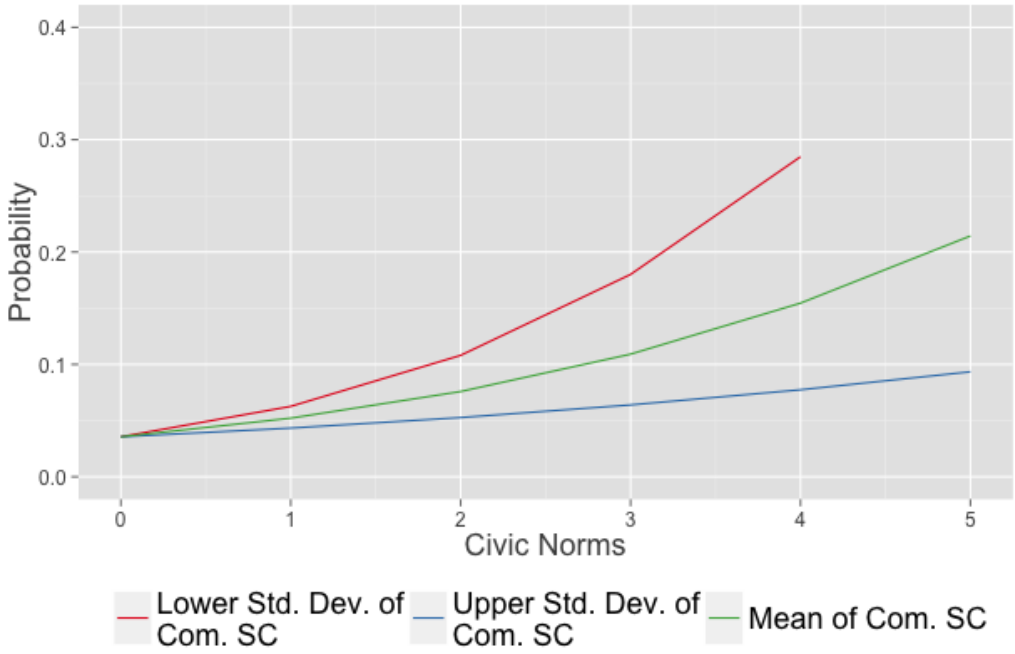


Figure 5.4: Combined Social capital x Civic Norms

The interactions with civic norms show a different pattern. The literature (Welzel, Inglehart, and Deutsch 2005; R. D. Putnam 2000) supports the idea that social fosters the creation of norms of civic norms, which in turn reflect on a higher propensity to participate. The results do show that these two variables produce a significant combined effect. Moreover, in all cases where there is evidence of this combination, the result is the same: a negative coefficient in the interaction term. This means that the association between civic norms and turnout decreases when the different levels of social capital increase.

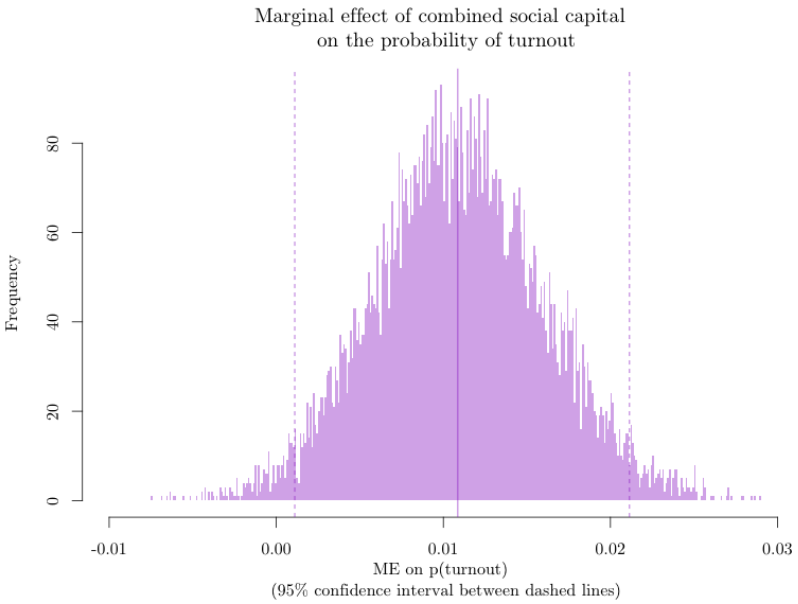
Given that the literature is fairly undeveloped in this area, it is not completely clear why the interaction produces a result in that direction. The civic norms variable measures the level of agreement with the statement that voting constitutes a civic duty. If civic norms were only the outcome of higher levels of social capital, we should expect that social capital would enhance the effect of civic norms on voting. This would be reflected with a positive coefficient in the interaction term. Conversely, the negative coefficients observed in this chapter suggest that the rela-

tionship between the both is not s simple causality. A more plausible explanation is that the relationship between these two variables is one of mediation, in which the effect of civic norms on turnout is mediated by the presence of the social capital. This is a proposition that escapes the purpose of this thesis, but is something that could be investigated further in future research projects.

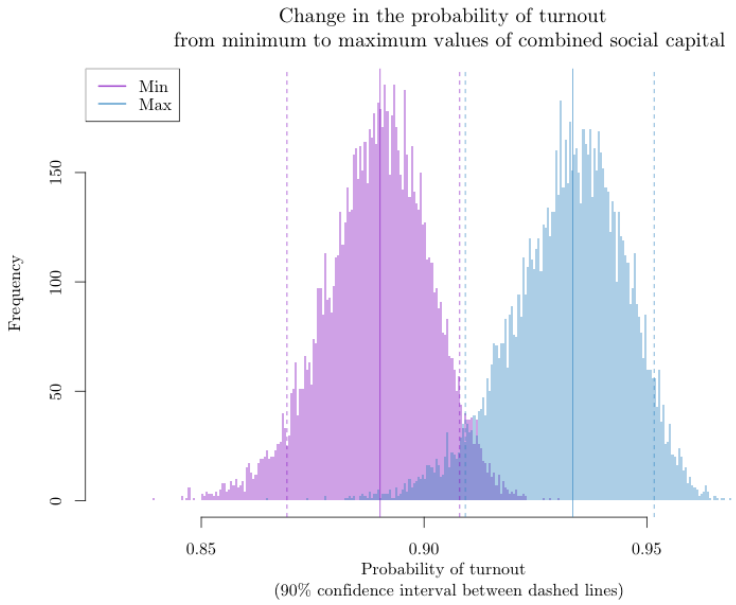
Coming back to Table 5.3, I move now to analyse the results from the General Election models. Model 26 shows the bivariate relationship between the combined social capital scale and the intention to vote in the General Election. The association is positive and statistically significant (0.22). This association holds across all different models in this case, even after controlling for other theoretical explanations of voting — Model 27 — and demographic controls — Model 28.

Model 29 shows that the relationship between combined social capital and the intention to vote is positive and statically significant, even after controlling for the rival explanations explored in this chapter, and for any unobserved differences across constituencies. Unlike the results from Models 21-25 using the EP election data, the results from the General Election provide support for hypothesis 9. That is, increases in the level of combined social capital leads to an increase in the likelihood of intention to vote for the British General Election.

In Figure 5.5 I follow the same strategy as in Figure 5.2 and calculated the marginal effects and the minimax variation in the predicted probabilities. Figure 5.5a shows that, at the mean of the combined scale, and while keeping everything else constant, the marginal effect of the combined social capital is 1%, and its 95% confidence interval remains above zero. When using the difference between the lowest and highest levels of combined social capital, the change in the predicted probabilities of voting rises from 0.89 to 0.93, representing a positive change of 4.3% (see Figure 5.5b). This is a lower effect size than in the case of online social capital, but in the opposite direction



(a) Marginal effect combined social capital - UK General Election



(b) Change in probabilities combined social capital - UK General Election

Figure 5.5: Probabilities for the Combined Social Capital scale

5.4.4 General Remarks

The objective of this chapter is to move beyond the traditional analyses of the effect — if any — that social capital has on turnout. I argue that distinguishing between different forms of social capital (and also different elections) is important to under-

stand the complexity behind the role that social connections play in the incentives for political participation. The literature on the role of social capital on turnout has overlooked the inherent mechanisms behind social connections. By treating social capital as a simple control variable or as a single construct, it fails to capture how the way in which we connect to others is related to our political actions. This chapter is an initial attempt to bridge that gap.

Throughout the discussion on self-reported turnout, I bring a word of caution about the interpretation of results using non validated measures of turnout. In the UK, validating the turnout from survey respondents requires access to the records from the Clerk of the Crown. Although the BES has planned to produce a measure of validated turnout, this is not available at the time of this thesis. Due to the lack of sufficient data, the discussions of this chapter cannot be conclusive with regards to voting behaviour. However, the literature on this topic (e.g. Blais and Rubenson 2013; Whiteley et al. 2013) usually relies on self-reported measures as a proxy for turnout, a strategy that provides face validity to my own research.

One important distinction that was highlighted in this chapter is between different types of elections. The literature on first-order and second-order elections shows that there are expected patterns with regards to turnout and voting behaviour. Apart form the differences in turnout, where the literature shows that less people would vote in the EP election, there are other important distinctions. In the particular case of this chapter, none of the models showed a direct significant relationship between any of the forms of social capital and turnout in the European Parliament election. A potential explanation for these results is the one anticipated in this chapter, i.e. that in second-order elections, moral considerations such as social capital play a less significant role in the decision of voting. Although this proposition is not directly tested here, the results from the models show that some of the rival explanations do act as a good predictors of reported turnout. Moreover, the comparison with the results of the British General Election support this idea.

With regards to hypothesis 7, the results show no support for it. The general social capital scale, as the evidence from the UK has revealed in the past, shows no

significant association with the variables measuring turnout in any of the elections analysed in this chapter. Although this result is expected given the previous findings from the literature, the fact that the other scales of social capital do produce significant results shows the relevance of understanding social capital as a complex concept that needs to be unpacked.

Hypothesis 8 states that the online social capital scale has a negative relationship with turnout. The results from the British General Election support this hypothesis and shows that, in fact, those who have higher levels of online social capital are less likely to report that they will vote. The data used in this chapter does not allow me to test if the reason behind the relationship observed in the case of the General Election is that respondents choose other, non-traditional, forms of participation. However, the literature has provided evidence in support of the idea that the use of ICTs is related to alternative forms of political participation. A potential extension of this chapter is the analysis of the relationships between the different forms of social capital and the different forms of political participation.

The test of hypothesis 9 also produces positive results. People with higher levels of combined social capital show a higher probability to report that they will vote in the next British General Election. This evidence supports the idea that people with combined social capital are more likely to engage in institutional political participation, but as stated above, it is not possible to provide a full comparison with other forms of participation (or with none).

The last evidence from this chapter relates to the interaction terms. Although this is not the main question of the chapter, the combination of civic norms and social capital is still relevant. In all the cases where this relationship is statistically significant, the effect goes in the same direction: the positive relationship between civic norms and turnouts decreases as the level of social capital increases. The potential explanation behind this interaction was explored above and relates to the different mechanisms by which social capital can affect turnout. In particular, I propose that it would be important to consider a potential mediation between social capital and civic norms.

In summary, the evidence from the chapters allows me to argue that people who are able to access social resources online and offline, and that do not choose one over the other, have access to more diverse networks. The information they obtain and the type of connections they create are different than those who focus primarily on online or offline connections. This might be related to the notion of bridging social capital. As Putnam points out (2000) when describing intra and extra group ties, societies where there is a virtuous mix of bridging and bonding social capital are more stable, have stronger institutions and better levels of trust. Higher levels of social capital, especially among diverse social contacts and resources, are positively related to successful institutions. Institutional success (i.e. trustworthy, stable, and efficient democratic institutions) requires an active citizenship that engages in institutional forms of participation. Through this two elements I suggest a potential link between diverse social capital and voting. If the combination of online and offline access is a reflection of this, this might explain why those who have a higher value on that scale are also more likely to engage in traditional, institutional political participation.

Chapter 6

Conclusions

The main goal of this thesis has been to critically examine the notion that the internet is changing the way we understand and practice politics. In order to achieve this, I have focused on the analysis of the structure of social capital, its content, and its outcomes in terms of voting behaviour. This final chapter aims to wrap up the different discussions and findings from the previous chapters and provide an overview of the main contributions and limitations of my thesis.

6.1 Main Contributions

From a theoretical point of view, I have argued that one of the main problems in the study of social capital is the lack of conceptual consistency in the literature. As is explained in chapter 2, the term social capital has been used with several disparate meanings in the past. Researchers have used the concept to refer to the individual advantage of social connections, to the presence of tight groups in a society, or the involvement in voluntary associations. For some time, social capital became an umbrella concept that encompassed a large array of different social phenomena, such as social cohesion, trust, community involvement, and civic engagement. Moreover, this conceptual diversity has been accompanied by a lack of consistency in terms of the measurement of the concept. In chapter 4, I discuss the common problems with the different attempts to measure social capital. In order to overcome these two problems, this thesis proposes a coherent strategy from the definition to the operationalisation of social capital

This thesis takes advantage of the progress in the field over the last 15 years, particularly since Putnam's publication of "Bowling Alone". In this book, he introduces the idea that social capital is comprised of networks, resources, and norms of trust and reciprocity. These elements can be considered as a "lowest common denominator" among different definitions, and form the basis of the definition I have created for this thesis. I define social capital as social networks based on trust and reciprocity that are able to mobilise resources and information. This definition is not only congruent with what the literature has been recently studying, but also provides a route map for empirical analysis. This is the first contribution of this thesis: a definition that is theoretically valid and that is directly observable.

This latter point is important, as it leads the methodological contributions of this thesis. Chapter 3 uses two network metrics to measure social capital that have been utilised in the literature. The use of network constraint and average clustering coefficients provide a valid way to analyse the structural signatures of social capital. However, one of the limitations of observing social networks in online contexts is the lack of ability to compare it to other contexts. Network constraint and clustering coefficients can tell us the degree to which certain structures are present in a network, but they do not explain whether those levels are relevant or not. I then expand this strategy by using simulations based on theoretical models. This approach allows me to determine whether the networks observed are different than random, or different than other theoretical expectations about social networks behaviour.

Another methodological contribution is the introduction of the Online Resource Generator. As described above, the lack of conceptual clarity when defining social capital has been met with an inconsistency in how social capital is operationalised. Chapter 4 discusses the different measures of social capital and their limitations. In light of them, I have designed the ORG as an instrument that provides several contributions to the existing methods. First, it focuses on actual resources, rather than assuming them. Second, it provides a measure of the diverse forms of social capital depending on how social resources can be accessed (online, offline, or both). Since the notions of social capital online and offline have been considered as

an either/or dichotomy for most of the literature, the ORG moves forward from this distinction based on the idea that social behaviour can be understood as a continuum instead of a dichotomy between online and offline.

From an empirical point of view, this thesis contributes to the literature that claims that social capital can be found in online settings. The evidence from chapter 3 shows that the structural signatures of social capital can be found in different online settings. Furthermore, the findings support the traditional expectation that organisations are relevant for creating bridging social capital, even in online settings. This is a departure from the recent literature that claims that online connections can make formal organisations irrelevant for collective action. The traditional theories about collective action are still relevant in the online era.

This thesis offers another empirical contribution by showing that the diverse forms of social capital are different in terms of the people who access each one of them. Higher levels of online social capital can be mostly observed in upper class men who are also Facebook users, while higher levels of combined social capital can be found, on average, in middle class men and women, who are more extroverted and that use both Twitter and Facebook. Higher levels of offline social capital are more recurrent among black and minority ethnic people, and also among those who do not use Facebook or Twitter regularly.

These differences are also reflected in the relationship between social capital and voter turnout. The theory suggests that higher levels of social capital are related to a higher probability of turnout, but the empirical evidence about this is scarce in the UK. My thesis provides evidence that this relationship needs unpacking by observing how different forms of social capital can be related to turnout in different elections. While none of the forms of social capital show a significant relationship with turnout in the context of the European Parliament elections, the online and combined social capital scales are significantly associated with turnout in the UK General election. Online social capital has a negative relationship with the probability of reporting turnout, which can be partly explained by the idea that the internet fosters other, non-institutional, forms of participation. However, this statement can-

not be tested at this point. Higher levels of combined social capital are positively related with turnout, which is preliminary evidence of the benefits of combining online and offline access to social resources. Also, I investigated the interaction between social capital and the presence of civic norms, and the findings show that any positive relationship between civic norms and turnout decreases when the levels of social capital increase. These findings contribute to the existing literature by showing the relevance of understanding social capital as a complex construct.

In summary, this thesis provides a definition that is well grounded in the literature and, at the same time, provides a clear route to measure it. From a methodological point of view, I provide two main contributions. First, I devised a strategy to compare the observed structural features through networks simulations. Second, I designed the ORG as a valid way to observe the content of social capital, i.e. the resources mobilised through social networks. Finally, from an empirical perspective, I show that social capital needs to be unpacked in terms of the platform in which it is created and sustained. Understanding this complexity is relevant to provide valid accounts of who holds different levels of social capital, and how these different forms of social capital are related to political participation.

6.2 Limitations of this Thesis

Throughout this thesis I have provided several contributions to the existing literature on social capital and political participation. However, as with any research strategies, there are inherent limitations to my approach.

I have argued that the measurement of the different components of social capital is a complex task. This thesis has focused on two elements of the definition: the structure of social networks, and the ability of social networks to mobilise resources. A clear limitation of this approach is that it assumes the presence of norms of trust and reciprocity. Observing the presence of these norms escapes the purpose of this thesis, but is important to acknowledge their existence and relevance. In future research, I would like to explore this topic and incorporate ways for measuring these norms in online and offline contexts.

In terms of the outcomes of social capital, this thesis has explored its relationship with voter turnout. One of the findings is that online social capital is negatively associated with turnout, and a possible theoretical argument from the literature suggests that this might be related to a preference for other forms of participation. However, due to the limitations of the currently available data, my thesis cannot account for how social capital is related to political participation outside the scope of voting. This is not a limitation for understanding the relationship with voting, but it limits my ability to provide a bigger picture about the relationship between social capital and political participation.

Another limitation of my thesis relates to the lack of test of the causal relationship between social capital and turnout. Social capital is a long-term trend, and building it requires time and effort. This means that the time-frame of the British Election Study does not allow me to observe big variations over time, even after considering that the data comes from a panel of respondents. A potential remedy for this would be to explore an experimental design to account for any spuriousness in the relationship. However, long-term behavioural trends are not easy to randomise, at least not in the context of short-term experiments. Another alternative would be to explore any potential instrumental variables that might be present in the data, but the literature is usually sceptical about finding good instruments within survey data. A third option for remedy would be to exploit the presence of a natural experiment, e.g. new property developments where people who do not know each other and create new social ties. However, if the purpose is to analyse the change in electoral behaviour, it would be a lengthy process that would require the observation of changes in social capital across different general elections.

Finally, the inability to explore a causal relationship is also present in understanding how social resources can be accessed and the levels of general social capital. As chapter 4 explains, it is not easy to separate analytically the way in which social networks are formed and the presence of social capital. This endogeneity is a feature of social capital, but it does no present a limitation that can be easily remedied. In fact, as both elements are constitutive parts of the concept, separating

them may not be the appropriate strategy. I argue that this endogeneity is inherent to the definition of social capital, and unpacking it would require strong assumptions about the precedence of social networks over resources.

6.3 Going Forward

The field of social capital has been very active for the past 40 years, with a revitalisation in the last decade due to the analysis of social capital in online contexts. My goal is that this thesis can provide new avenues for research for this area of the literature by providing new measurements of social capital, and by accounting for the different effects that social capital has on political participation depending on the nature of the social connections.

One option for future research relates to the validation of the Online Resource Generator in different contexts and in different populations. Furthermore, this new instrument requires a cross-validation against traditional measures of social capital. This step will not provide validity with regards to the presence of different forms of social capital, as most of them are not able to account for this diversity. However, the ORG does produce a measurement for general social capital, and that can be contrasted with traditional measurements.

The relationship between social capital and civic norms requires further investigation. The findings from chapter 5 show that the interaction between the two produce a significant relationship with turnout. However, there is not wnough evidence to establish the nature of this relationship. In the future, I would like to explore other alternative approaches such as analysing the relationship between social capital and civic norms as one of mediation. That is, that the relationship between social capital and turnout is mediated by the presence of high levels of civic norms. This step would allow me to expand on these findings and provide a clearer explanation for this association.

The presence of trust is also a pending issue in this thesis. I have explained this before in this chapter and also in the theoretical discussions of chapter 2. In summary, future research needs to find suitable ways to measure the presence of

trust in online settings, in a way that can be comparable to offline settings. Just as the ORG does, I would need to create an instrument that can account for this diversity and observe how trust differs depending on the context.

Finally, I expect that this thesis can contribute to the broader agenda of social capital and political participation by providing a new analytical framework. The use of network simulations, along with the ORG are theoretically driven decisions that are relevant for understanding social capital in online contexts. That is, I have aimed to connect, in a coherent and clear way, the definition with the measurement of social capital. Therefore, the current research agenda on the topic can benefit from the presence of a coherent strategy, and can expand the findings of this thesis to other scenarios of political participation. For example, the strategies used in this thesis can help us to provide more evidence on how ICTs can change participatory behaviour, and under which contexts. In that way, this research is an attempt to reject technological determinism in politics, and provide an alternative way to unpack how and when the internet matters for political participation.

Appendix A

Resource Generator - UK (Webber, 2006)

Do you personally know anyone with the skill or resource listed below that you are able to gain access to within one week if you needed it? Please answer all these questions, even if you possess the skill or resource yourself or if you have never needed to ask for it before. You will be asked about the skills later on. If 'yes', you may tick more than one box.

Table A.1: Original RG-UK version (Webber, 2006)

Do you currently have access to someone who...?	No	Yes	Immediate Family	Wider Family	Friend	Neighbour	Colleague	Acquaintance
1 ...can repair a broken-down car								
2 ...is a reliable tradesman (eg plumber, electrician)								
3 ...can speak another language fluently								
4 ...knows how to fix problems with computers								
5 ...is good at gardening								
6 ...has a professional occupation								
7 ...is a local councillor								
8 ...works for your local council								
9 ...can sometimes employ people								
10 ...knows a lot about goverment regulations								
11 ...has good contacts with the local newspaper, radio or t.v.								
12 ...knows a lot about health and fitness								
13 ...knows a lot about DIY								

Do you currently personally know anyone who would...?								
1 ...give you sound advice about money problems								
2 ...give you sound advice on problems at work								
3 ...help you to move or dispose of bulky items (eg lifting or use a van)								
4 ...help you with small jobs around the house								
5 ...do your shopping if you are ill								
6 ...lend you a small amount of money (eg for a local taxi fare)								

7 ...give you a careers advice								
8 ...discuss politics with you								
9 ...give you legal advice								
10 ...give you a good reference for a job								
11 ...get you cheap goods or “bargains”								
12 ...help you to find somewhere to live if you had to move home								
13 ...lend you a large amount of money (eg for a deposit on a flat or house)								
14 ...look after your home or pets if you go away								

Are you ...?	**No**	**Yes**						
1 ...able to repair a broken-down car								
2 ...a tradesman (eg plumber, electrician)								
3 ...able to speak another language fluently								
4 ...knowledgeable about fixing problems with computers								
5 ...good at gardening								
6 ...someone with a professional occupation								
7 ...a local councillor								
8 ...working for your local council								
9 ...able to sometimes employ people								
10 ...knowledgeable about government regulations								
11 ...someone with good contacts with a local newspaper, radio or t.v.								
12 ...knowledgeable about health and fitness								
13 ...knowledgeable about DIY								

Appendix B

Multicollinearity and Heteroskedasticity tests (chapter 4)

B.1 General Social Capital models

Table B.1 shows the VIF scores for models 1 and 2 which analyse the predictors of general social capital. None of the VIF scores show a high result, which suggests that the models do not suffer from multicollinearity.

Table B.1: VIF scores for models using General Social Capital (Table 4.12)

	VIF Model 1	VIF Model 2
Online	1.116	1.118
Combined	1.168	2.273
NS-SEC Analytic	1.037	1.038
Extraversion	1.015	1.015
BME	1.047	1.047
Married	1.230	1.230
Age	1.397	1.397
Household Size	1.256	1.257
Sex	1.038	2.487
Twitter use	1.128	1.128
Facebook use	1.105	1.107
Christian	1.096	1.096
Combined x Sex		3.522

I performed a Breusch-Pagan test to assess for any violation of the homoskedasticity assumption of OLS regressions. The results for the first model

produced a Chi-Square value of 4.75 with a p-value of 0.03, suggesting that the model was heteroskedastic. I recalculated the standard errors using a White-Huber corrected variance matrix. These are the standard errors reported in Table 4.12. In the case of model 2, the Breusch-Pagan test produced a Chi-Square value of 3.38 with a p-value of 0.07, which suggests that the homoskedasticity assumption is not violated.

B.2 Models Using Different Types of Social Capital

Table B.2 shows the VIF scores for all the variables of the models from Table 4.13. None of the variables showed a high score, which suggests that the independence assumption is not violated.

Table B.2: VIF scores for models using the different forms of social capital (Table 4.13)

	VIF Model 3	VIF Model 4	VIF Model 5
NS-SEC Analytic	1.023	1.023	1.023
Extraversion.x	1.010	1.010	1.010
BME	1.043	1.043	1.043
Married	1.227	1.227	1.227
Age	1.397	1.397	1.397
Household Size	1.244	1.244	1.244
Female	1.034	1.034	1.034
Twitter Use	1.119	1.119	1.119
Facebook Use	1.092	1.092	1.092
Christian	1.094	1.094	1.094

The Breusch-Pagan test showed that the models using the Online and the Combined Social Capital scales suffered from violations of the homoskedasticity assumption. The test of the online social capital model produced a Chi-Square value of 96.58, and the combined social capital model produced a Chi-Square value of 16.87 both with a p-value below 0.001. The test for the Combined Social Capital model produced a Chi-Square value of 1.45 and a p-value of 0.23. This evidence suggests that the first two models suffer from heteroskedasticity. The standard errors reported in Table 4.13 are corrected for this violation, where appropriate.

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