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Voting in context

A theory of environmental effects on electoral behavior

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1 Introduction

This work aims at analyzing theoretically and empirically the social and political environments and their relation with voting behavior. The basic idea behind the theory that will be exposed along the work can be summarized as follows: people, in their everyday lives, are assumed to interact among each other; moreover, these interactions are expected to construct, crystallize or even change one's believes and attitudes on myriad of topics. By means of interactions and opinions exchange, one can be affected about his/her everyday life decisions, such as buying a new car, trying a different restaurant, finding a job, getting involved in criminal activities or changing opinions about political matters. In these cases, it is usually stated that the individual has been affected by his/her *context* or *environment*. No strong assumptions are needed in order to accept these simple statements, and several works have investigated cases in which the environment, broadly defined, affect individual, and especially his/her voting behaviors and attitudes (Berelson Lazarsfeld McPhee 1954, Agnew 1987, Marsh 2002). An important amount of contributions, especially in US-based research, is focused on these issues and committed in seeking for evidences that connect the context, broadly defined, and voting behavior. Especially among European scholars of electoral behavior, the term context is usually considered as a vague, underdeveloped concept (Makse et al. 2014): tentatively, context is usually considered as the set of factors that do not depend – completely – on individuals, but contribute to affect behavior of these latter.

The most refined theoretical attempt of deepening the context term is that of Marsh (2002): according to Marsh's argument, it is possible to identify two types of context: the first, the global one, is connected with characteristics that can be defined as "high level factors" – institutions, party system, electoral laws, macro-historical or macro-social factors. The second, the compositional context, is given by the composition of the local units and is aimed at identifying how variations among these units will affect the behavior of individuals. Marsh argues that the focus on the latter type of effects has led to substantially poor results. Citing earlier works (Huckfeldt Sprague 1995, Pattie Johnston 1995, McAllister Studlar 1992), Marsh states, on the one hand, that geographical variation of electoral strength of parties, once considered as a "genuine" compositional effect, explains only residual amounts of variances of electoral outcomes, as well as personal relationships, that, according to Marsh, exert an effect, all things considered, weak. The suggestion of Marsh is, therefore, of abandoning studies that deal with compositional effects and focusing more on global contexts, which allow to appreciate quantitatively larger effects. The conclusion of Marsh is

illuminating on a specific way of understanding electoral studies. The theoretical and epistemological approach which permeates Marsh's argument – and a large part of European electoral studies in general – starts from the assumption that, from the theoretical and empirical point of view, political macro-environment has some kind of theoretical and technical precedence with respect to voter's social environments. In other words, the outcome of the election must be investigated, together with individual properties, by means of predictors substantially related to "high level" political factors that are placed "beyond" the individual with respect to relational factors, which are often difficult to empirically measure and theoretically understand. To some extent, the scientific project pursued by Marsh – and, with him, by an important part of the scholars who study elections – can be linked to the so-called new institutionalism (Hall Taylor 1996), a form theoretical approach to political and social facts that identifies institutions (in this case intended in a very broad sense) as relevant circumstances which affect human behaviors. It is important to stress that there is nothing wrong with this position. The new institutional argument made by Marsh is perfectly consistent with a political science-based idea of electoral studies, in which, rather than focusing on interactions, relations, networks and other "sociological" concepts, the researcher decides to focus on other factors, that actually contribute to shape vote choices differently, and, at the same time, are related to genuine "political" constructs (such as electoral laws and variation in party supply). These theoretical constructs are primarily national, and it seems quite obvious that, as we will see below, a large majority of voting behavior students are concerned in developing, theoretically and technically, relations between the vote and national predictors.

The route we will follow is different compared to the one exposed above: by and large, what we are going to follow is what can be defined as a *sociological way* of investigating electoral behavior. We argued above that, to some extent, interactions that happen during one's everyday life are relevant in shaping people ideas and behaviors. Citizens, by means of dyadic interactions, can be convinced to slightly change their opinion, or to sustain their idea more forcefully or, even, to be converted by, or convert, their discussant to different opinions. This, obviously, does not mean that people are not affected by national-level or purely political factors. More simply, what we argue is that, along with high-level political determinants to vote choices, a less studies set of factors, strictly connected to people's everyday lives, is important, if not crucial, in shaping citizenry political attitudes and behaviors. This framework, thus, represents some sort of alternative point of view by which we can see the same processes, such as an electoral campaign or results of an election. Theoretical and technical basis of this "sociological way" can be found in the 1940s and 1950s, in particular with the work of Paul Lazarsfeld and Bernard Berelson (Lazarsfeld Berelson Gaudet 1944, Berelson Lazarsfeld McPhee 1954) starting from clear and, at that time, innovative epistemological

assumptions. First of all, according to these theorists, it is possible to understand social reality by means of individual and, especially, relational mechanisms that guide human behavior in modern societies. Mechanisms, to a first approximation, are defined as "entities and activities organized such that they are productive of regular changes from start or set-up to finish or termination conditions" (Machamer Darden Craver 2000). Organizations, informal groups, social networks, structures of interdependence and actors are equally important to build theoretical models (Manzo 2010). This scientific program (that has been defined with the term "analytical sociology") is based on the idea of the individual as a non-atomized object of research and recognizes a softened form of methodological individualism, which has also been called structural individualism (Coleman 1990, Udehn 2001, Manzo 2010). Structural individualism, as understood from the interpretation of Coleman by Udhen, can be indented as a methodological individualism which stresses and investigates the presence of some kind of social structure and relational pattern among individuals and analyzes their relations and consequences. Differently from the classical structuralist sociology (e.g., Blau Schwartz 1984), structural individualism approach puts at the center of its theoretical treatment the individual, his desires, beliefs and opportunities. At the same time, it is expected that the structural conditions exert an effect on behavior outcomes. Keeping the individual at the center of our treatise, without forgetting his/her relational environment, means dealing with an individual who is affected by several types of effects, coming from outside him/her. More precisely, the effects that will be taken into consideration are essentially of two types: the first type is the one that will be defined as *network* effect. People with whom individuals share their everyday lives are a fundamental tool through which social – and voting – behavior is modeled. Following the ideas of several scholars (Granovetter 1973, 1983, Huckfeldt et al. 1995), we expect that the effects of stronger ties – i.e., people who are closest to us – will exert a greater effect on individual characteristics, while people who are less intimate will have a weaker effect. The second effect identified is that of geographic and temporal *context*. The context, as it will be defined, can be represented as a tool that contributes to *shape* the opportunities one has in encountering people that present certain characteristics (Blau 1977). In other words, it will be argued that the geographical and temporal contexts contribute to form the composition of the network the individual is embedded in. Another key argument of the work is connected to the relation between context and network and how this relation changes according to the strength of the relations that binds individual to different groups (such as relative, friends and coworkers, or simple strangers). The main feature of this environmental relation is that cohesiveness of different groups leads to different perceptions and connections with the broader context. This feature, as it will be seen throughout the work, has a huge impact on how individuals perceive the context and on how they can be indirectly connected

to this latter. A consistent part of the work, moreover, will be devoted to test hypotheses related to responses that individuals can give to contexts and networks. It will be argued, thus, that without clear theoretical expectations about relational strategies that citizens can give to the environmental stimuli, the theory would fall in some kind of sociological determinism. People, in other words, cannot be modeled simply as passive recipients of network and, indirectly, contextual effects. In order to overcome this theoretical hole, a set of expectation of relational strategies that individuals offer to their environment is constructed. The two main concepts which this theoretical framework is based on are assimilation and conflict. Given a certain pressure coming from the environment, an individual can conform to what comes from "outside" or, rather, the same person can refuse the external stimuli, by avoiding the discussant or engaging him/herself in a disagreeable relationship.

The theory, taken by and large, leads to a large number of expectations. Part of these expectations will be tested by means of Italian data, and, in particular, by the data collected during (and after) election campaigns of 2013 National Elections and 2014 European Elections. Italy represents an interesting case for many reasons: first of all, Italian political spectrum has been subjected, in those years, to a violent turmoil that threw into crisis the democratic changeover between center-left and center-right coalitions (the political equilibrium that journalists and scholars defined the "Second Republic"). The political crisis represents an important test bench of how mechanisms hypothesized are actually applicable also to political systems that are less stable with respect to, for instance, US (in which context and network studies are widespread).

Dealing with individual and relational mechanisms, especially in Italy, will force us to adopt non-classical methodological approaches. For instance, given that a large part of studies about the relation between environment and individual voting behavior is performed with US data – that is, a two-party system – the aim of testing those relations in a multiparty system needs several methodological adjustments. In this work, it will be made use of the *stacking* technique (van der Eijk et al. 2006), which allows the researcher to find relations between individual choices and characteristics of generic parties (De Sio Franklin 2011), considering, in this way, several characteristics of the environment and the effects that these latter can produce on the individual, with respect to several of party choices, at the same time. Regression-based approaches, however, tell us only indirectly whether mechanisms that we have hypothesized actually hold. In other words, by means of regression-based techniques, we can rely on indirect evidences of the processes we are arguing. In order to have stronger evidences of theorized mechanisms, simulation approaches are usually employed. Simulations, generally speaking, allow us to construct, by means of a computer software, a reproduced social system, in which agents follow very simple behavioral rules and are allowed to interact among each other (Rolfe in Manzo 2014). One of the main concept of these kind

of approaches is that of *emergence*: given a number of behavioral and relational rules that agents have, and given the environment in which these "simulated people" are embedded in, emergence is represented by aggregate patterns and outcomes that emerge from the repeated interactions among agents and between agents and the environment, although not directly related to rules the researcher determined. This approach is usually employed to test the logical consistency of different mechanisms and their aggregate outcome: for instance, the Axelrod model of dissemination of culture (1997), tested by means of agent-based modeling, aimed at assessing whether cultural differences persist in the system instead of disappearing. The simulation showed the emergence of diverse clusters as a "natural" property of a social system (Axelrod 1997, Bhavnani 2003). In this work, an agent-based model will be employed in order to assess relational/individual mechanisms that relate time, networks and individual voting strategies during an electoral campaign. The agent-based model that will be implemented in the work, moreover, present another element of novelty: if in political science-related studies simulations are usually employed to assess theoretically the logical consistency of certain outcomes, neglecting real-world cases, the model presented in these pages has the aim of being consistent with a real case (the diffusion of Movimento 5 Stelle among Italian citizens in 2013) and will be (partly) based on real data. In this case, thus, the agent-based model will need to be externally valid (Liu 2011), not only internally, that is, results will need to be consistent with real data.

1. The plan of this work

The work is structured as follows. Chapter 2 focuses on how the three conceptualizations of "context" or environment (temporal, geographical and interactional) have been deepened in the literature. Chapter 3 will be dedicated to further deepen the theory of the environmental effects that has been only sketched above. It will be investigated the relation between contexts, networks and the individual, it will be showed how global effects, according to Marsh lexicon, can be consistent with the theory (introducing the concept of constraints set) and it will be argued how the individual has some power in responding actively to these environmental effects. It will be showed why Italy, given some of its characteristics, can be intended as a special case in which environmental effects are clearly recognizable. The number of expectations the theory leads to is actually big, and only a subset of those expectations will be tested. In particular, it seems interesting to test what we can call the three main tenets of the theory: the relation between geography and networks, the one between time and networks, and responses by which individuals can face environmental effects. Chapter 4, indeed, will focus on the relation between geographical space and network in Italian National

Elections of 2013, showing how people can be affected by both these levels of sub-national environment. Moreover, it will be argued, by means of multilevel regression models, how these two levels interact. In chapter 5, the relation between time and network will be investigated. The chapter will focus on the case of Movimento 5 Stelle increaseduring the 2013 election campaign. Both regression-based evidences, as well as simulation-based ones will be exposed in order to stress that the shaping capacities the context has on networks can form a diffusion of innovation-like process. Moreover, it will be stressed (as in chapter 3 and 4) how different levels of intimacy among people lead to different outcomes. Chapter 6 will focus on individual strategies by which citizens can react to environmental stimuli. In particular, the chapter is focused on testing two dynamic relational processes: selection (that is, the process according to which a person avoid communicating with a disagreeable discussant) and influence (the relational strategy that, given a situation of disagreement, results in some sort of agreement by changing political position). Chapter 7 will focus on a summary of results obtained in the previous four chapters, will investigate the implications of these findings and will provide advices in order to test further our theoretical framework.

2 Towards a theory of environmental effects on electoral behavior: an historical background

In the subparagraphs that follow, we will present an historical background of the three main research streams this work is based on – those that concern the interactional, geographical and the temporal environments – and their main theoretical characteristics. Introducing previous research on these topics is important because, from a certain point of view, the framework that will be proposed can be viewed as an attempt to systematize the theoretical arguments provided throughout the history of these research streams.

1. Social and discussion networks: brief history of the "social logic of politics"

The debate around the so-called "social logic of politics" (Zuckerman 2005) is strictly connected with the political sciences' "behavioral revolution" (Farr 1995, Easton Dennis 1969), a scientific program emerged in the 1940s and based on the rejection of the "traditional political science", depicted, according to the behavioralists, as too much dependent on the investigation of constitutions, laws and other normative formalities (Farr 1995). The main argument of these theorists and researchers can be synthesized as follows: the fundamental aim of political science must be the explanation of individual political behaviors, which are embedded in a social and political framework. Behavioralists were aware of the fact that, in addition to a theoretical switch, the new discipline would have needed a re-foundation of methods by which social and political reality should be investigated. The range of this revolution spread over conceptualizations, theoretical categories and practices of research: "The behavioral revolutionaries, who were expressly interdisciplinary in their orientation, argued quite vociferously that political science could advance if and only if it adopted (or invented) new techniques of research, such as the use of polling data, survey questionnaires, psychological experimentation, scaling techniques and statistical methods" (Farr 1995). One of the first social facts which the behavioralist revolution successfully focused on was the study of electoral attitudes and behavior. Voting behavior studies were indeed highly based on the behavioralist methods and theoretical constructs: "Of direct and powerful relevance was a group of electoral sociologists at Columbia University, led by Paul Lazarsfeld and Bernard Berelson. Robert Merton and Edward Shils offered more general theoretical statements. At the same time, Campbell, Converse, Miller and Strokes reinterpreted Karl Lewin's social psychology in order to reformulate the understanding of the relationship between the group and the individual" (Zuckerman 2005).

Common interpretations of the analysis of electoral behaviors' social determinants identify Columbia school and its main representatives – Berelson, Lazarsfeld, McPhee and Gaudet – as the founders of this research program, who led strong foundations for a theoretical and empirical analysis of the social determinants of vote. Nonetheless, Zuckerman shows quite convincingly that Columbia's framework was not the only one that brought a relevant theoretical contribution to the social logic of politics. Zuckerman's argument is that, at the very beginning of the behavioralist revolution, the idea that immediately close social groups could strongly affect individuals in their voting behavior was a generally accepted idea, shared by the large part of behavioralist scholars. Even Michigan school's leading figures, commonly identified with a more individualist view, were aware of the strong effects hidden among people's relations and social groups (although with a slightly different operationalization). This awareness has been repeatedly showed in many Michigan's works: "[k]nowledge of social processes may add much to our understanding of the fact that party allegiance not only remains stable but grows stronger over time. In addition to intra-psychic mechanisms that act in this direction, social communication in a congenial primary group may constitute a potent extra-psychic process leading to the same end" (Campbell Converse Miller Strokes 1960 in Zuckerman 2005).

Having said so, Columbia scholars remain those who focused primarily on identifying driving mechanisms of voting behavior as a socially-mediated calculus. According to them, electoral behavior is highly dependent on the social environment in which voters are embedded. Huge stress is given to the role of "molecular interactions", as well as "hot communication" inside groups (Baker Ames Renno 2006). In general, we can state that, according to Columbia theorists, micro-environments can act as a tool of electoral choice crystallization or, conversely, change. This main theoretical argument can lead to different outcomes, based on the nature of networks which individuals are in relationship with: the most stressed option concerns individual behavior as function of a homogeneous social network. In this case, people belonging to highly homogeneous networks are swung towards the party, candidate or coalition that is supported by the majority of the network (Berelson Lazarsfeld McPhee 1954). This outcome can be related to a probabilistic mechanism that avoids sources of disagreement. As Huckfeldt and colleagues point out, "[i]f you are a liberal Democrat, and all your friends are liberal Democrats, the odds are very high that you will never hear one of your friends make a passionately convincing argument in favor of tax cuts. Conversely, if you are a conservative Republican, and all your friends are conservative Republicans, the odd are similarly high that you will never hear a friend make a passionately convincing case for eliminating restrictions on abortion" (Huckfeldt Johnson Sprague 2004).

From the end of the 1960s, relational theories of vote lose prominence among scholars. Zuckerman (2005) explains this disappearance with the effect of two sets of factors: "One set derives from the joint decision to use national sample surveys as the exclusive source of empirical evidence for political behavior and to analyze the information with statistical techniques" (Zuckerman 2005). The other set of factors is related to Keysian and Downsian approaches to electoral behavior and their reaction towards the social logic of politics framework: "Key and Downs denied what they saw as the approach's presentation of non-rational or even irrational voters. Key argued that this conceptualization does not mesh with the assumptions of democratic theory, while Downs maintained that it violated the principles of rational choice theory. As a result, political scientists moved to the analytical foreground of the immediate determinants of vote choice: attitude and calculation" (Zuckerman 2005).

Since the mid-1980s a new generation of political science scholars rediscovers Columbia school's theoretical and empirical findings. In great measure due to the work of Huckfeldt (Huckfeldt 1986, 1987, Huckfeldt Sprague 1995, Huckfeldt Johnson Sprague 2004), this new wave of scholars adapted Columbia school conceptualizations and relational mechanisms to modern techniques and mathematical formalizations. Besides the methodological innovations (e.g. social network analysis, as well as more sophisticated regression models), this new approach slightly modified the main tenets of Columbia's theorists. Huge stress is given to two main characteristics of social environment. The first one is what can be called the interdependence pattern of political communication (Huckfeldt Sprague 1995): basically, interdependence can be defined as the fact that people discussing about politics are, to some extent, influencing each other. In order to model this complex pattern of pressure between individuals, scholars employed, at least in their theoretical formalizations, auto-regressive models (Boyd Iversen 1979) borrowed by spatial analysis (Cliff Ord 1969, Anselin 1988, Ward Gleditsch 2008).

The second characteristic of Huckfeldt's theorization is the rejection of the interpretation of these groups as "self-contained, politically homogeneous" environments (Huckfeldt Johnson Sprague in Zuckerman 2005). As many scholars of the new generation pointed out from slightly different perspectives (Huckfeldt Johnson Sprague 2004, Mutz 2002, Mutz Mondak 2006), Columbia's theoretical approach has two main theoretical weaknesses. From one side, the position of Columbia scholars risks to fall into a sort of sociological determinism: in other words, arguing that social environment drives substantially people's vote choice can be easily understood as an attempt to interpret this effect as the sole relevant effect, without any possibility (or with very few possibilities) of escaping from some sort of "social cage". The second and more debated drawback of Columbia theorists is represented by the assimilationist nature of the theory: in other words, as

several scholars stress in different circumstances (Huckfeldt Johnson Sprague 2004, McClurg 2006, Huckfeldt Mendez 2008), the classic idea of the social logic of politics, if interpreted straightforwardly, must lead to the disappearance of political disagreement. This idea was primarily sustained by other seminal contributions (Festinger 1957) which have stressed the tendency of people to avoid disagreement in order to maintain a sort of peaceful coexistence with their social environment. Huckfeldt arguments about political homogeneity in discussion networks are different from those developed by Columbia school. According to Huckfeldt theorization, and consistently with Columbia scholars, different political information "cannot easily penetrate the social barriers that surround the individual" (Huckfeldt Johnson Sprague in Zuckerman 2005). However, voters in deliberative democracies experience disagreement related to political issues more often than expected in classic works on the topic. People experiencing disagreement tend to reject it: given that complete conversions after a single discussion are relatively rare, Huckfeldt theorized that mechanisms of defense against adverse opinions, borrowed by Festinger conceptualization, allow people to maintain a coherent political values system. For instance, people can construct counter-arguments to overcome disagreement, can discredit the message or can even degrade the message source, that is, the person who is defending the adverse opinion (Festinger 1957, Huckfeldt Johnson Sprague 2004). Nevertheless, group political homogeneity is not straightforward, especially in situations in which people are, at the same time, embedded in different social groups, such as familiars, co-workers or friends (Nieuwbeerta Flap 2000, Mutz 2002, Huckfeldt Mendez 2004, Mutz Mondak 2006): sources of disagreement about political issues could arise in any moment and from any person, but, usually, a small and relatively peripheral amount of disagreement is tolerated. Huckfeldt and colleagues conclude that "[t]he empirical reality is that minority opinion and political disagreement are able to survive, and hence the group conformity model appears to be a bad fit with respect to the substance of political preferences and political communication [...] You may not like your best friend's politics, but the disagreement is frequently tolerable, in large part because you are able to understand the motivation behind their opinions" (Huckfeldt Johnson Sprague 2004).

During the last 10 years, the study of political networks became, at least among American scholars, more common in political science and sociology. A new generation of electoral behavior students has given great relevance to the dynamic nature of environmental effects: these contributions are focused on a more systematic testing of the fundamental expectations of the theory (Fowler et al. 2011, Mollenhorst, Volker and Flap 2008, Rogowski and Sinclair 2012, Bello and Rolfe 2014, Huckfeldt 2014). According to these scholars, indeed, not enough attention has been paid to the *causal* nature of the effect that people exert one on each other (Klofstadt 2007, Bello and Rolfe 2014): the simple correlation between, say, respondents and their discussants vote choices does not

tell us anything about the fact that, actually, one influenced the other. Fowler (Fowler et al. 2011) argues how several confounders can affect the causal inference of influence effects. In particular, it is worth remembering three factors leading to an erroneous interpretation of these correlations: random clustering, homophily and contextual effects. *Random clustering*, generally speaking, indicates that the similarity of opinions of two connected individuals is due to chance (Fowler Christakis 2008, Cacioppo Fowler Christakis 2009). In this case, "standard techniques such as Pearson correlation that assume independence of the observations are not adequate because of the complex interdependencies in the social network" (Fowler et. al 2011, p.446). Another way in which standard correlations can be biased is *homophily* (Noel Nyham 2011): in a situation of homophily, a like-minded people's network is actively collected by our reference individual, making the correlation not driven by a genuine mechanism of influence. In other words, in a situation of homophily, ego seeks for people who share with him/her characteristics instead of being genuinely influenced by other people. Finally, contextual effects can be biased by what Fowler and colleagues call *contextual effect*: in this case, an environmental variable (the campaign, the presence in the same geographical context of ego and alter) produces conjoint variation on both ego and alter individual characteristics, producing thus an inflated correlation. From the methodological point of view, this new approach needs a number of different refined technical tools in order to get an unbiased influence effect: for instance, in order to assess a genuine causal effect in presence of suspect homophily, different studies have employed panel data (Bello and Rolfe 2014, Carrington Scott Wasserman 2005, Christakis Fowler 2008). In this way, by means of repeated measure of the same individuals in different times, it is possible to assess clear, and more defensible, causal effects. In other cases, influence has been tested by means of experimental designs (Klofstadt 2007, Huckfeldt 2014; Ahn et al. 2013). Also agent based modeling has been used in order to test, at least theoretically, the coherence of influence patterns (Huckfeldt et al. 2005, Rolfe in Manzo 2014). This new generation of scholars has not confined itself to the sole methodological side. On the contrary, the reflection about techniques that should be employed in order to have unbiased estimates have produced a slight change in the theoretical arguments: the idea that, more convincingly, emerges from this new wave of studies is that peer influence and environmental effects in general are not static phenomena, but rather, dynamic processes is becoming more and more relevant in electoral studies based on the social logic of politics (Huckfeldt 2014). Moreover, these studies argue that relational mechanisms can be further refined and that individuals are much more active than expected in classic studies: this late theoretical approach – which, however, keeps unaltered the main tenets of the theory– seems to be more committed in finding individual processes in which individual activeness counter-balances in a more effective way environmental stimuli (Bello Rolfe

2014). These latter works, as it will be stressed below, are no more part of a historical background, but, rather, are parts of the current debate on the social determinants of voting behavior and, thus, they will be employed directly in the theoretical framework and empirical tests.

2. Geography and the vote: historical background

So far, we have defined concepts related to what we have generically called above the "interactional environment", declined as the sum of interactions that an individual experiences in his/her everyday life. We will now switch to another level of possible source of non-individual pressure throughout voter's everyday life, namely, the geographical environment in which people are embedded. The discipline that has been mainly committed in investigating this relationship was the so-called electoral geography (Johnston Shelley Taylor 1990, Agnew 1996). Electoral geography analyses start from a main standpoint: closer individuals are more likely to share social characteristics with respect to individuals far between each other (Tobler 1970). Sharing a place allows individuals to share economic structures, political cultures, beliefs and values. One of the pioneers of the discipline, Edward Krehbiel, hypothesized a connection between geographical, economic factors and the vote (Krehbiel 1916). It is interesting to notice how Krehbiel analyses contain almost every primitive concept that will characterize spatial analysis of class vote in subsequent works. The conclusions of Krehbiel's work are straightforward: "Summarizing: When the labouring class is most numerous in a county constituency the chances are that it will incline to the Liberal or Labour party. The same is true for constituencies in which rural or agricultural interests predominate, if the farm lands are inferior in quality or if the farmers are themselves small landholders" (Krehbiel 1916). It is important to underline the importance of Krehbiel's work: the author indeed led the foundations for a theory of the integration between places, social structures and political orientation. If the main aspect of interest in electoral geography, from the very beginning of the discipline, was to relate social structures with places, the 1950s and the 1960s represent a turnaround compared to the beginning of the century. Johnston and colleagues report a theoretical contraction in geographical study of electoral behavior and a merely descriptive employment of maps: "Many electoral geography studies have consisted of mere descriptions of the spatial patterns of the vote in a particular election with little or no concern for wider issues" (Johnston Shelley Taylor 1990). In other words, electoral geography becomes a description of electoral outcomes: scholars who investigated the history of the discipline argued that this kind of theoretical debacle could be caused by the use of mass survey studies and the cited Downsian revolution (Johnston Shelley Taylor 1990). In other words, scholars who investigated electoral geography's history identify causes of

this theoretical emptying as the same that led to Columbia school's loss of academic prominence, even though the two veins of research were not directly connected. Similarly to the "social logic of politics" framework, we see, since the 1980s, a renewal of electoral geography. John Agnew is undoubtedly one of the founding fathers of the attempt of this renewal. The attempt of Agnew was merging geography and other social sciences (especially sociology), freeing the discipline from its theoretical impasse. Agnew's "micro-sociological-place approach", indeed, is partly amenable to Berelson, Lazarsfeld and McPhee theoretical arguments: briefly, geography is important for electoral studies because locates individuals in geographical places, allowing researchers to assess how characteristics of space structure people's voting behavior (Agnew 1987, Agnew 1996). Agnew framework implies that social designations (such as class, religious beliefs and educational level) are meaningful only if are located geographically, because geographical place can say much about patterns of interactions among people who own these individual characteristics. One of Agnew's most interesting arguments is the more complex conceptualization of local environment, compared to that presented in the Columbia's framework: according to Agnew, local environments can be seen as a level of a hierarchical construction: determinants of vote are ordered into a number of levels that contribute to structure voting behavior. According to Agnew, geographical and aggregated data become a higher context level, which surrounds groups, in the same way as groups – in Columbia's framework – surround individuals.

As Agnew himself states, the micro-sociological-place approach is primarily based on Giddens conceptual framework (Giddens 1984). The main contribution of Giddens to this new geography theorization can be identified in the concept of "time-geography": "Time-geography is concerned with the constraints that shape the routines of day-to-day life and shares with structuration theory an emphasis upon the significance of the practical character of daily activities, in circumstances of co-presence for the constitution of social conduct" (Giddens 1984). Agnew's work, from many points of view, can be seen as a crucial theoretical deepening of the relations between people's everyday life, social relations and the place that surrounds these individuals and, especially, provides us a way to theoretically understand the relation between interactional and spatial environments, structuring these two concepts as levels of a hierarchy. As it will be deepened below, this relation is fundamental in our understanding of the theoretical structure of environmental effects.

3. Time as an environmental factor: campaign effects

The idea of a time-geography-based social science implies a discussion of the effect that time, in addition to space, can exert on the behavior we are going to study. Even if – as it will be stressed

below – the driving mechanism that this kind of effect implies is not particularly deepened, the idea of a geographical effect that affects individual choices is widely recognized to be one of the driving factors that can contribute to change or crystallize people vote choices. In other words, it is quite clear that space, in a way that is usually not completely clear, contributes to affect citizens opinions, but what about time? It is possible to list basically three types of studies that are committed in investigating just as many time-span: several studies – especially recent studies (e.g. Dinas 2013, Corbetta Tuorto 2004, Zuckerman Dasovic Fitzgerald 2007) – focus on political changes and invariance in the long period, in order to assess, for instance, intergenerational transmission of political opinion from fathers and mothers to sons and daughters; other studies are focused on medium time-spans: the electoral cycle – or second-order election – theories (Reif Schmitt 1980, van der Eijk Franklin 1996) are committed in investigating differences between national elections and second-order elections (such as regional, European or mid-term elections). A large amount of studies that – borrowing the aforementioned expression of Michael Marsh (2002) – are committed in explaining elections, instead of electoral behavior, are usually presented as the time-span of a political campaign. How do campaigns affect voters' behavior? The question was central in the aforementioned works by the Columbia scholars (Berelson Lazarsfeld McPhee 1956), who, for the first time in electoral studies, conceived new techniques to investigate campaign effects in the US. The idea that election campaigns have an effect on vote choice is strictly connected with what happens during the campaign. In other words, the campaign is not an "empty time" characterized by the simple – reduced – distance from the Election Day. As pointed out in many studies (Harrop 1987, Norris et al. 1999, Swyngedouw et al. 2004) the time of the electoral campaign is a crucial period in which political opinion and beliefs are tested and, at the same time, conversion and changes of mind are more likely. It has been showed that the election campaign effect on voters' changes of mind is becoming more and more crucial in recent decades compared to the past: "At the beginning of the 1960s, one in 10 British voters made up his or her mind during the actual campaign; by the 1990s, this number had risen to one in four" (van Aelst et al. 2008). Studies related to the election campaigns, usually, intend their main research object as a top-down process (Schmitt-Beck and Farrell 2002), in which parties and candidates are focused on convincing the largest number of voters. At the same time, however, electoral campaigns can be seen as a sort of down-down process, in which social and political relations among citizens are the real engine of political change in large part of the population and top-down strategies, although influential, are not at the center of the analysis (Berelson Lazarsfeld McPhee 1954, Huckfeldt Sprague 1995, Bello Rolfe 2014).

From one side, during a campaign, politicians, parties, specialists agencies, militants, "seek to mobilize support among the mass public, to persuade citizens to their cause, and to inform citizenry about public policies and political activities" (Schmitt-Beck Farrell 2002). From the supply side, thus, a campaign tends to inform, mobilize or even convert to another opinion the largest amount of people possible. The tools that political actors employ in order to convince citizens are different. Schmitt-Beck and Pfetsch argue (1994) that two main elements of this top-down process can be listed. The first is related to the media: Harrop (1987), for instance, states that "the media do not cover the campaign, they are the campaign". Media coverage of a party/candidate idea, as well as image-related characteristics of candidates, have demonstrated repeatedly to exert a positive effect on mobilization and opinion crystallization (Maddens et al. 2006; Van Aelst et al. 2006). The effect of media can be mainly distinguished in *news*, *talk shows* and *advertising* (Schmitt-Beck Pfetsch 1994, Schmitt-Beck Farrell 2002): these three tools help parties to convey their ideas to the citizenry. Political actors are committed in having as much control as possible concerning the contents that these three media convey. Parties and candidates, thus, usually employ a large amount of organizational and economic resources to place themselves in a privileged position in the media landscape (Jacobson 1985, Schmitt-Beck Farrell 2002).

Although media arena is perceived as one of the crucial field in which the electoral competition is played, many scholar are pretty persuaded that media coverage effects are usually overestimated, theoretically and empirically (Dalton et al. 1998; Mughan 2000; Norris et al. 1999): with this respect, it is possible to give an alternative interpretation of the importance of media system, not necessarily related to its direct importance in shaping voting attitudes and behavior. In doing so, it becomes interesting stressing the role of down-down processes. The central idea of this approach is that top-down processes, such as the media system, are just catalysts that serve as injector of deeper mechanisms taking place among citizens. According to Huckfeldt and Sprague, a political campaign is a period of time in which the environment people belong to is "altered" (Huckfeldt Sprague 1995). Talking about South Bend (a county in Indiana, USA, in which the two scholars performed their data collection), Huckfeldt and Sprague stress the idea that several elements can contribute to enhance the perceptions that the period of election campaign is different from previous and later times: "the South Bend Tribune, bumper stickers, yard signs, party workers, candidate mailings, and informal discussions all served as inescapable reminders for South Bend residents. In short, and as John Stuart Mill has informed us, democratic politics includes a substantial element of coercion: citizens unavoidably pay heed to the events and debates and issues that impinge upon their lives from all sides" (Huckfeldt Sprague 1995). The campaign itself, moreover, is characterized by periods in which the alteration of the environment is not clear to all citizens and periods in which

the campaign “accelerates”. Relevant facts, scandals (Schmitt-Beck Farrell 2002) or the plain and simple approaching to the election day (Huckfeldt Sprague 1995, Baker Ames Renno 2006) lead to make a larger proportions of citizens more acquainted of what is going on in the political landscape and, then, more prone to discuss about politics.

3 Environmental effects and electoral behavior: an explanatory model

So far, the work has been focused on describing, with previous works' help, different environmental factors that can exert an effect on individual behaviors. Network-related effects, as well as those catalyzed by space (geographical effects) and time (campaign effects) have been considered by analyzing their historical flow and their main characteristics. Additional theoretical arguments based on these theories will be employed in subsequent sections of the work. Anyways, as declared in the introduction, the main aim of the work is to produce and defend by means of testable hypotheses and analyses a theoretical framework that encompasses coherently these three environmental sources (the network-related, the geographical and the time-dependent).

So far, sources of non-individual pressure on voting behavior have been defined as *environmental*: this is the generic term that has been (and will be) employed when referring to any generic, non-individual source of political change or stability. However, this definition is not the sole in the literature that defines generic non-individual effects. For instance, many works, as said earlier, employ the term *context* to define factors that do not depend on individual characteristics: this definition has been assigned to a certain period or political time (Korpi Palme 2003), to geographical areas (see Agnew 1996, quoted above), or certain type of electoral consultations (for instance, the "European Parliament" or "local elections context", see Reif Schmitt 1980, De Vreese 2003, Heath McLean Taylor Curtice 1999). The concept of "context" is usually employed in theoretical arguments which do not explicitly refer to a definite theory-driven meaning of the term. This evasiveness, combined with a huge employment in every field of political science, led the concept of context to be poorly defined. To some extent, if we would like to define the concept of context in the way it has been presented in the literature, we should define it "negatively": the context is a determinant to electoral/political behavior *that is not* individual. In much part of the literature, indeed, context does not have a clear theoretical definition and is employed as an a-theoretical concept. However, a number of more refined conceptualizations of the concept of context exist. In particular, here it will be analyzed the theoretical argument provided by Marsh (2002), that was only tangentially treated in the previous chapter.

Marsh takes into consideration two types of context: from one side, the global context (Lazarsfeld Menzel 1972, Marsh 2002) that encompasses the party and media system, the electoral law, and in general, those elements that exert a "global" influence on voters: the global effect forbids, for instance, an Italian citizen to vote for German CDU, and forces a German voter to a certain bouquet of alternatives, forbidding him/her, for instance, to vote for the Italian Democratic Party. The global

context, however, does not exert the same effect on all voters in the same way and in all the situations. This context leads different voters to behave in different ways when exposed to different individual option sets, conditioning their thoughts and behaviors. In this way, context can incentive people to apply some sort of strategic thoughts in order to make their vote more valuable (one could ask him/herself "is it worth voting for party A while, probably, that party will not pass the threshold?"). The global context can be also defined in a temporal way. The First Republic era in Italy, for instance, can be considered as a completely different global context with respect to the years of Second Republic (ITANES 2013). Summing up, global context effects expose an electoral body to one or more stimuli, which, from the supply side, are identical. From the voter's side, these stimuli can be interpreted differently and can lead to different responses by different part of the electoral body. Nevertheless, it is important to underline that the nature of these effects is top-down: in particular, people have in general no option (or a very little) to escape from or avoid these constraints.

The second type of effect that Marsh – and others (see Davis Spaeth Hudson 1962) – recognizes is the so-called compositional effect (Marsh 2002). A compositional effect, following Marsh's terminology, can be represented as a set of effects to which different subsets of a national aggregate of voters are exposed. In this way, we cannot talk of a stimulus, but it is better to define it as different variants of the same stimulus. Stimuli associated to compositional effects can present, for instance, different levels of intensity on the national territory: in its most elementary form, we can imagine that some parties can exert stronger effects in places where they are stronger compared to places in which they are weaker. Marsh assimilates compositional effects to those exerted by different localities on individuals who live in these places their everyday lives. From a methodological point of view, thus, a compositional effect is exerted by the composition of local units on the individual decision-making mechanisms in which citizens are embedded. As Marsh stresses, "parties have more support in some areas than in others, and where a party is strong on the ground, it may have a better chance of converting the undecided and mobilizing the faithful" (Marsh 2002). This formulation is not far from Blau's formalization of structural effects (Blau 1977): the prevalence of people presenting a certain characteristic, or showing support to certain political ideas is the main tool by which it is possible to operationalize a compositional effect. Marsh, in his article, identifies two different streams of research that assume explicitly the presence and the theoretical relevance of sub-national effects: the first one is related to studies aimed at investigating the geographical place influence, while the second is connected to network-related determinants and how they can explain people's decision-making processes. The fundamental critique that Marsh oppose to these two research flows is that, in general, it is impossible to trace

any “big effect” neither in American, nor in the (few) European works. According to Marsh, thus, effects related to localities, as well as those connected with discussion networks, present magnitudes that are negligible with respect to, for instance, studies that compare different countries. Marsh’s conclusion is thus that comparative works must be privileged – and funded – because their identification of strong, international differences and similarities allows electoral researchers to know more about elections with respect to single-nation studies that are aimed at finding local differences. It must be stressed that Marsh’s position is the main stream in the discipline, at least in the European context. For instance, a few more than 6% of articles appeared on the last 10 years’ issues of “Electoral Studies” cites seminal works related to Columbia school and around a half of these latter employ these citation in order to show classical results instead of signaling an intellectual debt towards these contributions. Attempting to account for compositional effects (local or relational), their invariance and differences could be seen as a minority research flow in European electoral studies.

This conceptualization of context has, according to who writes, several drawbacks that need to be addressed. First of all, Marsh’s theoretical framework defines two levels of context, but, referring to the global context, lists a series of characteristics which belong to national (that is, that are naturally national-only) and others that can be “compositional”, although at a national level. This possibility of having national and local characteristic of the context leads, in general, to an elusive definition of these different contexts and raises questions about what should be the correct scale to identify a nationwide or a local context. To be clearer, this elusiveness of the two definitions can be well depicted by the strength of a certain party at the national level. As Marsh’s conceptualization points out, indicators of a global context are at a national level and, thus, party strength should be a global contextual indicator. The problem is that this latter measure is the result of a compositional operation, that is, the number of people who support (or voted in previous elections) for a certain party divided by the population. The nature of the indicator is thus ambiguous, given that, in that way, a global effect is the result of a compositional procedure. The same can be said for every national indicator that is the result of a procedure that can be performed at a sub-national level, such as the percentage of activists on the territory or the effective number of parties of a political system.

This drawback, actually, is not necessarily problematic: independently on how the measures are constructed, the same can be used if they share theoretical characteristics that connect individuals and contexts. The definition of the conceptual construct would be, in this way, theoretically defensible: a global effect could be defined in this way because is national *and* because it assumes a certain relation between the national context and individuals. Marsh conceptualization, to this respect, does not assume a relation between individuals and the theorized contexts. Even though

many contexts can exert effects on individual behavior in many ways, there is no specific way in which global effects, properly defined, should affect individuals in a different way compared to compositional ones. Summarizing, there is no clear mechanism set that should, by and large, define the relation between the individual and his/her global/local context (in paragraph 1 the argument according to which we need a social mechanism that clearly explains the relation between individuals and environment will be further developed). This drawback is partially related to the aforementioned lack of a systematic subdivision between the two contexts. In general, thus, we can state that, according to Marsh conceptualization, the only way in which we should prefer global contextual effects instead of compositional ones is that these latter provide smaller coefficients than the former. This argument is hardly acceptable because the author does not define any *theoretical* reasons to his choice. Neglecting the importance of the sub-national environment, moreover, would lead us to sustain a direct relationship between individuals and the national context and, in turn, would neglect the fact that voting, as Zuckerman says, is a "social behavior" (assumption that should be trivial). For these reasons, neither Marsh's proposal of investing on national contextual determinants to voting, nor the taxonomy of contexts itself can be considered as strong theoretical argument that can be put as foundation of a theory of context and voting behavior.

The next paragraph of this chapter (paragraph 1) will be focused on some premises useful to understand from which ontological and theoretical basis our arguments start. It will be briefly treated the mechanism-based sociology and it will be argued how, through this latter, it is possible to efficiently find technically defensible and theoretically fruitful relationships between electoral behaviors and different environmental levels. Hereafter, in paragraph 2, definitions of several fundamental theoretical categories and processes will be introduced. In paragraph 3, the explanatory model will be deepened in its more complex characteristics. In this paragraph, different environmental effects, their nature, their role in influencing both individuals and other, environments will be defined. Paragraph 4 will deal with scales and contextual levels and paragraph 5 will deepen responses that individuals can give to environmental effects (in particular I will focus on assimilation and conflict responses).

1. The analytical explanation of social phenomena

"The root is man" states Eulau in the first lines of his "Politics, Self and Society" (1986). Eulau underlines how, before defining concepts like authority or power, it is necessary to focus, at first, on people's political behavior. First of all, it seems necessary to specify that the theoretical framework that follows is based on individuals and on their objectives, feelings, beliefs, commitments and

values. From a strictly ontological point of view, the individual is the main "object" by which it is possible to identify explanatory theories (Turner 1983, Weber 1949). Keeping in mind this premise, social researchers and, in particular, sociologists, committed themselves to recognize similarities and differences among individual behaviors in modern societies starting from different *corpora* of pre-theoretical and ontological approaches, that have the task of guiding theoretical thinking: Hedström (2005) identified, in the history of sociology, three fundamental approaches – corresponding to different scientific programs – that deal with the study of individuals' social behavior and relations. The first approach is founded on the so-called *covering-law* approach: assuming we have a social event or process that we want to explain, we seek for an invariance that has law form, that is, explainable by means of a law or a set of laws (Hempel 1965). A classic example in sociological theory is represented by the structural theory of Blau (1977, Blau Swartz 1984), that aims at constructing a hypothetical-deductive theory of social structure. Hempel's covering law approach, besides its attractiveness, seems to be hardly applicable to social sciences, given the difficulty of extracting laws from modern societies (which are complex systems) (Hedström 2005). According to Hedström, a "softer" variant of the covering law approach – that is, based on law that are not deterministic, but, rather, probabilistic – could neither be useful to explanation of social science phenomena. The covering-law approach, indeed, presents a fundamental aspect that makes a social theory a "bad" social theory, that is, the "lack of restriction on the content of the propositions" (Hedström 2005). In other words, a general law has severe difficulties in tapping causal relationship between different individual – or collective – properties due to the fact that it pretends to be applicable to a (too) broad variety of problems. In the following pages it will be argued that, although Hedström critique is acceptable in principle, the covering-law approach, if tested and connected appropriately to a mechanism approach, can offer theoretical explanations and systematic tests for the relation between individuals and social behavior determinants.

The second approach that Hedström treats is the so-called *statistical approach*, or variable approach. Whereas theoretical models that follow the covering-law approach are often quite refined – although they are not restricted to a small subset of social phenomena – the statistical approach is characterized by an inductive theoretical process. In other words, the objective of social science is "letting the data talk", by means of techniques that represent only variance decompositions of the phenomenon we want to study. In this way, no theory is required to perform our analyses. Borrowing an example of Hedström himself, the explanation of the difference in incomes between women and men starts from the decomposition of this former in sub-categories of interest – for example, by level of education. If the decomposition carried out leads to a disappearance of the

gender gap in wages, men and women with the same educational level are paid more or less the same, and, therefore, it is possible to argue that the difference between income levels is due to a different distribution of women and men in the various educational levels. If the gap does not disappear, we can further decompose the difference, for example, by splitting the sample by seniority, job tasks and so on. The theory, according to the statistical approach, is formulated on the basis of this decomposition procedure. The statistical approach can be useful to develop explanatory theories and to establish the facts (Golthorpe 2000), but it can hardly be employed as an approach that allows us to perceive the generative mechanisms of those relationships. The most critical issue that has been expressed in relation to this approach is that the statistics regularities are rarely so unequivocal to be interpreted through a unique causal explanation (Hedström Swedberg 1998). In any case, statistical approach represents one key instrument if we want to analyze social phenomena.

On the one hand, thus, we witness a too ambitious employment of theoretical thinking, represented by covering-law theories. On the other hand, we face the statistical approaches which, far from constructing hypothetical-deductive theories, tends to extract the theory from the data themself.

A good alternative between these two extremes is to root the project on the theoretical concept of *social mechanism*. The idea of social mechanisms has a long history, which generally starts from the Columbia school (Hedström Swedberg 1996) and, in particular, from the work of Robert K. Merton, who defined the social mechanisms as "designated social processes having important consequences for designated parts of the social structure" (Manzo 2010). Merton argued that the main commitment of sociology was to identify these mechanisms, in order to understand conditions that lead them to fail or be activated (Hedström Swedberg 1996). Manzo (2010), starting from the first attempts of systematic definition of the concept of mechanism (Harre 1972, Bunge 1973, Boudon 1979), defines these latter as follows: "[o]n a conceptual level, a mechanism began to be defined as a bundle of constraints and interdependent actions able to generate some macro-consequences. On a methodological level, a mechanism was conceived as an input-output function to be modeled. On an epistemological level, a relation of implication was established among the notions of mechanism, causality and explanation" (Manzo 2010, p. 135). We can thus define the mechanism as a set of constraints and actions, in some way comprehensible to the researcher, among interdependent individuals.

In this broad definition, we can meet two fundamental concepts that represent the basic of the theory that will be developed: the concepts of action and interaction. According to Hedström (2005), an acceptable theory of action must meet three requirements: 1) First, it must be psychologically and sociologically plausible; 2) it must be as simple as possible from the

individual-action side: according to Coleman (1990), a well-structured social theory provides a component that relates to the action, a component concerning the structure of the interaction and a component that binds micro interactions to a macro outcome. A simplified component of the action allows to give more attention to the other two components, which are the focus of the social scientist; 3) it must express actions of individuals in such a way that they are explainable as deliberate: explaining actions of individuals as intentional allows deeper and theoretically satisfactory explanations and forces the theorist to specify a clear set of mechanism.

The second crucial concept that has to be indicated is that of interaction. Firstly, we need to specify how individualist approaches to social mechanisms do not assume atomized individuals. Assuming that desires and beliefs that guide the actions are absolutely not affected by the interactions is an extremely complex assumption to defend. In a Weberian sense, individual behavior – and, in particular, individual determinants of behaviors – is shaped by interactions with others. James Coleman, one of the founding fathers of modern mechanisms sociology, points out that a key component of a social theory is the set-up of a set of systematic expectations of the interactions among individuals. Behavioral rules we hypothesize individuals follow are, thus, rules that theorize also relational strategies of these latter (Coleman 1990). It will be seen below how relations are fundamental in understanding our theoretical framework and, to some extent, represent the main source of political change or stability in our theoretical model.

The idea of individual and relational mechanisms leads us to present in a quite concise and systematic way our theory of environmental effects in voting behavior and gives us some important advices – such as the simple treatise of individual and psychological mechanisms and the presence of a clear relational process that guides behavioral choices and attitudes change – that will help the presentation of the theory itself. In the next section we will present a theory that, following the social mechanisms approach, is committed in systematizing the environmental effects and their theoretical role in shaping, changing or crystallizing individuals' beliefs, ideas and options. With this respect, the following section is focused on the relationships among different environments.

2. Networks, contexts and constraints sets

Effects arising out of environment have been variously defined. A first way to define a "contextual effect" is that of Fowler and colleagues (Fowler et al. 2011), which identify the effect as a statistical relation that makes two individuals exposed to the same environment non independent between each other. From the theoretical side, Marsh (2002) defines the effects of sub-national environments as compositional (contextual) effects: in other words, the environment affects differently the

individual conditional on different compositions of individuals' characteristics that surround that person. The definition, as pointed out above, is problematic, especially if we take into consideration what is the goal of the explanations of the phenomena that rely on social mechanisms: the first and most important issue when we talk about Marsh's compositional effects is the fact that the social mechanisms that underlie the empirical regularities are often vague or inconsistent. Marsh's definition of contextual effects, in other words, does not focus on the explanation of what would be the mechanisms that different densities of people, with certain characteristics, in a geographic space should produce on the individual.

An alternative definition of contextual effect is that of Eulau (1986) who defines the effect of the context as a sub-set of environmental effects in general. An environmental effect, according to Eulau and compatibly with our previous definition, is what affects[1] generically an individual behavior. In other words, the environmental effect is everything affects behaviors and attitudes that is external from the individual. In Eulau conceptualization, "contextual" effects are only those which affect the individual *by means of interactions* (Eulau 1986, Huckfeldt 1986). Although this definition of context will not be employed in our work, the definition is important for our aims because introduces us a non-trivial difference: the environment can affect individual both "generically" and by means of interactions, that is, by means of communication among people (Huckfeldt 1986, Huckfeldt Sprague 1995). Eulau's argument largely coincides with Columbia's framework: as argued above, a key feature of the Columbia approach and of those who explicitly refers to these studies is to consider the interactions – usually in co-presence – among two or more people as a fundamental element of opinion change or stability.

The difference between the two effects theorized by Eulau (contextual and non-contextual) could be exemplified by employing Schelling's quote (1998): "I interact with an individual if I change lanes when his front bumper approaches within five feet of my rear bumper; I interact with a social aggregate when I adjust my speed to the average speed on the highway". The environmental non-contextual effect is seen here in terms of a kind of Meadian "generalized other", which considerably widens the scope of the definition of these effects. The decision that Huckfeldt (and other theorists who study effects of context in the electoral field) has taken is that only effects based on actual interactions between individuals are worthy of further investigation. This, mainly, for two reasons:

[1] Throughout the work, there will be used two ways of defining the way in which characteristics of other people, by means of interactions, can change characteristics of our reference individual: the first is the term "influence", which means a precise phenomenon according to which ego is affected by alter and is convinced to change completely or im part his/her believes and actions. Other terms, more generic (such as "affect" or "pressure") will be used to name all other kind of pressure that can be derived by a large number of mechanisms, such as contextual effects or homophily processes (see below for details).

the first one is related to the possibility of interpreting the behavior of individuals as a series of hypothetical situations in which our individuals interact without tying up too much this behavior to other factors, such as adherence to rules and values, which would take us on a different path from that of the explanation of voting behavior, and would lead to considerations on the coercive nature of society (see Goffman 1959). The second reason is related to the ontological position that the theory has been assumed to be, concerning the explanation of social phenomena. The assumption that the individual is the principal ontologically knowledgeable entity that we can investigate, makes it theoretically difficult to harness processes that implement a "generalized other" of which we can only indirectly theorize characteristics and effects exerted towards an individual[2].

In any case, the interactional environment is not the only one which is worth to be investigated. In other words, other elements, which are not completely related to interactions among citizens, must be stressed. The first argument towards this direction is that people do not interact in a spatio-temporal vacuum. Rather, they interact in a precise set of spatial and temporal constraints: people have usually a house, which is located in a neighborhood, which in turn, is located in a municipality and so on. Moreover, people are inserted in a temporal frame, which can be defined in terms of long period (ages) or short period (days of an electoral campaign). These spatio-temporal constraints, according to our framework, contribute to have an effect on electoral behavior: as showed before (see paragraph 1), the literature about geographical and campaign effects is rich. One of the central points of this work is to link theoretically, and empirically, these two type of constraints to relational-based effects.

In general, according to Blau and Huckfeldt (Blau 1977, Huckfeldt 1986, Huckfeldt Sprague 1995), we can state that the spatial and temporal constraints are theoretically antecedent with respect to the relational processes that characterize citizens' lives. By definition, relations among individuals contribute to change the system of beliefs, commitments and values that characterizes citizens. In other words, what we assume when we state the effect of social relations on human behavior is that – reasoning counter-factually – a person's beliefs, commitments and values in a relational situation *A* could be different to beliefs, values and commitments of the *same* individual in a relational situation *B*. Such a formal-logical assumption is the starting point – for its own nature not directly testable – that the researcher must take into consideration if he/she wants to detect the presence of

[2] It is important to underline that, from many points of view, adherence of individuals to norms, values and beliefs that, to some extent, transcends theoretically interactions themselves is a fundamental element in the individual and relational mechanisms we are going to expose and test. However, it has been decided not to deepen our argument according from that point of view. Although the sociological tradition referring to explicit normative "interaction order" (Fine Manning 2003) would be of extreme usefulness in this framework, would lead to difficulties in translating the theoretical argument in existing-data and systematic tests. We thus chose a theoretical framework that simplifies the whole exposition of the theory, leading to not so dissimilar expectations.

environmental effects[3]. Imagine a person who has a probability to be affected in one of its characteristics (an attitude, a behavior, or any other characteristic) by other individuals. Imagine of not having to formally assume the mechanism that generates this pressure. The probability of being affected will depend on a number of factors, namely, the nature of the process, the characteristics of the individuals involved in the relationships, and so on. Our main logical assumption is that *all* these relational characteristics realistically follow the simple *exposure* to other individuals. In other words, if I am not exposed to another individual, that means that I have no relation with that individual, which means that there is no pressure by that individual whatsoever. We can thus state that the probability of being affected in a relation will be a function of the exposure to certain individuals.

Imagine, thus, that relation in a place *A*, which, as a characteristic, has the fact that people are distributed in an *a* manner. The probability of an exposure will be, in turn function of the distribution *a* of individuals in place *A*. The same individual, in the place B (which has a *b* distribution of individuals) will have a different likelihood of being affected. It is possible to apply the same argument with time, instead of space. A person in time t_0, which can be a certain day, a month, or year, can be pushed by different social forces (that are personified by people with whom he/she communicates) with respect to the same person in time t_1. In this way, time acts, as place, in producing different opportunities of contact between people. Having sketched the main argument of the work – that is, temporal and spatial framework contribute to shape the opportunities to relate with other people, influencing, in turn, the likelihood to be affected in a certain characteristic – it seems appropriate to insert our argument in a clear and consistent defining scheme.

Summarizing, different, and partly inconsistent, definitions of the concepts of context and environment have been depicted throughout the historical sketch presented in the paragraph. As pointed out above, we stated that environment is the most general definition of anything that exerts effects on individuals and, at the same time, does not pertain to the individual him/herself. This definition seems to be consistent with the literature, and helps us to clearly differentiate between internal and external factors that could affect choices and attitudes. Besides the idea of Marsh (2002) about global and compositional contexts (that has been rejected, compatibly with the idea of mechanisms sociology we chose as theoretical approach), it has been stressed that context can also refer, according to Eulau (1986), to the relational environment and, thus, that contextual effects are those enacted by means of interactions. According to Eulau, moreover, environmental non-

[3] It is interesting to stress how formal-logical assumptions, that are, to some extent prerogative of a covering-law approach, can also be part of a mechanism-based theory if they are enacted, indeed, as preparatory assumptions for a set of mid-range (Merton 1968) expectations.

contextual effects affect the individual in a non-relational form (and, compatibly with the idea mentioned above, can contribute to shape the opportunities one has in encountering one person instead of another)[4]. A further definition scheme, that has been employed, in particular, in more recent works (Huckfeldt Sprague 1987, Huckfeldt Sprague 1995, McClurg 2006), does not change the main tenets of Eulau's argument, but, rather, changes the terms employed to call concepts: according to this scheme, developed prevalently by Huckfeldt and Sprague (1987), context represents the non-relational environment in which people are embedded and network is the set of social relations one has. Compatibly with this latter set of definitions, thus, contextual effect are those which are not enacted (directly) by face-to-face relations, while network effects are those who affect attitudes and behaviors by means of interactions.

Having stressed characteristics of contexts ad networks, we can now define the meaning of contexts and network that we will employ throughout the work. Given a reference individual (namely, the target of different environmental pressures),

we define context as the uneven distribution in space and time of individuals carrying certain characteristics.

We define network as the sum of interpersonal relations the reference individual maintains with other people.

We define network effects as processes of pressure in which other people contribute to change or or reinforce reference individual's characteristics, by means of interpersonal relationships.

The composition of people in a certain time or space (the context) contributes, thus, to *shape* the set of relations that a person can have (the network): to paraphrase Blau, an individual cannot interact with an Eskimo, if there are no Eskimos around. According to the theoretical strategy chosen for this work, thus, the context does not contribute directly to affect the individual, but contributes to define the set of relations that the individual may have. Given a certain social context of opportunities, only the relationships that take place in this context are those which actually affect the individual. In general, therefore, we can say that context and networks can be hierarchized in a chain that includes the former as a necessary condition of the latter. This is quite consistent with many works (in particular, the hierarchical structure of these environments is presented in Huckfeldt Sprague 1987, 1995, Agnew 1995), in which higher levels generically "contain" lower ones.

So far, the relation between what has been called the context (or, even better, the contexts) and the network has been briefly outlined. Another environmental source of effects should, however, be kept into consideration. Marsh, in explaining his conceptual framework, is right in saying that

[4] If we would like to complicate further this defining Babel, we could add that this type of effect is compatible with the concept of *structure* and *structural effect* by Blau (1977, Blau Schwartz 1984).

different global environmental effects strongly affect electoral behavior. Electoral laws, party systems and type of elections represent elements that can influence the relationships between context, network, and individual behavior. In our theoretical framework, these institutional elements are defined as *constraints sets*. It has been decided to define them as constraints because they are elements on which individuals cannot exert a direct influence. Voters, in addition to being affected by their context, contribute themselves to be part of the environment for other people, while, in the case of the constraint sets, the electoral body, treated as theoretical element, is assumed to have no role in the definition of the rules of the game. Constraints sets have not a direct theoretical precedence with respect to contexts and networks. Simply, they affect individuals, as well as network and contextual environments at the same time. They represent a sort of macro-environment in which basic laws are more or less unchanged in an adequate amount of space and time. The next section aims at outlining a theoretical model that combines context and the different subsets of a network that can affect political behavior of individuals.

3. Groups, network and contexts

The network, as stressed above, is a source of environmental pressure that affects individuals by means of interactions: it can be represented by the sum of all interactions an individual is engaged in. The nature of discussants which people interact with, however, can vary. An individual is related to different sorts of people, who share with him different dimensions of his/her daily life. From a theoretical point of view, several taxonomies can be employed in order to differentiate a person's discussants: in this work it will be stressed a characteristic that, according to who writes, is fundamental in distinguishing an individual's set of relations, that is, their *strength.* According to Granovetter (1973), the strength of a tie is theorized through different dimensions: "the strength of a tie is a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (Granovetter 1973). The assumption which this idea is based on is quite straightforward: discussing with a relative or with a partner is, usually, different, from many points of view, with respect to relating with co-workers or random people one can meet in line at the post office. Starting from this theoretical argument, previous works showed how, from a chaotic set of relationships that one has, it is possible to extract (almost) systematic differences and, by means of the concept of tie strength, to construct taxonomies that take into account *social groups* (or *circles*) instead of simple dyads (see Huckfeldt et al. 1995, Erisen Erisen 2012).

The first and most important groups are usually defined as *primary groups* (Huckfeldt 1986) or *cohesive social groups* (Huckfeldt et al. 1995). Generally, primary groups are defined as those social groups with which people have strong, durable and stable relationships. An example can be provided by the family. Huckfeldt and colleagues (Huckfeldt et al. 1995) have repeatedly emphasized that the effect of primary groups – or cohesive social groups – is crucial, not only for the political socialization of people, but also for the pressure that is exerted on adults. In the literature, there is the relatively consolidated idea that cohesive social groups, or primary groups, are concepts that can be theoretically consistent with the strong ties construct. In other words, these groups are generally characterized by strong ties presence. Exposure and interactions with a cohesive social groups lead to several consequences that concerns the relations between the individual and the context as we defined it above (that is, the spatial and temporal framework in which individuals are embedded). These consequences are strictly related to the characteristic of the interactions enacted inside the group. First of all, people exposed to cohesive social groups tend to be more *coerced* in their attitudes and behaviors with respect to other groups. As pointed out by Huckfeldt and Sprague (1995), discussing, interacting, arguing with people of our network lead us to be exposed by different arguments coming from different sources, with which we share different degrees of intimacy, time spent together, emotional and material exchanges. We can thus legitimately argue that the more the sources (that is, the people) we interact with are intimate with us, the more their opinion will be taken into consideration, and the more coercive power of such sources will be strong. This expectation was quite easily demonstrated by several works (Huckfeldt Sprague 1995, Huckfeldt Johnson Sprague 2004, Mutz 2002) which showed how strong relationship tend to present higher levels of opinions' homogeneity. Another consequence of groups' cohesiveness concerns the relations that cohesive social groups and context have. We have stated that context contributes to shape opportunities that an individual has in encountering other people with certain characteristics. That means that network's characteristics are function of the context in which the network is located (Putnam 1966). Primary groups have the characteristic of being more cohesive (Huckfeldt et al. 1995) and thus, as showed above, more homogeneous. Given these premises, we can expect that cohesive social groups are less subject to the *shaping power* of the context compared to less cohesive groups. This argument can be defended counterfactually: imagine a case in which the shaping power of the context affects completely cohesive social groups in a certain set of choices: that would mean that the distribution of these choices would be identical in the broader (spatio-temporal) context and in the cohesive social group, but this cannot be true if we assume that cohesive groups are (sometimes significantly) more homogeneous respect than less cohesive groups: thus, it is possible to state that homogeneity of the primary groups leads to a

weaker effect of the context in shaping cohesive networks. The third and last consequence of being exposed to a cohesive social group is the different degree of *sensitivity* to the broader context. Cohesiveness, by definition, leads to close, homogenous groups, in which everybody knows each other. In this kind of situation, Huckfeldt and colleagues argue, the routes political information can travel through are quite limited (Huckfeldt et al 1995). In this way, it is difficult for a person embedded in such a group to be exposed to the opinions of the broader context. The exposure of these people to the public climate of opinion is weaker, and, in general, is altered by the cohesive social group, that represents some sort of filter that distorts political messages coming from the broader context or even makes it impossible for individuals to be reached by those messages.

It has been repeatedly demonstrated how political information and pressure, besides family, are transmitted through mechanisms of social loyalty and belonging to certain social groups (Tingsten 1937, Huckfeldt 1984, Huckfeldt 1986). We will define groups that affect individuals in this way as *reference groups* (Kelley 1952) or *non-cohesive social groups*. A reference group has basically two functions: the first one is to establish and perpetuate the social norms that bind individuals to each other within the group. The second function is to act as the basis of social comparison. The theory of reference groups, as formulated by Merton (1968) states that a reference group is not necessarily a group with which the individual is in direct contact, but can also be a group that is useful for a benchmark by means of which people compare their conditions in another geographical location or time. In this work, however, we will refer to the reference group as that collective within which the individual has relations of interaction in co-presence. The concept of reference groups, in Merton's argument, is related to the idea that those circles are able to convey some sort of loyalty. Studies on "environmental influence" of Langton and Rapoport (e.g. 1975) stress the importance of social loyalties: in addition to the effect of the primary groups, people often share with their environment a number of features not purely political (ethnic, religious, class-related, etc.): a person embedded in a reference group consisting primarily (or totally) by people belonging to, say, the working class, can be assumed to share a part of his day with people belonging to a social group that is different from the family (Tingsten 1937, Kelley 1952) and to be affected by it.

By definition, a reference group can be also defined as non-cohesive social group, if we assume that, on average, reference groups – that in general are composed of friends and workmates – are characterized by social ties that are weaker compared to the family (Huckfeldt et al. 1995). Following what we have stated concerning cohesive social groups, also non-cohesive ones can be characterized by three additional characteristics, produced by the degree of cohesiveness of the groups: for what concerns *coercion*, we can expect lower levels of coercive power enacted by the non-cohesive groups: workmates and friends usually present levels of intimacy that are lower than

familiar ones and, thus, it is possible to expect that these groups will present lower levels of homogeneity. Given that these groups are composed of weaker ties compared to the familiar one, the expectation is that the *shaping power* of the context towards these latter groups will be higher. In other words, the weakness of the ties leads to less homogenous groups, and this leads to a higher correspondence between these groups and the context. This, of course, does not mean that non-cohesive social groups can be intended as a representative subsample of the spatial or temporal context. For instance, different workplaces – according to the nature of one's job – lead to different distributions of political opinions and behavior (the distribution of political opinions in a factory will be very different compared to the newsroom of a newspaper or a political science department). More simply, our expectation is that groups characterized by weaker ties are less different from the context compared to the family, and this has consequences on the heterogeneity of the group itself – that is expected to be higher. Thirdly, the weak ties structure – that, usually, non-cohesive social groups present – allows individuals to be more fully aware of the public opinion. Huckfeldt and colleagues explain in this way how structural characteristics of different social networks influence the exposure to political information: "[i]nformation that is communicated through weak ties typically travels farther because it is less likely to feed back to the point of origin […] When social communication occurs through weak ties, beyond the boundaries of cohesive social groups, public opinion becomes more fully public" (Huckfeldt et al. 1995). The main consequence that one can imagine about this process of "differentiated awareness" is that people who are embedded in non-cohesive social group are more *sensitive* to the broader opinion climate.

It is important, before going on with the presentation of the theory, to stress the relationship that exists between the cohesiveness of a social group and presence of strong ties inside it. Huckfeldt and colleagues (Huckfeldt et al. 1995) connect the concept of cohesive/non-cohesive social group to the strong/weak ties tradition, defining the family (and the partner/spouse) as a cohesive social group and those relations which are outside these boundaries (such as friends or workmates) as non-cohesive groups. Bello and Rolfe (2014), as well as Erisen and Erisen (2013), treat the two concepts interchangeably (better, these works assume that cohesive social groups are largely composed of strong ties and vice versa) without deepening too much theoretical reasons of their choice. Although many scholars have treated the two constructs as equivalent, a theoretical difference actually exists. The main difference between the concepts of strong/weak ties from one side and cohesive/non-cohesive social group from the other is that, if in the first set of concepts, intimacy, intensity and stability of the relation are measured, in the second set of concepts, conversely, discussants belonging to one social circle with respect to another are assumed to enact relations characterized by weak or strong ties. The research that translated these concepts in electoral studies assumes that

cohesive social groups (that is, family and the partner) are assumed to be characterized by "strong ties", independently from the actual intimacy these people share. Similarly, non-cohesive social groups, represented by co-workers, friends or neighbors, are assumed to represent for our reference individual a set of weak ties. This assumption (that represent, to some extent, a violation of Granovetter theory) can be defensible, more than theoretically, empirically: the main idea behind this choice is that "normal" relations between people and their family will lead to present, by and large, characteristics that Granovetter lists in his seminal article (Huckfeldt et al. 1995). For the same reason, friends, co-workers, and neighbors tend to have, by and large, less intimate relations with our *ego*; this, however, does not mean that, in some cases, a person can evaluate more important the relation with a co-worker respect that with a wife/husband. More simply, the theoretical expectation that is implied above is that, overall, social groups can be ordered according to different levels of intimacy, from the stronger one (wives, husbands, fathers, mothers, sons) to the less intimate ones (neighbors, co-workers).

The third and last conceptual set of relations that will be treated cannot be intended by a group in the proper sense of the term, because it represents theoretically some kind of residual amount of relations that individuals experience in their everyday lives. This "residual" is constituted by casual interpersonal relations that people have in different and unpredictable ways. "When apolitical men or women shop at the local supermarkets, stand in line at the local post office sit in line at the local gas station, mow their lawns, walk in their neighborhoods, and engage in other everyday activities, they are also experiencing a form of casual social interaction with politically important consequences. […] the neighborhood social context might be important even for individuals who never discuss politics with close friend, and even for social isolates who have no friends" (Huckfeldt 1986). Needless to say, casual encounters, by and large, have much lower coercive power compared to both cohesive and non-cohesive network. People are hardly converted by strangers when they are in line at the post office, except in cases in which, as stressed by Huckfeldt, these individuals are apolitical and lack in other politically relevant interactions. An interesting characteristic of casual social relationships is the connection between these latter and spatio-temporal context: as we stated before, cohesive social groups (which are impersonated by families, partner and so on), are relatively independent with respect to spatial and temporal contexts. According to our theoretical framework, they tend to be refractory to spatial compositions of political preferences and fluctuation of public opinion over time. The dependence from the context by non-cohesive social groups is, rather, assumed to be stronger compared to that of cohesive ones. In a continuum-like fashion, thus, the relation between the casual encounters and the context is stronger. More precisely, the shaping power that the contexts exert on these set of interactions is

stronger, even stronger that reference groups'. In other words, having casual encounter with a person in line at the gas station is (almost) like picking a person from a random sample. We say "almost" because, to some extent, public places that persons usually associate with are not completely "public", that is, different supermarkets are designed for different groups of customers, local post office can be situated in rich or poor neighborhoods and, thus, prevalently employed by high/low class citizens and so on. However, although they do not give a perfect image of the so called "public opinion", or "general climate" (Huckfeldt et al. 1995), casual encounter are, at the relational level, the main way in which people can perceive (or being sensitive to) this latter trends, in a spatial and temporal fashion. As a consequence, sensitivity to the broader context is higher with respect to both cohesive and non-cohesive groups when people are exposed to casual encounter[5].

The graph presented in Figure 3.1 summarizes graphically the relation between contextual levels and different networks; it is principally based on the outline provided by Huckfeldt (1986), but contains some, significant, differences. The top part of the image represents the contexts (time and geographical ones) that, as underlined previously, contribute to shape the opportunities of interaction in co-presence. As pointed out before and differently to the outline sketched by Huckfeldt, the effect of the contexts on networks (and, in particular, on different social groups) is not exerted in the same way. In other words, the shaping power of the contexts – represented by the thickness of white arrows in the image – does not affect equally all the social circles. At the same time, coercive ability of these circles – that is, the capacity to affect individuals – are differentiated, as represented in the thickness of grey arrows. Individual sensitivity to the broader context represented by the thickness of the dashed line, decreases as the cohesiveness of the groups increases.

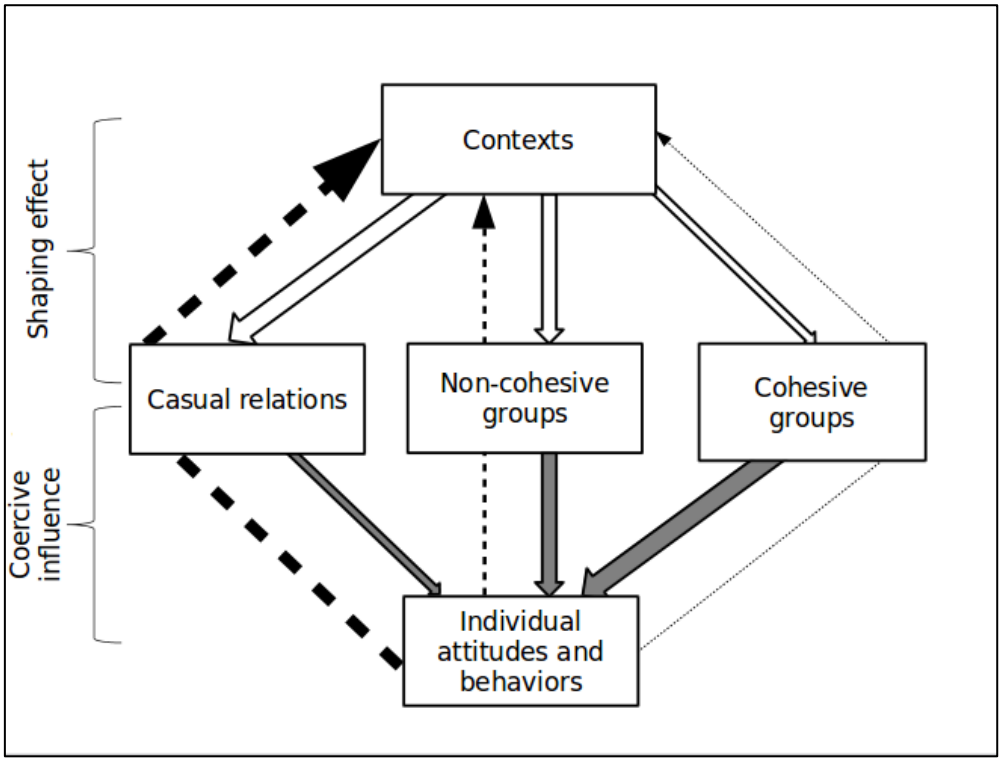
4. Contextual scales

Having stated the relation between (spatial and temporal) context, networks and, especially, different social circles, a question arises: how do we measure correctly time and space? Even

[5] So far, the theoretical framework assumed indirectly that all the individuals in the network are all at the same level. That is actually not true. As pointed out by classical theory on network influence (Katz Lazarsfeld 1957, Katz 1957), influence in interpersonal communication is mediated by individual characteristics of the nodes, such as the capacity of certain individuals to be acknowledged as "opinion leaders" or, more generally, "experts" of a certain topic. Experts' opinions are more likely to be considered by less attentive individuals in their political choices. Even though the political attentiveness is crucial in shaping the relation between individuals and their contexts (Mancosu 2014) and networks (Sidanius Lau 1989, McClurg, 2006, Huckfeldt et al. 2000), the work's main statement and major aim are to focus on structural/relational characteristics of the environment. The focus on individual characteristics would need a much more refined theory (see chapter 6).

though time and space represent continuous measures, in passing from the theoretical to the methodological side, a choice must be made: changes in time of the network exposure must be intended in decades, years, months or days?

Figure 3.1 Theoretical links between contextual levels, social groups and the individual



And spatial effect must be intended as neighborhood, municipality, province, or regional-based effect? Or, maybe, both the effects must be, for instance, be thought not in terms of official data or common unit measures, but new spatial structures and new measure (such as, say, days triplets) must be introduced? It seems important to stress that this is not a question that can be accounted only technically: scales are, primarily, a theoretical issue and, especially when we talk about contextual effects, the choice of the scale and a theoretical deepening on theoretical arguments that guide our choice are fundamental. Spatial, as well as temporal scales are chosen according to several discriminating factors (Meentemeyer 1989): existing data, economic constraints, size and speed of the social phenomenon or process we want to investigate, theory-driven constraints, as well as size of the units themselves are the main factors which allow geographers to choose a scale instead of another one. For what concerns time, in this work the choice of the scale is constrained to several factors. First of all, what we are going to study is the behavior of individuals during a single

election. Months, years and decades, more than allowing to study a single election, are more suitable to describe and analyze a set of election – for example a single electoral cycle or several of them (Reif Schmitt 1980, Marsh 1998). As we pointed out above, different elections present radically different structures of the political offer, the media landscape and even electoral rules of the game, with the obvious consequence that the constraints set would change radically. Thus, stated that our main idea is to test the main tenets of a theory of contextual and network effect on the individual during the days immediately previous to the Election Day, we are theoretically forced to identify days of campaign themselves as the most suitable candidate as a well-balanced scale.

From the geographical point of view, rather, the choice is less obvious. Stated that the geographical scale must not exceed the national level (at that point the constraints set would be different), many, equally defensible, scales could be employed in order to test our hypotheses. Regional, macro-regional, provincial and municipality levels (in addition to levels that are not official and could be constructed, say, minimizing within variance and maximizing between variance) could be equally good candidates, from a theoretical point of view, to be tested as a context. Two main discriminating factors will be employed to reduce the number of these candidates: first, the availability of the aggregate levels (that is, non-existing level will not be created and tested). This for a simple reason: no theory states how these possible aggregate levels should look like and, since we are dealing with a theory-driven framework, no measure that do not have clear expectations will be tested. Secondly, the number of ecological units of the aggregation process must be sufficiently large, in order to allow these levels to vary. In other words, regional and macro-regional levels are expunged from the list of candidates to be tested as theoretically relevant levels. A reduced number of ecological units would lead to aggregates which are not sufficiently differentiated and, even more important, to people who are surrounded by a context which is too broad: a person who mainly lives in his/her own municipality has a low likelihood to be affected by the political distribution of people residing in other regions or provinces. Thus, the two geographical levels at which the analyses will be performed will be the provincial and municipality levels.[6]

[6] Presented in this way, the theoretical structure concerning scales is consistent with the Russian-doll model of sclaes: scales, here, are "constructed as a system of nested territorial containers defined by absolute geographic size" (Brenner 2005, 10). The same can be said for temporal scales. Treating scales as simple nested systems neglects a number of theoretical characteristics that, for 30 years, have been developed by political and economic geographers. Several contributions, indeed, focus on the relational and dynamic characteristics of geographical and time scales (Lefebvre 1991, Howitt 1998, Brenner 2005, Marston et al. 2005). According to these views, "[e]ach geographical scale is constituted through its historically evolving positionality within a larger relations grid of vertically 'stretched' and horizontally 'dispersed' socio-spatial processes, relations and interdependencies" (Brenner 2001 in Marston et al. 2005). Scales and their very nature can be fully understood only if analyzed by combining relationally local, national and supra-national factors. Studies working on rescaling, however, principally focus on systemic analyses of the circulation of capital and globalization processes (Brenner, 2005). Our analysis, rather, starts from a methodological individualism

5. Individual responses: assimilation and conflict

The model depicted so far is characterized by two basic assumptions, theoretically preceding the model itself: the first assumption – or theoretical prerequisite – is the centrality of the individual in the model. The individual – what can be called *reference individual*, a brutal simplification that allows to theoretically construct the argument – is subject to different, direct and indirect, effects. Of course, these effects are exerted by other individuals, especially when we talk about network effects. However, we cannot forget that our reference individual is him/herself source of environmental effect for people he/she is in contact with. If we had to represent as much realistically as possible our theoretical argument, probably, the best candidate for such a model would be that depicted by Peter Berger and Thomas Luckmann (1966) and especially their argument about the dialectic nature of the relationship between the individual and the social reality: "it is important to emphasize that the relationship between man, the producer, and the social world, his product, is and remains a dialectical one. That is, man (not, of course, in isolation but in his collectivities) and his social world interact with each other. The product acts back upon the producer" (Berger Luckmann 1966). The main consequence of this dialectical process is the fact that there is no such thing as a primacy of the environment on individual, or vice-versa. The individual and his/her social environment are embedded in a common dialectical process in which the latter contributes to give sense of the world to the former and, at the same time, the individual contributes to represent an environment – namely, to be part of an ordered social reality – for someone else. In this theoretical framework, focusing on the individual, and, thus, choosing methodological individualism, must be considered as a simplification of reality, due to theoretical and technical issues that would arise by exposing the model in a dialectical fashion.

The second assumption that must be considered in the model exposed so far is characterized by the passive role of the individual: this latter represents a sort of passive recipient of environmental effects, and, at this point of the theoretical presentation of the model, seems to have no power in selecting or resist to the environmental forces. In other words, the theory exposed so far is more focused on environmental forces and neglects, to some extent, the concept of individual action. This

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standpoint. Even though the study of scales and their relational nature could be useful to understand where (and when) people are embedded in, it seems difficult to employ successfully this promising geographical theory about scales without going off topic. Too many assumptions and theoretical arguments would be necessary to sketch generally this vast theoretical flow, combining it with a basically individualist theory and a quantitative hypothesis testing. For now, it is important to stress how working with Russian-doll models of scales represents a rough (and necessary) simplification of what scales are.

paragraph is aimed at analyzing the ways in which individuals can respond to environmental stimuli. The point of view that we will choose is not related to individual characteristics that can allow or deny environmental effects: to this respect, many studies have previously contributed to collect theoretical arguments and empirical evidences. It has been demonstrated, for instance, how political sophistication can be a strong determinant of levels of permeability with respect to discussants opinions (Zaller 1992, De Sio 2008, Huckfeldt 2001).

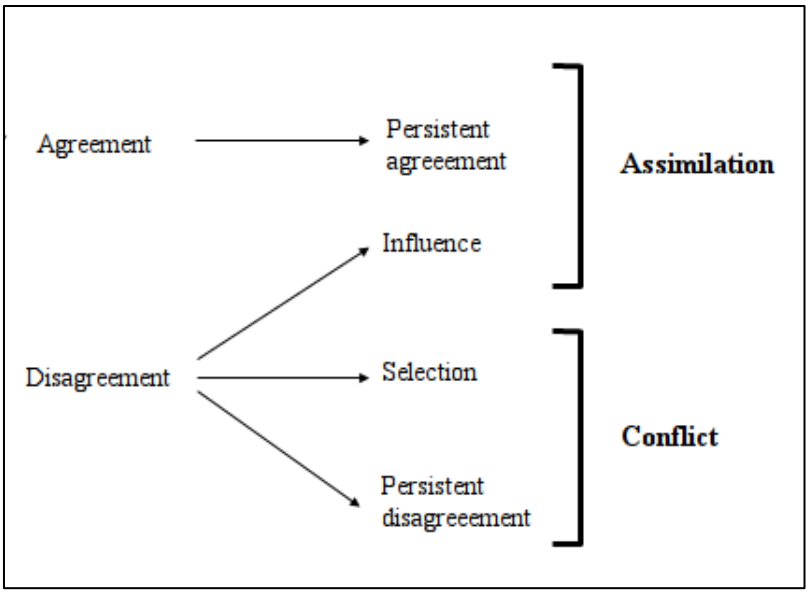
Keeping constant those factors, other types of responses to environmental stimuli can be argued. These responses, which are not directly connected with individual characteristics, will be called *relational responses*. Huckfeldt argues how individuals can react to the social forces that swing them towards a political option in two ways: individuals can have *assimilation* or *conflict* responses (Huckfeldt 1986). An example of assimilation can be represented by Newcomb's seminal work (Newcomb 1957), in which it is showed how young women in Bennington College were persuaded to embrace liberal ideas by the school environment. Most students who, at the beginning of their experience in Barrington College, were reflecting political opinions (prevalently conservative) of their parents, gradually started to change their view, mainly shifted by large part of their peer group. In his classic study, Key (1949), showed an opposite effect of the environment in shaping political opinion in opposition to external stimuli. According to Key study, in the south of the US, high black population prevalence in part of the counties have, as a result, a stronger effect on white citizens to have more conservative opinions and xenophobic sentiments towards Afro-American people. These two studies show how a strict entanglement of individual, social and environmental characteristics can lead to opposite outcomes: from one side, young girls of Bennington College tend to present higher levels of agreement with (part of) the discussants who belong to their environment. On the other side, southern US white people tend to develop higher level of xenophobia towards Afro-American people as the results of conflictual responses to the prevalence of these latter. These two cases exemplify the two concepts that will be developed in these pages. As Huckfeldt points out (1986) "Assimilation is consensual, favorable response to a social context that can be empirically identified as an instance in which the individual probability of engaging in a behavior sympathetic toward a group, or predominant within a group, increases as a function of that group's concentration, or density, within the population". On the other side, "[c]onflict is a dissonant reaction to context that can be identified empirically as an instance in which the individual probability of engaging in a behavior sympathetic toward a group, or predominant within a group, decreases as a function of that group's density in the population" (Huckfeldt 1986). Huckfeldt definitions present two main characteristics of interest for this work. The first one is that, according to Huckfeldt, the concept of context is defined in a broad way. In general, is difficult to locate

"context" among the categories previously specified (that is, networks and contexts, as we defined them). In this particular theorization, context is both the sum of all the dyadic relationships (that is, the network) and the general prevalence, or the density, of the group in the population. If we want to translate the definitions of conflict and assimilation in the light of the structure of contexts and networks previously exposed, first of all, we must have a clear idea of the relational processes enacted and their characteristics. First of all, it is clear that reactions of assimilation and conflict happen at the relational level: as we stressed above, the relational level is the only one that affect the individuals, and consequently, is at this level that responses to the environment can be evaluated. Moreover, we can say that assimilation and conflict are, in its more refined way, dyadic processes, that is, processes that involve the reference individual and one of his/her discussants. The fact that, as Huckfeldt specifies, we can interpret these concepts as a relation between an individual and a social group does not cancel the fact that the group is composed of discussants, that every discussant holds a political opinion, and that every political opinion can be consensual or dissonant with respect to our reference individual. Individual reactions, in practice, can be seen mainly in a dyadic framework. The logical consequence of treating the dyad as the fundamental environment in which people can react is, thus, to use the term political agreement and disagreement (Huckfeldt Johnson Sprague 2004) to translate assimilation and conflict, from a generic "context" framework, to a relational one. *We will define, thus, conflict as a situation of political disagreement between an ego and his/her alter and assimilation a situation of political agreement between an ego and his/her alter*. Assimilation and conflict, declined in their dyadic sense, represent two different types of response to external stimuli in the way that is the reference individual who, having been exposed to the environment, defines his/her position towards the environment. This process can be intended as *static* or *dynamic*.

In figure 3.2 is exposed a simple model of how the dynamic of assimilation and conflict works. In a dyadic relationship, an individual can simply be in agreement with his/her discussant, remaining in agreement in a later moment. In this case, we talk about *persistent agreement*. In general, indeed, dyadic relationships tend to be non-conflictual. The idea of the persistent agreement is based on the fact that people in interaction, in the majority of the cases, are agreement-seekers (Huckfeldt Johnson Sprague 2004). People in interaction with others are more prone to share ideas and options with these latter instead of engaging in discussions which lead to stressful condition. According to Festinger (1957), processes of cognitive dissonance reduction are enacted by individuals in order to avoid disagreement with other citizens. Moreover, individuals who are going to sustain a disagreeable relationship must be "armored" with an adequate, well-organized amount of political information (Sidanius Lau 1989), which is not at disposal of the whole citizenry. Given this number

of hurdles to the production of disagreeable relationships, usually agreement is the "normal" situation among citizens who interact.

Figure 3.2 Assimilation and conflict as individual responses to discussants



As Huckfeldt and colleagues (2004) point out, however, agreement is not the only situation in which people can find themselves. For instance, it has been demonstrated that, in some cases, discussants can present situations of *persistent disagreement*, that is, circumstances in which, contrarily to the expectation of cognitive dissonance theories, people are stably engaged in dissonant relationships. Broader context characteristics have been identified by Huckfeldt and colleagues as determinants of this type of behavior. In general, authors stressed the fact that a certain degree of persistent disagreement in a dyad perfectly is sustainable when the residual network (that is, the other dyads in that are present in the ego network) is coherent with ego. Network density and level of autoregressive influence have been identified as the two main characteristics that can modify these dyadic relations patterns (Huckfeldt Johnson Sprague 2004): the density of the network can be defined as the number of people in common that two individuals, randomly picked from a social circle, share: a situation in which A knows all B's friends will present higher levels of density compared to a situation in which A knows barely no one of B's friends. As Huckfeldt and colleagues underline (2004), the density of a network is better understandable by employing the definition of "strong tie" conceived by Granovetter (1973) and deepened in previous sections. A dense network is a network in which strong ties are dominant. In other words, a dense network is characterized by people who share strong ties and rarely interact with other people. Being embedded into highly dense network has two main effects for the

individual: people embedded in highly dense networks tend to be more affected by their context and more refractory to diverse opinions[7]. The second network characteristic that is taken into account is the autoregressive influence. According to Huckfeldt and colleagues (2004), "autoregressive patterns of influence occur when the effectiveness with which an opinion is communicated, or the influence of the communicated opinion on others, depends on the incidence of the opinion in the larger network of communication". In other words, discussant's opinion is more relevant for ego when is generally more accepted in the residual part of the network. In a network with reduced levels of autoregressive patterns, the opinion of a random discussant is more relevant with respect to the opinion of the same discussant in a network characterized by higher autoregressive influence. At the aggregate level, Huckfeldt and colleagues notice, mechanisms unleashed by these two characteristics of the networks lead to non-trivial outcomes: "[t]he model of influence we are describing rewards majority opinion at the same time that it punishes the political minority, but it produces an aggregate outcome in which the minority does not disappear. The potential of this mechanism for maintaining political disagreement is that the influence of majorities and minorities are defined according to the distribution of opinion within closely held micro-environments of political communication. Hence, people are able to resist divergent viewpoints within the network because every opinion they encounter is filtered through every other opinion they encounter" (Huckfeldt Johnson Sprague 2004). Levels of autoregressive influence and density of the network have been demonstrated to be highly influential on levels of sustainable and persistent disagreement.

Persistent agreement and disagreement are, however, two stable processes. The concept of persistency itself states that, given a dyad between ego and one of his/her alters, situations of persistent disagreement and agreement will be stable during time. In the literature two other outcomes have been investigated so far. Both consider the idea that, given a situation of disagreement, ego and alter, instead of taking the route of the persistent disagreement, can differentiate their action or, to make the idea consistent with what exposed until now, respond to an environmental stimulus. Given a situation of disagreement, thus, an individual can react in two ways: as showed in figure 3.2, the individual can take the routes of *influence* or *selection*. Influence is the process according to which a sort of agreement is reached. Ego can influence his/her alter or, conversely, he/she can be converted to another political option (Bello Rolfe 2014). A person who finds him/herself in a disagreeable relationship with his/her discussant, rather, can just filter out disagreeable discussants, that is, stop talking about politics with that person and withdrawal from the conversation (Bello Rolfe 2014, Mutz 2002). Selection processes consists in both direct and

[7] Density, according to this definition, is another way to define what we have called cohesiveness of a social group.

indirect choices, which have, as a result, the termination of the relationship. According to the classification we have made until now, it is possible to define these two dynamic processes as assimilation and conflict responses. As pointed out in figure 3.2, influence can be defined as an example of assimilation processes: coming to an agreement from a previous situation of disagreement means that people, to some extent, have given consonant responses to the environment. On the contrary, avoiding further relations with the dissonant discussant, in this work, will be defined as a conflictual behavior. One may think, instead, that stopping any political discussion with a discussant cannot be defined clearly as a conflict situation. There is no conflict if there is no relation. As pointed out above, however, a conflict response is, actually, a dissonant response to the environment, and a situation of disagreement to which follows a truncation of political discussion is a dissonant response to the environment (and it is difficult to think of a more dissonant answer than a total closure of the discussion).

Previously, it has been stressed how more recent works concerning political network focused on the interactional side of the processes depicted so far. Although the categorical structure these scholars use can be only partially overlapped to the framework we employ here, it is important to analyze differences and points in common between the two. The main difference is that the argument exposed so far is focused on the outcomes of several – and theoretically relevant – trends that are common in dyadic political relatinoships. Other contributions, on the contrary, focus on mechanisms given which these outcomes take place. Similarly to our taxonomy of relation outcomes, other scholars (Fowler et al. 2011, Noel and Nyham 2011) have underlined the fact that social influence is just one of the relational situations that can be theoretically depicted in a relational framework. Recent research, moreover, allows us to more convincingly theorize relational mechanisms that lead to different outcomes. As pointed out above, four types of relational mechanisms can be listed: a genuine influence effect, an agreement given by homophily processes, and two other effects (random clustering and contextual effects) which do not pertain completely to the realm of relational effects (these two processes can be more described as contextual/network effects). In their theoretical/methodological treatment of the influence problem, Fowler and colleagues (2011) provide some useful insights concerning the *mechanisms* according to which people get in agreement. Influence process is quite straightforward and is compatible with the framework presented in the literature: one person, or both, can be persuaded to change one or more of their political characteristics in order to get to an agreement situation. Less unequivocal is the relation between homophily mechanism and residual outcomes: however, it can be argued that persistent agreement and selection can be two parts of a homophily process: in other words, it is possible to think to persistent agreement as a form of “positive selection” that leads people to

maintain political interactions with their discussants *because* of political similarity. At the same time, selection (as it has been defined above) is the process according to which people tend to discard their discussants *because of political dissimilarity*. In this way, homophily represents the theoretically sufficient reason according to which people can opt for both a persistent agreement and a selection outcome. Finally, persistent disagreement can be developed theoretically as some sort of residual outcome. As pointed out above, such disagreement is something that is sustainable in cases in which the residual network presents several characteristics, thus, it cannot be intended as a relational outcome per se (the outcome is in fact dependent on the rest of the network)[8].

6. Why Italy?

The theoretical framework exposed above is enough general to be employed in a large number of cases: many of the individual statements and part of the theoretical structure derive from the American literature, which boast a longer tradition (with respect to European electoral studies) of the investigation of voting behaviors' social determinants. Nothing forbids us to apply to other countries one or more theoretical expectations that can be extracted from the exposure of the theoretical framework. As pointed out above, works employing European data in combination with theoretical expectation involving social determinants to vote are quite rare in the literature (Schmitt-Beck et al. 2003, Bello Rolfe 2014). In particular, Italy provides some important characteristics that could be useful to identify strong evidences to our framework in this particular constraints set. First of all, it is important to stress the particular geographical situation of Italy: as pointed out in many studies (Galli 1968, Sani 1976, Diamanti 2003), one of the Italian distinctive traits is the stability of the so-called electoral geopolitics, that is, the geographical subdivision between influence spheres, dominated by former major parties of the political landscape during the First Republic (1946-1992) and the legacy produced by this political system, that started in 1994 (Diamanti 2003, Vezzoni 2008). The main idea that we can derive from the electoral geopolitics in Italy is that, combined with the long-standing stability, Italy presents also huge sub-national variance of the support for

[8] It is important to notice how also the situation in which one passes from a situation of agreement to a situation of disagreement can be defined as some sort of residual category, in a similar fashion with respect to persistent disagreement. If one passes from agree with someone to disagree with the same person, it means, in a relational framework, that someone in the dyad has changed his/her opinion because of an influence process in another dyad. In this case too, the mechanism is not focused on the dyad itself, but the outcome of the dyad is conditioned on another relation.

parties (Diamanti 2003), a fragmented geography of political support, based on relatively remote causes (Anderlini 2007).

The second, and more important, property that Italy provides for the analysis is the choice of the elections that will be treated: National Elections of 2013 and European Elections of 2014 provided a lot of surprises for journalists, politicians and electoral behavior scholars: first of all, it must be remembered that 2013 elections in Italy were held in a climate of strong political and economic crisis; moreover, almost half of the citizenry changes its vote from the previous elections (2008): finally, new political parties, aimed at harshly criticizing the entire traditional political supply, considered unfit to govern the country, received strong support, in differentiated parts of the country, by means of, apparently, sudden rise a few weeks before the election day (ITANES 2013). In particular, it is important to stress the role of Beppe Grillo's Movimento 5 Stelle, a "strange political creature" (Corbetta 2013) that became, at its first appearance on the national electoral scene, 25% of valid votes, becoming the biggest party on the Italian territory, after an aggressive and stunning election campaign. Elections of 2014, from the other side, sees a strong victory of the PD, guided by Matteo Renzi, that gains 40.8% of valid votes, an unprecedented result for every party still existing in the Italian political spectrum (Maggini in De Sio Emanuele Maggini 2014). This political turmoil, thus, is useful for our aims because it allows us to assess strong, rapid differences in time (testing in this way the effects that time context exerts on networks and, thus, on individuals) and, at the same time, gives us a combination of traditional and new parties that is difficult to find in contemporary mature democracies. Summarizing, the peculiar case of Italy during the first part of the 2010s is that both geographical and time contexts *vary* and this is important to test whether the main tenets of the theory actually hold.

7. Testing environmental effects framework's expectations

This chapter, so far, has focused on producing a coherent and comprehensive theoretical framework that accounts for environmental effects. We have separated the concept of environment from that of constraints set, postulating that the work would be focused on environments that pertain to the same constraints set. Essentially, two types of environmental effect have been identified according to this framework: the contextual and the network effect. A relation among them and a theoretical precedence of the contextual with respect to the network effect have been hypothesized. We have argued that space and time contribute to shape the relations between networks and the individual:. We have also argued that there is no single network, but it is possible to theoretically divide the broad concept of network into different social circles or groups, which have the same "qualitative"

relations with the higher level context and the individual, but are characterized by different degrees of those relations. We have also tackled the issue concerning responses that individuals can give to these effects, and we systematized four theoretically significant dyadic dynamics in which individuals can accept or reject the pressure of their relational environment.

The number of hypotheses that we could draw from this theoretical framework is quite large. A number of expectations can be made about relationships between the individual and different structural characteristics of the network: for instance, one could argue about the fact that different structural characteristics of social circles (for instance, the aforementioned density and autoregressive influence) tend to alter the relationship between contexts, networks and reference individuals. Moreover, one could investigate how geographical and temporal context influence "at the same time" networks and, thus, individual beliefs and behavior. Other projects could relate exogenous individual characteristics and hypothesizing relations between, say, context, networks and individual properties. These and other expectations will not be able to be tested in this work, for basically two reasons. The first one is related to the lack of data. Testing without technical problems the whole set of expectation that could arise from the framework would mean having at our disposal a time-varying panel of refined dyadic data from a number of different geographical context. As far as we know, no dataset at this moment can provide such a level of detail. Secondly, if we would like to take into account the effect of geographical, temporal, network and dyadic dimensions we would be probably need a more refined, not straightforward statistical modeling. For these reasons, the next three chapters will test a number of expectations that, however, cannot exhaust many other hypotheses that could arise from the theory. In order to provide the strongest evidence with the amount of data at our disposal, thus, it has been chosen to deal with the main tenets of the theory exposed above. We can state that, generally speaking, the theoretical framework we presented states three main ideas around which everything else is dependent to: the first tenet is the connection between geography and different circles in influencing individuals; the second is based on the relation between time and the network in doing the same; the third is related to the different strategies that individuals can enact in order to respond to environmental forces.

Following this idea, the next chapter will deal with the shaping effect that geographical distribution of the main parties that ran in 2013 exerted on networks and, in turn, on political ideas of people. More precisely, the relation between local geographical contexts and different types of circles (measured by dyadic relationships) will be investigated. The second empirical chapter (chapter 5) will treat the relation between time (in this case, the time of the electoral campaign of 2013) and network. In this chapter, it will be taken into account as a case-study, the Movimento 5 Stelle rise in the 2013 campaign, which ended with a stunning result for the party leaded by a former comedian,

Beppe Grillo. In this chapter, the conceptualization of context and networks as a multilevel structure will be declined in term of a diffusion process, a more studied phenomenon that can be seen as a special case of our general theoretical framework. It will be argued how a diffusion process (that is, the modification of the share of votes owned by a party over time) can be fueled, in certain circumstances, by the exposure to non-cohesive social group. The third empirical chapter, chapter 6, will deal with individual responses to the environmental effects and will take into account dyadic dynamic processes exposed above, employing 2014 European Election data. The two main dynamics that will be investigated are those which have been defined as more interesting above: influence and selection (Bello Rolfe 2014).

4 Networks and geographical context in Italy: 2013 National Elections, sub-national environments and electoral behavior.

1. Introduction

According to the "social logic of politics", described in the previous chapter, voting is, among other things, a social activity: discussion networks represent the environment in which people structure their attitudes and political preferences. Voting behavior is, therefore, affected by the relations unfolding among citizens who share their everyday lives (Berelson Lazarsfeld McPhee 1954; Huckfeldt Sprague 1995; Huckfeldt Johnson Sprague 2004; Zuckerman 2005). Discussions with other citizens can crystallize, slightly change or even throw into crisis one's ideas, beliefs and opinions. However, as pointed out in the last chapter, discussions with friends and relatives are not the sole source of political information and influence in a contemporary democracy. Also, the general climate, the local environment, by shaping the structural context of individual opportunities of encountering a supporter of a certain party, crucially contributes to affect individuals voting behaviors and political opinions.

Research applying these approaches and focusing on the relation between discussion networks, contexts and voting behavior has focused on either extremely stable (Huckfeldt Sprague 1987, Huckfeldt Johnson Sprague 2004) or extremely unstable political systems, such as young democracies (Baker Ames Renno 2006). The Italian situation in 2013 can be described as somewhere in between these two extremes (Bellucci Segatti 2013): the Italian political landscape in 2013 is characterized by a period of high instability. This political turmoil culminated in November 2011 when the worsening of the economic crisis, an increasingly weak majority and the evident lack of international credibility led Berlusconi to resign as prime minister, after almost four years in government (Bellucci Costa Lobo Lewis-Beck 2012; Vegetti Poletti Segatti 2013). His office was taken by Mario Monti, who headed by a non-political technical government, aimed at achieving economic reforms and austerity measures. From the political supply side, despite changing their names, a part of the relevant parties in the Italian political landscape have remained stable for the last 20 years. In 2013, support for Pierluigi Bersani's Partito Democratico (Democratic Party, PD) was rooted into the left-wing tradition, starting from the end of the Second World War (continuing, even if changing dramatically in the ideological tenets, the legacy of the Italian Communist Party). In the right-wing area, the legacy of the Christian Democrats was continued by Berlusconi's Popolo della Libertà (The Freedom People, Pdl) and its small, more extremist ally, the Lega Nord (the Northern League) (Shin Agnew 2002, Diamanti 2003, ITANES 2013). In 2013, however, we

witnessed the appearance of new political alternatives characterized by a harshly critical attitude toward the established party system. Along with the Movimento 5 Stelle – that, in 2013, at its first appearance in a general election, gained 25% of the valid votes becoming the largest party in the country – other parties have tried, with less success, to represent an alternative to the old party system. The case of Scelta Civica is enlightening of this attempt: as will be deepened below, the coalition of Scelta Civica, led by the leader of the Government, Mario Monti, was a (partly failed) attempt to provide a liberal right-wing party in Italy that could challenge Berlusconi's strength in that area of political spectrum.

In this fluid situation, it will be attempted to test several hypotheses concerning the social mechanisms that are enacted at the local geographical, as well as at the discussion networks levels. The theory presented in chapter 3 will be extended and several, more particular, hypotheses, will be tested. As stressed in chapter 3, Italy represents an interesting test bench for two main reasons: if it is possible to have clear evidences that witness the existence of strong effects at the environmental level in stable, unstable and "mixed" systems (such as the Italian one in 2013), we can argue, with empirical evidence on our side, that these mechanisms do not strictly depend on a particular structure of the supply. The second reason starts from the matter of fact that a little research on environmental effects has been carried out in Europe (for one of the few works showing interest on these topics, see Schmitt-Beck 2003): providing information and evidence of environmental effects of different natures in a European country assures us about the fact that theoretical mechanisms hypothesized can be adapted – even by employing different techniques – also to a European environment.

2. Context, network and dyadic relations

As pointed out in the previous chapter, several levels of environmental effect can be identified. It is worth to remember that environmental effects can present themselves in several ways and can affect individuals by activating different mechanisms. Environmental effects, according to Eulau (1986) are defined as effects that act on individuals, whether are they enacted by interpersonal relations or not. As discussed above, the theoretical category of environmental effects can be further divided in two constructs: we have defined the contextual level as a source of non-interactional pressure. Context affects people by changing the distribution of opportunities they have in establishing a co-presence relationship. As explained by Blau and other scholars (Blau 1977, Huckfeldt 1986), a context that presents, say, a large number of republicans, protestants or Eskimos contributes to shape the likelihood of relationship that one can have with a republican, a protestant or an Eskimo

(namely, it enhances the likelihood of engaging in an interaction with these latter). The actual mechanisms of pressure, by the way, are not enacted by means of the simple proximity between an individual and other discussants presenting certain properties. According to the theoretical model, convincing or reinforce a person's beliefs and opinions is possible only through interpersonal communication among people (Eulau 1986, Huckfeldt 1986, Huckfeldt Sprague 1995). That is, if context contributes to prepare the conditions under which the interactions can take place, it is the interaction itself that changes (or stabilizes) individuals beliefs, values and opinions.

The theoretical argument exposed so far is generic: from one side, we have the context, which is the simple distribution of characteristics in a certain environment, from the other side, we have networks, whose main characteristic is the chance of (potentially) change people's beliefs, attitudes and behavior. Combining the works of political scientists (Huckfeldt 1986, Huckfeldt Sprague 1995) and geographers (Agnew 1987), however, it is possible to refine these generic statements, applying them to the case of geographical context and political network, translating the sources of environmental pressure in levels of sub-national environmental effects and, at the same time, providing theoretical expectations according to different combinations of these environmental levels' characteristics. Given an individual who is embedded in a certain geographical environment and establishes continuously dyadic relationships with other citizens, we can easily state that aggregate geographical patterns of political loyalties (that is, the context) contain a large number of people our individual is usually engaged in conversation with (that is, the network). At the same time, network with which our ego relates to is nothing more than the aggregation of all the dyadic relations the individual has. From the conceptual side, we can define these various sources as multiple – nested – levels of environmental pressure (Huckfeldt 1986, Huckfeldt Sprague 1987, Huckfeldt Sprague 1995).

The top level – that is "top" when we talk about sub-national geographical effects in a single constraints set – is the local geographical level. It provides the context of opportunities that shapes the network of relations that one has. This context is represented by the distribution of opinions at the sub-national geographical level. The fact that the geographical level is specified as a context leads to some theoretical assumptions that have to be made explicit. First of all, we are assuming that the scale employed in defining the geographical narrowness of the ecological units taken into account represents adequately the distribution of individuals who potentially interact with our reference individual. This problem will be dealt by comparing different levels of geographical scale (compatibly with what argued in paragraph 4, chapter 3), showing how different scales can change – or not – contextual effects and their interactions with network effects. Secondly, and more important, we are assuming that people actually pick their potential discussants in the geographical

area they belong to. This is usually not a straightforward assumption, given that, in different studies, a – actually small – proportion of discussants have been reported to be spatially far from the geographical region in which our individuals reside (Huckfeldt 2001). This latter problem can be easily overtaken remembering the Italian situation: 2013's Italy is a case in which intra-country mobility is clearly lowered since the '70 (Pugliese 2002). This relative stability of intra-national migrations of the Italians allows us to assume that the large part of the relations one has is actually situated nearby our reference *ego*.

The social network our individuals are embedded in, also defined as ego network (Knoke 1990), is the environment in which relations and patterns of pressure take place. The network, taken as a whole, is the sum of all the interactions an individual maintains in his/her everyday life (Granovetter 1973). The network theoretical construct, although is the result of an aggregation of interactions, has, *per se*, several characteristics that are worthy of being deepened. As stressed above, networks present different levels of density, autoregressive influence or homogeneity that are not produced by the aggregation of the single dyads that compose the network. For instance, density of a network, that is the incidence of strong ties present in a network, is a characteristic that cannot be reduced to single relations. Other properties of the network, rather, can be applied also to single parts of the ego network, that is, its dyads. As showed in the previous chapter, an ego network includes different types of interactions, characterized by various level of intimacy, political agreement, as well as by "classic" individual characteristics of every discussant, such as their gender, educational level, political sophistication etc. In his/her everyday life, as pointed out before, an individual belongs at the same time to many social circles and interacts with many people. People comment political events when they are interacting with relative and close friend (they can comment these events while watching the News on TV, reading the newspaper or just because certain people are accustomed to talk about politics). Moreover, people can involuntarily eavesdrop conversations in public places: for instance, when in line at the post office, people can comment a situation that is happening in their presence and they can connect these small episodes to the local, or even national political situation, showing in this way (part of) their political ideas (Huckfeldt 1986)[9].

It is possible to expect that, taken singularly, different levels of environmental pressure actually exert an effect on the individual. Given a random individual and his/her discussants, the viability of a certain party for the individual will be enhanced by the exposure to the discussants, and vice

[9] Interactions between people in co-presence are not the only external features that can shape a person political loyalty. Non-relational information can be gathered, besides media, by books, reviews and other informational devices that do not need verbal communication. However, these non-relational influence agents will not be investigated in this study.

versa. At the same time, given an individual embedded in a context our expectation is that the viability given for a certain party will be function of that party in the local environment. The former expectation is straightforward, since it is the baseline of our work: if people do not exert a pressure one on each other, no network effect can be recognized and, thus, we should state that interpersonal communication is not relevant in shaping individual voting behaviors and attitudes. As stressed in chapter 3, the simple relation between one's opinion and his/her discussant's opinion could be due to different processes. Several works (see Fowler et al. 2011) stressed how these relations could be due to plain influence or, rather, to homophily. In the first case, the mechanism theorized is a process of persuasion, in which one or both components of a dyad change their opinion. In the second case, harmony in the vision between the two would be actively sought by the reference individual. In order to (partly) account for these alternative explanations, a technical device will be presented below, but we must be aware of the fact that both homophily-based and influence processes are expected to have, as outcome, a positive relation between ego's and his/her alter' opinions.

The direct effect of the local environment, even though is not explicitly theorized, should be expected because of an argument exposed above: the prevalence of an opinion in a sub-national geographic space leads, indeed, to enhance the likelihood of random encounters with people who hold that opinion[10]. The first hypothesis, thus, will read as follows: *Being exposed to discussants who vote for a certain party will enhance the individual viability of that party. Moreover, the strength of the party in the local context will enhance the viability for that party too.*

It has been stressed in chapter 3 how different social circles possess several characteristics: first of all, we have seen how dyad belonging to different social groups can, by and large, present different levels of social cohesiveness (Huckfeldt et al. 1995, Granovetter 1973). Secondly, it has been showed how different levels of cohesiveness lead to differences in coercion of our reference individual (Berelson Lazarsfeld McPhee 1954, Huckfeldt Sprague 1995); thirdly, it has been stressed how social groups can provide different levels of sensitivity to the broader contexts, according to their cohesiveness (Huckfeldt Sprague 1987). It has been also argued that sensitivity and cohesiveness represent some sort of tradeoff: more cohesiveness means a weaker sensitivity to the broader context. As stressed above, sensitivity to the context is a way of "understanding" – and, at the same time, being exposed to – the broader context, or the "public opinion climate". With different degrees, determined by the group in which an individual is embedded, network contributes to alter the image of the context that the individual has: in other words, network contributes to give

[10] According to this argument, the context can provide a sort of indirect operationalization of relations that are usually not measurable by means of survey tools.

a more or less distorted image of "what is going on" in the larger climate of opinion. At the same time, interactions make individuals more or less biased to this perceived context and, thus, more or less prone to be affected by the perception they have about it. We can argue, thus, that network alters the relationship between individuals and the public opinion in two ways. First of all, it alters perceptions about prevalence that different political ideas have in the public debate. As Huckfeldt and Sprague (1987) point out, the exposure to certain parties' supporters modifies – at different levels, according to the nature of the discussant – the idea of how the broader context is distributed (Huckfeldt Sprague 1987). This kind of *cognitive sensitivity* to the broader context is strictly connected with another type of sensitivity, *political*; in other words, the network contributes to change the reactions that the reference individual has towards different levels of political strength in the context. Imagine a situation in which our ego is exposed to party *A* supporters. If party *A* is supported by a large majority in the broader context as well, the exposure to discussion networks in which party A's ideas are held will represent a *reinforcement* of the viability the context transmits. This argument, indirectly, tends to state that the exposure to political opinions and the distribution of such opinions on the territory *interact*; the main expectation that we can make, thus, is that party supporters with which an individual lives his/her everyday life, combined with local levels of support for the same party, tend to exert an multiplicative effect on individual attitudes. The second hypothesis will then read as follow: *Being exposed to discussants who vote for a certain party will lead the individual to have boosted viabilities for that party, as long as the prevalence of the party in the broader context is higher.*

Sensitivity, thus, is a sort of measure of how the network lets the individual correctly perceive the broader context. We have stated above how this effect is weaker in people surrounded by strong-tied networks – namely, cohesive social groups – and stronger in people who are surrounded by discussants who are a better approximation of the actual political climate in the context – namely, non-relative groups, which are characterized by weaker ties: if less cohesive groups guarantee higher levels of awareness of the larger public opinion climate, then they guarantee an unbiased idea about the environment too. On the contrary, thus, more cohesive groups will lead to distorted perceptions and reactions about the larger environment (Huckfeldt et al. 1995). It is possible to hypothesize, thus, that the capacity that strong ties have in altering – cognitively and politically – individuals are stronger. If the second hypothesis holds, thus, we must expect that the interaction between context and network would be stronger with people exposed mainly to strong ties and is weaker with weaker ties. Imagine, again, a situation in which our reference individual is exposed to party A supporters who are also relative: if it is true that, together with higher levels of cohesion, we can identify higher levels of homogeneity and coercion towards the individual, the reinforcement

given by the party prevalence in the broader context will be stronger. We must expect lower levels of reinforcement towards party A if the individual is exposed to less cohesive social groups. In this case, the presence of a large prevalence of party A in the context is mitigated by the relative less amount of coercion given by friends or acquaintances, combined with the fact that lower levels of homogeneity in these groups lead the individuals to have higher likelihoods of being exposed to alternative opinions (Mutz 2002). The third hypothesis, thus, will read as follows: *intimate discussants – namely, family members – will exert a stronger pressure compared to non-intimate discussants – namely, non–relative – contributing to strengthen the alterations of evaluation produced by contexts in shaping parties viabilities.*

3. Data, models and variables

3.1 Data and main regressors

In order to test the three hypotheses presented above, ITANES 2013 election study data will be employed, in particular the 2013 post-electoral follow-up to the Rolling Cross-Section (RCS) campaign survey. Interviews were administered by employing a CAWI (Computer Assisted Web Interview) method. Around 3000 respondents who answered the RCS questionnaire were re-contacted for the post-election follow-up. Individuals in the second wave were selected in order to respect proportions in the Italian population for age, gender, geographical area and vote choice in 2013 National Elections[11]. The choice to employ thes data is due to technical reasons: as pointed out before, works on network and context have been rarely deepened in Italy (as well as in Europe). Processes of data collection have been consistent with this relative lack of interest given by scholars on these issues, with the consequence that the only two recent ITANES National election studies provide sufficient information for a physical person (the so-called main discussant) with whom respondent discusses about politics: the 2013 RCS follow-up and 2013 CAPI survey[12]. The number of interviewed people who answered the questions about their main discussant in the CAPI survey was low (around 500 cases). This could be due to several demographic factors: it has been showed (McPherson et al. 2006) how, in American discussion networks, several demographic characteristics, such as educational level and age, affect – respectively positively and negatively –

[11] 91% of the interviews (2812) was completed between March 29 and April 4, 2013. 196 respondent were added in order to reach the objective of 3000 interviews in the second wave (these latter respondents are substitutions).

[12] Other studies in Italy provided generic network-based information: for instance ITANES 2006 provided questions about general network agreement (Baldassarri 2009).

the amount of information about discussants that respondents are available to give, as well as the number of discussants. Having lower response rates about respondents in the CAPI survey, thus, should not surprise, given that the CAWI interview (because of the survey instrument itself) contains younger and more educated respondents (descriptive statistics of the demographic characteristics of the two surveys are available on request). Moreover, part of the lower response rates can be explained by means of a well-known literature showing how Italian voters tend to be particularly jealous of their political opinion (see Pagnoncelli in Mannheimer Natale 2008) and, apparently, of their relatives or friends opinion, too. The choice of employing 2013 follow-up data, thus, is due to the fact that this latter is the only one among Italian data which provides a sufficiently large amount of non-missing responses to these questions in order to make it possible to perform complex analyses (see paragraph 4 for descriptive information concerning the data). As pointed out in paragraph 2, networks are, ultimately, the aggregation of many discussants with whom the individual relates to. Technically, collecting information about discussants is usually done by means of individual surveys that ask the respondents with whom they talk about important matters of their lives or, more explicitly, about politics. In general (Huckfeldt et al. 1995, Huckfeldt et al. 1998) people tend to instinctively order their discussants from the more important one to the less important one. The discussant who is the first to be nominated is usually defined as the "main discussant". This discussant usually holds characteristics that differ from the remaining discussants: firstly, it is more likely that this discussant belongs to an intimate social circle, such as the relatives circle (Huckfeldt et al. 1995). Secondly, he/she usually presents higher levels of agreement with the respondent. It is important to underline that main discussant concept does not necessarily overlaps with an intimate relationship. The main discussant can be picked among non-cohesive social groups (Huckfeldt et al. 1995) or, rather, intimate discussants can be not chosen by the respondent to be a main political discussant too. In general, we can state that the concept of main discussant usually overlaps with that of "intimate person". In the work that follows, the variable that will account for the network effects is voting behavior of the main discussant. For our purposes, although not being a totally exhaustive measure, exposure to main discussant represents a sufficient measure for investigating the relation between the context and different circles. If the main discussant, that is, the first person coming to respondent's mind when asked about political discussants, is not a member of the family, we have a baseline proof that the respondent is not solely exposed to a cohesive circle, but, rather, his/her everyday life is marked by relations with "weak" ties[13]. The network level, in this way, is reduced to a single dyadic relation. This is, undoubtedly, a problem in

[13] Another interesting question would be why people tend to seek for their political discussants outside the strong-tied relations, but this latter exceeds the aims of the work.

terms of biases of the estimates. Although the main discussant is usually one of the people who affect the most respondents, an ego network is not the sole main discussant. This issue could lead to smaller estimates of effects we are going to test: assuming that the main discussant is just a part of the effect and the effect is shared among different discussants, having just one of these sources of information should decrease the strength of the effect. In a certain way, however, this forced choice allows us to play against ourselves. If, besides the biases and the relative poor information on the network available, there is actually an effect of the "network", broadly conceived (and operationalized with a single dyadic relation), that means that, with more information (namely, more discussants' information) we should witness bigger coefficients.

From the context side, rather, the variable that will account for the contextual effect is the strength of relevant parties at the municipality/provincial level, that is, its percentage result in 2013 National Election. Since a huge share of works on these multiple levels of pressure were based on the American data, in the literature the employment of the geographical context is based on the concept of "majority party" (Huckfeldt Sprague 1995, Huckfeldt et al. 1995, McClurg 2006) and it could not be otherwise: the American political system is a two-party system and the most straightforward interpretation of a geographical context in US politics is represented by the definition of which of the two parties is dominant[14]. The Italian (as well as almost all European countries) case is different. In a fragmented, multiparty system there is no majority party (at least, the majority is not absolute, as in US system, but rather relative). This situation is even truer in the Italian 2013 case. In this case the focus will be on party strength respect than to party majority. Since the network data at our disposal are so reduced, the geographical level will cover more than one indicator. The geographical scale employed in this chapter is the municipal one, in Appendix 1, however, models estimates are fitted with aggregate strength of parties at the provincial level.

3.2 Propensity to vote as dependent variable

Our purpose is to model voter's perceived viability of different parties as an electoral option, given their exposure to diverse social groups and the contextual set of opportunities. A promising candidate to become the dependent variable is the propensity to vote (henceforth ptv) for the main parties that ran in 2013 Italian National Elections (Tillie 1995; van der Eijk Franklin 1996; van der Eijk et al. 2006). ITANES 2013 RCS follow-up presents the classical formulation of the question:

[14] If we exclude 1992 Presidential elections (and the relative success of Ross Perot) and, partly, 1996 Elections, the US system has been seen as a stable two-party system in recent years (Abramson Aldrich Paolino Rhode 2000).

respondents are asked to indicate, on an 11-point scale, how likely it is that they will *ever* vote for several parties.

As Van der Eijk points out (van der Eijk et al. 2006) ptv's are a non-ipsative measure, this means that a high ptv for party A does not *necessarily* lead to low values of ptv for party B, C or D. Psychological processes implying propensity to vote measures differ from those related to vote choice, in which having voted for a party implies, automatically, that all the other parties have not been chosen by the respondent. Research showed that the party which receives the highest ptv is the most likely to be chosen in the actual vote choice, but, at the same time, it has been demonstrated that "in all member states of the EU there are a substantial number of voters whose preference for the second most preferred party lag only minimally behind their preference for the most preferred one" (van der Brug van der Eijk Franklin 2007). In this case, a slight difference at the level of national constraints (for instance, at the level of party competition), can change the rank order of the preferred party for that individual, leading eventually to a different vote choice.

Much literature has employed ptv's for comparative (namely, cross-national) analysis. In this chapter, however, the investigation of ptv's in a single national context allows us to study the attitudes toward parties people have not voted for, something that would be impossible with the employment of binary vote intention or with vote recall variables. Ptv's, indeed, supply a sort of observed utility. Thus in our analysis, the ptv's for different parties represent a measure of the viability of these parties as an electoral choice. Broadly speaking, ptv's can be seen as an overall synthetic judgment of the main parties as political objects that can possess, to voters' eyes, characteristics that make them a more (or less) attractive political options.

3.3 Managing a stacked data matrix

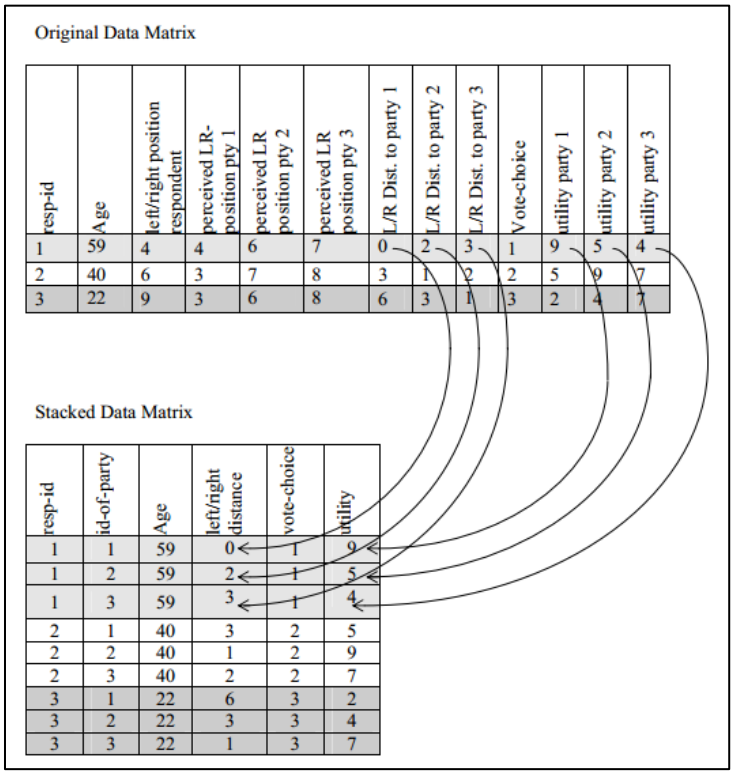
The main aim of this chapter is to test a generic set of mechanisms that relates contextual structures of opportunity, networks and propensity to vote for a party. In this case, the party we address to is not a single party: we are not interested in the relation that exists between, say, how the local strength of Pdl and the main discussant's support for Pdl modify individuals' propensities to vote for the Pdl. Rather, we are interested in a mechanism that encompasses *every* party, or, better, a "generic" party (De Sio Franklin 2011). The hypothesized mechanism conditions in similar ways all voters who are exposed to every type of discussant, whatever party he or she support. American research on social mechanisms that led to electoral choices did not provided any technique in order to overcome this problem, given that in the American two-party system such a problem does not arise (logistic-based models can easily produce tests of mechanisms that are independent of the

party, since, in a two-party system, party A is – almost – the 1 complement to party B, see Huckfeldt Sprague 1995, Huckfeldt et al. 1995, Huckfeldt Johnson Sprague 2004). In Italian, and in general in European electoral studies, the need to identify mechanisms that are not restricted to parties and to their number (usually greater than 2) led to the employment of the technique of *stacking*. A stacked data matrix will be employed in order to test the hypotheses. Stacking procedures transform the data matrix from a case*variable matrix to a case*choices*variables one (see figure 4.1). In other words, a single case does not represent an individual. Rather, it represents a determined choice with respect to a party. Some variables are "naturally" arranged to be stacked: for examples, party utilities, main discussant's voting behavior and municipal percentages represent a trivial example of a variable that is easily reshapable. Since ptv's are collected for every case and for the 5 main parties that ran in 2013 elections (the Pdl, the Pd, the Northern League, Scelta Civica and Movimento 5 Stelle), the stacking procedure will multiply the cases by 5. Individual-level variables, such as social class, age and gender, need a slightly different treatment. Imagine a two-party system, composed of party A and party B. Imagine an individual regressor, say high/low educational level. Imagine that high educational level could affect positively the ptv for party/coalition A and affect negatively party/coalition B. Thus, regression estimates of the individual characteristic in a stacked data matrix would be just nonsensical. Imagine, for instance that, by employing just party *A* choice, the effect of the high educational level on the propensity to vote of party is *k*. Imagine that the effect of high educational level is *-k*. The total effect of the stacked matrix will be 0. In order to overcome this problem, y-hat technique will be employed (Franklin van der Eijk 1996, van der Brug van der Eijk Franklin 2007): a y-hat variable is constituted by the predicted values of a bivariate regression performed on every single "stack" (that is, on every single choice). In this way, we can estimate the impact of the regressors on our dependent stacked variable. In this work, independent y-hat variables have no substantive meaning and are used just as control variables, but it is worth to remember that, from the substantive interpretation side, the bigger the y-hat, the more the variable has an impact on the dependent variable (van der Eijk et al. 2006).

We can now identify three nested conceptual levels in our dataset. A first level, that is the party*individual level, a second one, which is the plain individual level, and a third one, which is the municipal/provincial level. Stacking procedure increases the degrees of freedom and can lead to too tight standard errors. In order to overcome this issue, it has been proposed to perform a clustering of the standard errors, by means of multilevel linear random-intercept models (Gelman Hill 2007, Snijders Bosker 1999). In the models considered, the third conceptual level, the geographical one, will not be treated as a nesting level: tests on this procedure have been conducted

and demonstrated that too few individuals nested in municipalities would lead to biased estimates of the variance of the intercept for the third level (the number of municipalities in which is nested just an individual is around half of the sample, see Gelman Hill 2007).

Figure 4.1 Structure of the data in a stacked data matrix (from van der Eijk et al. 2006)



It has been chosen not to cluster standard errors at the aggregate levels neither when employing provinces, although it was possible, in order to give the highest level of comparability among models at our disposal.

3.4 Models and control variables

The first problem that such an analysis must face is the problem of endogeneity, and, especially, the fact that respondents' ptv's and discussant perceived vote choice do not have a clear causal relationship. Regression models assume that the regressors are exogenous with respect to the dependent variable and, thus, that no issues of reverse causality can arise by employing certain variables. In other words, regression models assume that alters' characteristics affect ego's dependent variable and no other reverse effects are possible: that would mean that a regression models assumes an influence process, as defined by Fowler et al. (2011). In this case, however, it

could be that ego's property influences alters' because of an active seeking for similarity process enacted by ego (this would lead to the methodological side of a homophily process).

In order to avoid the problem, usually instrumental variables approach is employed (Kenny 1993, Lewis-Beck Nadeau Elias 2008). Since endogeneity is, technically, a correlation between the errors and the independent variable which leads to biased estimates (Lewis-Beck Nadeau Elias 2008), one or more instrumental variables are regressed on the endogenous variable in such a way that the predicted values of the model can be placed, in turn, as regressors that will be employed in two stages estimation procedures (Greene 2000). An instrumental variable is correlated with the endogenous regressor and not correlated with the errors, being, thus, exogenous with respect to the dependent variable. In this way, unbiased causal effects can be estimated. The problem is that techniques that provide, at the same time, an estimation of stacked data matrices and instrumental variables employment does not exist in a straightforward and generally accepted version[15]. Given this issue, a more straightforward and simple decision has been taken: It has been decided to erase the "stack" (and, thus, the party choice) corresponding to the choice declared by the respondent. For instance, given a person who declared voting for Pd (and given 5 stacks, one for each major party) the choice identified with PD characteristics is erased. The procedure (conceptually borrowed by Huckfeldt and Sprague 1987) force us to treat just the propensities to vote for parties that respondent *did not declare to vote*. In this way, the major source of endogeneity (that is, the situation in which alter presents the same political characteristics of ego, sign of a suspect homophily process) is erased from the model.

This is, from one side, a problem: indeed, we erase the only stack that can give us information about the actual (declared) vote of respondent. Our theoretical aim in this chapter, however, is not related to the investigation of the vote choice reasons. Rather, the aim is to show how different contextual characteristics can alter ideas and beliefs voters have about parties and about the propensity to vote for them. The other problem that can arise by employing this procedure is the so-called selection bias. If we erase part of the decision-making process (by erasing one stack), no one tells us that this part will not alter coefficients. The choice has, moreover, a technical consequence, related to the empirical working of the ptv question: if we consider the distribution of the ptv for a certain party of respondents who claim to have no intention to vote for the party, we see that, though peaking at zero, it is usually fairly scattered along the scale from 0-10. In contrast, the distribution of the ptv, again for party A, among those respondents who have declared an intention to vote for it, is

[15] Instrumental variable techniques that provide the possibility of error clustering by means of multilevel models exist (see Spencer Fielding 2000), but no straightforward computational solutions have been provided to estimate these models. In order to simplify the procedure, a less problematic and easier to understand technique has been designed.

narrower and concentrated around the high values of the scale. The general idea that guided this approach is that the declaration to vote for a party is some kind of hurdle. Once the decision has been crystallized in voter's mind, that is, once one has decided to vote for a certain party, psychological mechanisms of cognitive consistency are enacted in order to make coherent statements about political opinions that have been declared previously (Festinger 1957, Regan Kilduff 1988). So, once the "hurdle" has been passed, the effect due to the exposure to discussion network – as well as those related to context – in the evaluation of the party fades, as the evaluation (in this case, the ptv) is adjusted by the respondent him/herself to the actual behavior. As far as our argument is concerned, what matters technically is that the distribution of respondents' ptv for groups either voting or not voting for M5S turns out to be as expected, with a narrow variance for the first group. Once we have a distribution with a very narrow variance, there is not much left to explain. Models ran only on the vote choice's stack (and available on request) results to be not informative in any way about contextual or networks coefficients and, moreover, contribute to confound coefficients in a pooled model containing ptv's for both voted and not voted parties.
It is important to stress, however, that this procedure does not assure us to be free of every source of endogeneity: for instance, it is still impossible to assess clearly whether these effects are moved upwards by or homophily factors (Noel Nyham 2011)[16].

Three models have been fitted in order to test our hypotheses. The first one just gives us a plain test of the actual correlation that the geographical and network characteristics exert on propensities to vote, that is, the first hypothesis. The second introduces an interaction between these two variables, in order to test whether there is actually a multiplicative effect in presence of consistency between context and network, while the last model deals with the differentiated correlation of relatives and non-relatives, assessing whether the multiplicative effect is stronger among the former. Several control variables are inserted in order to account for compositional effects. Formalizing, the models are estimated as follows

1. PTV = CONS + DISC_VOT + LVOTE + LR_DIST + Y_EDU + Y_GENDER + Y_AGE + Y_SC
2. PTV = CONS + LVOTE*DISC_VOT + LR_DIST + Y_EDU + Y_GENDER + Y_AGE + Y_SC

[16] This would be possible to assess, for example, by employing repeated measures of the same individuals in different periods of time (Rogowski Sinclair 2012). Unfortunately, for what regards 2013 national elections, information for both the discussant and respondent vote choices are not available.

3. PTV = CONS + LVOTE*DISC_VOT*NET + LR_DIST + Y_EDU + Y_GENDER + Y_AGE + Y_SC

Where:

- CONS is the fixed coefficient of the intercept of the model;
- PTV is the propensity to vote for the parties, without considering party voted by the respondent;
- DISC_VOT is a dummy that identifies whether the main discussant voted or not for the selected party;
- LVOTE is the percentage strength of the party (on valid votes) at the municipality level;
- NET is a binomial variable that accounts for a relative or non-relative discussant;
- LR_DIST is the perceived distance between the party and the voter on the left-right scale (from 0, that means that respondent and the party are in the same place, to 10, which means that position on the left-right scale of respondent and party are opposite);
- Y_EDU is the y-hat for the educational level (four levels: Elementary school, Middle school, High school and university degree);
- Y_GENDER is the y-hat for gender;
- Y_AGE is the y-hat for age;
- Y_SC is the y-hat for social class (7 levels: Employer, Professional, Manager, Middle class employee, Petty bourgeois, Working class, and Agricultural worker[17]).

4. Descriptive statistics

4.1 Mapping the major parties in 2013 National elections

Below are presented descriptive geographical analyses for each of the 5 relevant parties that ran in 2013 elections. The geographical scattering of these parties is important, firstly, in order to assess whether variations exist in the Italian territory: low levels of variance among different municipalities or provinces would lead to inconsistent estimates of the regression models that will be presented later. Secondly, geographical descriptive statistics can show us how, in general, higher or lower levels of party strength depend on different and usually idiosyncratic reasons. If this is

[17] Levels of the variables in the models for y-hat variables refer to the variables in their non-y-hat form, given that, after the y-hat procedure these are treated as continuous variables.

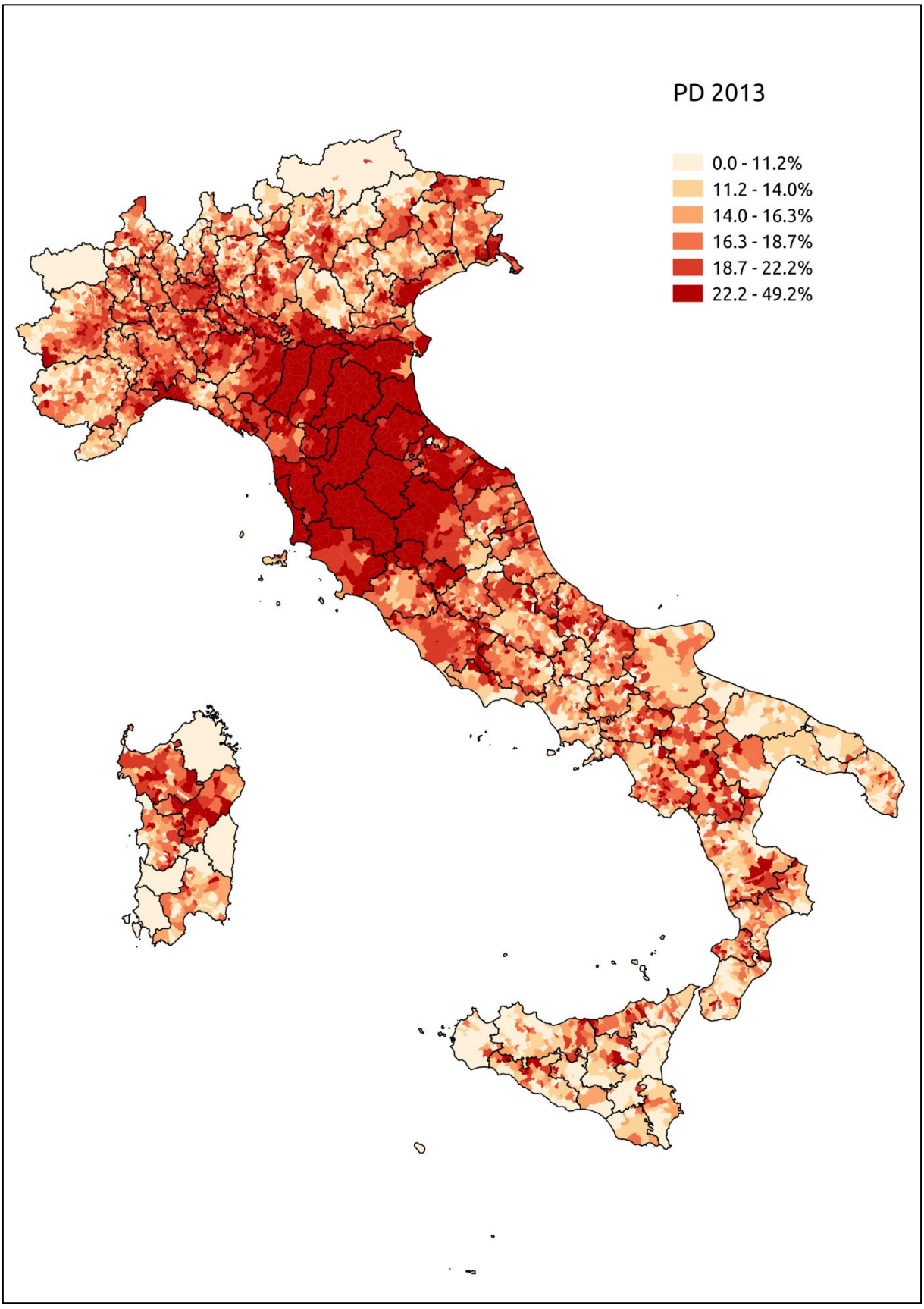
true, the importance of the argument stated above is even stronger, given that it transcends different local political episodes and can be argued as a "genuine" social effect.

First of all, it seems important to underline several elements of geographical stability that have been going on until the 2013, usually known as electoral geopolitics (namely, a strong, time-invariant geographical stability of electoral strength of First Republic party system, see Galli 1968). Since the postwar period, and, consistently, all over the so-called First Republic (thus, until 1992-1994), Italian territory was fractured in 4 macro-regions, in which one of the two main parties (namely, Christian Democrats and the Communist Party) were dominant. In the North-west part of the country, Socialist and Communist parties were dominant, while the eastern part of the country was ruled by the Christian Democrats. The central part of Italy was definitely controlled by the Communist party, while in the south no strong dominance was present (Galli 1968, Trigilia 1981). It is important to notice that these geographical-level fractures should not be interpreted deterministically, but rather, help to depict a general interpretation of the phenomenon: a more detailed analysis shows indeed how different places could be interpreted as enclaves supporting opponent parties with respect to surrounding zones (Shin Agnew 2002). Since the early nineties, and with the first relevant crisis of Italian party system, political scientists faced a completely new scenario. The Communist Party collapsed and gave birth to the Partito Della Sinistra (PDS) and a little, more extreme party (Partito della Rifondazione Comunista - PRC). From the right side of the political spectrum, the disappearance of the Christian Democrats left a vacuum occupied by the alliance between Berlusconi's Forza Italia, the post-fascist party Alleanza Nazionale and, in the Northern part of the country, by a regionalist party, the Northern League. The revolution that invested the party system has been widely investigated with sophisticated geographical analyses (Shin Agnew 2002, 2008). Results of this political transitions are geographically differentiated: it seems that the transition from the Communist Party and the new alliance between PDS and PRC has been less traumatic compared to the transition from the Christian Democrats to the alliance between Forza Italia, Alleanza Nazionale and Lega Nord: Shin and Agnew (2002) attribute, as many Italian political scientists (Floridia in De Sio 2011, Diamanti 2003), this fragmentation to the ideological fracture the new parties brought in zones dominated previously by the Christian Democrats. More precisely, the northern-east part of Italy experienced a revolution in terms of relevant issues, aims and identification of its dominant parties: if, during the First Republic, the Christian Democrats' ideological basis was characterized by a religious identification, the Second Republic right-wing parties carried a mix of liberal/populist/territorial values that were partly inconsistent with previous frame. Conversely, the transition in places where the former PCI was dominant has been less traumatic because of the political continuity between the old party and the

new center-left spectrum, with the result that, for instance, "[w]hile the Northern League clearly exhibits [...] a territorial re-framing in the Veneto, the PDS and RC continue to benefit from the territorial and political legacies of the PCI in Tuscany" (Shin Agnew 2002) Now, how can this additional level be placed in our theoretical framework? First of all, it seems quite important to notice that the sub-national character of electoral geopolitics is primarily identifiable with the "public opinion" concept presented above. The only element, about which electoral geopolitics tells us more, is that this general climate is geographically more spread than the single municipality. Another element that electoral geopolitics theory suggests us is the highly stable nature of these subdivisions. We are facing a hundred-year-old phenomenon (Anderlini 2007) that changed very little across time and that could have been thrown into crisis by 2013 events. In the pages that follow, a geographical analysis and maps for every relevant party will be provided.

Partito Democratico. The geographical distribution of the PD respects, in many ways, a trend that is historically consolidated. As D'Alimonte (in De Sio et al. 2013) remembers, the "red zone" is the set of regions that kept high levels of support for the PD. The stability of the left-wing parties, as pointed above, has a long standing tradition, which starts, according to some scholars, since the beginning of the XX century (Anderlini 2007). The situation depicted above – that is, the number of melting and splits operated by center-left parties from 1994 to the beginning of the '2000s – stabilized in 2008 with the foundation of the Partito Democratico, which have been composed of the former cadres of the DS (*Democratici di Sinistra*) and politicians who were members of the left factions of the Christian Democrats party (who have previously formed another political object, the "Daisy"). The pattern of the strength in Central Italy regions remained more or less intact during the Second Republic too, despite splits and merges. This stability, however, presented anomalies during the 2013 elections (see Figure 4.2): the geographical zone usually labeled as "red belt" is conceived with two regions in the eastern part of the central Italy (Marche and Umbria). In these two regions the Partito Democratico lost a huge part of its previous electoral strength.Moreover, the PD "conquered" the Basilicata (in the south) and the Lazio (which is, despite its geographical central position, has been traditionally far from center-left parties, in particular in provinces such as Latina). The regions in which the PD has failed in doing well are surely the south regions. Moreover, the PD "conquered" the Basilicata (in the south) and the Lazio (which is, despite its geographical central position, has been traditionally far from center-left parties, in particular in provinces such as Latina). The regions in which the PD has failed in doing well are surely the south regions. As D'Alimonte underlines (D'Alimonte in De Sio et al. 2013) in Puglia, Campania and Sicily, right-wing parties won with percentages between 33% (in Sicily) and 37% (Campania).

Figure 4.2 Pd geographical scattering (2013 Elections)



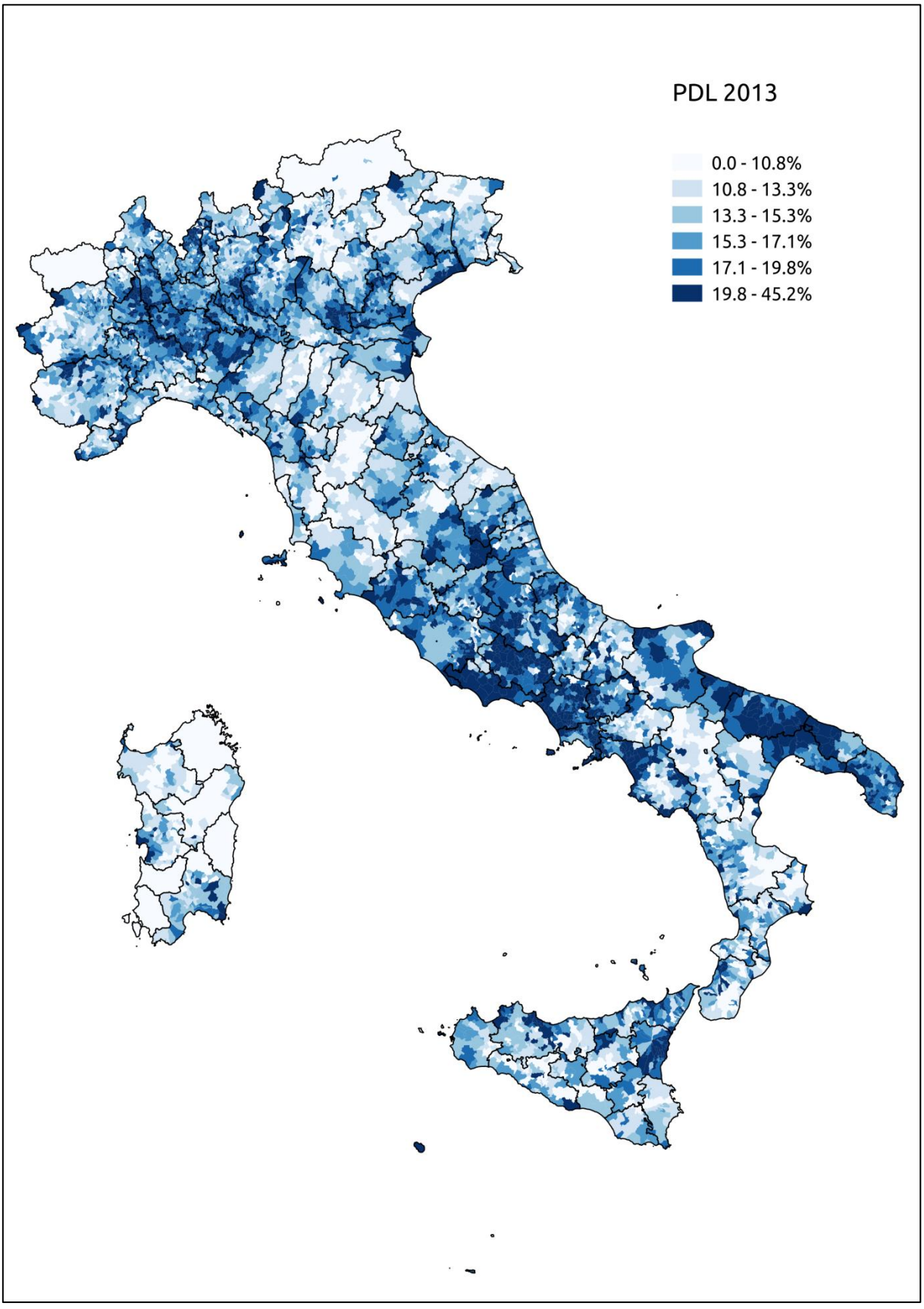
In this latter region, the 2008 PD had lost, but the coalition had obtained higher percentages compared to those reached by Bersani's PD. If we exclude Basilicata and (small) municipalities present in the southerner Apennine, the PD performance in the south is deluding. The northern part of Italy, conversely, was consistent with the electoral geopolitics defined above. In the Northeast of the country, the PD fails at having consistent results and lies under the national average almost everywhere. In the Northwest performances are better (especially in the big cities, such as Torino and Milano), but the central Italy levels are far (in the municipalities of the center, indeed, levels of the PD are above 40%, while in the Northwest are systematically below this percentage).

Il Popolo delle Libertà. The "bipolarism" age (Pappalardo 2001, Chiaromonte D'Alimonte 2010), that is, the period in which two coalitions (the center-left and the center-right ones) used to alternate at the government of the country, seems to have stopped with 2013 elections. Silvio Berlusconi's resignation in 2011, combined with a number of trial to which the same Berlusconi has been subjected seemed to have weaken fatally the *Popolo della Libertà* (The people of Freedom), the new party created before 2008 elections (more precisely, a merge between Forza Italia and the post-fascist party *Alleanza Nazionale*).

According to the majority of pre-electoral polls, in 2013, Bersani's PD was expected to have a strong majority compared to his opponents. Berlusconi's coalition – which was constituted by Pdl, the Northern League and a myriad of small allies (D'Alimonte et al. in ITANES 2013) – was predicted to be the second coalition and, in particular the Pdl itself, was estimated to be below the 20% of votes, while in 2008 the percentage of the party was around 37%. This defeat was mitigated by the actual outcome, which has seen the Pdl around 21.5% of votes, and the center-right coalition separated by the center-left coalition by only 125.000 votes (D'Alimonte et al. in ITANES 2013). However, the share of voted lost by the Pdl is relevant. In 2013, Pdl lost 15 percentage points compared to 2008 elections, the most important loss in the history of Italian Republic (Passarelli Tuorto in ITANES 2013). Anyways, this turmoil in the section of electorate that used to give its consensus to Berlusconi's party generated a geographical dispersion that is not so different compared to the past.

If we focus on the relative strength of the party without comparing its strength with previous elections, we can say that places in which the Pdl was well-established (in the south of Italy, and in particular Puglia, Campania and Sicily) remain the places in which the Pdl is, even in 2013, stronger. In the northern part of the map, Lombardy and Piedmont (and, in general, the north west of the country) witness slightly higher levels of Pdl strength compared to the north-east (see Figure 4.3).

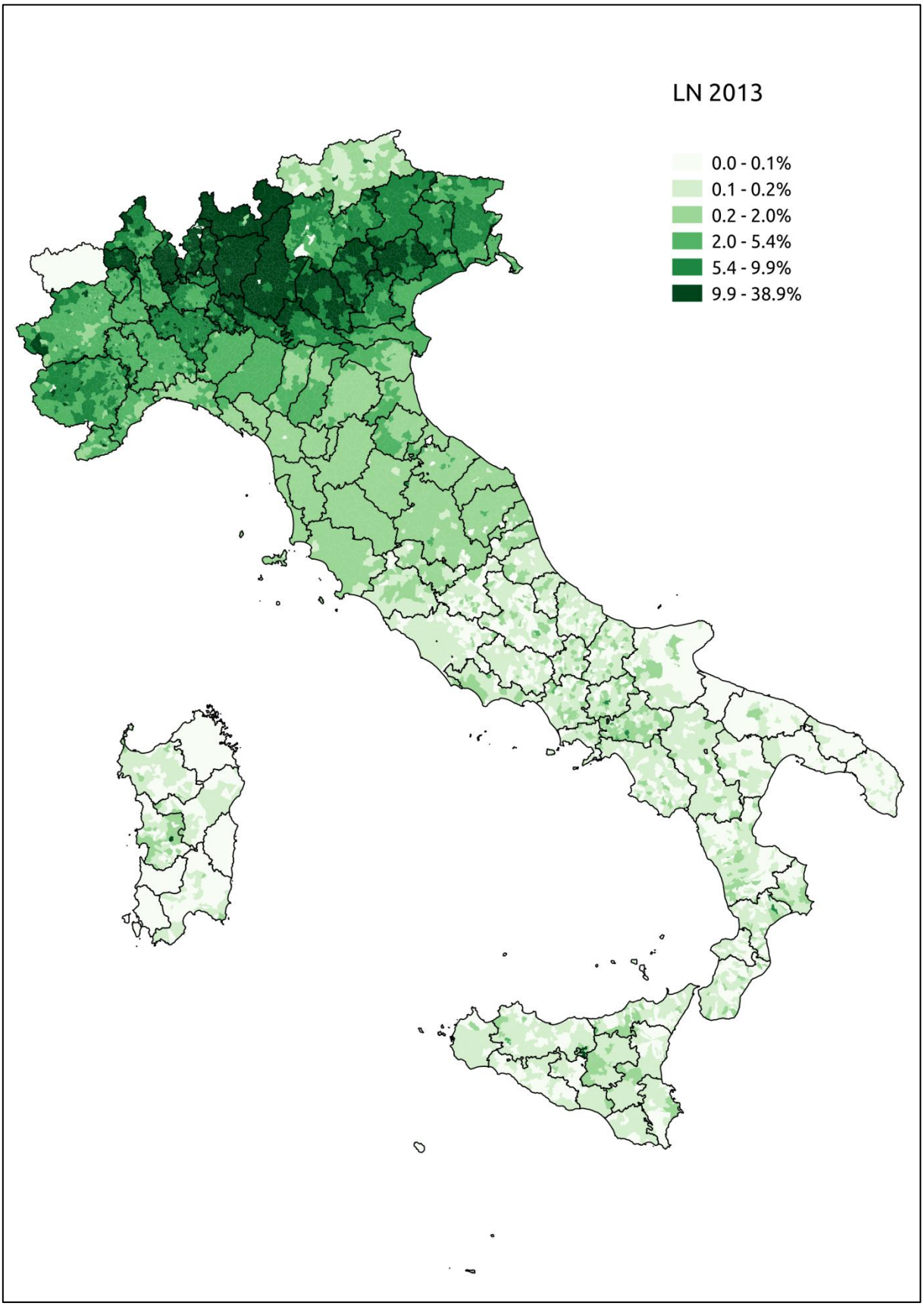
Figure 4.3 Pdl geographical scattering (2013 Elections)



In general, if the relative geographical strength does not change, at an absolute level, we witness to systematically lower levels of the Pdl in the whole country. As we can see for the Northern League (see below), the main result of 2013 election is a geographically exogenous drop, which invested the whole electoral body and not, selectively, parts of the country.

Lega Nord. According to Tarchi (1998), the political history of Italian "leguism" is similar to the path of regionalist movements in Europe. The first organized regionalist movement in Italy was a coalition between the Union Valdotaine and the Venetian League which came together to contest the 1984 European Election. Their program was based on typical ethno-regionalist goals, such as the promotion of knowledge of local history and culture, as well as demands for the transfer of powers to local administrations (Agnew 1995, Tarchi 1998). The actual rise of regional autonomy leagues is connected with Umberto Bossi, the "great unifier" of the galaxy of Italian autonomist movements (Diamanti 1993). Bossi crucially contributed to shape the first ideological structure of the Northern League, which was based, at the beginning of the 1990s, on direct and inflammatory language – far from previous political communication strategies – clear anti-southern sentiments and claims against the First Republic parties – the so-called *partitocrazia*, namely the government of parties (Agnew 1995): as Agnew points out, "[t]he anti-party and anti-Roman rhetoric of the leaders is of vital importance in understanding the expansion in support for the movement" (Agnew 1995). During its troubled history, the League experienced high levels of support, combined with long periods of political irrelevance. It is worth stressing that, after the 1992 exploit (in which the League gained almost 3.4 million votes), the amazing results of 1996 and 2008 (in which Bossi's creature gained respectively over 4 and 3 million votes), the 2013 represented a deluding election for the League, which, in the meanwhile, had become the oldest party in the Italian political landscape.
2013 Elections represented the first test of consensus after the most important illicit financing scandal that invested the very inner circle of the party (and led to the resignation of Bossi from the head of the party). The Northern League, after the 2008 exploit, was thus forced to be, again, not relevant in 2013, with the 4% on valid votes, equal to less than 1.5 million votes. Anyways, it is possible to track down the geographical characteristics of the League in 2013 elections too (Figure 4.4). We can say that Northern League achieves good results in Veneto, and, in general, in the North-East of the country (eastern part of Lombardia, Veneto and Friuli-Venezia Giulia). Conversely, party performances are poor in the central part of the country (Emilia-Romagna, Toscana, Umbria and Marche). In the North-west, the League seems to have low-range performances, a pattern confirmed by the literature (Cartocci 1994, Diamanti 2003, Shin Agnew 2002, 2007, 2008).

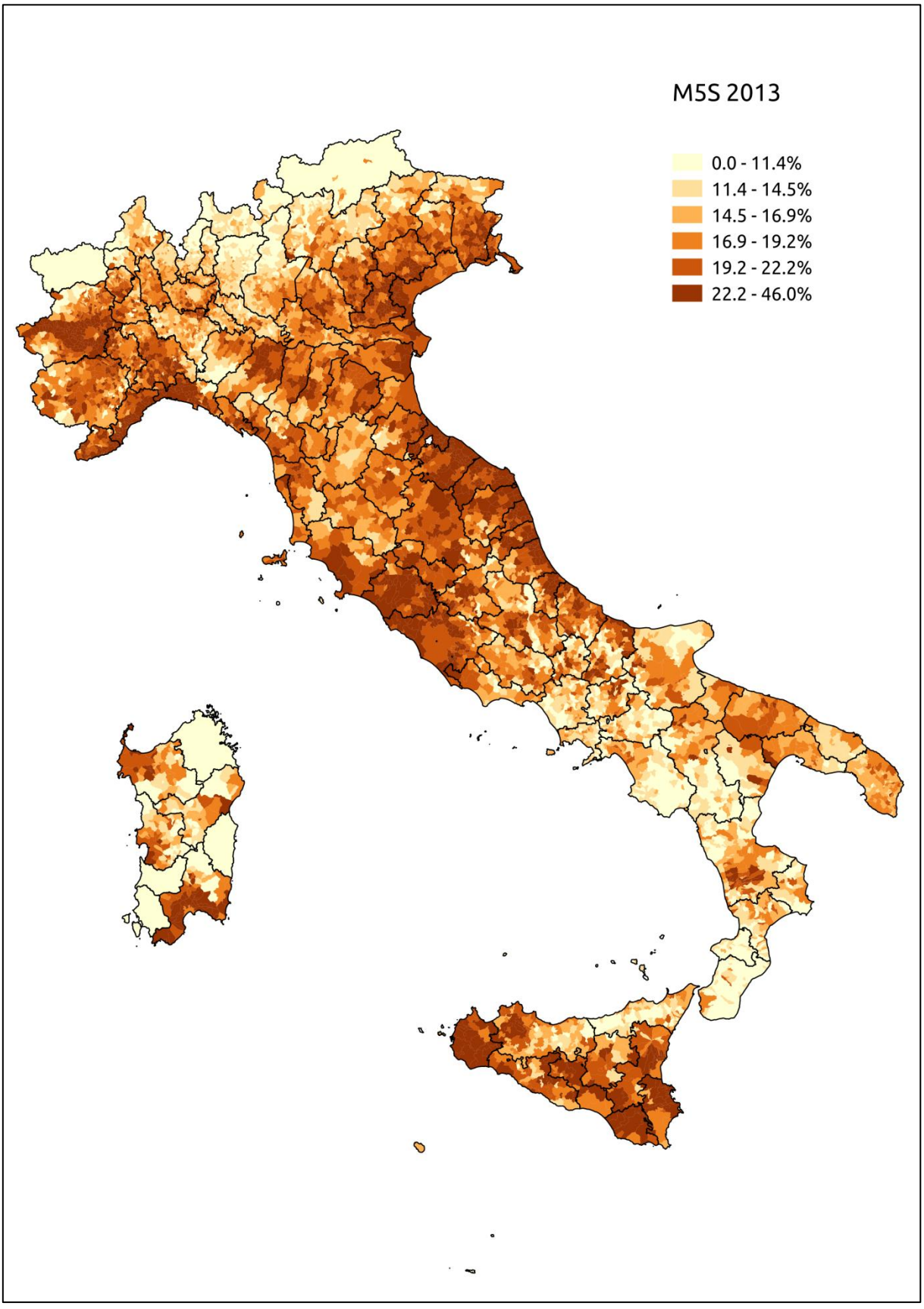
Figure 4.4 Lega Nord geographical scattering (2013 Elections)



Movimento 5 Stelle. The geographical distribution of the Movimento 5 Stelle is extremely scattered on the territory. However, as pointed out also by other contributions (see De Sio et al. 2013) the pattern is clearly new, that is, no other party in the Italian Republican history seems to behave like the Movimento. In general, several characteristics of the geographical pattern can be stressed: in the center-north of the country, Movimento's pattern seems to break the existing sub-cultural zones. In the north-western part of the country (that encompass Piedmont, Lombardy and Liguria), the Movimento is strong in the four provinces of Liguria, in the province of Turin (but the average level is high in the whole Piedmont), and is poorly supported in West Lombardy. This is kind of surprising, since west Lombardy and Piedmont, during the first and the second Republic, tended to behave in a similar way. The north-east of the country, that usually encompassed the East-Lombardy, Veneto and Friuli-Venezia Giulia (and voted solidly for center-right parties), seems, in 2013, to have switched, supporting massively the Movimento. Also the center of the country witnesses an upheaval. The so-called red zone, which encompassed Tuscany, Emilia-Romagna Marche and Umbria and has seen for almost a century a strong left-wing majority, is broken by the new Movimento's geography. In Umbria and Marche, the Movimento is, almost everywhere, over 28% of valid votes, while in Emilia-Romagna and Tuscany the average level of support is lower (see Figure 4.5). Moreover, northern part of the Lazio shows high levels of support for the Movimento. The other two clusters of strength are situated in the South of Sardinia and in almost all Sicily. Summarizing, the geography of the *Movimento*, in its first electoral competition, is completely different from that of the other parties, present or past. As far as certain local outbreaks are concerned, however, it is possible to hypothesize some kind of determinant related to the peculiar situation of those places. For instance, in Turin province, and in particular in Susa valley, the planning of high-speed rail (the TAV) that should connect Turin with Lyon has produced, for about 20 years, a movement against the construction of the train line. Movimento 5 Stelle and its leader, Beppe Grillo, have repeatedly underlined solidarity towards the No-TAV movement (Tronconi 2013, Biorcio Natale 2013). Thus, it is perfectly conceivable that citizens of those zones, who are massively against the public work, gave their support to the only party that was explicitly hostile to it. Similarly, the south of Sardinia cluster of support can be related to the struggle of Sulcis miners who, again, received Movimento's solidarity (Tronconi 2013).

Scelta Civica con Monti per l'Italia. As pointed out above, *Scelta Civica* (Civic Choice) represents one of the two novelties of the 2013 Italian political landscape.

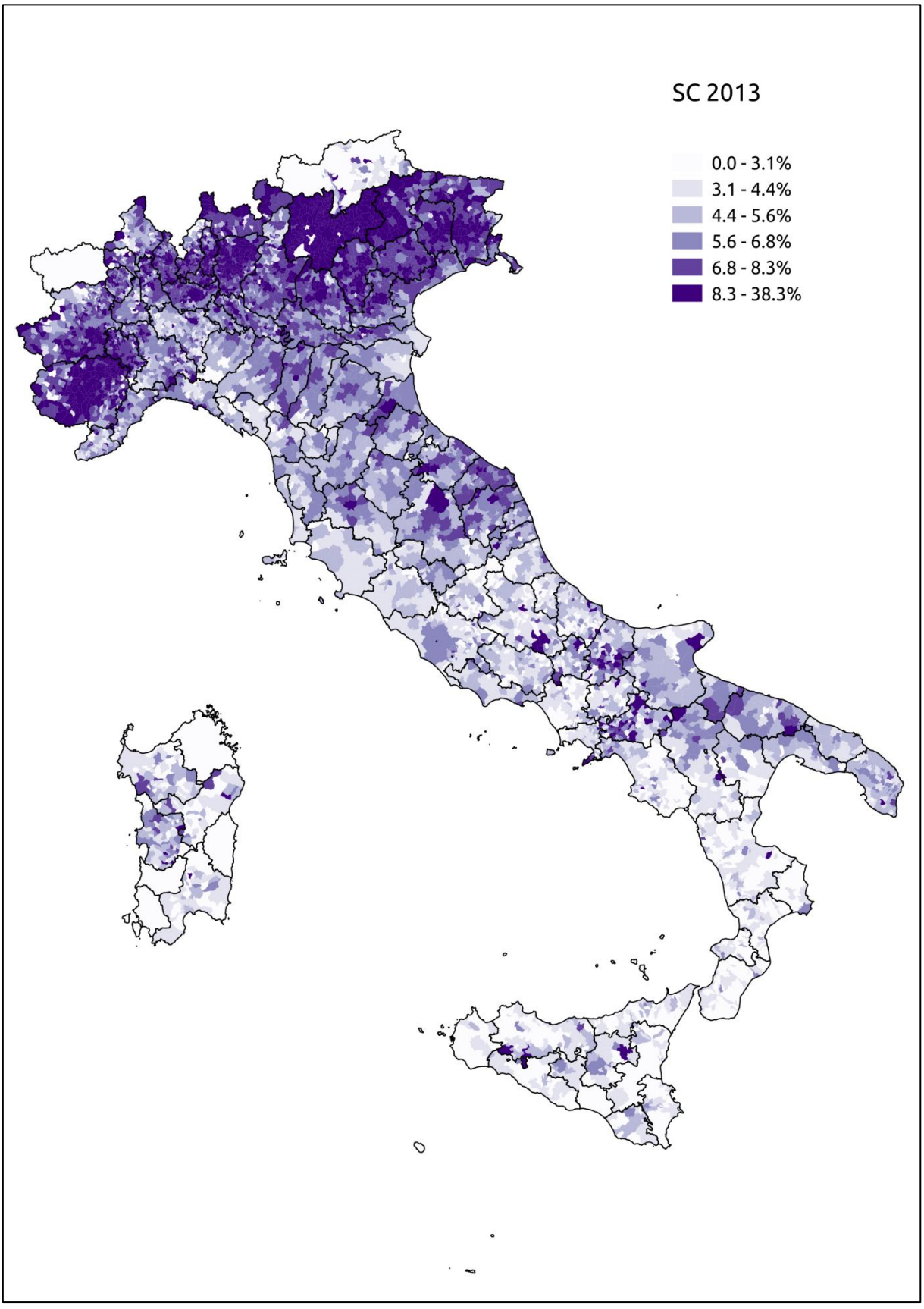
Figure 4.5 Movimento 5 Stelle geographical scattering (2013 Elections)



The leader of the newborn party, Mario Monti, at the beginning of the 2013 and after his resignation, decided to enter into the political arena, no more as a *super partes* technocrat, but, rather, as the leader of a coalition of three parties: Pierferdinando Casini's UDC, Gianfranco Fini's Futuro e Libertà per l'Italia (Future and Freedom for Italy) and the new party, *Scelta Civica.* The main idea behind this political operation was to present a coalition whose the main objective would have been the continuation of the Monti's agenda (a set of radical reforms that, according to the leading spokesmen of the coalition, were stopped by the sudden lack of confidence of the Chamber of deputies in the late 2013, see D'Alimonte Di Virgilio Maggini in ITANES 2013). Election results, at the national level, were not satisfying for Monti's coalition. The coalition obtained, indeed, around 3.5 million votes (around the 10% in the Chamber of Deputies and 9% in the Senate). The sole party of the coalition that ran in the previous Elections, the UDC, had obtained in 2008 around 2 million votes. We can say, in a descriptive way, that the "surplus value" represented by Monti, his ideas and agenda brought to the coalition something like 1.5 million votes. The UDC electoral basin, moreover, has been pumped by the most recognizable symbol of Scelta Civica: affected by the ally competition, the UDC lost almost 1.5 million votes with respect to the previous elections, equal to the 70% of previous consensus, passing from the 5.6% to the 1.8%. The geographical distribution of Scelta Civica is interesting if we focus on alliances that the coalition made. Diachronically, as D'Alimonte and colleagues note (2013), the territorial distribution is radically different from the old UDC: if the latter had been, in past elections, primarily strong in the southern part of Italy, we can see, from Figure 4.6, that the strength of the coalition is based on the northern part of Italy, in particular in Veneto, Lombardy, Piedmont and Trentino Alto Adige. Regions in which the entire coalition did not reach the threshold in the Senate (the 8% of valid votes) were, indeed, southern and central regions: Lazio, Sardegna, Abruzzo, Calabria and Sicily – surprisingly for a coalition that includes the Sicily-centric UDC. Consistently with Movimento 5 Stelle we can expect that part of the geographical outbreaks can be related to local factors. The example of Trentino (in the north-east part of the country) is enlightening in this respect.

The province was indeed ruled by the former President of the Province Lorenzo Dellai, one of the first politicians who argued and practiced an electorally successful center-left way to the Italian Catholic party (Augias Covotta 2005). Dellai benefited, for over a decade, of a large majority in Trentino and his resignation from the presidency coincided with the appearance in the new political project led by Mario Monti. Thus, it is possible that (part of) the north-eastern outbreak of Scelta Civica is due to the presence of this political figure in that place.

Figure 4.6 Scelta Civica geographical scattering (2013 Elections)



4.2 Individual data: descriptive statistics

It is interesting to stress that, as showed above, aggregate patterns of parties' geographical scattering can be due both to extremely local (in time and space), as well as extremely general reasons. From one side, for instance, it is possible that the presence of important political characters or facts on the territory had surely led to a higher level of support for different parties. At the same time, we witness centuries-old patterns that resisted even to strong political facts, such as the continuity of support for the center-left of the red belt. The reasons of these patterns, however, are not the central point of our analysis. On the contrary, the more these patterns are attributable to different causes, the more out theoretical arguments, if corroborated by empirical data, represent a generic mechanism that, to some extent automatically, leads to outcomes explainable with our socially-driven theory.

After having described briefly what we called the "set of constraints" of the 2013 National Elections (the historical, national background) and the geographical composition of the opportunities – in other words, the geographical context – it seems interesting to briefly review descriptive statistics of the fundamental variables of our dataset. In CAWI 2013 survey, 2,975 cases nested in 1,922 municipalities have been collected. As we can see from Table 4.1, the effective percentage of the various parties (first 5 rows, first column) seems to be consistent with the actual parties' strength. The Pdl is around 21.5%, the Pd and the Movimento 5 Stelle are near around 25.5%, while Scelta Civica is around 9% and the Northern League is below 4%. This data are reassuring about the fact that no evident errors of sampling are acting at the municipal level, that is, there is no party that, on average, is systematically over- or under-represented in the sample. The Pd, as it is possible to see from Table 4.1, is moreover the party with the highest variance (the central 80% of the distribution is between 17 and 34%).

After having assessed the level of the parties in the municipalities, it is appropriate to investigate the distribution of the individual variables of interest. The first one, propensity to vote for a certain party, will be used as dependent variable. In table 4.1 – row 6-10 – are reported descriptive statistics for every relevant party's ptv. These statistics give us important insights about the shape of the different distributions and, moreover, about the consistency between voting behavior at the aggregate level and preferences at the individual one. For instance, it is possible to assess how the two most voted parties in the electoral competition, the Pd and the Movimento 5 Stelle, present higher average ptv's. It is worth to remember that the ptv is a measure assumed as continue, extracted from a question that asks the respondent, in a scale from 0 to 10, how likely is that he/she

will vote for a certain party: in this case, it is possible to see how both M5s and Pd mean values are around 4.

Table 4.1 Descriptive statistics for relevant parties

Statistics	Mean	S.D.	10th percentile	90th percentile	N
Local Strength Pdl	21.3	5.8	14.7	28.5	2,975
Local Strength Pd	25.9	7.0	17.6	34.8	2,975
Local Strength LN	3.8	5.2	0.1	11.5	2,975
Local Strength M5s	25.6	5.6	17.7	32.8	2,975
Local Strength Scelta Civica	8.7	2.8	5.5	12.7	2,975
ptv Pdl	2.7	3.5	0	9	2,748
ptv Pd	3.9	3.6	0	9	2,730
ptv LN	1.9	2.9	0	7	2,742
ptv M5s	3.9	3.7	0	10	2,720
ptv Scelta Civica	2.1	2.8	0	6	2,743

In other words, giving a substantive meaning to the number on average – that is, counting also people who will never vote for the two parties and those who are sure voting for the party, the sample would vote Pd and M5s with a likelihood of 0.4. The distance between these two major parties and the Pdl is, on average, more than one point. This is one of the many evidences that show the loss of trust that voters gave to the Pdl in 2013 compared to 2008. The other two parties, Scelta Civica and the Northern League, that reached respectively 8 and 4% present, as expectable, lower average values of the ptv's (parties that are less voted have a larger proportions of zeroes and ones, that lower the average ptv in the sample). The variance and the central 80% of the distribution give also us useful insights to understand the sample and, thus, 2013 electoral behavior. The Movimento 5 Stelle standard deviation, indeed, is slightly higher than that of the Pd and higher than every competitor (3.69 versus 3.56 of Pd and 2.92 of LN). If we compare the central 80% of the distribution of Movimento 5 Stelle with other parties, moreover, we can see that the Movimento's range is the only one that goes from 0 to 10. In other words, this can be an evidence of the fact that Movimento's novelty had very different levels of acceptance from the voter, much different with respect to new but not charming parties (Scelta Civica) and old parties (Pd, Pdl and the Northern League).

So far, we have focused on the sub-national results of main parties, together with relevant individual variables, that is, our dependent variable, the propensity to vote individuals have for the five main parties. It is now important to explore descriptively data for the main discussant – the other source of environmental pressure – and the perceived relation this one has with respondents. Basically, two characteristics related to the main discussant can be explored, with data at our

disposal: firstly, it is interesting to see the distribution of perceived vote choice of the discussants and, thus, their agreement with the respondent. In table 4.2, these information are presented in a cross-tabulation where, in row, it is possible to find the respondent's vote choice for the main parties and in column we can find discussant's perceived vote choice[18]. First of all, it seems quite interesting to notice that, compared to the whole sample (2,975), people who declared their vote choice and discussant vote choice for the five main parties are about half of the sample (1,478 non-missing cases)[19]. As it is possible to assess, summing the diagonal of the cross-tabulation, about 75% of the couples respondent-discussant agree on the vote choice. The off-diagonal percentages, as it is possible to see in table 4.2, are residual.

Table 4.2 Respondent and (perceived) discussants vote choices for the 5 main parties (cell percentages)

		Discussant vote choice					
		Pd	M5S	Pdl	Ln	Monti	Total
Resp. vote choice	Pd	25.3	3.3	0.5	0.1	0.7	30.0
	M5S	3.7	27.6	2.0	0.1	1.3	34.6
	Pdl	2.6	3.1	15.4	0.7	0.7	22.5
	Ln	0.3	0.4	0.4	3.5	0.3	4.9
	Monti	1.8	2.0	0.1	0.00	4.2	8.0
	Total	33.7	36.4	18.4	4.3	7.2	100.0 (n=1478)

Another interesting element of the cross-tabulation is represented by the marginal percentages. Since we are dealing only with the 5 main parties, it is quite clear that respondents' vote choice are not similar to actual results in the population, however, an interesting point can be noticed by observing how individuals tend to slightly over-estimate discussant vote choice when referring to PD and the Movimento 5 Stelle, and slightly underestimate the Berlusconi's Pdl[20]. In this case, however, the two distributions differ in some percentage points. This slight difference in perceiving

[18] Analyses, as pointed out above, are performed on the five main parties on which we have complete information (respondent and discussant's voting behavior, aggregate level outcomes and respondents ptv). A quite small percentage of respondents and discussants declared to have voted other parties: the five relevant parties, however, represent more than 85% of the sample that expressed a non-missing vote choice. Moreover, it must be stressed that, given that other parties vote choices are expunged from the analysis, parties' percentage cannot realistically represent the actual vote structure, but, rather, are over-represented.

[19] In the models presented in the next paragraph, additional 365 cases will be expunged due to missing cases in social class, distance from the party and ptv variables. The total number of non-missing cases for the models that follow is thus 1,113.

[20] When we talk about over- and under-estimation, we are assuming that discussants' perceived vote choice, on aggregate, should have the same distribution of respondents' one, given that they pertain to the same population. If this does not happen, then we could imagine than respondents perceptions are biased or, conversely, certain voters tend not to be recognized as certain parties supporters.

people's voting behavior could be related, among other things, to the political outcomes of the elections themselves. The only two parties that, in very different ways, had positive results after the Elections, in terms of crude percentages, are the PD and the Movimento 5 Stelle. Even though Bersani's PD was expected to have even higher levels of support, it represented one of the two major parties in the Italian political landscape, with a difference in comparison with the Movimento 5 Stelle of few thousands of votes. At the same time, it is possible to see the relative low perceived performance of the Pdl as the effect of poor results Berlusconi's party had. Another important characteristic to our hypotheses is the level of intimacy discussants and respondents have. In table 4.3 is presented a cross-tabulation that combines perceived agreement/disagreement and intimacy of the relation (relative and non-relative discussant). In the last row of the table (in parenthesis) is reported univariate distribution of the social circle of the discussant. As it is possible to assess, relative main discussants are more than non-relative ones (63.4 vis-à-vis 36.6%). This is perfectly conceivable, if we imagine that the main discussant is the person with which respondent talks more about politics and, as pointed out in other works, also about important matters of life (Klofstad McClurg Rolfe 2009).

Table 4.3 Discussant circle and perceived agreement (column percentages)

	Relative	Non-relative	Total
Disagree	18.5	33.8	24.1
Agree	81.5	66.2	75.9
Total	100.0 (63.4%)	100.0 (36.6%)	100.0 (n=1478)

Political discussants, indeed, tend to be drawn among people whom respondents share their everyday life with.

As it is easily conceivable too, it is more likely that respondents perceive agreement with a relative respect than with a non-relative. Percentages of agreement with relatives are around 81%, while non-relatives who are perceived to disagree with their respondent are 15 percentages points below (66%). This is pretty consistent with American results (see Huckfeldt et al. 1995), in which more intimate relations tend to share more in terms of political ideas. Moreover, the majority of relative main discussants is consistent with the idea that these citizens are, typically, intimate people with whom the respondent is usually engaged in conversations with.

Summarizing, we have shown how the political offer have changed over the so-called Second Republic. We have seen how different parties have different strength on the territory and how the individual-level situation is mainly consistent with aggregate results. We have, moreover, assessed

levels of disagreement and slight differences in perceived voting behavior by the discussant and expressed respondents voting behavior. Finally, it has been showed how relatives tend to be more agreeable compared to non-relatives. The next section will use these descriptive insights in order to deal with a set of regression models that will test our hypotheses concerning the environmental effects, their interactions and the level of intimacy between ego and perceived alter.

5. Results

As pointed out above, 3 models will be fitted in order to test our expectations. In order to assess whether differences can be noticed among several geographical scales, the models have been fitted with, instead of the geographical variable at the municipality level, the same variable (that is, the strength of each of the main parties) at the provincial level[21].

Firstly, it is interesting to comment briefly the variables which have been employed to control for possible compositional effects. As stressed in previous sections, Educational level, gender, age and social class were inserted in their (centered) y-hat version. Y-hat parameters estimates show the importance that every regressor has in explaining the variable (van der Eijk et al 2006). Except for gender, in model 1, all other control variables (educational level, social class and age) are significant, that is, they discriminate for the propensities to vote for one party respect than for another. As it is possible to see, moreover, the left-right distance estimate is significant. The left-right distance variable (see previous section) was constructed by taking into account the absolute value of respondent's position on the left-right scale subtracted by the left-right position, evaluated by the respondent him/herself, of all the main parties taken into account. The result of such a procedure is a variable which has a 0-10 range – when 0 means "no difference between respondent and the party" and 10 means "respondent and the party are at the opposite".

The parameter estimate, as it is possible to imagine, is negative and significant. In other words, the more the individual is distant from the party in the left-right scale, the more the propensity to vote for that party will be low. The difference between being in the same position with respect to the party and being completely opposite from the party leads to a difference in the dependent variable of more than 5 points in the ptv scale. This is consistent with the literature that shows distances in the left-right scale as a strong predictor of voting behavior (van der Eijk Franklin 1996). The first model tests the simple relation between the two environmental levels and the ptv for the generic party (De Sio Franklin 2011).

[21] Since provincial level results are consistent with those that employ municipalities, it has been chosen not to provide results for these models here in the chapter. Appendix 1 provides coefficient estimates for those models.

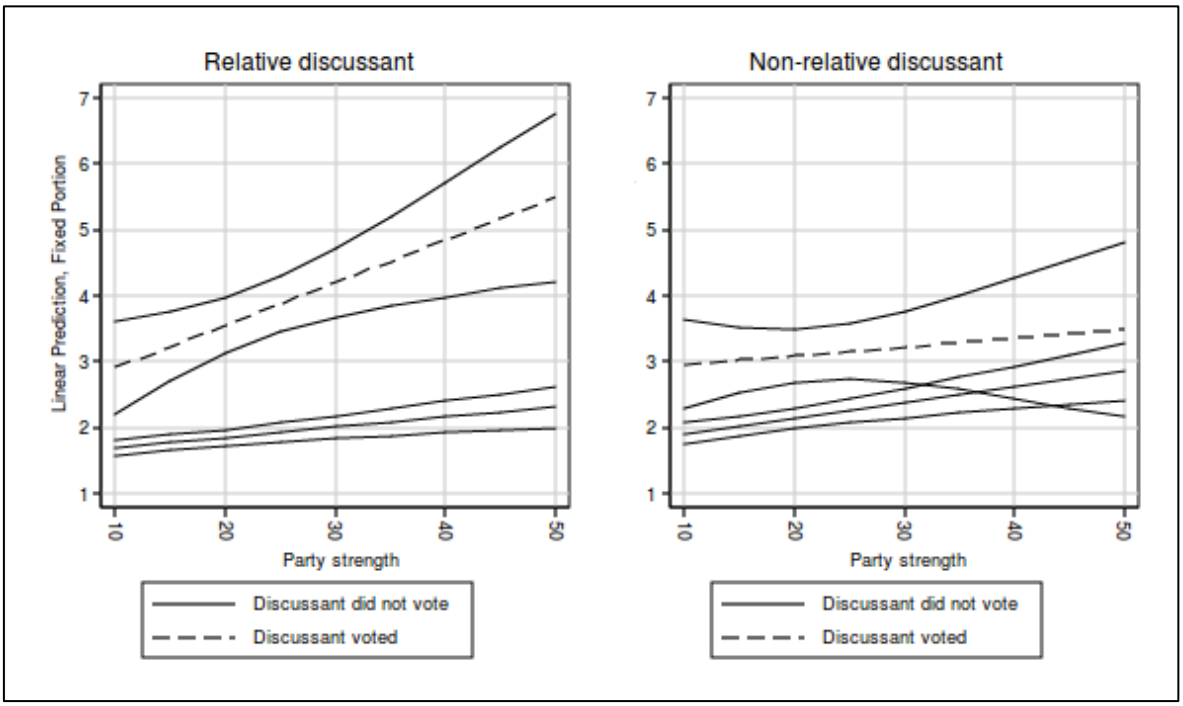
Table 4.4 Multilevel regression models

Dependent variable: Ptv	Model 1 Coef.	S.E.	Model 2 Coef.	S.E.	Model 3 Coef.	S.E.
Discussant voted for the party	1.39***	(0.15)	0.88**	(0.39)	0.72	(0.56)
Local vote for the party (Munic)	0.02***	(0.00)	0.02***	(0.00)	0.02***	(0.00)
Non-relative discussant (ref. relative)					0.13	(0.14)
Disc. Voted * Local vote			0.02	(0.02)	0.05**	(0.02)
Disc. Voted * Non-relative					0.44	(0.79)
Non-relative * Local vote					0.01	(0.01)
Disc. voted * non-relative * Loc. Vote					-0.06*	(0.03)
Left-Right Distance	-0.53***	(0.01)	-0.53***	(0.01)	-0.52***	(0.01)
Edu. lvl. (y-hat)	0.57***	(0.14)	0.57***	(0.14)	0.56***	(0.14)
Gender (y-hat)	0.16	(0.31)	0.16	(0.31)	0.14	(0.31)
Age (y-hat)	0.24**	(0.09)	0.24**	(0.09)	0.24**	(0.09)
Social class (y-hat)	0.22**	(0.10)	0.21**	(0.10)	0.21**	(0.10)
Constant	3.70***	(0.09)	3.72***	(0.09)	3.66***	(0.10)
Level-2 Variance	2.18***	(0.01)	2.18***	(0.01)	2.18***	(0.01)
Observations	4,181		4,181		4,181	
Number of groups	1,113		1,113		1,113	
Log Likelihood	-9517.27		-9516.30		-9508.30	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As it is possible to see in model 1 (Table 4.4), both the municipal level of the party and discussant vote enhance the propensity to vote for the generic party. A party which has been voted by the discussant – or, better, which respondent perceives discussant actually voted – raise the propensity to vote for that party by 1.39 points. The estimate represents more than 10% of the entire range (0-10) of the dependent variable. The local vote for the party, however, present a significant coefficient of 0.02, that is, every percentage point is the party higher in the municipality, the higher is the propensity to vote for the party.

Figure 4.7 Linear prediction (fixed portion) for Models 3 (relative and non-relative discussant)



A difference of 40 points (that represent around the 80% of the distribution of the parties' strength) will lead to a 0.8 points higher ptv. In other words, belonging to a geographical environment that is more favorable to a certain party leads to higher propensities to vote for that party, that is, to higher level of considering the party as a viable option. This is even more interesting if we consider that the set of respondent's ptv's was restricted to those parties respondent has not voted for. The second hypothesis stated that being exposed to other individuals interacts with the geographical prevalence of the party in the geographical context. The way to test this is by providing an interaction between the dummy variable of discussant's vote choice and municipality strength of the party. As Table 4.4 reports, the interaction, if we take into consideration the whole sample, is not significant. Thus, hypothesis 2 about the multiplicative effect of different environmental level (or, more precisely, about the exposure to the main discussant and prevalence of generic party in the geographical context) seems not to be supported by data. The third hypothesis, however, states that discussants who are also relatives, that is, people who are part of cohesive social groups, should exert a higher pressure on propensities to vote with respect to discussants who are just friends or acquaintance, because of their capacity to alter perceptions and actions towards the context. In order to test the hypothesis, Model 3 is fitted. The model is equivalent to Model 2, but, differently from this latter, is fitted with a three-way interaction: this interaction serves to assess whether the interaction that was not present in Model 2 holds for one of the two subsamples, that is, if the interaction is valid for, say, relative and is not significant for non-relative. In order to interpret the three-way interactions,

predictions of Model 3 for relatives and non-relative are exposed in Figure 4.7, respectively, in left and right panel. As it is possible to see, we can see a multiplicative effect only in the model that considers the sole relatives: the prediction for a person who is exposed to a relative who does not vote the generic "locally strong" party – a party which strength is around 40% – is around 2, not so higher with respect to the same situation, but with a party that is around 10%. On the contrary, when both discussant and party strength at the local level are consistent (big party - discussant votes for that party), the ptv rise until 6[22]. The right panel shows the predicted scores for the non-relative discussant. The interaction results not significant: as it is possible to see in the plot, there is not any clear multiplicative pattern.

6. Discussion

This chapter's aim was to investigate the relation between contextual effects and the network environment, focusing primarily on what we called the geographical context. Results are, after all, consistent with the theoretical framework exposed previously. Firstly, the relational exposure, which has been operationalized as the exposure to the main discussant, demonstrated to present strong positive coefficients on the propensity to vote for a party – a party that, it is worth to remember, has not been voted by the respondent. At the same time, the strength of the generic party (De Sio Franklin 2011) on the territory, that is, its geographical result in 2013 elections, correlates positively with the individual level of acceptance of the generic party. If there are more supporters of party A in a municipality/province, it is easier to pick people who have higher ptv's for party A when sampling in that municipality/province. Less straightforward is the result for the models with interactions. First of all, consistently with the theory, the idea that different ties lead to different outcomes is successfully corroborated. In particular, the effect of the interaction is significant with relatives and non-significant with other discussants. The nature of the interaction, moreover, is of extreme interest. First of all, it is interesting to focus of the left panel of figure 4.7. The linear prediction for people who are exposed to a relative discussant who voted for the generic party is consistent with the hypotheses we stated above: the propensity to vote (that is, the viability granted by the individual) for a generic party is the result of a multiplicative effect that combines exposure to a discussant who is perceived to have voted for the party and the prevalence of the party in the

[22] As it is possible to assess from the graph, the group of family discussants who were perceived to vote for a different party present quite big confidence intervals. This is pretty straightforward, since a small amount of relatives are in disagreement. However, according to who writes, the group, although small, is theoretically relevant for investigating the relation between contexts and networks.

broader context. According to our hypothesis, thus, it seems that the exposure to network represent some sort of "filter" (Huckfeldt Sprague 1987) that leads the prevalence of a party in a context to be a reinforcement of the exposure to generic parties' supporters. Moreover, it is worth to remember that the effect that member of cohesive social groups exert on the individual was assumed to be stronger compared to people who belong outside the boundaries of cohesive social groups (Huckfeldt et al. 1995). These two processes were hypothesized to enhance the practical viability of the same, generic, party. Results, thus, seem to be consistent with our expectations and with the theoretical framework presented. This interpretation is even truer when we consider that the stacked regression is performed on parties that have not been voted by the respondent and, thus, that predicted propensity to vote for the party can be intended as some kind of measure of impartial sympathy for the party (if we assume that voting for one party inflates the propensities to vote because of the "hurdle" argument stated above and homophily effects).

People who have a (strong-tied) discussant who did not vote for the generic party tend, on the contrary, to be refractory to the strength of the party in the broader context, irrespectively from the strength of the party in the context. This, in a certain way, can be intended as a by-product of our hypotheses, consistent with these latter: people who are exposed to strong ties – given the coercive force that this latter circle can exert on the individual – are more prone to be "protected" from external stimuli (such as the geographical distribution of the population nearby). In this case, the network alters the effect of the context, but in an opposite way compared to the previous combination. If we further analyze the model, we can think about these latter results in terms of agreement/disagreement between respondent and discussant. Having stated that the ptv's in the analyses are referring to parties respondents has not voted for, the prediction line referred to a discussant who have not voted for the party indicates, indirectly, an agreement situation with the discussant in *not having voted for* the party (if discussant did not vote for the party, he/she must have voted for the same party of respondent, which has been expunged from the models to avoid source of endogeneity). This leads respondents to have firmly low propensity to vote, independently from the position (namely, the prevalence) of the broader context about that party. This outcome is a sort of negative filtering exerted by the network: if we are in agreement in not voting for party A and if my discussant is a relative, the strength of the relation is stronger compared to that of the broader geographical prevalence of the party, and, thus, the propensities to vote are distorted with respect to the broader context, leading to opposite outcomes. The situation is different in the case in which respondent has non-relative discussant: the network, in this case, does not act significantly as a filter (positive nor negative) of the broader context.

Analyses presented in the chapter present some limitations. The first, and most important, one is the fact that evidences about the relation between individual opinions, networks that surround them and local geographical contexts are solely cross-sectional. In other words, we have poor evidences concerning the fact that correlations emerging from our analyses can actually be interpreted as influence mechanisms or, rather, is the outcome of homophily. As stated in literature (Rogowski Sinlcair 2012, Mollenhorst Volker Flap 2008), indeed, simple cross-sectional correlations could be the result of a number of alternative processes, not directly related to direct influence. Even though some devices (such as the erase of the voted party stack) were employed in order to avoid endogeneity, it is still possible that the relation between respondent ptv and discussant's vote choice is partly caused by a homophily process (namely, a process in which respondent seeks for relations with a certain party supporter and, thus, is not directly influenced by him/her).

However, it must be stated that the ambiguity concerning the nature of peer pressure coefficient does not affect the center of our argument, that is, the relation between network and different social circles and context. As stated above, the framework we have developed previously stress that *exposure* to one circle would lead to theoretically explainable regularities, as in the case of the reinforcement expectation. With respect of this argument, thus, the ambiguity of the mechanism that is behind main discussant's coefficient represents, all things considered, a minor limit with respect to the core of our argument.

In this chapter it has been hypothesized a certain type of relation between networks and contexts. It has been stated that networks act as a filter to the external world, given two characteristics of the networks specified in chapter 3, coercion and sensitivity to the broader context. As Erisen and Erisen (2012) point out, familiar ties represent some sort of "social bubble" in which individuals have more distorted cognitions and preferences compared to external stimuli; people, thus, react to these distortions by boosting or depressing viabilities for parties, according to opinions of their network and to parties prevalence in the context. These expectations turned out to be consistent with the data. In some cases, especially in cases of agreement between the discussant and the respondent, and solely in the case the discussant is a strong tie, the exposure to the respondent him/herself seems to act as a filter that makes the individual relatively unresponsive to the general climate. In cases in which the discussant is perceived to support a generic party, which is not supported by the respondent, the effect on the ptv is given by a multiplicative effect of the party strength in the geographical context and the effect of the relational network.

The next chapter will focus again on this multiple characteristics of different social networks, stressing how different circles' coercion and sensitivity can lead to very different outcomes, according to characteristics of the political supply. Moreover, after having focused on geographical

context, it will be depicted the relation between temporal context, networks and individuals, by employing an interesting case study that occurred in 2013 National Elections: the rise of Movimento 5 Stelle during the electoral campaign.

5 Time as a context: the 2013 election campaign and the rise of the Movimento 5 Stelle.

1. Introduction

In the previous chapter it has been showed an example of the relationship between context and network. The main characteristic that context presents is related to the fact that, as Huckfeldt (1986) and, previously, Blau (1977) have pointed out, the former contributes to shape the opportunities that individuals have to relate among each other. The idea of context is usually identified with the sole geographical context. The network – the complex set of different interactions that individuals experience in their everyday lives – has been assumed to be conditioned to the general prevalence of a certain characteristics in the larger spatial environment (Blau 1977, Blau Schwartz 1984, Huckfeldt Sprague 1987). Given that we are dealing with political preferences and electoral choices, the crucial characteristic of contexts underlined above must be translated in terms of political preferences. We can say, thus, that the distribution of political preferences in the context is the fundamental property that distinguishes geographical context and contributes to shape the likelihood of encountering a party *A* supporters with respect to, say, party *B*'s.

Having said so, we must remember that the framework presented in chapter 3 does not only refer to context intended as geographical context. The idea that only geography can be thought as a context clashes against the fact that the theoretical construct from which the context definition is borrowed – the "structure", according to Blau lexicon – clearly allows the possibility of thinking about other form of contextual influence. Structure, according to Blau, is characterized by the distribution of a certain characteristic in a certain environment, which is expected to influence individuals. Modifications of this distribution lead to different structures which the reference individual must deal with. This change in the distribution of preferences or characteristics, as it has been argued in many sociological works, varies on a geographical dimension, as emerged in the previous chapter, but, at the same time, can be witnessed in a temporal fashion (Rogers 1983, Granovetter 1978, Blau 1987, 1994): the increase (or decrease) over time of certain characteristics in the population leads individuals to be in a context that is differently distributed, compared to days, months or years before. This, in turn, affects the network the individual is embedded in.

The chapter that follows will interpret and expand this general theoretical argument, combining it with some of the tools that sociological theory gives us in these situations. The special case taken into account, in order to assess the effect of network and temporal context, will be one of the surprises of the 2013 Italian National Elections, the Movimento 5 Stelle, a party which, in less than

two months (according to the data that have been collected during the election campaign) raised from 17% to 25%. What factors led to this dramatic rise in such a small period of time? What insights can sociological theory give us, in order to argue, at the level of social mechanism, what happened during the 2013 election campaign? Which theoretical arguments can our general framework benefit from this special example? The mechanism hypothesized here is related to the strict relationship between the context – that is, the prevalence in the environment, in different periods in time, of people who voted for the Movimento 5 Stelle – and network – that is, the social space in which the set of mechanisms that contributed to convert people have been enacted. These two theoretical objects will be integrated and explained by means of the general framework of the so-called "strength of weak ties" (Granovetter 1973, 1983) in combination with the theory of the threshold diffusion processes (Granovetter 1978, Valente 1996): the main idea, indeed, is that the rise of the Movimento can be interpreted as a diffusion process fueled by the exposure to the so-called "weak ties". The testing strategy will be based on two main techniques: firstly, some evidences that are compatible with the diffusion process fueled by weak ties will be exposed, by means of multilevel regression model. In order to test systematically the relational mechanisms that are hypothesized of being involved in the process, a real-data-based agent simulation will be presented.

Firstly, however, it seems appropriate to depict briefly a sketch of the history of Movimento 5 Stelle, explaining why the party can be viewed as an interesting case study.

2. The Movimento 5 Stelle in 2013 elections

From its official foundation, the Movimento 5 Stelle ran in 4 electoral consultations. In 2010 and 2011 regional elections, the Movimento reached percentages that led to the election of a small number of representatives in Piedmont and Emilia-Romagna. During 2012 Sicilian Elections, however, journalists and commentators witnessed the electoral relevance of the Movimento. In this electoral turn, indeed, 4 majors of small municipalities of the island were elected, and, even more important, Grillo's movement became the first party in the Sicilian regional assembly, collecting the 18.7% of votes (Biorcio Natale 2013). This electoral exploit came after an aggressive election campaign in which Grillo splurged his skills of entertainer and politician (Biorcio Natale 2013). This local electoral success helped the Movimento to receive visibility in perspective of the 2013 National Elections. 2013 Elections in Italy, as pointed out above, were held in a situation of economic and political crisis. Results have been stunning for more than one reason, especially with respect to the Movimento: "Partially unexpectedly […] the 5 Star Movement (M5S) led by a former

comedian, Beppe Grillo, became the largest party in the House with 25.5% of the votes. Overall, the electoral results showed the greatest vote-swing in the whole electoral history of the Italian Republic, with an index of aggregate volatility of 39.1%, even above the level reached in the first election of the Second Republic in 1994 (36,7%)" (Bellucci Maraffi 2013). In order to present a sketched picture of 2013 Elections, we must, again, stress two elements: from one side, classical political parties – that, although name changes and internal secessions, used to remain more or less stable for more than 20 years – lost a huge part of their previous strength (ITANES 2013). From the other side, several scholars (ITANES 2013) report a growth of the number of new political parties that criticize the whole party system. Undoubtedly, the most successful of these parties in 2013 has been the Movimento 5 Stelle. The Movimento, presenting itself during the crisis of representation (Diamanti 2014), has revealed to be incredibly charming for the electorate. This happened for several reasons: first of all, we have to underline the figure of Beppe Grillo, a former comedian who has become, during the last years, a foreground character in the political arena. The relation between the charismatic leader of the party and his followers became more and more similar to that of a populist party (Corbetta Gualmini 2013). Beppe Grillo, who defines himself as a simple loudhailer of a "non-party" (Diamanti 2014), refused repeatedly any institutional mediation between him and his followers, stressing the difference between the Movimento and the old, traditional political arena. Secondly, Movimento's 2013 election campaign has been based on popular and captivating arguments, such as the institution of a basic income for the unemployed and the clampdown on corruption in the public administration. Next to the electoral manifesto, the image of the Movimento was promoted also by means of the MPs selection process: in order to signal a distance between the Movimento and the old political parties, a troop of young citizens, who had never experienced militancy in traditional parties, have been selected by means of a web-based contest. Grillo's media and political strategies, taken together, led analysts to borrow Taggart's (1995) classification in defining the Movimento as a populist (or neopopulist) party (Corbetta Gualmini 2013, Biorcio Natale 2013, Diamanti 2014). As pointed out in several other occasions (Diamanti 2014, ITANES 2013), peculiar characteristics in the 2013 Italian political arena led voters to signal their dissatisfaction in a way that was different compared to simple abstention: "a vote for the M5S does not reflect identification with it. The last-minute voters and the most peripheral passengers of February 2013 voted for the M5S to express dissatisfaction and anxiety. It was a 'tactical' vote – an alternative to a non-vote – and it was manifested through a non-party" (Diamanti 2014). From the outcome side, these factors led to a stunning two-month increase of the percentage of votes for the Movimento 5 Stelle: as it is possible to see from 2013 ITANES Rolling Cross-section data (Figure 5.1), Beppe Grillo's party passes from around the 17% of the first days

of January to more than 25% that gained in 24-25 February. The aim of this chapter is to hypothesize a social mechanism that can account for this dramatic rise of the Movimento, combining two important theories of modern sociological thought. From one side, the strong-weak ties framework and, from the other, the diffusion of innovation theory (Rogers 1983) and in particular, the threshold model of diffusion (Granovetter 1978).

3. The theoretical framework

3.1 Strong and weak ties, cohesive and non-cohesive groups

As pointed out before, this work is about interpersonal relations and the ways in which they can affect voting attitudes and behaviors. As stressed in chapter 3, relating with the partner is different, from many aspects, compared to dealing with a casual interaction while waiting in line in a public office. The main difference between these two interactions is related to the strength that characterizes the relationship. Granovetter, as remembered in chapter 3, defined four dimensions in which tie strength can be theoretically reduced: the amount of time one spends with his/her alter, the emotional intensity they both share, the intimacy and the reciprocal services the two individuals accord one to each other. Each of these characteristics are somewhat independent from the others, although the set is obviously highly inter-correlated (Granovetter 1973). If we think about real relations that happen in everyday citizens' lives, it is possible to see how these four elements can adequately account for differences among these types of relations: two random persons who are in line at the post office will probably share just the amount of waiting time in the line, they probably will not talk about intimate events of their lives, they will not have to offer services each other, nor they will share any emotion or feeling. The exact opposite can be said for a mother-daughter relation: the amount of time spent together, as well as the mutual confiding, the number and relevance of mutual services and the emotional intensity of the relation are, usually, higher than the discussants of the post office line case. This definition has a main consequence. Given spatial, emotive and temporal constraints that characterize everyday life of individuals in a certain society, people would have a finite number of strong ties: since a person assigns to strong ties more time and more energies, and since these variables are both finite, the number of strong ties will be finite too. Moreover, these ties will be interconnected between each other: for our purposes, now, it is crucial to stress the "forbidden triad" argument. If A is strongly tied with B and B is strongly tied with C, the probability that C is (either strongly or weakly) tied with A is high. This argument is compatible

with the premises related to the finiteness of emotional and physical energies (and time) exposed before. If I assign to a person a huge amount of emotional and physical energies (that can be translated in amount of time), and if this person makes the same with another individual, the finiteness of our life-time will lead me to know this latter individual too. Moreover, the fact that I have strong relations with B but I do not know C (who is strong tied with B), could lead to "psychological strains", argued by cognitive balance theory (Heider 1958, Granovetter 1973).

The "weak ties" conceptual framework and its related definitions have had an impressive impact on social sciences. Political scientists employed concepts derived from Granovetter works, applying some of his categories to electoral and political behavior (Huckfeldt 1986, Huckfeldt et al. 1995). In particular, Huckfeldt and colleagues crucially contribute to translate the strong/weak tie argument in political behavior, introducing cohesive/non-cohesive social group concepts. Cohesive and non-cohesive social groups are, to some extent, a faithful translation of the strong/weak ties argument, but, though, some differences between the two conceptual continuums remain (see chapter 3). If, in Granovetter theory, the strength/weakness of ties is function of the four dimensions explained above, Huckfeldt's conceptual framework assumes certain social groups to be "naturally" constituted by strong or weak ties. Thus, as Huckfeldt et al. (1995) assume, for instance, "[t]he family is the most basic and ubiquitous of all cohesive group" and friend and simple acquaintances are people who, mainly, place themselves outside the boundaries of cohesive groups. Even though this argument is theoretically different from Granovetter's idea of what strong or weak ties are, Huckfeldt conceptualization of group cohesiveness starts from the data that he and his colleagues were dealing with. In presence of survey data and egocentric networks, that usually do not provide information about the strength of the relationship between respondents and their discussants, the only way in which it is possible to infer tie strength is through social circles to which discussants belong to. Moreover, the fact that authors are dealing with representative samples of the population can support the idea that, on average, relatives share actually stronger ties with the respondents than, for instance, friends.

If we accept the conceptualization of Huckfeldt and colleagues (1995) and, substantially, we accept that strong/weak ties and cohesive/non-cohesive social networks are overlapping concepts, we can focus on the crucial feature we are interested in. As pointed out in several studies (Berelson Lazarsfeld McPhee 1954, Huckfeldt Sprague 1995) as well as in chapter 3, cohesive social groups, such as the family, present, in addition to levels of tie strength, different levels of sensitivity with respect to the public opinion. As it will be seen in detail below, cohesive groups tend to feed back the information to the point of origin: "the close friends of my close friends are quite likely to be my close friends too. As a consequence, if political communication only occurs through close

friends, the social reach of political information is likely to be quite limited" (Huckfeldt et al. 1995). According to Huckfeldt, this characteristic of cohesive groups has a main consequence on the (reduced) capacity of being exposed to a larger climate of opinion: as stressed repeatedly in chapters 3 and 4, indeed, belonging to a close circle leads the individual to be less aware of the dynamics of the broader context. Conversely, weak ties, given their structural characteristics, allow people who are more connected with them to be more embedded in a climate of public opinion. Since non-cohesive social groups are composed primarily by weak ties, the structure of these networks is wider, and allows to be in touch with a larger amount of people, making the individual more aware of the public opinion climate: "[w]hen social communication occurs through weak ties, beyond the boundaries of cohesive social groups, public opinion becomes more fully public" (Huckfeldt et al. 1995). Another characteristic that differentiates groups, stressed in chapter 3 and strictly connected with sensitivity, is coercion: strong ties have been theorized to act as a tool of political normalization and coercion towards their members: "[…] democratic politics includes a substantial element of coercion: citizens unavoidably pay heed to the events and debates and issues that impinge upon their lives from all sides" (Huckfeldt Sprague 1995). Family is more coercive, from this point of view, with respect to other social groups, because familiar ties are stronger compared to other ties (Huckfeldt Sprague 1995, Huckfeldt et al. 1995) and the system of social rewards and punishment for those who are not homogeneous to the group is more efficient. Contrarily, non-cohesive social groups are more prone, as pointed out above, to be affected by everything is present at the level of broader public opinion and, thus, disagreement and arguments are normal. The question that arises, thus, is the following: what happens when a novelty, a new, charming object is introduced in a social system? And what would be the role of non-cohesive social groups in the spread of this novelty?

3.2 Diffusion of innovations and the threshold model

Intuitively, a process of diffusion can be defined as some kind of social process that results in a progressively higher prevalence of a behavior or an opinion in a social system. This rough definition, however, can be refined by referring to the work of Rogers (1983). Rogers defines the diffusion as a process by which an innovation spread through certain communication channels, over time among members of a social system. The author identifies 4 main elements that define a diffusion process. The first element is the object of the diffusion, the innovation itself. Following Rogers's framework, the innovation can be represented by a large number of behaviors, physical objects or opinions: a technology (Coleman Katz Menzel 1957, 1966), attitudes towards certain

behaviors (Nazio Blossfeld 2003), voting behaviors or political ideas (Lutz in Eagles 1995). All these "things" can be conceptualized as *innovations*. On first approximation, an innovation is something that is perceived as "new" by potential adopters. According to Rogers, innovations can be defined by means of 5 characteristics that make the innovation more interesting or affordable with respect to old behaviors, devices and attitudes. To be easily diffused, an innovation needs to guarantee an advantage with respect to the status quo. Moreover, the process of diffusion will be faster if the innovation is compatible with previous systems of values and practices. Thirdly, choosing an innovation that is not difficult to adopt will make its diffusion faster vis-à-vis innovations whose implementation is harder. Fourthly, a "triable" innovation – that is, something whose employment is reversible – will be subjected to a faster development with respect to solutions which the same is not reversible. The fifth characteristic identified by Rogers concerns the extent to which an individual can assess benefits coming from the innovation without adopting it (Rogers 1983).

The second cornerstone of a diffusion process is the communication between individuals. In its basic structure, communication networks in a diffusion process can be modeled as individual homophilic relations. In order to have a successful process of communication, Rogers argues, a certain quantity of heterophylly among people who communicate must be present (Rogers 1983). This is consistent to what Granovetter stated about the relation between weak ties and diffusion processes.

The third element that defines a diffusion process is time. Diffusion of innovations and communication does not happen in a temporal vacuum. Usually, models which try to define communication-based processes tend not to take into consideration time or, better, the temporal succession that characterized communication. The temporal dimension is important in Rogers's model in three ways. Firstly, from the individual side, time articulates the succession from being non-adopter to being an adopter of the innovation. Secondly, from the group side, time allows us to identify prior adopters and laggards during the process. Thirdly, from the aggregate side, we can see how the adoption rate changes (and rise) during time.

The fourth and last element that Rogers theorizes is the social system in which a certain individual is embedded. Social systems can influence adoption rates in various manners: for instance, the position (with respect to class, religion, ethnicity etc.) in which individual are in the social system can facilitate (or not) the adoption of the innovation. The normative system can influence the diffusion rate and the steepness of diffusion curve over time: as explained before, norms can allow or impede the diffusion process, given the level of conflict that exists between the former and the innovation.

The main idea that can be clearly seen after this brief exposure of the model is that, in case of a diffusion process, time-context, networks and individuals are strictly interdependent. If we would like to translate Rogers's concept into the lexicon introduced in chapter 3, we would say that, given an individual embedded in a network, a diffusion of an innovation is a process that leads the individual, in different periods (context), to be exposed to a larger and larger prevalence of discussants who are adopters of that innovation among his/her ego network, contributing in this way to enhance propensities to adopt it.

So far, the "big picture" has been depicted, without referring to the lower-level dynamics in which people are engaged in. No clear arguments about the individual and relational mechanisms that should support the choice to abandon a behavior to embrace a deviant option have been proposed. In order to do so, we must firstly switch our theoretical argument from the aggregate to the individual, micro-relational level. At the level of social mechanism, the diffusion over time of the deviant behavior can be well depicted by the so-called *threshold model* (Granovetter 1978, Macy 1991, Valente 1996). Generally speaking, the threshold model states that, before adopting a deviant/innovative behavior, people tend to evaluate how many other people of their social network are engaging in that behavior. In other words, the adoption of a deviant behavior is function of the prevalence of that behavior in one's ego-network (Valente 1996, Granovetter 1978). Moreover, the model states that people can differ between each other in terms of low thresholds and high thresholds – that is, people who are more subject to diverse opinions and people who are not. Valente (1996) identifies two main conceptual arguments that describe efficiently the theoretical framework. The first is the concept of *exposure*, that is, the proportion of adopters of the deviant behavior who surround our reference individual in a social network. Generally, the exposure rises over time (because of the fact that, if the process over time is a genuine diffusion process, the probability to interact with an adopter of the deviant behavior, as stressed above, is higher during time). Obviously, the increasing prevalence of adopters in a social network can vary conditionally on the structural constraints of the social network itself (Valente 1996): for instance, "younger" circles will be probably more prone to adopt innovations with respect to "older" ones.

The second concept, as pointed out above, is that of threshold. The threshold is usually defined as the proportion of people of one's social network that is necessary to convert ego to the innovative behavior. In exposing an example related to riot participations, Granovetter states: "Conservatives will have high thresholds: the benefits of rioting are small or negative to them and the consequences of arrest high since they are likely to be "respectable citizens" rather than "known rabble-rousers". Thresholds of 80% or 90% may be common, and we may allow for those individuals who would not join under any circumstances by assigning them a threshold of 100%" (Granovetter 1978). From

the other side, people who are exogenously more prone to join the riot will need, say, a 5-10% of their social network that joins the riot to embrace the uprising.

In classical threshold framework, the exposure concept is usually interpreted without differentiating circles which ego is exposed to. Works from which Granovetter takes inspiration for his threshold model, usually state dyadic relations that cannot be differentiated by their strength. For instance, the work by Coleman and colleagues (Coleman Katz Menzel 1966) show how the adoption of a new drug in a doctor community actually follows some kind of diffusion process, no matter the actual strength of the ties that bind agents. We state, however, that there are some diffusion processes in which, on the contrary, the diffusion itself is the result of several types of interaction. In other words, the nature of the tie that binds two agents can fuel or, rather, discourage the adoption of the innovative behavior, keeping constant different thresholds that individuals have. This argument is not new, although, in its original treatise, it was only sketched. As pointed out above, in his seminal article on weak ties Granovetter (1973) states: "Intuitively speaking, […] whatever is to be diffused can reach a larger number of people, and traverse greater social distance (i.e., path length), when passed through weak ties rather than strong".

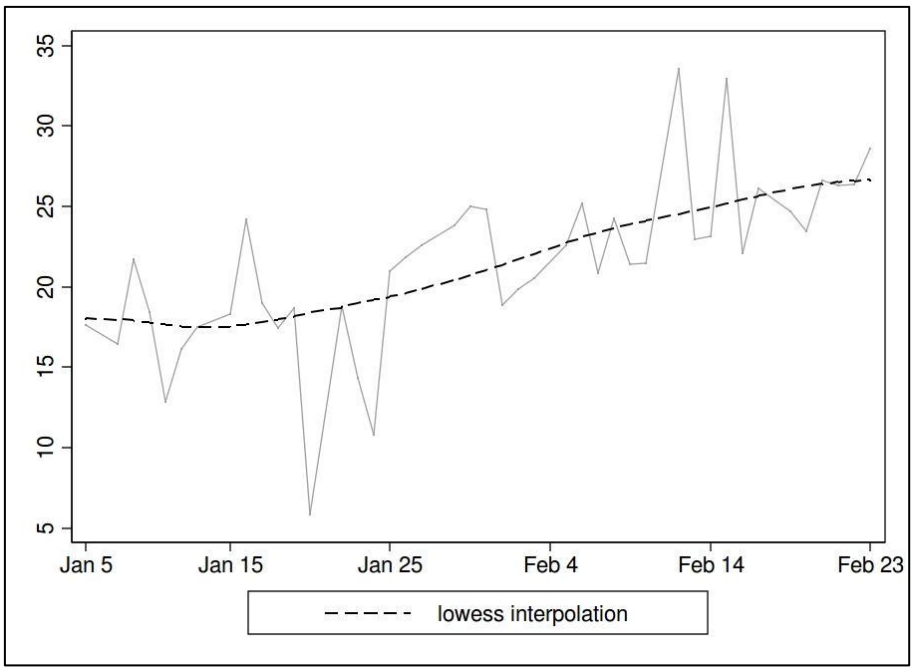
The main idea behind this chapter is that the diffusion processes in which multiple social circles are involved should be combined with the theory of strong/weak ties: in general, it is possible to assess that, since information can travel farther when conveyed by weak ties (for the reasons we stated above), these latter will enhance the probabilities of being exposed to the deviant opinion. Of course, exposure does not mean automatically conversion to the innovation: individual propensity to embrace the innovation, which can be converted in a threshold in Granovetter's sense, contributes to shape the likelihood of embracing or, rather, rejecting the innovative behavior or attitude. As long as the environment changes, however, more people are exposed to a higher number of discussants who have switched to the innovative option, more of them are exposed to the new idea and, eventually, can be converted to it. It is important to underline that the process involves individuals and collectives at the same time. The same individual can be influenced by his/her environment and can be seen as part of the environment by other individual with which is in contact. The process of diffusion is characterized by the aforementioned dialectic relation between the environment and individuals (see chapter 3).

The next paragraph will deal, more in detail, with the combination of diffusion processes and weak ties frameworks, exploring the example these mechanisms will be applied to, that is, the rise of the Movimento 5 Stelle during the 2013 election campaign. Moreover, several other explanation of the phenomenon will be given and criticisms about these alternative approaches will be argued.

3.3 The Movimento's rise: a diffusion process fueled by weak ties?

In Figure 5.1 it is showed the rise, in term of voting intentions, of the Movimento during the campaign (RCS ITANES data).

Figure 5.1 The rise of the Movimento 5 Stelle during the election campaign (Source: ITANES 2013 RCS survey, lowess bw=0.8)



If, at the beginning of data collection (January 6), the percentage of potential voters of the Movimento is about 17-18%, the day before the Election Day (February, 23), the percentage of people who declare their vote for the Movimento is above 25% (a substantially correct prediction of the actual electoral outcomes). In particular, the S-shaped form of the trend resembles the form that many diffusion processes share. Seminal works on the topic (see Rogers, 1983), as well as more recent ones (Fisher and Hout 2005) identify an S-shaped curve as the result of a process of diffusion activated by means of personal/impersonal communication. As Rogers himself points out, "At first, only a few individuals adopt the innovation in each time period (such as a year or a month, for example); these are the innovators. But soon the diffusion curve begins to climb, as more and more individuals adopt. Then the trajectory of the rate of adoption begins to level off, as fewer and fewer individuals remain who have not yet adopted. Finally, the S-shaped curve reaches its asymptote, and the diffusion process is finished" (Rogers 1983, 23).

The rise of the Movimento during the 2013 election campaign, however, could not necessarily be consistent with a diffusion process. In other words, it is possible that the rise we see in figure 5.1 is

not related to an influence processes in time, or, alternatively, having assessed a process of diffusion is actually unfolding, the same can be not given by the exposure to weak ties. Asking ourselves whether the case of the Movimento 5 Stelle in 2013 Elections can be described as a diffusion process fueled by weak ties implies several assumption: first of all, we are assuming that deciding to vote for the Movimento is compatible with an innovative behavior; secondly, we are stating that this innovative behavior actually spreads by means of communication networks and, thus, is not (completely) due to other non-social factors. In order defend these assumptions, the real, campaign-related conditions that have led to the rise of Movimento 5 Stelle will be treated.

Movimento 5 Stelle's 2013 campaign represents the first nationwide testing ground of Grillo's party. That means that voters could not vote for Movimento 5 Stelle in previous National Election. According to Rogers's theory, an innovation is something (behavior, attitude or opinion) that is perceived as new by a certain social system. The Movimento, in the National Elections context, is indeed a new option that was not available in previous electoral consultations. Thus, we can say that, by definition, the choice of voting for the Movimento is an innovative option. It is important to underline that the word "innovative", here, is employed in a non-evaluative meaning (we are not talking about party manifestos, but about the matter of fact that the Movimento was not an available option in National Elections before 2013).

Furthermore, some case-specific elements about the rise of the Movimento and the 2013 campaign should be evaluated: as stressed above, the success of the Movimento 5 Stelle happens in combination with a huge economic and political crisis (Diamanti 2014, ITANES 2013). The claims of the Movimento during the campaign, such as charming electoral promises, heavy critical attitudes towards the old political system, combined with the low trust in political institutions and parties shown by larger segments of the electoral body, surely contributed to make the Movimento appealing to large sector of the citizenry (Diamanti 2014, Biorcio 2014).

The – so far not particularly extended – literature that tries to explain Movimento's 2013 exploit, instead of focusing on discussion networks, employs two main explanatory arguments: several scholars (Diamanti 2014) argued that Grillo's media-related strategy was one of the key of Movimento's outcome. Albeit Movimento's candidates did not show in TV debates and talk show, the Movimento and especially its charismatic leader, Beppe Grillo, "has succeeded, indeed, in being visible and making news even without being directly present. He has 'compelled' news broadcasters and talk-show hosts to deal with him, to download his video messages and retransmit them. Grillo, in fact, exploits television to his own advantage, pushing the lever of communication to 'full on' when an election is in sight" (Diamanti 2014). This "indirect" media coverage could, indeed, have affected positively voters, who basically heard Grillo's claims without any direct contradiction. This

hypothesized mechanism would allow to explain the rise of the Movimento without assuming any discussion network as well as any positive effect given by weak ties. The second explanation that seems to have been accepted by many commentators and scholars will be called the "internet explanation". From a general point of view, the employment of the web and of its instruments (weblog, social networks etc.) by the Movimento has been much more intensive and successful with respect to traditional parties (Nizzoli 2013, Mosca Vaccari in Corbetta Gualmini 2013, Diamanti 2014, Bentivegna 2014). According to several scholars, this element could have been crucial in the success of Movimento 5 Stelle: the Internet, in this explanation, become a sort of substitute of real interactions. Bentivegna (2014) exemplifies the relation between individuals and the social networks with, for instance, Twitter, arguing that "[g]iven the presence of social networks in everyday life, another approach sees Twitter as a "third place" (Chadwick 2009), recreating the informal conversational features typical of the communities identified by Oldenberg (1997) in bars, bookshops, and other places frequented by individuals as alternatives to both the workplace and the settings of family life. In these places, conversations and exchanges can be interwoven, covering a broad field and including politics as one of the many topics of day-to-day interactions" (Bentivegna 2014). According to this explanation, the diffusion process is enacted by means of virtual interactions instead of real-life ones: in this case, just part of the social circles, the virtual and the real one, would overlap, while the rest of the diffusion effect could be given by on-line interactions with people they do not physically get in touch with. These two alternative explanations (the media and internet one) have several drawbacks. The main problem related to the internet explanation is the fact that the web is far from being pervasive in the Italian electoral body. From the demographic side, Italy is one of the "oldest" countries in the world and, consistently with this situation, the rate of penetration of the web is among the lowest in developed countries (Chen Wellman 2004). Moreover, analyzing descriptively results of the 2013 CAPI survey, collected by ITANES, it turns out that only 3.8% of the respondents use Twitter and only 8% of the sample uses the social network Facebook to share political contents or ideas[23]. These results should make us sufficiently aware that, if an internet effect does actually exist, it risks of being lower than one could expect. The media effect argument drawback, instead of being related to the prevalence of the conversion instrument, is related, according to who writes, to the prevalence of the message in the media itself. No doubt that the effect of media, although it is not clear to which measure, can affect voting behavior (see chapter 3 for more details). In the specific case of the Movimento, however, the information has been spread together with huge conflicting opinions that were typically aired after Grillo's speech during the election tour (Diamanti 2014). In this way, if a media effect did actually exist, it was

[23] Results are based on author's descriptive analyses on ITANES 2013 CAPI survey.

probably against the Movimento itself, or, at least, it is difficult to expect that the effect has been solely positive. The choice to take into account the diffusion of the Movimento as a social process does not neglect, however, the fact that other effects can have been exerted towards the electoral body. More simply, our interpretation is that, among other effects, the social one can be included as one important engine of the electoral change.

Summing up, the situation hypothesized in this work starts from several arguments: families are social circles that present lower levels of sensitivity, higher levels of coercion and are those groups in which new, deviant opinions tend to be contrasted (Berelson Lazarsfeld McPhee 1957, Huckfeldt et al. 1995). Contrariwise, non-cohesive social groups, characterized by a higher likelihood of weak ties relation among their members, allow people to be more embedded in the public opinion, making them more aware of political novelties and thus making the likelihood to adopt these novelties higher. The first hypothesis will read as follows: *the Movimento 5 Stelle vote intentions rose, during the election campaign, like a diffusion process, especially among people who were embedded in non-cohesive social groups.* This does not mean that relatives cannot have produced, to some extent, a more favorable climate for the Movimento 5 Stelle. More simply, the hypothesis stated here is that political discussions with weak ties, during the campaign of 2013, represented one privileged communication channel by which people have been converted towards the Movimento 5 Stelle.

Moreover, it must be stated that exposure to weak ties does not lead automatically to higher likelihood to vote for the Movimento, that is to say, not all voters were convinced in the same way by Movimento's claims and promises. We can hypothesize that a certain section of the electorate, during the campaign, could have been very skeptical towards the characters of Movimento's claims or the party manifesto. This part of the electorate could have been composed of those who were closer to other parties, or who have just not been convinced by the Movimento. Another part of the citizenry, rather, could have been naturally more enthusiast with respect to the Movimento and its general characters, demonstrating, almost immediately, trust toward the whole political operation. Others, again, could have been only partially skeptical and partially charmed by some claims. Thus, the second hypothesis will read as follows: *people possess higher or lower thresholds that can make easier or more difficult the conversion to the Movimento, independently from the exposure to converted discussants.*

The next paragraph will deal with these interpretations of the process, providing results based on multilevel regression models. Moreover, in order to deepen our understanding of a threshold-like diffusion through weak ties mechanism, an agent-based simulation, based on real data, will be performed.

4. Data and measures

The hypothesized processes presented above will be tested by means of data coming from ITANES 2013 Election Study. In particular, the 2013 pre-electoral Rolling Cross-Section (RCS) survey (Johnston Brady 2002) will be employed. ITANES 2013 RCS spans for a 50-days' time, from January 5 to February 23 (the day before the elections). For every day of the time span, a quota sample of 200 respondents was collected by means of CAWI (Computer Assisted Telephone Interview) mode. The total of the sample is of 8722 cases, distributed over 43 days (on Sundays data were not collected).

The diffusion process of the Movimento 5 Stelle is strictly related to the vote intention that respondents have declared during the campaign. The choice of the dependent variable has dropped on a simple binary vote choice, where 1 is a declaration of vote for Movimento 5 Stelle and 0 equals "anything else" (which represents other parties and includes people who are not yet sure which party vote for).

Testing diffusion mechanisms means adopting adequate measures that can account for different concepts of the diffusion itself: for instance, exposure to weak ties can be operationalized in several ways. The most straightforward method has been asking characteristics of a number (usually up to 5) of discussant with witch respondent talks about politics. The so-called "name generator" procedures (Huckfeldt et al. 1995, Huckfeldt 2001, Klofstadt McClurg Rolfe 2009) have been crucial for discovering relations between networks and have proven to be reliable and powerful procedures. However, as Baldassarri (2009) notes, name generator procedures – focusing on a few individuals who represent a sort of "inner circle" of political discussion network – systematically disregard political views and attitudes of the broader social network, that is usually composed of more than a three or five discussants. As explained above, what are we looking for here is a measure of exposure to different *social circles* instead of *discussants*. When facing such an issue, name generator procedures become less useful than usual: indeed, by means of name generators, non-cohesive groups information could be systematically underreported, being people who compose these groups, by definition, individually less "important" compared to those who belong to cohesive groups (Huckfeldt et al. 1995, Baldassarri 2009). Given that name generator-based measures cannot allow exhaustive information of both strong and weak ties, the solution proposed in this work tries to account for this bias by employing another measure. The two questions that have been asked in

2013 ITANES survey – which subsequent analyses are based on – are a variation on the theme of those presented by Baldassarri[24] and read as follows:

1. How many of the members of your family do you think have your same political opinion?

a. None of them (0%)
b. A few of them (around 10%)
c. Some of them (around 25%)
d. About half of them (around 50%)
e. Many of them (around 75%)
f. Most of them (around 90%)
g. All of them (100%)

2. Now let's think about your friends: how many of them do you think have your same political opinion?

a. None of them (0%)
b. A few of them (around 10%)
c. Some of them (around 25%)
d. About half of them (around 50%)
e. Many of them (around 75%)
f. Most of them (around 90%)
g. All of them (100%)

This measure allows us to assess how voters are embedded in homogenous or, rather, heterogeneous networks. In particular, questions are asked about the familiar circle (which is assumed to be the strong tied one) and the friend circle (which will be assumed to be characterized by weak ties). It is important to stress a slight difference between the theoretical framework presented so far and the operationalization of our main predictor. In the theory exposed above, being embedded in a non-cohesive social circle – namely, a non-familiar one – should lead to a higher awareness of the broader context, that could probabilistically lead to a higher awareness of the novelties that in this context. Embeddedness can be interpreted as a mix of exposure and general agreement: in other words, a person embedded in a social circle is both exposed to people who belong to that circle and,

[24] If the wording of the questions proposed by Baldassarri (2009) ask explicitly a rough percentage of how many people vote for a certain party/coalition respect to another one, in 2013 survey it has been decided to ask respondents an estimate of how many discussants have the same political opinions (see below for a more refined argument on the measure).

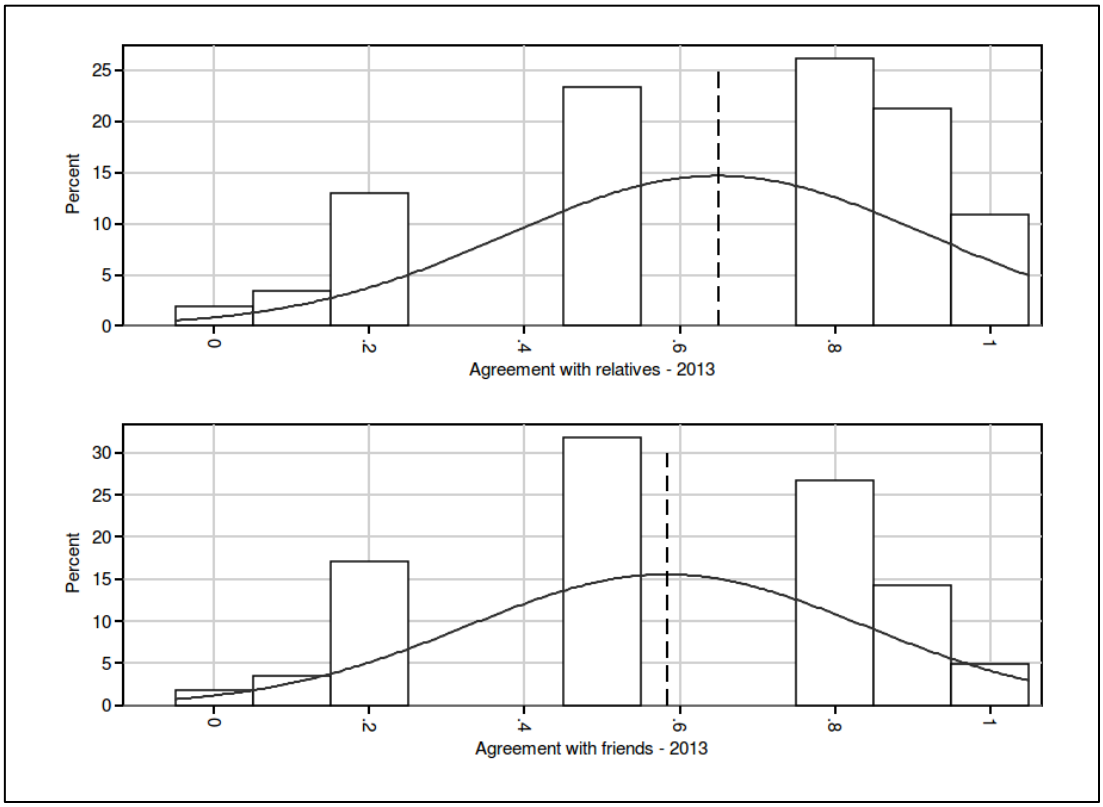
at the same time, he/she shares general political attitudes. It is important to underline that the wording of the questions does not involve, strictly speaking, voting behavior: respondent, indeed, are asked to report a rough percentage of relatives or friends who share, generally, the same political opinions. For our aims (that is, finding social determinants to the rise of Movimento 5 Stelle) this represent a perfect measure, because it does not tap voting behavior characteristics: in order to make clear this point, imagine a person embedded in a, say, friends network in which 75% of the discussants have a very low opinions about old political parties and are going to signal their dissatisfaction with a protest vote or with abstention. This circle can be a catalyst for political change as long as the context – of which the non-cohesive circle is some kind of "mirror" – changes its prevalence of support for the Movimento. If the question wording had asked about some electoral-related behavior, this kind of situation would not have been tapped by the question itself. At the same time, a familiar circle, assumed to be more refractory to the broader environment, is expected, given its network structure, to be less sensitive to the novelties, to push its members to avoid the novelty and to go on in adopting traditional choices. Also in this case, being embedded in a homogenous familiar circle should lead to depress the likelihood to accept the deviant option. These kinds of situations, as pointed out above, are those that are expected to have fueled the chain reaction leading to the spread of the Movimento during the campaign.

As it is possible to see in Figure 5.2, the distribution of the two variables follows common sense, as well as theory-driven expectations. In the upper panel, the distribution of the relatives' homogeneity variable has an average value that is higher with respect to that of the lower panel (the friends' homogeneity one). The central idea that emerges from these descriptive statistics, indirectly supported by Huckfeldt and colleagues (1995) is that weak ties or non-cohesive social groups are less homogenous compared to close, intimate, strong relations, given that the respondent's overall judgment on the former is produced by a higher level of homogenous relations compared to the latter.

As pointed out above, in order to test the diffusion mechanism, we have to insert a variable that takes into account time, that is, the day of campaign in which respondent have been interviewed. The day has been recoded in such a way that 1 equals to the first day of campaign and 43 represent the last day of campaign (Sundays have been expunged from the analysis since there has not been any data collection).

Several other variable have been inserted in order to control for possible confounders. The controls variables are: Educational level (Elementary schools, Middle schools, High School, University degree or more), age, gender and type of household (Single, in a couple, in a couple with sons or daughters, Other accommodations).

Figure 5.2 Descriptive statistics: distributions of relative (n=8387) and friends (n=8192) homogeneity variables



The outcome will be a binary variable related to the voting intention declared during the interview, where 1 equals to the declared intention to vote for the Movimento and 0 equals to any other party (irrespectively of the certainty of the decision).

The model employed is a logistic multilevel random-intercept model. The choice of using a multilevel model instead of a simpler model is due to the fact that one of the crucial variables in our testing strategy is time. Each respondent is, thus, nested in a certain time-frame, in which his/her decisions are shaped in the light of his/her networks and the broader temporal context in which is embedded. The idea of performing a multilevel model resides in the fact that standard errors, in such a model, are unbiased and, thus, coefficients significance is reliable.

In order to test whether the mechanism hypothesized is consistent with the data, 4 models will be fitted.

1. p(VOTE_M5S=1) = CONST
2. p(VOTE_M5S=1) = CONST + EDULVL + GENDER + AGE + HHTYPE
3. p(VOTE_M5S=1) = CONST + EDULVL + GENDER + AGE + HHTYPE + FAMNET + FRINET

4. p(VOTE_M5S=1) = CONST + EDULVL + GENDER + AGE + HHTYPE + FAMNET*DATE + FRINET*DATE

Where:

- VOTE_M5S is the dependent binary variable, the vote declaration. 1 is equal to vote for the Movimento and 0 is "Any other choice";
- CONST is the constant;
- EDULVL is respondent's educational level;
- GENDER is respondent's gender;
- AGE is respondent's age;
- HHTYPE is the household type in which the respondent usually lives;
- FAMNET is the homogeneity measure in relatives' network[25];
- FRINET is the homogeneity measure in friends' network[26];
- DATE is the (centered) day of the interview in the RCS[27];

Briefly, as pointed out in the introduction, these regression models are useful to find evidences that are compatible with the first hypothesis explained previously. In particular, these models serve to assess whether 1) the exposure to (homogenous) weak-ties-based networks boosts the likelihood of voting for the Movimento and 2) This effect increases during time (that is, following some sort of diffusion process).

5. Regression models' results

In table 5.1 are presented the 4 models, with coefficients and standard errors. The first two models represent some kind of descriptive results about Movimento 5 Stelle's voters: the first model presents the dependent variable without any regressor, while Model 2 adds several control variables.

[25] The variable has been recoded in a way that a respondent who reported 0% of discussants in agreement with him will have a 0 value, a respondent reporting 10% of agreeable discussants is coded as 0.10 and so on.
[26] See note 17.
[27] From the 8722 cases of the whole sample, respondents who answered to the question related to the vote intention (whether or not they were sure about their decision) were 6731 (that is, the number of non-missing cases in Models 1 and 2). Further 279 cases are lost because of missing values of the familiar/friend network homogeneity. Given this missing data, Model 3 and 4 are fitted on 6452 non-missing cases.

Table 5.1 Regression coefficients and Standard errors for 4 multilevel models. Test of networks effect during time

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Family exp./hom.					-0.46***	(0.14)	-0.48***	(0.14)
Family exp. /hom. * Day							0.01	(0.01)
Fridens exp./hom.					0.93***	(0.15)	0.91***	(0.15)
Fridens exp./hom. * Day							0.02*	(0.01)
Day (centered)							-0.00	(0.01)
Educational lvl. (ref. Elementary)								
Edu lvl. Middle School			-0.32	(0.23)	-0.39	(0.24)	-0.39	(0.24)
Edu lvl. High School			-0.59***	(0.22)	-0.66***	(0.24)	-0.66***	(0.24)
Edu. lvl. University degree			-1.16***	(0.23)	-1.25***	(0.25)	-1.24***	(0.25)
Gender (ref. Male)			-0.13**	(0.06)	-0.14**	(0.06)	-0.14**	(0.06)
Age			-0.03***	(0.00)	-0.03***	(0.00)	-0.03***	(0.00)
Family type (ref. Single)								
Couple with no children			0.01	(0.12)	-0.01	(0.12)	-0.00	(0.12)
Couple with children			-0.01	(0.11)	-0.03	(0.11)	-0.04	(0.11)
Other			-0.15	(0.15)	-0.16	(0.16)	-0.16	(0.16)
Constant	-1.32***	(0.05)	0.97***	(0.29)	0.82***	(0.31)	0.84***	(0.31)
Intercept variance	0.26***	(0.18)	0.21***	(0.21)	0.21***	(0.22)	0.03	(3.01)
Observations	6,731		6,731		6,452		6,452	
Number of groups	44		44		44		44	
Log Likelihood	-3,474.04		-3,357.13		-3,174.08		-3,157.42	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Although these variables are considered controls, they provide some insights about Movimento voters' profile. First of all, we can see how Movimento's voters have higher probabilities of being low educated: elementary and middle school present higher and significant likelihoods to vote with respect to high school people. The coefficient for people who reached a University degree is negative, significant and large, that is, graduated people tend to have lower likelihood to vote with respect to elementary school people (the difference is around 20 percentage points, keeping constant all other regressors). Model 2 also tells us that women have lower propensities to vote for the Movimento with respect to men. Age coefficient is negative and significant. In other words, keeping constant all other characteristics, the older the respondents are, the more they have lower

propensities to vote for the Movimento. A 20-years-old person has a propensity to vote for Movimento that is 23 percentage points higher compared to a 60-years-old respondent. The type of family in which an individual lives in seems not to predict different propensities to vote for the Movimento.

Model 3 introduces the first theoretical expectation related to the environmental effects. Indeed, levels of homogeneity of the two networks are introduced. Results are consistent with the expectations. If the theory of the diffusion of favorable opinions of the Movimento through weak ties is correct, on average, during the campaign, the homogeneity of friends circles must enhance the probability to vote for the Movimento, while an homogenous familiar networks should be able to exert stronger influence in the opposite side, given that this latter circle tends to be less prone to trust on new, alternative choices. As said, results tend to be consistent with part of the first hypothesis: the coefficient for relatives' homogeneity is negative and significant, that is, as long as the homogeneity within family circle is higher, the individual propensity to vote for the Movimento is lower. On the contrary, friend's homogeneity coefficient is positive, significant and twice bigger with respect to the negative coefficient. The substantive interpretation of the coefficient is equivalent with respect to that of family homogeneity. The more a friend network is homogenous with respect to the respondent – that is, the more respondent is embedded in the circle – the more the propensity to vote for the Movimento will be higher. It is important to underline that adding the two network-related variables in model 3 changes only slightly coefficients related to socio-demographic characteristics. This means, substantively, that the two variables are orthogonal to respondents' individual properties.

Model 4 introduces the interaction between time – that is, the different days in which respondents are embedded – and the homogeneity levels of the different networks[28]. First of all, it is important to underline that, again, socio-demographic variables' significance and magnitude are not undermined by the two interactions. As it is possible to see in Table 5.1, the interaction between family homogeneity and campaign's day is not significant, while the main effect of this latter remain significant and negative. On the other side, the interaction between friends and homogeneity is negative and significant. That means that, as long as the campaign accelerates, the difference of likelihood to declare vote choice for the Movimento between those who have an agreeable network

[28] Several others interactions have been attempted in order to investigate the relation between time and the levels of homogeneity in different networks. Different models with a single interaction per model (that is, a model with an interaction between familiar homogeneity and time and a separate model with an interaction between friends homogeneity and time), as well as three-way interactions models (familiar homogeneity* friends homogeneity*time) have been fitted. No clear difference with the model presented in table 5.1 emerged. Thus, the model that, according to who writes, was the most readable has been chosen for presenting the systematic test.

and those who have a non-agreeable network will be higher, compared to the early days of campaign. Figure 5.3 and 5.4 show the predicted probabilities of the dependent variable, according to Model 4 coefficients[29]. As it is possible to see, the two figures give us additional insights of variables behavior: figure 5.3 shows predicted probabilities for familiar homogeneity during the days of campaign (on the x-axis). As showed in figure 5.3, the only significant difference that can be assessed is the intercept one, already seen in model 3. The rise of the probability to vote for the Movimento just follows the spread of the party in the system, and no interaction between time and circle exposure can be assessed. More interesting is figure 5.4, in which we can see different trends in respondent highly embedded in their friends circle and people who disagree strongly with their circle (what has been called homogeneity): Those who are completely isolated with respect to their network have a smaller probability of voting for the Movimento and, moreover, this propensity does not change as long as the campaign accelerates. On the contrary, people who are exposed and agreeable to non-cohesive discussants, that is that are truly embedded in the social circle, tend to have higher likelihood to vote for the Movimento and, moreover, these propensities tend to be higher as long as the campaign accelerates At the end of the campaign, according to the model, 40% of people who are exposed to homogenous friend circles declare they will vote for the Movimento.

The basic idea that has been stressed in these pages was the relationship between the temporal context, intended as the increasing (or decreasing) prevalence of a certain behavior in the context during time, and network influence mechanisms. If we are witnessing a diffusion process, the prevalence of the option in the context will rise during time. As a result of this increasing proportion, more people, probabilistically, will be exposed to a larger number of Movimento's supporters and will have higher likelihoods to be converted towards the new option, becoming, in this way, part of a chain reaction that enlarges the proportion of people who support the Movimento. Moreover, according to the strength of weak ties argument, the information conveyed through weak ties should spread farther. The regression model presented above show us results that are compatible with the two main ideas: people who are embedded in politically non-hostile friends circles tend to be exposed, as the weak ties theory suggests, to less conservative options. On the contrary, people exposed to non-hostile relative circles tend to be exposed to traditional opinions and behaviors. This because, as stressed above, network structure of familiar circles tend to prevent the broader context political information to pass through its nodes. Families, as stressed above, are more conservative, in the sense that they provide exposure to political options that are to some extent the same during different elections.

[29] As in the previous chapter, predicted probabilities are calculated by not considering the random intercept that has been fitted in order to control for the nesting structure of the data.

Figure 5.3 Predicted probabilities for relatives' homogeneity variable and time (Model 4 estimates).

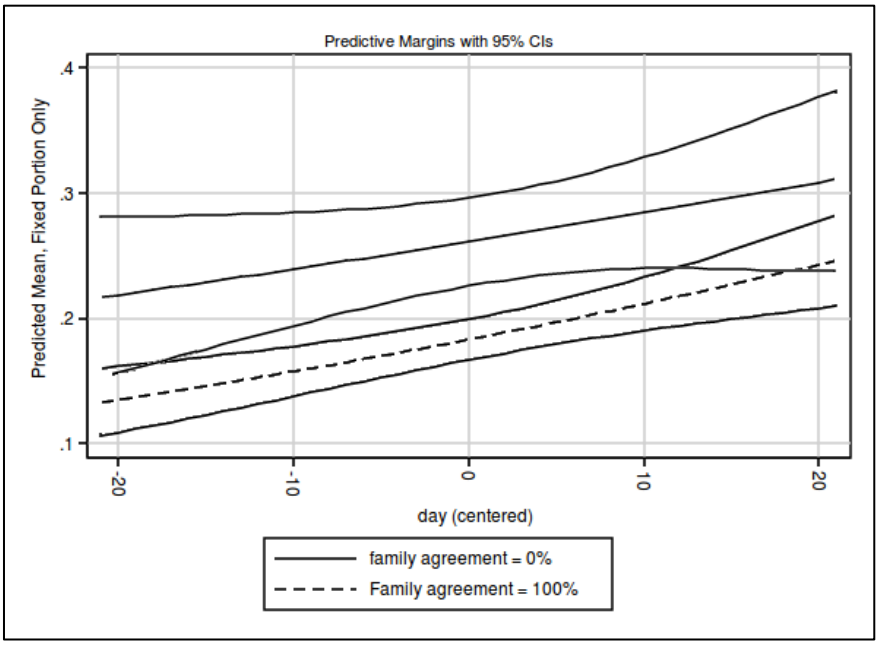
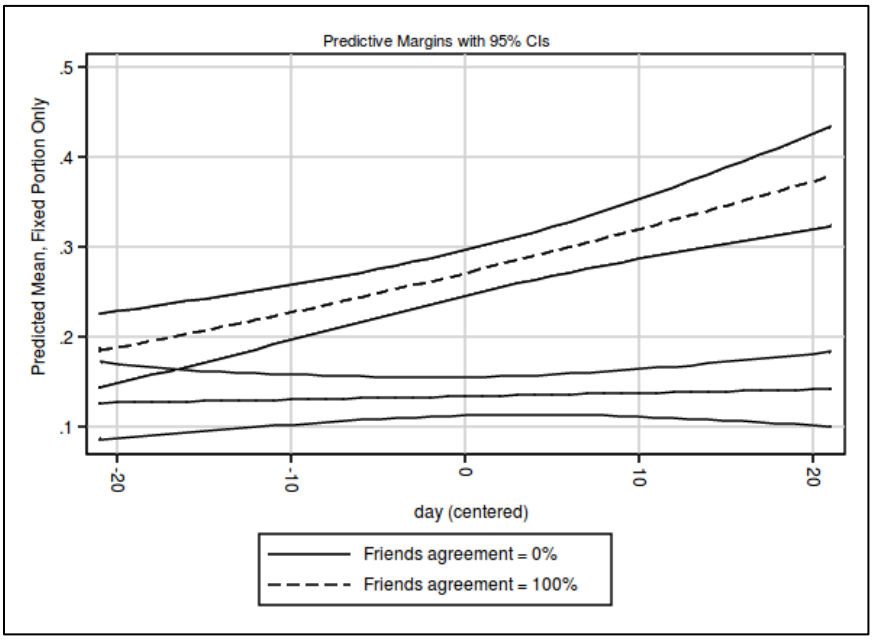


Figure 5.4 Predicted probabilities for friends' homogeneity variable and time (Model 4 estimates).



People who are exposed to homogenous friend circles result to be more prone to be exposed to the deviant vote choice and, thus, to change their choice in favor of this latter. As long as the campaign accelerates, the process of conversion among people who are exposed to friend circles enhances the prevalence of Movimento's supporters, enhances the probability to be exposed to a friend who is

supporter of the Movimento and, thus, enhances the probability of being converted. Once converted, our reference individual is, in turn, part of the environment for another – not yet converted – individual and, moreover, a confirmatory source of political homogeneity for already converted individuals. Theoretically, the process self-reproduces itself, like a chain reaction, as long as Movimento's supporters find discussants who are prone to be converted.

The data employed to test systematically this complex process are insufficient, though. Issues that arise between theory and empirical evidence are essentially three. First of all, the regression models neglect the importance of people individual thresholds (not testing, thus, hypothesis 2 exposed in paragraph 3): models focus only on the probabilistic mechanism that leads to a deviant voting behavior without considering the fact that this probability is also function of individual propensity to evaluate the deviant option as viable. The second problem is related to the Rolling cross-section structure of the data. We do not have at our disposal panel data that cover the entire election campaign but, rather, the rolling cross-section design allows us to have different samples for each campaign day. In this way, it is impossible to assess causal effects that influence transition rates from a moment in the campaign to the subsequent one (see Fowler et al. 2011, Rogowsli Sinclair 2012, Christakis Fowler 2013). This issue forces us to assume that, for instance, a quota of people who are not converted to Movimento 5 Stelle at t_0 actually has been converted at t_1. Even though the assumption is not so unlikely (several works rely on repeated cross-section data in order to test processes in time, see Johnston Hagen Jamieson 2004), the general idea in the literature is that causal effects – or, better, effects that can be defended as causal in social sciences – are better detected with panel data instead than with repeated cross-sectional analyses (Yang Land 2008). The second drawback of the analysis above is the relatively raw measurement of circles homogeneity variable. Measures of political homogeneity with friends or relatives are subjected to two main problems: the first one is represented by the relative generality of the questions and, as a result, the psychological mechanisms that every individual realizes in order to include or exclude a person from one or another circle. This is particularly true with friends circle: if it is straightforward that a person with whom John attended high school, or went on holidays with respective families is a friend, what about a neighbor with whom John maintains a friendly relationship and, sometimes, invites to drink a coffee? Will this person be defined as a friend or as a simple acquaintance? In other words, the term "friend" implies that a more or less large amount of people could be placed in a "grey zone" in between friends and acquaintances. Another drawback of the measure is the precision with which an individual is able to clearly define the percentage of friends or relatives. Citizens can systematically over-represent or under-represent people who agree with them, could be

more or less precise, can have an exact idea of their family circle and no idea of the friends one, and vice versa.

Obviously, no such thing as a daily panel that provides a large amount of cases with questions on a large amount of discussant is at our disposal, and it is difficult to imagine that such a dataset would be available in the future, given the level of social network-related data (see Erisen Erisen 2007). The problem of systematic lack of information in survey data can be partially overtaken by employing the so-called agent-based modeling approach (from now on, ABM, Kohler Gummerman 2001): which is based on computer simulations that, once initialized, allow us to test social mechanisms in simulated (and highly simplified) social systems (Kohler Gummerman 2001, Gilbert Troitzsch 2005). The paragraph that follows will deal with the basic concepts of an ABM in electoral research and will discuss differences between the ABM here exposed and the typical simulation in electoral research. The second paragraph will provide insights on initialization and running procedures of the ABM itself. Finally, results of the model will be presented.

6. Testing the mechanism: an agent-based model of threshold diffusion through weak ties

6.1 ABMs: theory and applications in electoral studies

The main aim of performing an ABM is to understand the individual and relational mechanisms enacted in a certain social process and to assess whether these mechanisms hold, logically and empirically. But what an ABM is? As Macal and North (2010) point out, "[a]n agent-based modeling simulation […] is a relatively new approach to modeling complex systems composed of interacting autonomous agents. Agents have behaviours, often described by simple rules, and interactions with other agents, which in turn influence their behaviours […] By modeling systems from the 'ground up' – agent-by-agent and interaction-by-interaction – [… p]atterns, structures and behaviours emerge [in a way that is] not explicitly programmed into the models, but arise through the agent interactions ".

The definition provided by Macal and North is satisfying, although quite condensed, because, besides the particular phenomenon an ABM deals with, it shows the advantage of ABMs as a tool of analysis with respect to, say, regressions or ordinary statistical models. The main theoretical focus about the ABMs is related to the fact that, having constructed a set of behavioral rules and relationships among agents, the aggregated result of the simulation is not straightforward, but, rather, aggregate and relational patterns emerge from the interaction of these simply-ruled agents.

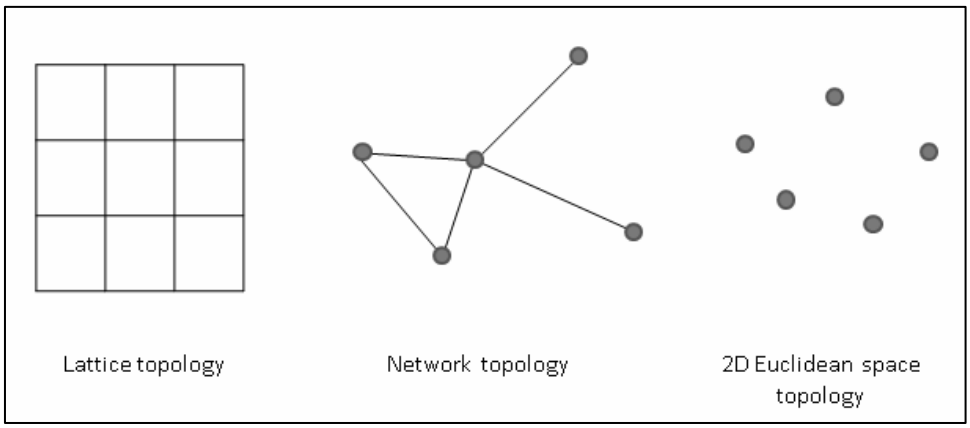
The whole story of ABM, from Schelling segregation model (Schelling 1971, Clark 1991) to Axelrod model of political opinions and disagreement (Axelrod 1997, Huckfeldt Johnson Sprague 2004, Zuckerman 2005) is based on the argument that simple and plausible individual behavior can lead to counterintuitive, complex aggregate patterns.

Macal and North's definition, moreover, stresses the basic characteristics of an ABM, which can be exemplified by the concepts of "agent" and "relationship". According to the literature, the fundamental object in an ABM is the *agent*. An agent can be intended as an object that owns several characteristics: first of all, it is self-contained (Jennings 2000, Macal North 2010), that is, agent is distinguished by other agents by some sort of "boundary" and, thus, makes it clearly possible to distinguish characteristics the agent possesses, characteristics possessed by other agents and shared characteristics, that is, properties that pertain to the relation itself (the strength of a tie is a good example of a shared characteristic). Secondly, the agent presents behavioral rules (Jennings 2000; Macal North 2010, Gilbert Troitzsch 2005), usually a more or less simple set of "if-else" connections, which guides agents' actions. Agents possess also states that can change over time, usually by means of relations among agents. Obviously, the status change is due to the joint effect of relation between agents and behavioral rules. Finally, the agent is social, that is, is related to other agents with which usually share the same behavioral rules but not the same characteristics (states). As pointed out by several works (Macal North 2010, Gilbert Troitzsch 2005) structuring agents and their relations is equally important in order to perform a good simulation. Agents typically interact with other agents, called neighbors (and, in some cases with other non-agent objects, the "environments").

Simulated social mechanisms are different relatively to the type of relations that agents are embedded in. The nature of relations among agents is usually called "topology" (Macal North 2010): a topology can be in form of network, lattice, like in cellular automata models (Gilbert Troitzsch 2005), GIS maps or 2D/3D Euclidean space (see figure 5.5). It is important to underline that different topologies lead to different representations of the real underlining processes and, thus, to different assumption the simulation is based on. Assuming a topology that is, say, lattice-based means assuming that, for instance, neighbors of a certain agent are the sole which can influence the agent itself and are equivalent from different "structural" sides. Defining a network topology, rather, can give the researcher more freedom of choice about characteristics of the structure of the relationships. Agents, by means of network topologies, are linked to other agents, sharing a higher or lower number of other agents, thing that is not possible with a lattice structure. From the other side, many other real phenomena could need only random relationships between agents. A 2/3D space in which agents are free to move (randomly or not) is the perfect environment to which these

cases apply on – for such an example, see the predator-prey ecosystem models (Gaylord Nishidate 1996). From a more technical point of view, an ABM is composed of two fundamental steps. The first one is usually called "initialization": by means of this step, agents are created, characteristics and behavioral rules are implemented into them and every adjustment is made in order to set up the environment. During the "running" phase, the simulation is actually started, agents can communicate among them and results are collected (Gilbert Troitzsch 2005).

Figure 5.5 Different types of topologies



Having introduced what an ABM is, it is now necessary to introduce a number of characteristics of our ABM that differ with respect to other simulations in political science and, in particular, in political and electoral behavior studies. First of all, the ambition of the ABM that will be presented below is the attention to internal and, in particular, external validity of the simulation. Laurent (2000) defines validity in a simulation as a generally good correspondence between the simulated system and the real one. As Liu (2011) points out, simulations can respect two different validity criteria. The first is the so-called internal validity that can be also defined as "analytical adequacy": an internally valid model must correctly predict the main tenets of the theory on which is based (Liu 2011, McKelvey 2002). A model that is internally valid represents a sort of assurance that the emergence due to the relations among agents is, at least, consistent with previous theoretical thinking. External validity, on the contrary, represents a criterion that must be developed and tested with data coming from the real world. If the former type of validity is not related to real data at all, and validity is just assessed in order to prevent illogical emergence processes, external validity requests are more demanding: the data coming from the real world must be adequately represented in the simulation. That means that, firstly, the simulation must be initialized with real data (in other words, starting values must be extracted from real data); secondly, an additional number of tests

must be performed in order to assess the level of coherence between real data and the simulation (Liu 2011).

The difference between simulations satisfying internal and external validity is based upon a tradeoff: if the former type of models aim "is to enrich our understanding of fundamental processes that may appear in a variety of applications" (Axelrod 1997), a simulation that aims at being externally valid must provide, as said, a larger amount of real world-based evidence, but is also forced to provide information on a single case study (Liu 2011).

Generally, electoral studies aiming to test their mechanisms with simulations (and, in particular with ABMs) have proven not to care much about the adherence of their model with real data (Axelrod 1997, Huckfeldt Johnson Sprague 2004). Simulations in electoral studies tend to be more focused on providing logical evidence about one or more theory tenets on which the simulation is based, rather than a strictly empirical test of the mechanism. Given that the chapter focuses on a single phenomenon and a single case study, besides testing the set of mechanisms presented above, external validity test will be performed and, moreover, the simulation itself will be initialized on real data provided with the ITANES RCS.

According to research methodology dealing with ABMs, the most straightforward way to performing external validity procedure is the so-called Indirect Calibration approach (IC, Mehta Bhattacharyya 2006, Liu 2011). The IC approach is based on four stages (Liu 2011). The first stage is based on representing "a set of stylized facts [the researcher] is interested in" (Liu 2011); the second stage is to build an ABM in a way that keeps the rules as similar as possible with respect to the stylized fact. The third stage concerns the initial values of the simulation, which must be as close as possible with respect to the real data. The last stage is to seek for simulation evidences that contradict, or that are different, from the theorized stylized fact. The IC procedure has one main advantage with respect to the competitors (Liu 2011): IC is a substantially theory-driven procedure and is sufficiently general not to demand huge levels of availability of sophisticated datasets and coherence between simulation and real data.

Another difference between usual simulation research in electoral studies and our ABM resides in the topological structure that constrains agents. Usually, political behavior research employing simulations relies on a simple lattice-based topological structure (Axelrod 1997, Zuckerman 2005, Huckfeldt Johnson Sprague 2004). By mean of this topology, position in the simplified social system of an agent is represented by a square in the lattice and its neighbors are contiguous squares that surround it (see figure 5.5). This kind of topology seems not to fit with our aims. The idea of a diffusion process enacted by means of weak ties naturally demands a more complex set of relationships between agents: for instance, a single agent must represent a strong tie for another

agent and, at the same time, a weak tie for a third agent. The lattice topology cannot provide this complication of relationships that is crucial in modeling diffusion processes. For this reason, a network topology will be employed in the ABM that follows.

Moreover, the distribution of weak and strong ties, as well as the differences in agreement with the strong and weak ties, must be based on real data. For this purpose, the aforementioned variables concerning group homogeneity (Baldassarri 2009) will be employed to provide a real data foundation of the ABM. As we will see below, attempting to establish on real data a set of constraints that, instead of being exclusively individual, are also relational, arise a series of methodological and computational issue that will be considered in detail in Appendix 2. For now, the reader must be aware of the fact that calibrating a simulation on only-individual data is quite easy (Liu 2011). A simplified situation will explain better the idea. Assume that we want to base on real data a simulated population placed in a lattice topology. Variables of interest are x and y and have, as possible statuses, 1 and 0. To do so, we construct a joint probability distribution extracted by real data available. Every agent, then, is assigned to one of the four categories (x=0,y=0; x=0,y=1; x=1,y=0; x=1,y=1), according to the distribution of the real data. Thus, if the combination x=0, y=0 is present in 30% of the real cases, a random agent in the simulation will be constructed to have .30 likelihood of having x=0 and y=0 statuses.

Things are more complicated when we want to calibrate one or more distributions on real relational data. In this case, the individual characteristics presented by an agent are function of the characteristics of the other agents. To make a clear example, an agent (say, $agent_1$) that has a data-driven assigned propensity of being in agreement with 50% of the strong ties and 75% of the weak ties must have a network of people who present vote choices that are (around) 50% for the strong ties and (around) 75% for the weak ties. Other agents, however, that represent *alters* in the ego network of $agent_1$, are *egos* in their own ego-network and have a certain data-driven probability of being in agreement with a certain percentage of strong and weak ties. The solution advanced in this work will be something that we can call, borrowing a jargon employed in computer science (Morton Mareels 2000, Spiriti 2008), a “brute force random search approach”. In the next subparagraph, the real-data variables, a concise description of initialization procedure and behavioral rules employed in the simulation will be deepened.

6.2 Initializing and running the ABM

As showed above, the diffusion by weak ties hypothesized here is composed of several sub-processes, identifiable as follows:

1) People who are exposed to weak ties are more exposed to broader context opinions and behavior, given that information transmitted by means of weak ties can spread farther (Granovetter 1973). These various opinions lead, probabilistically, to be exposed to deviant opinion/behaviors, such as Movimento 5 Stelle.
2) Exposure to Movimento's supporter could eventually lead to conversion of people who are not yet convinced to vote for it.
3) The likelihood of conversions is also function of individual thresholds (Granovetter 1978), that is, the propensity that the individual will be converted is based upon a sort of exogenous propensity to consider the party a viable option.
4) Once converted, the individual serves as environment for someone else, and can be part of his/her environment during the process of conversion.
5) If the process is a diffusion one, points 1-4 become a cycle of a chain reaction that involves a growing number of people.

Firstly, two main individual characteristics related to every agent must be operationalized in the simulation. The first one is a binary measure, that is, the adoption/non-adoption variable that can be easily extracted from the data by employing the vote intention variable of the Movimento 5 Stelle vis-à-vis every other choice. The second is the individual threshold that, in the simulation, will be measured with the propensity to vote (see chapter 4). The propensity to vote for a party (in this case, for the Movimento 5 Stelle), represents the individual, exogenous measure that is nearer to the idea of an individual characteristic that adjusts the propensity of being converted to the innovation. In Granovetter's theory, actually, threshold is not seen only as an individual characteristic, but, rather, can be also interpreted in a relational way: as stressed above, the threshold can be represented by the rate of discussant an individual should be exposed to in order to change his/her opinion. At the same time the source of this relational outcome is individual: recalling the riot example, conservatives need a higher proportion of riot participants in their ego-network *because* they are conservatives, that is, exogenously skeptical towards riots.
As pointed out before, the simulation is based on a network topographic structure. Agents are nodes linked in a stable way for the whole duration of the simulation. The main need of the simulation is the capacity to differentiate between strong and weak ties. As Granovetter says, two nodes form a strong tie when they share a high number of other ties (Granovetter 1973). According with the idea of the "forbidden triad" (Granovetter 1973, Granovetter 1983), the situation in which A has a strong relation with B, B has a strong relation with C, and A and C do not know each other is highly unlikely. Thus, in order to assess if two nodes share a strong or a weak tie, the Jaccard similarity

index will be provided (Jaccard 1912). Jaccard similarity, translated into network analysis, is a measure that tells us in percentage how many other nodes two agents share (Adamic Adar 2003). If Jaccard similarity between an agent *A* and *B* is equal to 1, that means that *A* and *B* share all their discussants. If it is 0, it means that *A* and *B*, besides being connected, do not share any other node in common.

We have stated above that the topology employed will be a network-based one. Several random networks, however, can be used, and different networks possess different "natural" characteristics. The choice of the network was aimed at having an adequate level of clustering: in other words, agents must be in relation both with agents they share a lot of nodes (that will be employed as strong ties) and few nodes (weak ties). Among the different type of random networks one may chose, a Watts-Strogatz (WS) random network was employed (Watts Strogatz 1998). The procedure of constructing a WS network follows two steps. The first step is constructing a simple random network (Erdős Rényi 1959), and the second step is changing randomly a certain proportion of ties – decided by the researcher – that construct the network itself. It has been demonstrated that, compared to other networks, the WS produces higher level of clustering with respect to basic random network (Watts Strogatz 1998).

Table 5.2 Real data of the ABM four main variables. Correlation matrix (n=993)

	Friend Agr.	Family Agr	M5s Ptv	Vote M5s
Friend Agr.	1,00			
Sign.	-			
Family Agr	0,50	1,00		
Sign.	0,00	-		
M5s Ptv	0,03	-0,03	1,00	
Sign.	0,28	0,28	-	
Vote M5s	0,01	-0,06	0,67	1,00
Sign.	0,75	0,04	0,00	-

In order to perform the ABM, and given the aim of performing an externally valid simulation, the initialization procedure of the individual and relational variables will follow real data distributions extracted from the first seven days of 2013 ITANES RCS. It has been decided to choose the first week of data collection because this is the time interval in which the level of the Movimento is relatively stable and the party's share of votes has not been reported yet in the data (see Figure 5.1).

Table 5.3 Real data of the ABM four main variables. Bivariate tables (n=993)

		Family agreement							
		0%	10%	25%	50%	75%	90%	100%	Tot
Friend Agreement	0%	0.5	0	0.1	0	0.1	0.1	0	0.8
	10%	0.2	0.4	2.0	0.8	0.5	0.2	0	4.1
	25%	0.1	1.6	5.7	6.2	3.4	1.4	0.4	18.9
	50%	0	0.4	3.2	9.7	11.7	3.8	2.3	31,1
	75%	0.2	0.4	1.5	5.1	9.6	7.4	2.3	26.5
	90%	0.1	0.1	0.6	1.5	3.3	7.0	2.7	15,3
	100%	0	0	0.1	0.1	0.5	0.5	2.0	3.2
	Tot	1.1	2.9	13.3	23.5	29.1	20.3	9.8	100

Ptv	M5s vote=No	M5s vote=Yes	Total
0	43.8	0.1	43.9
1	6.9	0.1	7.0
2	4.5	0.0	4.5
3	3.6	0.2	3.8
4	4.6	0.5	5.1
5	7.6	1.0	8.6
6	4.6	1.6	6.2
7	4.3	2.0	6.3
8	1.8	2.3	4.1
9	1.1	1.3	2.4
10	0.2	7.8	8.0
Total	83.1	16.9	100.0

The variables that are extracted from the real data and that will account for our theoretical expectations are, basically, four. The aforementioned homogeneity of the relatives' and friends' networks (that will account for the exposure and homogeneity of strong and weak ties networks), the vote choice (that will account for the adoption of the innovation) and the propensity to vote for the Movimento 5 Stelle itself (that will represent the individual threshold). As stressed in the previous chapter, the ptv represents the propensity to vote for the party in the future, independently from which party the respondent will vote for in the imminent election. As it is possible to see in table 5.2, vote choice and ptv correlate positively. This is consistent with the literature (van der Eijk et al. 2006) which states that people who have higher ptv's for a party tend to have higher propensities to declare to vote for the same party. People who have higher levels of agreement with friends have also higher agreement with relatives (as we can see in table 5.2, the correlation is positive and significant). No other correlation results significant from the table. In other words, translating statistical ideas into substantive arguments, a certain ptv concerning the Movimento associated with an individual will lead the same individual to have a certain probability to declare to vote Movimento, but not lead automatically to a certain propensity to be in agreement with friends

or relative. Vice versa, a certain percentage of friends in agreement leads to a certain distribution of being in agreement with relatives, but does not tell us anything about Movimento ptv or vote choice. Table 5.3 shows bivariate results of friends' and familiars' networks homogeneity (top panel, cell relative frequencies) and ptv vote choice (bottom panel, cell frequencies) for the first seven days of data collection. As expected from the correlation matrix in table 5.2, people who have higher levels of agreement with friends' circles have also high levels of agreement with relatives' circles. It is important to underline that the diagonal and cells nearby cases being in strong agreement with both the circles is over-represented with respect to the rest of the table. At the same time, having a certain vote choice leads to a certain ptv distribution, in which people who declare to vote for the Movimento are over-represented in the right tail of the distribution and vice versa.

Initializing the simulation in order to keep it externally valid needs that, on the aggregate level, these two tables can be reproduced in the multi-agent model. As pointed out above, the joint distributions of individual characteristics are relatively easy to implement in a computer simulation. The less straightforward part is the implementation of these individual traits, keeping under control relational characteristics (such as the level of homogeneity in different groups). The details of the aforementioned random search procedure that has been applied to the ABM before running it will be explained in detail in Appendix 2[30]. The random search approach, generally speaking, is a stochastic procedure that tests whether several network structures, with randomly assigned values for each node, satisfy the two cross-tabulations that are present in table 5.3 (the family/friends agreement and the Ptv/vote choice one). If the network does not satisfy, on aggregate, these two conditions, another random network is generated, until the routine converges, that is, until the generated network is not statistically different from the real-data one. Parameters for the simulation initialization are briefly summarized in Table 5.4. As it is possible to see, not all the parameters are data-driven. In order to run the data-driven simulation, we have to adapt these data to the ABM, assuming, thus, a certain number of parameters: consider, for instance, the first cross-tabulation in Table 5.3. The random search subroutine, as it will be deepened in Appendix 2, after having produced a network of individually-consistent agents (according to the second cross-tabulation of table 5.3), compares a data-driven table with a simulated table. The real-data table presents the percentage of agreement with friends and relatives: in order to run the simulation, thus, we need to define how do we implement the concepts of "friends and relatives" and "agreement". Consistently with Granovetter's theory, it has been chosen to define "friends" as nodes with which agents have a low Jaccard similarity index (lower than .5) and relative nodes those who share a high Jaccard index

[30] The commented source code of the simulation, written in R, is presented in Appendix 3.

(higher than .5). Agreement about politics, instead of the plain vote choice, has been implemented by means of the propensity to vote for the Movimento 5 Stelle.

Table 5.4 Simulation parameters

Parameters description

Parameter desc.	**Value**
Network characteristics	
Number of nodes	1000
Number of neighbors (on average)	20
Probability to change tie (WS model)	0,1
Relational characteristics	
Jaccard Similarity for Friend	J <= .5
Jaccard Similarity for Relative	J > .5
Ptv difference for agreement (+-)	3 points
0%	[0 – 0.05)
10%	[0.05 – 0.15)
25%	[0.15 – 0.375)
50%	[0.375 – 0.625)
75%	[0.625 – 0.85)
90%	[0.85 – 0.95)
100%	[0.95 – 1]
Friends agreement	Data-driven
Family agreement	Data-driven
Individual characteristics	
Ptv	Data-driven
Vote choice	Data-driven

Agents who have 3 or less point differences in propensity to vote for the Movimento are coded as agreeable people. Vice versa, agents who differ from more than 3 points of ptv are assumed in disagreement.

Once defined these initial values, we have, for every agent, a crude percentage of "friends" and "relatives" whom this agent is in agreement with. However, the real-data table provides, instead of effective percentages, an "ordinalized" coding of those percentages: in other words, respondents are not asked of reporting the real share of people whom they agree with. Respondents, indeed, could only choose among a set of percentages (0, 10, 25, 50, 75, 90, and 100%). In the simulated network, agents can agree with, for instance, 20% of their friends, or with the 80% of their relatives. This problem has been faced by ordinalizing simulated percentages according to the coding rules exposed in Table 5.4. For instance, an agent who is in agreement with 40% of its "friends" will be

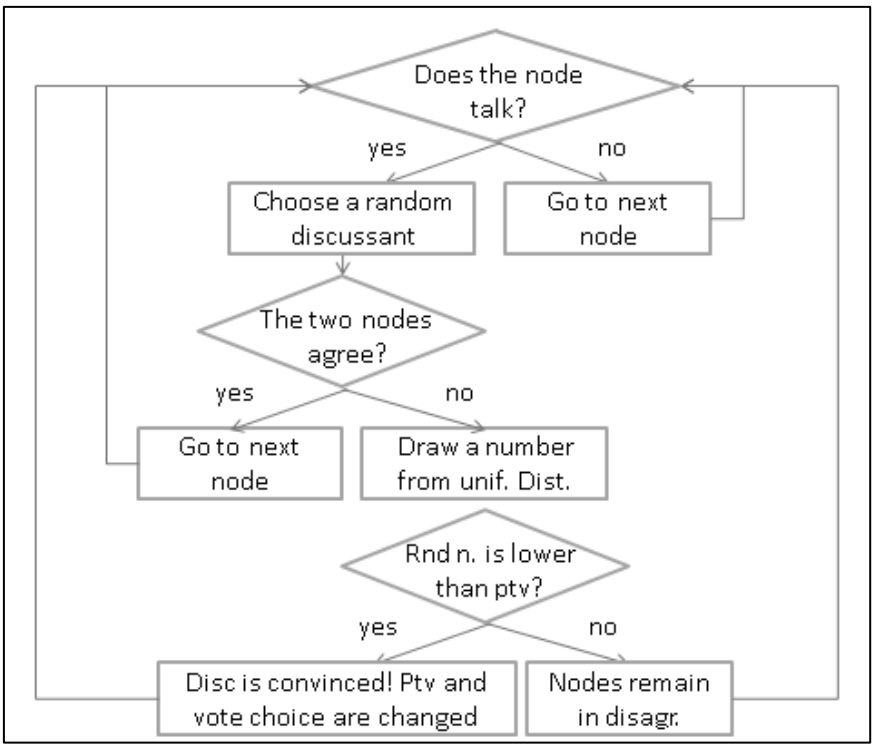
placed, in the table that will be compared to the real data, in the "50%" category. It is useful to remember that these parameters are useful only in order to provide a network which can be defended as compatible with the real data. Once the simulation runs, these parameters are no longer useful, given that actual data of the simulation will be employed[31].

Once the initialization process converges, how are agents' actions modeled? A flow chart of the individual process is graphically depicted in figure 5.6. At the beginning of the simulation, a generic propensity to talk about politics, extracted from the data (and not substantively correlated with the other variables) is assigned to every node. It is now possible to start the simulation. Firstly, the algorithm, starting from the first node in a dataset constructed on purpose, assesses if this reference node is available to "discuss" (higher is the propensity to talk of the node, higher would be the probability for the node to start seeking a discussant). If the reference node is available, it seeks for a "discussant node", extracting it among its neighbors, that is, the nodes which the reference node is connected to. If the two nodes are in agreement (that is, if they have the same voting behavior towards the Movimento), the iteration switch to another reference node and nothing happens. If the two nodes disagree, the "convincing attempt" subroutine starts. Imagine that reference node, say, Node A, has a vote choice equal to 1, while the discussant node, say Node B, has a vote choice equal to 0 and a Ptv variable equal to 6. The software draws from a uniform distribution (with 0-10 range) a random number. If the number is lower than the discussant ptv (say, the random number drawn is 4.5) this latter discussant is "convinced". Its vote choice variable becomes 1 and its ptv is drawn from the distribution of ptv of those who voted for the Movimento 5 Stelle. Of course, no changes are made on the network this "discussant node" has (the network is assumed stable during the campaign) The procedure starts again for all the nodes in the sample and repeat itself for 41 "days" (the number of days of campaign if we erase the first week that was used to initialize the simulation). It is important to underline three main characteristics of this procedure: firstly, it is applied also when the convincing node is not a supporter of Movimento 5 Stelle. In general, thus, this is consistent with the fact that people can be convinced also not to vote for the Movimento during the campaign. The diffusion process, as we will see below, is just a process in which people convinced towards the Movimento are more than those who are convinced "against" the Movimento. Secondly, the simulation assumes that the propensity to vote, a data-driven individual characteristic, can be employed as a measure of the threshold. In this way, by means of propensity to vote, it is possible to measure the exogenous, individual propensity to be affected by others

[31] Several sensitivity tests about network and relational characteristics – available upon request – have been added in order to test whether the choice of these parameters changes outcomes. Among combinations of parameters that allowed the initialization process to converge, no relevant differences emerged during these tests.

during the simulation. Thirdly, the procedure of construction of an ABM forces the researcher to explicit the mechanism of influence in a more systematic way. According to Granovetter, the threshold of a person, combined with the exposure to deviant opinion holders, determines almost automatically the conversion of a node. The simulation presented here does not assume this automatic switch. The node remains coherent with its opinion until it does not find a discussant that, trying to convince it, make the software drawing a number that is lower than the node's ptv.

Figure 5.6 The flow chart of the conversion process



Thus, the probability of being converted by the node is based on the equation presented below.

$$p(conv\_ego_t) = f(thresh\_ego_t, conv\_nei_t)$$

(- , +)

That is, the propensity to be converted in time t is (a not necessary linear) negative function of ego threshold and positive function of the number of converted that surround ego (*conv_nei*). If we assume that the spread of the innovation goes farther during the diffusion process, the propensity of having converted nodes among neighbors will be based on this equation:

$$conv\_nei_t = f(weakties\_nei_t)$$

(+)

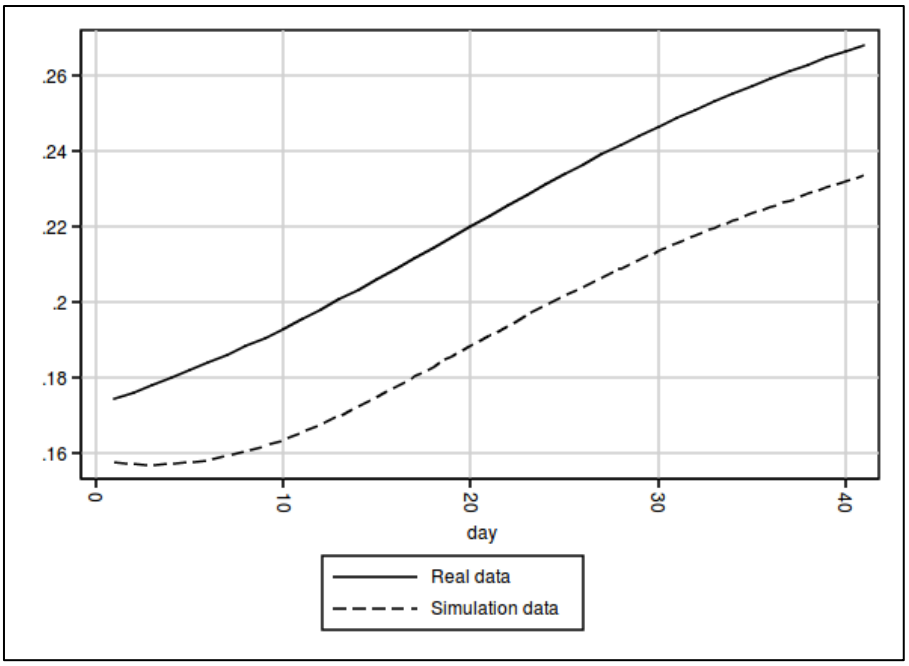
Testing these two equations with the simulated data and making a test of external validity will be main topic of the subsequent subsection.

6.3 ABM's Results

As pointed out before, the ABM initialization has been performed using the first week of the RCS data. However, data for the rest of the campaign is available (we have used this data for the multilevel regression models in the previous section). This availability of information that is subsequent to the data employed in calibrating the ABM can be used as a test of the ABM external validity. If the mechanism that we have hypothesized holds, the aggregate patterns of Movimento 5 Stelle rise in the simulated social system should be, if not equal, at least similar to the real outcomes. In Figure 5.7 are presented two curves, both showing the proportion of Movimento's voters in the system: the solid one is a lowess interpolation of the trend of the real RCS data (bandwidth=0.8) during the remaining days of election campaign (41 days, from January 13 to February 23). The dashed line, rather, is a connected line that represents, for every day of campaign, the proportion of Movimento's voters in the simulated system (the line represents an average of 25 simulated campaigns). The correlation between the two lines is .96. As is it possible to see in the figure the trends show small differences. The first difference is that related to the "intercept". Simulated data tend to present, in general, lower levels of support for the Movimento. Moreover, there is a small difference in the slope, that is, simulated data presents slightly smaller rise than the real one. Anyways, the simulated data, given also the high correlation between the two, seems to fit quite well the real trend and this is truer if we think about the fact that real data and the simulated trend are based on different data. In other words, the two lines are, from a merely technical point of view, unrelated. The data extracted from our simulation, indeed, are extracted by means of behavioral and relational rules and selected variables which have been hypothesized to exert an effect on the diffusion process itself. If the rules would have been senseless, probably, our outcome could have been a trendless fluctuation of our aggregate results and a substantially flat line of reproduced data. Figure 5.7, conversely, shows us that aggregate simulated data present a surprising similarity with real data: this gives us strong evidence that the simulation reproduces in quite a convincing way the process we are investigating. Having assessed the goodness-of-fit of the simulation compared to the real data, it is necessary to provide evidences for the mechanisms hypothesized in the work. Firstly, we test whether the simulated data can comfort us about the

individual mechanism we hypothesized, that is, the fact that the process is actually a threshold-like one.

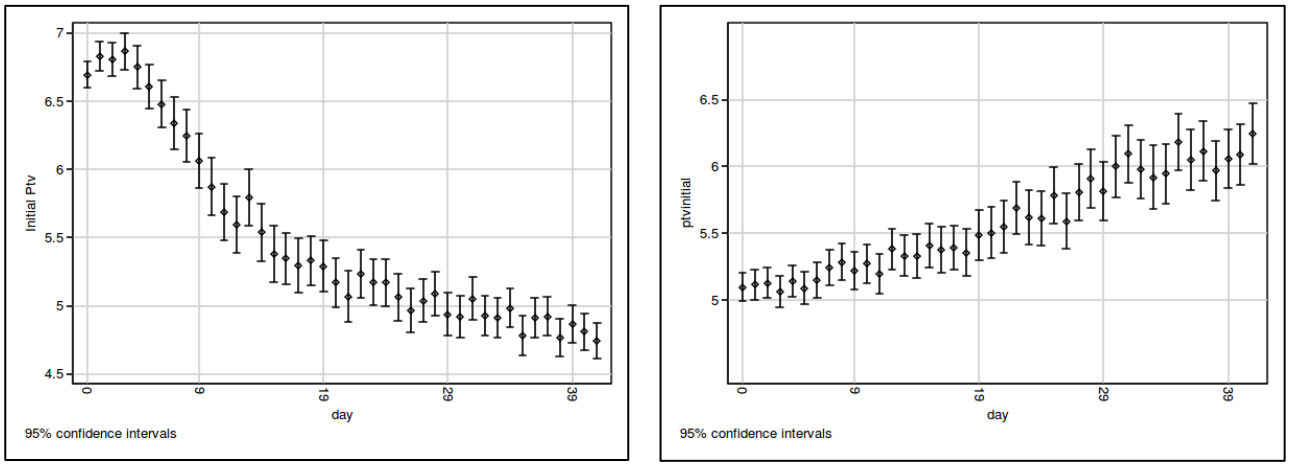
Figure 5.7 Aggregate results: simulation and real data



In figure 5.8 it is possible see the average values of initial ptv's of converted towards the Movimento and against it. The ptv, here, can be seen as the complement of the individual threshold. If ego has a high propensity to vote for a certain party, it would have a low threshold, that is, higher propensities of being converted if it is not. Vice versa, if the ptv is low, that means that it is more difficult to convert ego, and, thus, the threshold is high. Every day, thus, it is calculated the average individual ptv – at the beginning of the simulation – of those nodes that have been converted towards the Movimento and against it. In the left panel are plotted the averages of the converted towards the Movimento and 95% confidence interval. As it is possible to see, the propensity to vote of the converted, at the beginning of the simulated campaign, is higher, that is, the first nodes to be converted are those that are "easier" to be converted. As long as the campaign accelerates, however, the average ptv of converted lower. At the end of the campaign, on average, nodes that have a 50-50 propensity to vote the Movimento are converted. The situation of the right panel is the opposite: at the beginning, nodes that believed to vote Movimento but had a ptv which was not too high were easily converted not to vote for the Movimento (the average of the ptv is around 5). At the end of the campaign, the level of those who have been converted against Movimento is higher but, the confidence interval is bigger (indirect evidence of a smaller number of conversions against the

party). Plots in figure 5.8 show us many evidence of the fact that of our hypotheses hold. The idea that people who are more prone to vote for the deviant innovation are the first to be converted is straightforward. Moreover, the evidence suggesting that people who are converted at the end of the campaign were, at the beginning of it, less prone to vote the Movimento (as pointed out above, the average ptv is 5 for those nodes) is pretty consistent with the idea of a threshold model of diffusion. People who are less prone to vote for the Movimento are more refractory to conversion but, as long as the proportion of Movimento supporters becomes higher, these are subjected to a higher number of influence attempts and, probabilistically, some of these more refractory people could fall and "being converted".

Figure 5.8 Average initial ptv's of converted toward M5S (left panel) and against it (right panel) by day



Converted nodes, however, are part of the network for those nodes that are not yet converted. That mechanism is the core of the chain reaction presented above only in theory. Moreover, it is important to stress how a small resistance effects are present in the system. Nodes who do not vote for the Movimento and have, by construction, lower propensities to vote for the Movimento itself, tend to convince others to vote for other parties but, on aggregate, given the disproportion of forces and the distribution of ptv and vote choices, their "efforts" are too weak to lead to a counter-trend that could, theoretically, lead to a stagnation (or even a fall) of the diffusion process.

Summarizing, it is important to stress again how this ABM shows a mechanism related to the threshold model that usually is underdeveloped: in this ABM there is no automatic routine that, given a certain threshold and a certain number of converted neighbors, leads to an immediate conversion. The idea behind the ABM mechanism is that being surrounded by a certain number of converted neighbors leads an individual to be exposed to more inputs that push the same to be

converted. Instead of being an automatic process, the process is probabilistic[32]. Moreover, the simulation shows us another original element, usually underdeveloped in the literature: a diffusion process is not a plain and simple rise of the proportion of an innovation during time. As pointed out by Blossfeld and Nazio (2003), there are forces that try to challenge this process, in this case, convincing their discussants to change their option and to return, to some extent, to traditional choices. A diffusion process, according to the results that emerge from the simulation is, in part, a victorious struggle against these "conservative" forces, instead of a simple rise of a proportion in a social system.

Table 5.5 Number of "Friends" and mean of "Friends" conversions towards and against the Movimento

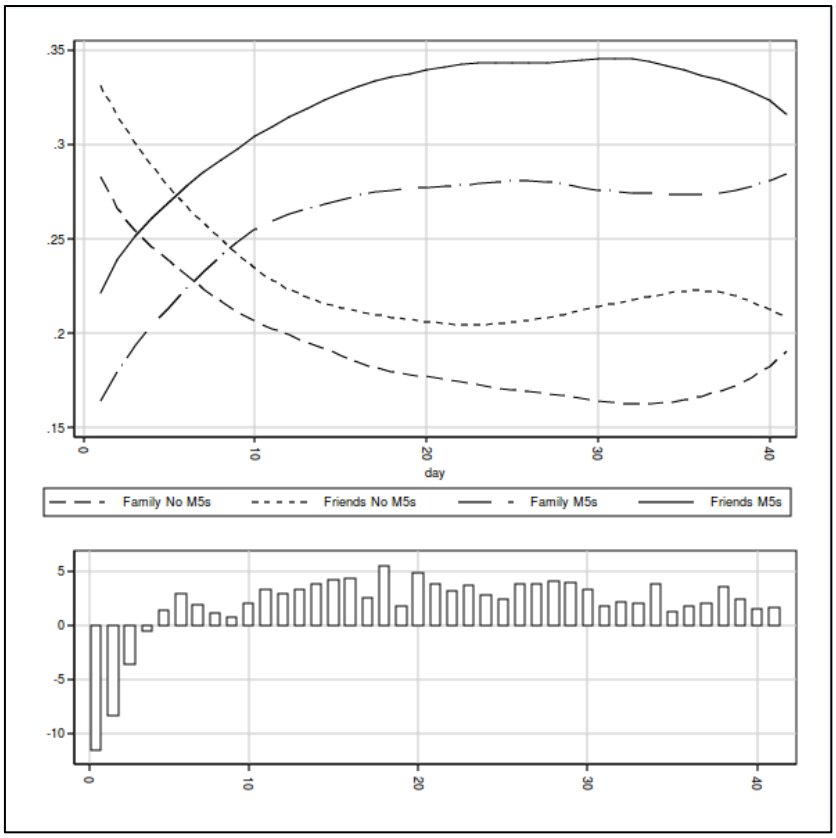
Conversions to M5s			Conversions to Other parties		
Number of friends	Mean of Friends-led conversions	N	Number of friends	Mean of Friends-led conversions	N
8	0,67	0.4	8	0,50	0.2
9	0,35	1.7	9	0,50	1
10	0,52	162.0	10	0,51	128.0
11	0,54	125.0	11	0,54	99.8
12	0,58	71.1	12	0,58	58.6
13	0,66	22.1	13	0,62	15.6
14	0,72	7.8	14	0,66	5.8
15	0,75	1.4	15	0,69	1.2
Total	0,55	391.5	Total	0,54	310.2

The second idea expressed in the equations in the previous subparagraph was related to the fact that people are more easily converted where there is a weak tie around respect than when the node is surrounded by strong ties. In table 5.5 is presented an evidence of this hypothesis. The first column presents the number of friends (namely, nodes that share a Jaccard similarity index <= .5) a node can have, the second presents the proportion of conversion "provoked" by friends, the third the average number of conversions for the 41-days simulations during the 25 simulated campaigns. As it is possible to see, as long as the number of friends rises, the proportion of conversions caused by friends rises too, and the same does the raw number of conversions. The number of friends, given

[32] One may argue that the simulation neglects some kind of memory effect. A person exposed to many inputs of the same nature could have memory of these repeated pressures and change more rapidly in a real settlement respect than in the simulated one. This is an interesting complication of the original model that has not been deepened, given that it would have been too computationally demanding.

the structure of the circle, contributes also to convert people to other parties (columns 4-6 of table 5.5), but in a weaker way with respect to the conversion towards the Movimento.

Figure 5.9 Source, direction and number of conversions in the ABM



This is a strong evidence that friends are the main channel by which the new information is transmitted and, at the end of the process, more people are converted. Additional evidence is showed by figure 5.9: the top panel shows trends for conversions towards the Movimento caused by friends, conversions against the Movimento caused by friends, towards the Movimento caused by relatives and against the Movimento caused by relatives. Every conversion type is divided on the total of conversions per day and the lines are represented by a lowess interpolation (bandwidth 0.8). An element of interest is that friends' conversions (towards and against the Movimento) are the majority of all conversions, while family conversions are systematically lower[33]. It seems that, moreover, the difference between these two types of influence decreases at the end of the campaign.

[33] It is important to stress that "friends" are also a tool of political change also towards other, non innovative, parties. This could be intended as a disconfirm of our theory. However, it is important to stress that, according to our theoretical model, weak ties are the realm of debatable opinion, and the diffusion process of the Movimento can be seen as a simple by-product of this "structural" characteristic of these relations. From the other side, family is the social space in which stability is the normal situation and, thus, as expected, is less important in converting our agents, towards and against the Movimento.

This could be related to the fact that the diffusion's "fuel" (that is, people with relatively high ptv's who are not yet converted) is running out, and then the basic mechanism that we hypothesized, the diffusion through weak ties, is weaker. The relative difference between friends- and familiar-driven conversions is showed in the lower panel of figure 5.9 gives, more or less, the same insights about the simulation. The figures in the graph are calculated by subtracting the number of conversion caused by friends minus those caused by familiars. Positive figures represent, thus, that friends tend to convert more than familiars and vice versa. As it is possible to see, after the first 4 days, the advantage of friends in making nodes "changing their mind" is strongest in the middle of the campaign and tends to slightly decrease at the end of it (compatibly with the hypothesis that agents prone to be converted are fewer).

7. Discussion

The fundamental argument which this chapter started from was related to theoretical expectations deepened in chapter 3. In that occasion, three main ideas have been sustained. The first is based on the relationship between context and networks: it has been stressed that contexts provide the structure of opportunities in which one can be exposed to networks that present certain characteristics. Secondly, it has been stressed that, instead of being only geographical (as in many studies concerning electoral behavior), the conceptualization of context can be also *temporal*. Time, thus, can represent, as well as space, the frame in which different networks characteristics are shaped. Thirdly, it has been stressed that individual exposure to different networks – which possess different levels of cohesiveness – leads to predictable and non-trivial outcomes.

In order to investigate the relation between individuals, their networks and the temporal context, a special case has been chosen: the rise of the Movimento 5 Stelle in 2013 elections. The Movimento's rise happens in a situation of huge political and economic turmoil (we have implicitly hypothesized that without this instability several elements could have changed the scenario): the Movimento represents, thus, a charming, non-orthodox vote choice. Before summarizing results of the chapter and its implications, it is important to stress what it has not been tested with this work: no hypothesis has been made in order to assess *why* the Movimento reached such a leading position in the Italian political spectrum. Our analysis is explicitly interested, more modestly, to investigate mechanisms that are triggered by social systems in front of a charming, non-orthodox political object.

From a more strictly theoretical point of view, the rise of the Movimento during the campaign presents several important characteristics that allowed performing non-trivial tests of the theory

exposed in chapter 3. First of all, the case of the Movimento represents a huge variation in a short time (7 percentage points, almost the 30% of the final national strength, in less than 2 months). The fact that the variation is so rapid allows us to test the relation between context and networks keeping constant what we called the constrain sets, and, thus, assuming some of its institutional characteristics as fixed during the construction of the argument.

As stressed above, the capacity of time in shaping encounters among people leads to different outcomes depending of the prevalence of different characteristics in the population and the intimacy of the relations themselves. It has been showed in chapter 3 that different levels of intimacy present, in general, different levels of awareness of the context and, thus, different propensities to be indirectly affected by it (Huckfeldt et al. 1995). Intimate relationships, especially with homogenous networks, imply higher levels of closeness, while, on the other side, it has been stressed that being exposed to non-cohesive social circles make individuals more aware of, and prone to be convinced by, the public opinion. Moreover, it has been stressed that individual exogenous propensities can shape propensities of influence or being converted to the new, unorthodox alternative. This set of theoretical expectations has been linked to more robust and well-adjusted theoretical frameworks: the strength of weak ties theory and the threshold model of diffusion. Although these two frameworks are related, a few research on these two theories as part of one, more general framework, have been conducted. In order to test these expectations, it has been argued that classic statistical models could not tap the complexity of such a process. Thus, agent-based modeling, combined with multilevel models which provided indirect evidences of the phenomenon, have been employed as testing strategy. The attempt of this work is, thus, twofold. From one side, the chapter has the aim of combining these two theories, finding evidences about the fact that innovative behaviors can be diffused by means of weak ties and threshold-like processes. At the same time, the chapter provides an effort that, as far as who writes knows, is extremely rare in the study of electoral behavior: providing direct proof of a social mechanism related to certain electoral behaviors by means of a real-data based computer simulation.

Results comfort our hypotheses. As pointed out by the ABM and regression models, part of the rise of the Movimento 5 Stelle in the 2013 election campaign can be due to social mechanism depicted above. The diffusion process, as expected, is mediated by the role of exogenous individuals' propensities to vote (their thresholds) and, at the same time, is fueled by the exposure to those we called "weak ties". It has been showed, also, how the computer simulation developed fits surprisingly well to the real data, especially if we consider that the two curves in figure 5.7 are generated with data that are unrelated (although the simulation is based on the first week of data collection): the difference between the simulated curve in Figure 5.7 and the real one is never over 3

percentage points, and the shape of the increasing is almost identical. How these results are consistent with the general framework exposed in chapter 3? The very concept of diffusion, first of all, can be considered as a special case of the relationship between temporal context and networks: as long as the prevalence of the behavior in the system increases over time (context), it is more likely for the reference individual to be surrounded and exposed by sustainers of the innovative option and to change opinion. Once the reference individual has changed mind, compatibly with his/her threshold, he/she can serve as part of the environment for another individual. Moreover, he/she contributes to increase the proportion of people who support that innovative opinion at the systemic (read: contextual) level. Secondly, it has been demonstrated, by means of regression models and the ABM, how the role of weak ties is crucial to this diffusion process. At the same time, and contextually with the mechanism depicted above, relations enacted in less cohesive groups allow individuals to be exposed to, and to embrace, less conservative options, making them more prone to consider their electoral change as an option. In this way, less cohesive groups fuel the chain reaction. Results presented in this chapter, however, have some limitations: the first is related to the fact that, although time is expected to be the main context of influence in this case, also space (namely, geographical context) can have had an influence on the mechanism presented above. If we think about context as the changing proportion of people carrying a certain characteristics (in this case, support of the Movimento), we could expect a differential of support in different places of the country – this is even more likely if we analyze the scattered geographical distribution of the Movimento in 2013 elections (see chapter 4). Unfortunately, testing this combined relation between two contexts and ego networks would have needed a large amount of data, which is not available. Secondly, we can imagine a different explanation of our results: stating that non-cohesive groups can boost the likelihood to vote for the Movimento means assuming that a single property of these groups, cohesiveness, can influence people's behavior. Actually, it is easy to imagine that non-cohesive and cohesive groups present huge differences in several other dimensions: it can be that refractoriness of cohesive social groups towards the new political alternative is due to demographic determinants, such as the fact that usually familiars are older than friends, and thus less prone to evaluate positively different anti-system, new political alternatives. This concern can be partly taken away by ABM results, which implicitly assume that cohesiveness (and homogeneity) is the only difference between cohesive and non-cohesive groups: as pointed out above, the simulation present results highly compatible with real data[34].

[34] Furthermore, no additional information about demographic characteristic of the groups is available in the data. Thus, the problem of a demographic confounder in the relation between networks and vote choice is still present.

The first two chapters have attempted to test some of the expectations concerning the relation between two different conceptualizations of contexts and networks. It has been stressed how contexts can shape the interaction among individual and how different levels of intimacy in dyadic, as well as circle-based interactions can modify the influence outcomes. The next chapter will deal with the set of responses the individual can give in order to react to environmental pressures, investigating, in particular, influence and selection processes.

6 Individual responses to the environment: selection and influence

1. Introduction

During the intellectual history of the so-called social logic of politics, huge stress has been given to the role of ”molecular interactions”, as well as ”hot communication” among voters (Lazarsfeld Berelson Gaudet 1944, Baker Ames Renno 2006). According to these views, communication in social networks can affect people’s voting behavior as well as perceptions about their social environment (Berelson Lazarsfeld McPhee 1954, Huckfeldt Sprague 1995). We have seen in previous chapters how different environmental sources can affect decisions and changes in voting attitudes and behaviors. As pointed out above, (see chapter 3), however, individuals are not just passive entities who are affected by environmental stimuli. People can react to these stimuli leading in this way certain patterns of discussions to non-trivial outcomes. The most basic structure in which these individual responses to contextual and network effects take place is the dyadic one. As stressed in chapter 3, if we want to systematize theoretically different alternatives of a dyadic relationship along time, we can identify four possible ideal-types. The first one is what we can call *persistent agreement*: person A and person B agree about a certain political topic over time; the second one is represented by what Huckfeldt and colleagues have called *persistent disagreement* (Huckfeldt Johnson Sprague 2004) that has been demonstrated to be, at least in the US and under certain conditions, sustainable by individuals.

Given a situation of disagreement, however, two other theoretically relevant relational mechanisms can be expected in a dyadic relationship: several contributions, indeed, stressed the role of *selection* and *influence* in shaping patterns of disagreement among citizens during election campaigns. Selection, broadly speaking, can be identified with a behavior that filters out disagreeable discussant, while, on the other side, influence is the mechanism according to which respondent and his/her discussant reach some kind of agreement, that is, one out of the two (or both) change their idea, reaching a situation of agreement. As Bello and Rolfe stress in their work on the topic (2014), the means by which it is possible to test systematically the presence (or absence) of these mechanisms cannot be represented by cross-sectional surveys, as those used in chapter 4. This type of instruments, indeed, can only give us indirect evidence of the environmental pressure on the individual, and do not tell us anything about changes of their opinions in reaction to external stimuli. Neither, it is possible to investigate different patterns of influence and selection by employing rolling cross-sectional surveys, because, besides giving us information about aggregate characteristics in time, they cannot give us, similarly to cross-sectional designs, differences of

opinion of the same individual from, say, t_0 to t_1. Given the fact that these behaviors are relatively fine-textured, many studies employed experimental sets or panel data in order to tap these mechanisms. Nickerson (2005) and Klofstad (2007), for instance, show, by means of experimental approaches, how influence can act as a strong tool of political change in people and how these changes can produce spillover effects, that is, diffusion processes that transcends the single dyadic relation. Moreover, other contributions (Fowler et al. 2011, Mollenhortst Volker Flap 2008, Rogowski Sinclair 2012) suggested the employment of repeated measures to account for influence and selection patterns: for instance, using a 4-waves panel collected during the 2010 British Elections, Bello and Rolfe (2014) show how, if influence does actually represent a real outcome of dyadic relations during an election campaign, selection is much less present in their data.

By means of a pre-post panel survey collected during 2014 European Elections in Italy, the chapter aims at testing whether Italians voting behavior is conditioned by influence and/or selection strategies. We must stress several differences with respect to the original work to which this chapter mainly refers to: first of all, the aim of Bello and Rolfe is to find evidences (mainly) during an election campaign. The data at our disposal, conversely, are based on a 2-waves panel in a pre-post design. As pointed out in many studies, the pre-post design leads to several differences in terms of expected behavior of voters (Noelle-Neumann 1984, Atkeson 1999, Schadee Segatti Bellucci in Segatti Bellucci 2010). For example, crystallization of voting behavior, as well as bandwagon effects, can influence the relevance and even cancel other effects. Rather than a nuisance, this structure of the data will be employed as a resource. Our aim will be, indeed, to find whether effects of influence and selection can be detected also controlling for those events that can happen immediately after an election. Moreover, in order to test influence mechanism, and differently from Bello and Rolfe, the testing strategy of this mechanism will be "directional". In other words, it will be explicitly tested how, given a discussant who votes, say, party A, the respondent is directed towards that party[35]. In order to perform these analyses, the aforementioned stacking procedures will be employed.

The next paragraph (paragraph 2) will investigate the electoral situation in 2014 and its peculiar characteristics; the third paragraph will investigate in depth influence and selection as complex conceptual constructs and will state explicit theory-driven hypotheses. The fourth paragraph will deal with presenting the data and models that are going to be employed in the hypothesis testing procedures. The fifth paragraph will provide some descriptive statistics that explain how and in which direction patterns of disagreement, as well as individual and perceived voting behavior,

[35] Bello and Rolfe strategy, rather, employs an indirect, non-directional way to test influence. See paragraph 4 of this chapter for details

change from the election campaign to the moment in which results are clear to everyone. The sixth paragraph will present results of both directional and non-directional models and, finally, the seventh paragraph will summarize theoretically relevant results, presenting limits of the work and possible theoretical and empirical workarounds.

2. The 2014 European Election in Italy: Renzi's victory

If 2013 elections (see chapters 4 and 5) represented a stunning result for journalists and scholars, the 2014 elections showed a further evolution of 2013 political turmoil. The General Elections of 2013 did not provide a clear winner of the electoral competition. Two main elements can exemplify the stalemate situation that came out of 2013 consultations. First, although having a strong majority in the Chamber of Deputies, the Democratic Party, after the election day, did not have a majority in the Senate (D'Alimonte Di Virgilio Maggini in ITANES 2013), with the consequence of being forced by the numbers to form a coalition government with one of the two main competitors, from one side the Movimento 5 Stelle, and, from the other, the coalition guided by Berlusconi's Pdl. The second element of instability has been represented by the election of the President of the Republic: the incapacity of the new Italian Parliament to provide a new President, forced the choice to an absolute novelty in the history of the Republic, that is, a second office of Giorgio Napolitano, who had been already President in the previous seven years. After more than three months of political crisis, in a thorny economic situation, an agreement between Enrico Letta's (who meanwhile had substituted Bersani) PD and Berlusconi's Pdl to form a Grand coalition government – of which Letta would have been the head – unraveled the knot. After Bersani's resignation from the PD leader's post, at the beginning of December, 2013, primary elections to choose the National Secretary of the PD were held. Matteo Renzi (who had lost against Bersani previous 2012 primaries) won with almost 2 million votes and over 67% share of votes (Fasano Martocchia Diodati in Pasquino Venturino 2014). The new office of Renzi has been characterized by an effort to signal the difference between him and the previous leadership, with a clear attempt to direct the government agenda. Meanwhile, the right part of the political spectrum was exposed to turmoil too: in November 2013, a part of Pdl's MPs decided not to take part to the reconstitution of Forza Italia, a change in the name and the structure of the Pdl strongly supported by the founding father of both parties, Silvio Berlusconi. In this split, two new parties came to life: from one side, Berlusconi's Forza Italia (that will take strong positions against grand coalitions and the PD-centered governments in general), from the other, the Nuovo Centro-Destra (New Centre-Right), led by Angelino Alfano and composed of a small but significant part of the former members of

Berlusconi's inner circle. After the election of Renzi as the head of the PD, the project of Letta became briefly unpopular in his party and, after a vote in the National Direction of the PD (and in a quite unusual fashion with respect to the Second Republic standards), Letta was forced to resign. Letta's office was taken by Matteo Renzi on February 22, 2014 (De Sio Emanuele Maggini 2014).

The European Elections – that were held in Italy on May 25 of the same year – represented the first electoral test for the new Government and for Renzi himself. As anticipated, results were stunning: "the Democratic Party (PD) led by Matteo Renzi has obtained a neat success reaching a record share of 40.8% of the votes. No center-left party had previously achieved a similar result. Since the EP elections are held in 1979, the PD is overall the Italian political party that has obtained the highest share of votes ever." (Maggini in De Sio Emanuele Maggini 2014). Compared to the 2013 result, 2014 PD gained around 2.5 million votes. This is an even stronger result if we take into account the fact that the turnout in European Elections was lower than in National Elections (the turnout was 17 percentage points lowered in 2014 with respect to 2013). The PD result almost doubled its main competitor in 2013, the Movimento 5 Stelle, which lost 1.5 million votes, gaining something more than 21%. The center-right coalition did not suffer, in percentages terms, of a clear debacle: the sum of Forza Italia and Nuovo Centro-Destra was around 21%, as in 2013 (Forza Italia, Berlusconi's party, gained almost 17% of valid votes while Nuovo Centro-Destra, gained a mediocre 4%). Given the lower turnout, however, in absolute terms, the two parties, taken together, lost around 1.5 million votes from the previous National Elections. The only right-wing party that could be satisfied was the Northern League, which gained around 300.000 votes compared to 2013, gaining a respectable 6% of valid votes. Scelta Civica (that, for the European consultation became Scelta Europea – European Choice) almost disappeared from the electoral competition, gaining, without the strength of the UDC, that in the meanwhile decided an alliance with the Nuovo Centro-Destra, less than 1% of votes (precisely 0.7%).

From the political point of view, the first result that has been stressed concerns the unexpected victory of Renzi's Pd. Although, according to the polls, PD had strong probabilities to be the first party, with over 30% of votes, no research institute had predicted such a stunning victory. The results of the Elections are stunning also for several, theoretical, reasons: according to the Second-Order Elections framework, in a European Election, a number of expectations on this latter's outcomes can be formulated (Reif Schmitt 1980; Marsh 1998; Hix Marsh 2007). First of all, lower level of participation compared to national elections should be seen; secondly, it is expected to register a relative worse performance of parties in government (compared to the opposition parties), and, thirdly, a relative worse performance of large parties (compared to small, new and anti-European parties). If we describe by and large performances of PD and its main opponents, that is,

Movimento 5 Stelle and Forza Italia, we can easily see how these two latter, at the time in which 2014 European Election were held, were the anti-European, opposition parties, while the PD was the incumbent, big, pro-European one. It is possible to say, thus, that the theory of the electoral cycle, except for the lower turnout expectation, fits badly to this last election.

Table 6.1 Polls and results (in %) for relevant parties

	Polls average	Survey pre N=1985	Survey post N=1883	Outcomes
PD	32.3	34.1	37.5	40.8
Movimento 5 Stelle	23.0	23.3	23.3	21.2
Forza Italia	20.4	16.4	13.9	16.8
Nuovo Centrodestra	5.1	3.6	2.8	4.4
Lega Nord	4.3	6.2	7.8	6.2
Fratelli d'Italia	3.5	4.0	3.6	3.7
Tsipras	3.0	7.0	7.0	4.0
Other parties	8.4	5.4	4.1	2.9

However, what we are going to analyze here is not the difference between elections – as in the second-order framework – but the differences between a pre-electoral moment and the subsequent post-electoral one. Besides these non-fulfilled theoretical expectations, thus, if we think in terms of actual support for different political parties, we must recognize two characteristics of the election. Table 6.1 presents, for parties who have passed the 4% threshold (and thus had MEPs), latest polls' average predictions before the so-called "electoral blackout"[36], respondents' answers to the vote intention question in the ITANES pre-election wave, actual outcomes of the elections and respondents answers to vote intention question in the post-election wave. As it is possible to see, and as anticipated, during the election campaign, PD is perceived as highly underestimated, while its main competitor, Movimento 5 Stelle is actually well predicted and Forza Italia is slightly over-estimated (see Table 6.1). Moreover, it is possible to see an increase in the PD vote intentions in the post-election wave (about 3.5 percentage points). Many effects can have led to this rise: an actual rise in the two week previous to the elections (by means of some sort of diffusion process, as depicted in chapter 5), as well as conscious pre-election misreports. Similarly, it is possible to imagine that, from the pre- to the post-electoral data collection, different effects, based on the perception and adjustment of opinion between these two periods, like bandwagon effects, could

[36] According to the Italian law, no polls must be publicly conducted since 2 weeks before the Election Day. The average is calculated by taking into account the four polls that have been conducted (and published) in the last available week (and especially from 6 to 9 March). The polls selected have been realized by IPR Marketing, Tecné, EMG and Demopolis, mainly for the employment on TV political shows and in newspapers.

have biased opinions and vote intentions of the respondents. In order to have substantively correct estimates of our mechanisms, it will be necessary to control for these effects (see Paragraph 4).

3. Political influence and selection: definition and effects

As pointed out in chapter 3, although influenced by environmental factors – that have been identified with contextual and network effects – individuals have different ways to respond to environmental stimuli. Generally speaking, Huckfeldt (1986) argues how individuals embedded in certain social (and political) networks and contexts can provide essentially two different answers to their environment: from one side, they can provide consistent responses to their environment – the so-called assimilation responses. From the other side, they can react in a dissonant way to external stimuli – having, in this way, conflictual responses with respect to the environment. As stressed previously, when referring to responses to external stimuli, Huckfeldt employs a very broad concept of the term "environment", using different meanings of the term. From one side, the environment is a set of relationships and peer effects enacted in co-presence. From the other side, it is also exemplified as a broader – geographical – context for the conflict response (see chapter 3). As we stressed several times during this work, context is necessary to shape the propensity one has in having an interaction with a discussant who possesses certain characteristics. In other words, contexts contribute to shape ego-network's characteristics. Moreover, one's network can be further dismembered in a series of interactions. The individual shares with other people several levels of intimacy, frequency of political discussion, as well as, for instance, different gender, the same social class and so on. The shaping properties of the contexts – that is, the capacity to make people with certain characteristics to interact among each other – combined with the fact that an ego network is nothing more than the sum of all the interactions that individual has during his/her everyday life, gives us the definition of how the environment and its responses are intended in this work: the first assumption from which we start is that the mechanisms that we are going to test are network mechanisms, that is, processes based on interactions between people (Huckfeldt Sprague 1987). The second assumption states that these processes are better analyzed in a dyadic fashion, that is, considering, theoretically and technically, the dyadic interaction as the fundamental level of analysis we are dealing with (Mutz 2002, Huckfeldt Johnson Sprague 2004, Fowler et al. 2011, Bello Rolfe 2014).

What we have stated in chapter 3 is that the most relevant, theoretically investigated, outcomes of a dyadic relations are, basically, four. The first one is what we called the "normal" situation, the persistent agreement. Given the possibility of having information in two different times, t_0 and t_1, people who are perceived as being in persistent agreement, agree in t_0 and in t_1 too (an outcome that

can be theorized as an homophily mechanism). Another situation which has been reported in a quite convincing fashion (Huckfeldt Johnson Sprague 2004) is the so-called persistent disagreement. It has been reported how people can sustain a certain level of political disagreement that persists in time. This phenomenon has been showed to be consistent both theoretically and empirically, at certain, network related, condition (see Huckfeldt Johnson Sprague 2004, Mutz 2002).

Given a situation of disagreement, a person, rather than being in a "static" situation, can avoid interactions his/her discussant or influence (and be influenced) in his/her political position. The chapter focuses on these two social processes (Bello Rolfe 2014, chapter 3 of this work) that, as pointed out above, are called selection and influence. Unlike it could be possible to expect, as stressed by Bello and Rolfe (2014), these mechanisms, especially the selection process, does not usually represent behaviors that undermine the relations among people in every dimension: for instance, "[s]election of political discussants does not necessarily means ending pre-existing relationships or befriending all Liberal Democrats that one meets; it can be as simple as choosing to sit at the opposite end of the table from politically conservative Aunt Edna at family gatherings". Similarly, influence processes must not be seen as a complete conversion from, say, a xenophobic view of the world to a set of liberal opinions. Usually, as showed even in long-term panels (Zuckerman Dasovic Fitzgerald 2007), short-time changes are especially due to small variations from generally liberal (or conservative) views, to more (or less) liberal (or conservative) ideas. In other words, frontline changes are rare.

As outlined in chapter 3, these four dyadic outcomes are expected to be theoretically relevant during an election campaign. The question that can arise is: why just these four outcomes are assumed as relevant? The mechanism that, say, takes into account an initial agreement that results in disagreement are usually not evaluated in the literature as relevant, basically because people are assumed as agreement-seekers. People tend to reach agreement situations, for reasons related to cognitive dissonance reduction (see Festinger 1957) or given the fact that they do not possess a rich, well-organized system of information by which it is possible to face political discussions (Zaller 1992, Sidanius Lau 1989). In the next two sections, ways in which selection and influence act in changing patterns of agreement/disagreement among citizens will be outlined. Similarly to other studies (Partheymüller Schmitt-Beck 2012, Bello Rolfe 2014) patterns that we are going to test can be seen only in small periods of time (an election campaign or, in our case, before and after the Election day); thus, a large part of the interactions that we see in these small periods are "stable" interactions. Part of these stable situations, however, can be the result of one (or many) influence and homophily processes that happened before the observational window. Anyways, a sufficiently big number of changes, in the waves taken into account, can be observed – moreover, in a moment

in which the attention towards politics is higher than ever, that is, the period surrounding the Election day.

3.1 Selection

Selection mechanism consists in both direct and indirect choices that have, as a result, the termination of the relation between ego and alter (Bello Rolfe 2014). An individual involved in a relation characterized by political disagreement can avoid the disagreeable alter, choosing another (agreeable) discussant (Mutz 2002). From an individual point of view, this behavior is quite comprehensible: since we are assuming agreement-seekers individuals, it makes sense to expect that disagreement with a discussant can lead to uncomfortable situations in which the former is forced to defend him/herself against the "attacks" of the latter. Conversely, for the same reasons, an individual has no (political) reasons to desert conversations with agreeable discussants. The basic hypothesis based on the mechanism just exposed is thus that *people will have higher propensities to retain in time agreeable discussants compared to disagreeable ones* (Bello Rolfe 2014). To some extent, and consistently with more recent research (Noel Nyham 2011), selection patterns can be explained by employing the concept of "negative homophily": if, in a homophily situation, ego maintains his/her alter because this latter is similar to him/her, in a selection pattern ego discards him/her because of dissimilarity in opinions.

The propensity to retain people who are perceived as agreeable depends, among other things, on the capacity an individual has of perceiving correctly these opinions. This skill has been largely demonstrated to be a function of the quantity of notions one has about politics (Huckfeldt 2001, Mutz 2002). If ego has a large, well-organized amount of political knowledge, indeed, it is easier for him/her to find arguments sustaining his/her opinion during a conversation, with respect to a person who has not such knowledge of political affairs. Political sophistication (Zaller 1992) has been widely recognized to be an individual characteristic that allows people to perceive correctly different political opinions. The result of this more refined capacity has important consequences on the relational mechanism we are dealing with. It is widely known, for instance, that more knowledgeable people tend to develop more homogenous social networks, both by the fact that they are naturally inside homogenous groups and by acting actively in selecting agreeable discussants (Huckfeldt Sprague 1995, Bello Rolfe 2014, Mutz Mondak 2006). Another hypothesis that it will be tested, thus, reads as follows: *the more a person is a politically sophisticated one, the more he/she will tend to select agreeable discussants and discard disagreeable ones.*

Network-related characteristics of one's discussant could increase or reduce the propensity of adopting a selection strategy. For instance, people with whom the discussant "share more" would

probably be unable to avoid this latter. Here, we have to introduce again the concepts of cohesive/non-cohesive social groups. As explained repeatedly, cohesive dyads lead to different outcomes with respect to non-cohesive ones, in many ways. In general, it has been stated that, in normal conditions, people who are part of cohesive social groups exert a stronger coercive effects on people who are part of non-cohesive circles.

To resume a previous example, it can be more difficult than expected to stop talking about politics with the aggressive Aunt Edna – especially if Uncle Ben organizes a monthly family gathering – with respect to stop talking about politics with a neighbor who we barely know. Since we have stated previously that, on average, cohesive social groups are more likely to be composed of strong ties instead of weak ones, it can be hypothesized that *the likelihood filtering out a discussant who is member of a cohesive circle is lower compared to members of non-cohesive ones.*

3.2 Influence

As pointed out above, selection is not the only strategy one has in order to avoid disagreement. Discussing and contrasting opinions, in different occasion, can lead to outcomes that are different from selection. As stated by Huckfeldt and colleagues (Huckfeldt Johnson Sprague 2004), one of the possible outcomes can be the so-called persistent disagreement. Persistent disagreement has been demonstrated of being a non-rare, theoretically driven outcome. But persistent disagreement, together with selection, is not the only outcome that a situation of disagreement foresees. Influence is the mechanism according to which people reach a sort of agreement about, in this case, political matters. "[O]ne person may change his or her mind as a result of new information, social pressure, imitation of peers or some other psychological mechanism associated with making conditional choices" (Bello Rolfe 2014). We can recognize essentially two different types of influence. Influence can be seen as a process in which one of the two nodes of the dyad stays on his/her own position and the other one switches towards the first, or, given to different positions in t_0, two nodes of a dyad arrive to some sort of intermediate position in t_1. In any case, the baseline to assess the presence of the mechanism is that, given a previous situation of disagreement, the agreement is reached by means of someone who changes his/her political opinion. As pointed out by Bello and Rolfe (2014), an indirect hypothesis that can support our argument can read as follows: *an individual will be more likely to change his/her vote choice if, previously, the dyad was a disagreeable one*. In other words, the probability to change vote choice is conditional to previous situation of disagreement in the dyad.

Influence, however, is not just related to the dyad itself: "Influence may depend less on dyadic disagreement with a single discussant, and more on the distribution of attitudes within the larger political discussion network." (Bello Rolfe 2014). In other words, as pointed out in various studies (Mutz 2002, Huckfeldt Johnson Sprague 2004), the choice of being influenced by another individual is, indeed, function of the broader network: disagreement can be sustainable in cases in which the broader network is homogenously in agreement with our reference individual. Especially, more dense network, or networks in which there are higher level of autoregressive influence are capable of protecting individuals in sustaining a single disagreeable discussant. As stressed above, it is perfectly logical to expect that familiar networks can provide higher levels of autoregressive influence and network density, since relations are more intimate and ties are generally strong, with respect to non-familiar ones (see chapter 3 for details). The hypotheses dealing with the relation with broader network will read as follows: *an individual will be more likely to change his/her vote choice conditional to disagreement in his/her broader network.* Moreover, *disagreement in the family will exert a stronger effect in the likelihood of change vote compared to that of non-familiar social circles*.

Previous literature (Bello Rolfe 2014) provides only indirect proof of the influence effects, testing whether the vote change is function of previous disagreement. In this way, we have no direct proof of the fact that the individual choice is directed actually towards the party preferred by the discussant. In order to overcome this drawback, and by means of different models (see below), a directional hypothesis can be formulated: *An individual will be more likely to change his/her vote* towards *the vote choice of his/her discussant if, previously, the dyad was a disagreeable one*.

3.3 Selection and influence in a pre-post design

So far, our theoretical framework and the hypotheses connected with it are framed in an "empty" time. Time, rather, is not empty, in the sense that, from t_0 to t_1, many events occur. As pointed out before, we are dealing with influence and selection on a pre-post design (in other words, t_0 is not much before the election and t_1 is not much after the election). This structure of the data leads us to think about several other explanations of our outcomes. For instance, as many studies stress (Huckfeldt Sprague 1995, Barisione Catellani De Sio in Segatti Bellucci 2011, Bello Rolfe 2014), undecided voters are more prone to change their choice (and to declare so after the elections). Even though certainty can be somewhat related to political engagement, previous studies treated the two concepts as separated and, thus, we will treat the two hypotheses as different. Given our pre-post design, moreover, we are persuaded that the certainty of the vote choice refers to a different

theoretical sphere and deserves a dedicated hypothesis. The hypothesis, thus, will read as follows: *citizens who are surer about their vote choice will be less prone to change their choice (and to declare so after the election)*.

Another characteristic of time in this particular situation must be taken into account: as pointed out in paragraph 2 of this chapter, European Elections of 2014 reported the striking victory of Matteo Renzi's Partito Democratico. Although the victory was largely anticipated by the polls, the unexpected result was the relevance of the victory (over 40%) and the consequential difference between the PD and other political forces. This impressive gap could have led people to a misreport of their actual vote in order to signal some kind of "post-electoral survey bandwagon" effect (Crow Bowler Johnson 2010). Misreports in post-electoral surveys are widely recognized as being one major problem in pre-post designs.

Several psychological mechanisms can be taken into consideration in order to explain citizens' behavior: according to the "spiral of silence" explanation, people may be less inclined to admit their vote because electoral outcomes did not validate their expectations (Noelle-Neuman 1984, Atkeson 1999). In other cases, it has been argued how less sophisticated voters, when asked to recall their vote choice, tend to apply their evaluation at the moment of the interview, respect of trying to recollect the set of propensities they have had at the moment of the election, failing in this way to provide the correct information and, thus, leading, at the same way of the spiral of silence explanation, to some sort of post-electoral bandwagon effect (Wright 1993). In the case of 2014 European Elections, if we want to control for this possible bandwagon effect, we must control for people who decided to vote for it in the post-electoral wave.

4. Data, measurements and models

Data of this chapter come from the ITANES 2014 panel survey. As pointed out in paragraph 1, the design of the survey is a pre-post panel survey (Schadee Segatti Bellucci in Bellucci Segatti 2011), in which the first wave is collected before the Election Day and the subsequent one is collected over the same individuals after the Election Day. The first wave of the panel was collected from May 9, to May 19, 2014, while the post-electoral wave was collected from June 10 to June 18, 2014 (European Elections in Italy were held on May 25, 2014). Both the interviews have been conducted by means of CAWI (Computer Assisted Web Interview) mode. In the pre-electoral wave, 3244 respondents were interviewed, while, in the post-electoral survey, 2890 people accepted to be re-contacted, with a re-interview rate of 89.1%. The rate is quite above the average of those types of panels in Italy: for instance, the re-interview rate in the 2006 pre-post panel was around 70%

(Bellucci Maraffi 2008). In each wave, respondents have been asked to provide information about their voting behavior, the certainty to which they were going to vote for the party in the pre-electoral wave, as well as a number of questions about political knowledge, in order to measure the degree of respondents' political sophistication. The individual behavior was not the sole information respondents were asked for: the questionnaire was also developed to have information about main discussant's perceived voting behavior. As in the 2013 survey (see chapter 4), main discussant has been identified as the person the respondent talked more about politics "recently" (namely, during the week previous to the interview). This person is the so-called main discussant, a discussant who has been demonstrated to be slightly different with respect to other discussant, in terms of coercive power (Huckfeldt et al. 1995, chapter 4).

The structure of the questions and the wording has been identical to those of the 2013 Election study: in other words, in both the pre- and post-electoral survey, respondents were asked to report their vote intention (or their actual vote choice in the post-electoral wave), as well as the perceived voting behavior of their main discussant (see below). From the network homogeneity point of view, the level of homogeneity with friends and relatives social circles has been asked. The set of questions is identical to those depicted in chapter 5: respondents have been asked to provide a level of homogeneity of their circles based on the percentage that shares respondents' political views (see chapter 5 and Baldassarri 2009).

From the dyadic point of view, respondent has been asked to report the social circle the main discussant belongs to (this variable has been recoded in three theoretically relevant circles: "Relative", "Friend" or "Acquaintance"). Finally, information that was not present in 2013 survey (and, for the first time has been asked in an Italian Electoral Survey) was collected: respondents were indeed asked to provide the initials of their main discussants, in order to univocally identify them.

4.1 The name generator

The name generator employed to identify the main discussant represents a unique attempt in Italian Electoral studies (as well as in most of the continental Europe studies) to identify, with fewest biases possible, an actual *individual* as main discussant, rather than a set of individual characteristics: usually, information provided in electoral studies that include network characteristics are focused on discussants' information without trying to identify univocally that person. In several panel data that account for network information (e.g. Schmitt-Beck et al. 2009), the main discussant is identified in a panel fashion with a several information, such as gender,

perceived interest in politics, perceived vote choice and relation intimacy. Anyways, it is difficult to identify, especially in panel data, whether the discussant in t_0 is actually the *same* discussant as in t_1. Although the assumption that, say, a female relative, very interested in politics in t_0 is the same female relative, very interested in politics in t_1 is plausible, we have no certainty about this fact. Moreover, we must stress that the mechanisms that we are going to test – especially selection – are hugely based on an unbiased measure of the main discussant, that is, a measure that assures us about the fact the discussant is the same, or, rather, he/she changed from t_0 to t_1. In order avoid this ambiguity, ITANES 2014 provides information about the initials of respondents' main discussants. As Bello and Rolfe stress, by means of this measure, combined with other information collected "it is possible to trace both whether a discussant was named at a later date […], and how the presence of acknowledged disagreement within the dyad changes over time" (Bello Rolfe 2014). Obviously, since only initials are asked, likelihood of biases in overestimating stability of the discussant is not nullified: a John Smith in t_0 and a James Smith in t_1 will be actually coded as the same person, "JS". However, the probability of biases is undoubtedly smaller with respect to surveys in which name generators identify only generic information about respondents that could be shared by several people in one's ego network. Moreover, some other source of bias could arise by the recoding of the variables. In addition to the erase of initial considered as clearly impossible to occur in an Italian survey (such as "XX" or "ZZ"), in order to minimize the biases, respondents with inverted initials during time were considered as being the same discussant: in this way, a respondent that indicates, for instance, a "ST" in t_0 and a "TS" in t_1 is assumed to have the same discussant with name and surname inverted.

4.2 Models

Models that are going to be presented will be differentiated by the mechanism they test. Firstly, there will be presented models testing the selection process, followed by models that test influence, as showed in Bello and Rolfe (2014). Finally, it will be proposed a model to test the directionality of influence (that is, whether influence is actually directed towards the party supported by one's discussant).

Analysis of selection mechanism will employ logistic models, and, as pointed out above, is based on the fact that dyadic ties persist along the two measurements. Following Bello and Rolfe (2014), the most promising candidate as dependent variable is constructed in a way that is equal to 1 when the respondent indicates the same discussant in both the waves and 0 otherwise. In order to assess the fact discussants in both waves are equal, initials of the discussant will be employed.

Given the binary dependent variable, a logistic model will be performed. The first hypothesis related to selection process was that, if selection mechanisms actually contribute to shape people's political networks, disagreeable people in the first wave should have higher likelihood of being discarded in the subsequent wave. Perceived disagreement between respondent and his/her discussant will be thus the first (and main) predictor. As pointed out in paragraph 3.1, moreover, discussants belonging to closer social circles (such as the family), should present lower discarding level (that is, it is more difficult to filter out a relative respect than a neighbor). Finally, it has been hypothesized that voters who are more politically sophisticated will have higher propensities to change their discussant in order to have a more homogenous network. The model that will be performed thus can be written as follows.

1. $p(INIZEQ_{w1w2}=1) = CONS + DISAG_{w1} + SOC\_CIR_{w1} + POLSOPH.$

Where:

- $INIZEQ_{w1w2}$ is equal to 1 if $initials_{w1} = initials_{w2}$ and equal to 0 if $initials_{w1} \neq initials_{w2}$
- CONS is the constant;
- $DISAG_{w1}$ is disagreement with discussant in the pre-electoral wave;
- SOC_CIR_{w1} is the discussant's social circle in the pre-electoral wave[37];
- POLSOPH is respondent's political knowledge[38].

Analysis of influence mechanism in a non-directional fashion will follow, firstly, the modeling strategy proposed by Bello and Rolfe (2014). The binary dependent variable is constructed in a way that is equal to 1 when the vote choice of wave 2 is different from the vote choice of wave 1 and 0 otherwise. As pointed out in paragraph 3.2, several hypotheses have been taken into consideration: first of all, it has been stated how, if influence process actually exists, voting behavior changes in time are function of the level of disagreement in the social system that surrounds the individuals. This level of disagreement has been operationalized in two ways: disagreement at the dyadic level

[37] The original question regarding main discussant (the person with whom respondent talked the most in the previous week) had 7 response categories and it has been recoded to 3: "Partner" and "Other relatives" were recoded into "Relative"; "Workmate", "Neighbor", "Other person" has been recoded as "Acquaintance" and "Friends" has been left as is.

[38] In ITANES 2014, there were 3 knowledge questions, related to likewise European Union topic: the number of Union Members, the name of candidate as President on the European Commission for the Popular Party and the Candidate for the Socialist Party. The scale that has been formed was a 0-3 scale in which 3 corresponds to having answered correctly to all the 3 questions and 0 equals to having answered wrong to all the questions.

and disagreement among the dyads of the broader ego network. The measure for this latter concept was borrowed from the synthetic agreement measure exposed in chapter 5 (Baldassarri 2009). The complement to 1 of the variable, that asks respondents with which percentage of their friends and relatives groups are in agreement with, can give us an appropriate measure of disagreement in strong- and weak tied social groups. It has been stated that several other explanation of the voting behavior change can be hypothesized: first of all, people who were not sure of their declared vote choice during the election campaign could be more likely to have changed their mind. Moreover, part of people who declared their vote for PD in the post-election wave could have misreported their vote choice as a result of a bandwagon effect. The models will be designed as follows.

2a. $p(DIFFVOTEw1w2=1) = CONS + DISC\_DISAG_{w1} + SURE_{w1}$
2b. $p(DIFFVOTEw1w2=1) = CONS + AMINET\_D + FAMNET\_D + SURE_{w1}$

3a. $p(DIFFVOTEw1w2=1) = CONS + DISC\_DISAG_{w1} + SURE_{w1}$ if $VOTEPD_{w2}=0$
3b. $p(DIFFVOTEw1w2=1) = CONS + AMINET\_D + FAMNET\_D + SURE$ if $VOTEPD_{w2}=0$

Where

- DIFFVOTEw1w2 is equal to 1 if $votechoice_{w1} \neq votechoice_{w2}$ and equal to 0 if $votechoice_{w1} = votechoice_{w2;}$
- CONS is the constant;
- $DISC\_DISAG_{w1}$ is the perceived disagreement with discussant in wave 1;
- $SURE_{w1}$ is a 0-10 scale of the vote certainty in pre-election wave;
- AMINET_D is a measure of the general disagreement with friends (the complement to 1 of agreement measure in chapter 5);
- FAMNET_D is a measure of the general disagreement with relatives (the complement to 1 of agreement measure in chapter 5);
- $VOTEPD_{w2}$ is equal to 1 when respondent switched to PD in wave 2 and 0 otherwise.

It is important to understand the rationale behind model 3a and 3b. We said that, in order to take into account possible bandwagon effects, we should have controlled for those who have switched from any party in wave 1 to PD in wave 2. Among these respondents, indeed, there could be people who actually misreported their vote choice in the post-electoral wave, once having realized the official results. In order to technically control for those cases, it has been decided to drop the cases from the analysis. We are conscious that this is a rough simplification of the whole argument:

employing such as sub-sampling implies assuming that everyone who actually changed his/her vote choice towards the PD is considered as a person who misreported his/her choice in the second wave. We must remember, however, that the main aim of the chapter is to recognize in the Italian case individual response mechanisms, in particular selection and influence. This very trenchant expedient, thus, will lead us to play against ourselves given that coefficients of those models will be, at worst, underestimated. If the effect, though smaller, is however present and significant, we can rely on stronger evidence about these mechanisms.

As pointed out above, models that test the influence mechanisms do not test if, say, respondent is pushed towards certain party by the exposure to his/her discussant. More simply, indirect proofs that link a change in vote choice during time and previous disagreement are exposed. According to Greene (2011) and Bello and Rolfe (2014), the choice to use a first-difference-based approach (Augustyniak Liker Duncan 1985), such as that exposed in models above, allows to have unbiased estimates only if variables that are central to our understanding of the process are not related to explicit voting behavior: "Looking only at whether or not a subject changed his or her vote choice (instead of whether or not friends share similar party preferences) eliminates many issues that might arise when using cross-sectional panel data, particularly as we look only at the binary outcome of vote switching instead of transitions to and from one party choice to another (Jackman and Vavreck, 2010)" (Rolfe Bello 2014).

Another, directional, version of vote switching determinants can be argued. This approach is related to the stacking procedure exposed in chapter 4 (van der Eijk et al. 2006). In that case, the stacking procedure has been implemented in order to create a dataset in which determinants to "generic" parties were estimated (Franklin De Sio 2011). Imagine a situation as that depicted in Table 6.2.

Table 6.2 Stacked data matrix example

ID	CHOICE	PTV_{w2}	LOCALPART	$VOTE_{w1}$	$VOTE_{w2}$	$SWITCH_{w1w2}$	$DISCVOTE_{w1}$
1	1	4	30	1	0	0	1
1	2	1	10	0	0	0	0
1	3	6	25	0	1	1	0
2	1	5	30	0	1	1	1
2	2	4	20	1	0	0	0
2	3	1	5	0	0	0	0
3	1	1	6	0	0	0	0
3	2	1	8	0	0	0	1
3	3	9	40	1	1	0	0

The table exemplifies three cases in a stacked data matrix. Columns 1 and 2 represent what stacking procedure does to the matrix, leading to obaservations which no more represent an individual, but

rather a choice*individual combination (see chapter 4). Columns 3 and 4 present, in this example, ptv's for three parties given by three individuals (PTV_{w2}) and, as possible predictor, aggregate level of those parties in different ecological units respondents belong to (LOCALPART). This situation is, synthetically, similar to chapter 4 one. As pointed out in other works (Franklin van der Eijk 1996, van der Eijk et al. 2006), propensities to vote are not the sole variables that can be stacked: stacking procedures can be applied also to binomial dependent variables, namely ipsative measures, such as those expressed in voting behavior. In this way, it would be possible to regress, by mean of a logistic regression model, the vote choice, say, in wave 1 or 2 (column 5 and 6 of Table 6.2) with, as predictor, aggregate outcomes in a certain ecological unit.

Our aims, however, are different: rather than predicting vote choice in a certain time, in order to recognize directional influence effects, we want to predict the *change* from one status to another one. As showed in column 7 of Table 6.2, this is possible by constructing a variable equal to 1 when the respondent has passed from another party in wave 1 to support that choice in wave 2 and 0 otherwise (in the example, the variable is $SWITCH_{w1w2}$). In that way, it is possible to predict the variable by means of the (completely exogenous, since it is previous in time) discussant's perceived vote choice in wave 1 (exemplified in column 8). Obviously, the question that we are making ourselves is slightly different compared to the hypothesis testing presented in the non-directional model, borrowed from Bello and Rolfe (2014). We are interested, indeed, whether, given a sample of people who switched vote choice from wave 1 to wave 2, a discussant's effect on the switching choice is recognizable. The two models, thus, take into account only cases in which the switch has been made, and expunge all the cases who have not hanged vote choice from wave 1 to wave 2. That means that, taking as example Table 6.2, case number 3 would not be valid for the analysis.

The second model is equal to the first one, but it erases a further number of cases, that is, those who have switched towards the PD, in a way that is equal to the procedure depicted above for the non-directional test of influence. This is a strong control of the possible bandwagon effects that could lead to misreporting.

Logistic model presented below will be fitted with robust standard errors in order to avoid erroneously significant estimates. Below is presented the formalization of the directional model:

4. $p(GEN\_DIFFVOTEw1w2=1) = CONS + DISC\_VOTE_{w1} + PTV_{w1}$
5. $p(GEN\_DIFFVOTEw1w2=1) = CONS + DISC\_VOTE_{w1} + PTV_{w1}$ if $VOTEPD_{w2}=0$

Where

- GEN _DIFFVOTEw1w2 is equal to 1 if $VOTE_{w1} = 0$ and $VOTE_{w2} = 1$, equal to 0 otherwise;
- CONS is the constant;
- $DISC\_VOTE_{w1}$ is discussant vote choice in wave 1;
- PTV_{w1} is propensity to vote of the respondent for every relevant party in wave 1.

It has been decided to provide ptv's for parties in this latter model in order to add an equivalent measure for certainty of the choice. According to the theory (van der Eijk et al. 2006), ptv represents a sort of observed utility of the vote choice, and, by definition, measures the propensity to vote for the generic party. Given the need of employing as control variable this latter measure, the non-missing switches that will be used in the model are only those which a ptv is actually available. In other words, only those parties of which a ptv has been asked will be employed in the analysis. Usually, indeed, ptv's are not asked for every party, but just for relevant ones. For 2014 ITANES survey, parties for which ptv was asked are: Partito Democratico, Forza Italia, Movimento 5 Stelle, Lega Nord Nuovo Centro-Destra. The sample was, subsequently, divided in three subsamples in which another additional ptv was asked. The three different subsamples were asked to provide ptv for Lista Tsipras, UDC and European Choice. The number of stacks for this latter model is thus 6 (that is, cases are multiplied by 6 choices about relevant parties).
The subsequent paragraph is intended to present the data and provide useful insights for the multivariate analyses.

5. Descriptive statistics

The main aim of this chapter is to find empirical evidences for dynamic relational responses that individuals give to their environment, namely selection and influence. In order to understand better results, it seems necessary to introduce descriptively the data, and, especially, characteristics of the discussants provided by the respondent and dyadic measures that can help in deepening our understanding of these relational mechanisms. One of the key variables to understand whether it is possible to talk about selection strategies is represented by the name generator depicted in paragraph 4.1. As stressed before, the name generator employed in ITANES 2014 data is based on the main discussant's initials that demonstrated to be a good tradeoff between discussants discernibility and respondent privacy (Burt 1985, Bello Rolfe 2014). As pointed out before, several recoding procedures have been performed in order to provide a sufficiently plausible variable. During the month that divides the two waves, people who maintained their discussant are 46.2% of the sample that provided a non-missing answer (1062 cases). Contrarily, people who changed their

main discussant are 53.8% (1236 cases). These results could be quite surprising – in general, one could expect a more stable measure of the main discussant – but we have to stress that this is perfectly plausible as long as we know that the data provide only information for one discussant. It is thus plausible that a quota of respondents, instead of discarding their wave-1 discussant, just reported another individual as main discussant in wave 2, continuing to keep interacting with the one cited in wave 1. Given the limited amount of discussants at our disposal, it is possible that this issue can depress the effect that disagreement has on changing main discussant, that is, our main hypothesis on selection. However, this is an issue that is shared with previous contributions contributions and should be fixed only with a bigger effort in data collection (namely, providing information on a larger number of discussants).

One of the main predictors of the selection test is represented by the circle which discussants belong to. Seeing the trend over time of these variables is interesting, given that tells us, from a very rough point of view, if some kind of selection strategy exists, even though it can be showed descriptively. In Table 6.3 it is possible to assess how discussants' social circle changed during the two waves. Since just a month passed between the first and the second data collection, we can reasonably assume that a switch in social circle represent a change in discussant, that is, if the discussant was a relative or the partner in wave 1 and an acquaintance in wave 2, it is possible to infer that the two discussants are actually two different individual. However, it is not possible to infer that the stability of the social circle means that respondent did not change discussant: in other words, it is possible that in declaring as main discussant as, say, friend in both waves, respondent is referring to different individuals.

As showed in Table 6.3, the most stable social circle is represented by relatives: given 100% of people who have declared a relative main discussant in wave 1, 81.4% of these draw their discussant from the most cohesive circle. The other circles, contrarily, tend to fail to keep discussants after the elections. The diagonal in table 6.3 shows clearly how only 60% of discussants are confirmed in the friends and acquaintances social circles. Moreover, it can be seen how higher proportions of the original strength tend to be pushed towards the more cohesive circles (this is clearly understandable by seeing the relative difference between the upper and the lower triangular section of the matrix): for instance, a person who chose in wave 1 a friend has a 20% probability to have a relative after the elections. Similarly, it is less likely that a person who used to discuss with a relative will be exposed to a friend in the subsequent wave (9.5%). Several theoretical arguments are consistent with these descriptive results: first of all, the strength of relatives among the main discussants was previously assessed by other studies (e.g. Huckfeldt et al. 1995) and is related to the fact that cohesive social networks are more prone to exert a coercive effect on individuals.

Moreover, the fact that a higher percentage of people who were exposed to non-relatives and, after the elections, are exposed to family members can be related to the theoretical argument that states the importance of atypical relations before the elections.

Table 6.3 Social circle of the main discussant

		Post-election circle			
		Relative	Friend	Acquaintance	Total
Pre-election circle	Relative	81.4	9.5	9.1	100.0 (51.3)
	Friend	19.8	61.7	18.5	100.0 (24.7)
	Acquaintance	21.3	19.9	58.8	100.0 (24.0)
	Total	51.8	24.9	23.3	N=2343

The election campaign is a moment in which people could be pushed to evaluate different political alternatives, and, in this moment, it is more likely the exposure to "unusual" political discussants. After the campaign, when political stimuli are weaker, political discussants are more likely to be people with whom respondents share their everyday lives (Klofstadt McClurg Rolfe 2009). This would be consistent with Downs (1957) idea of interpersonal communications finalized to obtain low-cost political information. However, the different trends we have exposed above do not change much the aggregate results, given that, in the second wave, proportions of the different circles to which people are exposed are practically identical (pre-election univariate percentages are presented in parenthesis in the last column, while post-election's are presented in the last row). Thus, no theoretical arguments can be clearly defended by looking at table 6.3 characteristics.

Another descriptive information that could help us in better understanding the relational mechanisms we are going to test is the (perceived) agreement trend between respondents and their main discussants before and after the campaign. The cross-tabulation of the two variables is presented in Table 6.4. Agreement variable is simply constructed by comparing respondent vote intentions and discussant perceived vote intentions. As it is possible to see from the cross-tabulation number of cases, the share of people who answered to every of the four answers (vote choice and perceived discussant's vote choice in pre- and post-wave) is about one third of the entire sample (1109 cases). As it is possible to see from the conditional percentages, the subgroup of those who were in agreement with their discussant in wave 1 tends to keep a larger share of cases. In other words, it is easier for a person who is in agreement with his/her discussant to maintain an agreement

situation, while is simpler for disagreeable dyads to report a situation of agreement in the second wave (a disagreeable person has 42% of chances to report an agreeable dyad in wave 2). This result is consistent with the idea of people as agreement-seekers. Two main substantive remarks must be made, however, upon this table. First of all, even though we are studying two mechanisms that, to some extent, tend to lead people to agreement – and although we are modeling our individuals as agreement-seekers citizens – it is clear the lack of theoretical thought on part of these mechanisms. For instance, it can be easily assessed how 18% of persons who were in an agreeable dyad in wave 1, after the elections, found them in a disagreeable situation. Many explanations are possible: given that we are talking about perceived vote choices, it is possible that, after the election, a quota of those who actually *thought* to be in agreement with their discussants realized that was not true. In this case, this outcome could be interpreted as an evaluation error made by the respondents and no theoretical thinking about mechanisms related to this outcome should be needed.

Table 6.4 Agreement between pre- and post-electoral survey

		Post- Dis.		
		Disagree	Agree	Total
Pre- Dis.	Disagree	57.9	42.1	100.0 (18.2)
	Agree	18.1	81.9	100.0 (81.8)
	Total	25.34	74.66	N=1109

If those cases, conversely, are not subjected to such an error, we should conclude that not the whole citizenry can be modeled as composed of agreement-seeker people, but other factors must be considered. For instance, structural characteristics of the network can lead people to pass from agreeable dyad to disagreeable ones. It is possible, moreover, that influence mechanisms could lead, as a sort of by-product, to disagreement with other dyads. Consider A, who agrees with B and disagrees with C: if, by means of an influence process, A starts to be in agreement with C, the consequence of this change is that he/she will be in disagreement with B. Having at our disposal only one discussant in the data, this hypothesis cannot be tested. In any case, those trends must be investigated more carefully. The last column of table 6.4 shows the univariate percentages of the pre- wave and the last row shows those for the post- wave. As it is possible to see, the level of aggregate disagreement slightly increases instead of diminishing. That means that, even though the mechanisms we are looking at have some sort of importance in order to shape discussion and political choices of individuals, the number of people who pass from agreeable dyads to

disagreeable ones is high and, until now, not enough investigated. This could represent a further argument supporting theoretical thinking about dyadic relations leading to disagreement.

6. Results

6.1 Selection mechanism

Model presented in Table 6.5 accounts for the presence of selection processes in the data. Consistently with the hypotheses exposed in paragraph 3.1 of this chapter, the probability of keeping the same main discussant before and after the Elections is lower for people exposed to less cohesive social groups. Coefficients for main discussants who are, in the first wave, friends or simple acquaintances are negative and significant from the reference category (that is, relatives). Predicted probabilities also tell us that the difference between different social circles is huge: relatives have a .59 probability of remain respondents' main discussants, while friends discussants probability is .39 and acquaintances is .31.

Table 6.5 Model 1. Testing selection processes (logistic regression model)

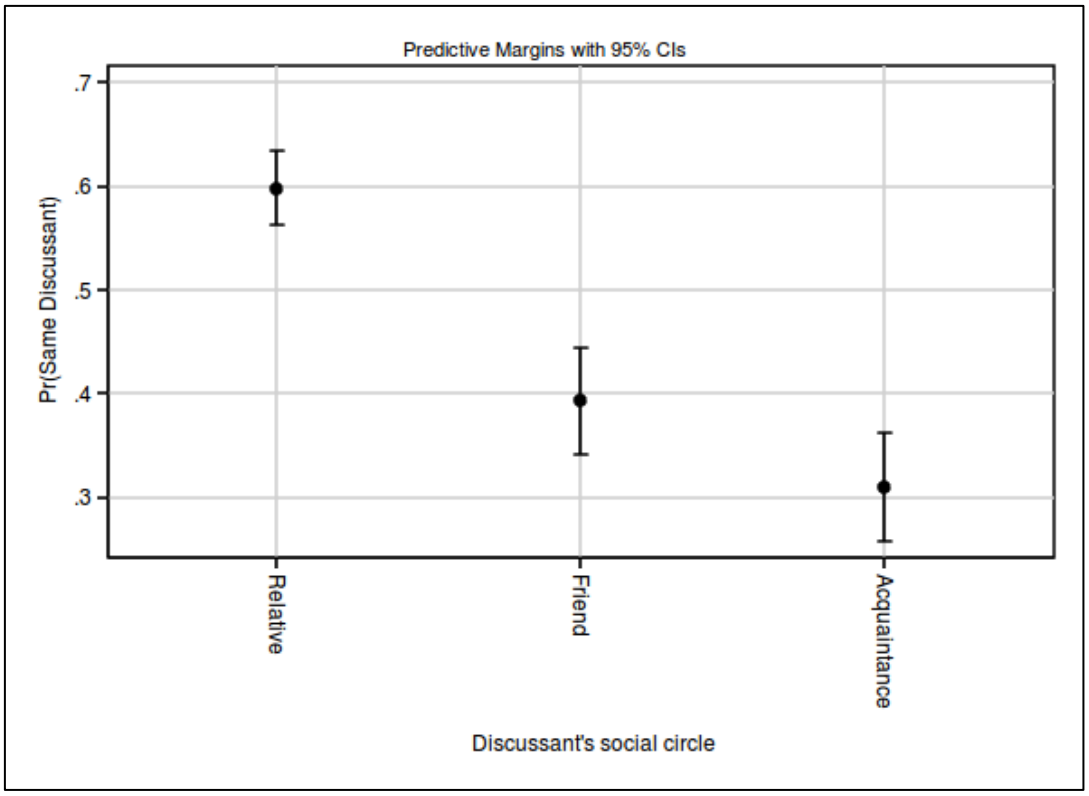
Dep. var. Same discussant	Coef.	S.E.
Disc. circle in w1 (ref. Relative)		
Friend	-0.84***	(0.14)
Acquaintance	-1.21***	(0.15)
Disagreement in w1	-0.17	(0.14)
Knowledge in w1	0.18***	(0.05)
Constant	0.16	(0.12)
Observations	1,348	
Log Likelihood	-882.47	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, it is important to notice that the difference is significant only for the family, while there is no significant difference between friends and acquaintances (see Figure 6.1). For what concerns the knowledge variable, the related coefficient is significant, but goes to the opposite side compared to the theoretical expectation (see Table 6.5): the idea was that more involved people could use

selection processes in order to have a more homogenous environment, but the coefficient tells us a very different story, that is, the more a person in knowledgeable, the less is likely that he/she changes discussant. This inconsistency can be explained by the fact that the data is based on a pre-post analysis: the fact that the two waves are so near with respect to the Election Day could mean that knowledgeable citizens have *already* made efforts to make their environment homogenous, leaving less knowledgeable ones to be more likely to change discussant.

Figure 6.1 Discussant's circle (in w1) and predicted probability of having the same discussant (in w2)



If we add the point that, usually, less involved citizens are less sure about their vote choice (Barisione Catellani De Sio in Segatti Bellucci 2009) it is possible that this uncertainty led less sophisticated people to be less protected with respect to external effects and, thus, more prone to maximize their information sources. The last variable taken into consideration, the dummy variable referring to the pre-election disagreement in the dyad, is the one that should actually account for the selection mechanism. Consistently with Bello and Rolfe (2014), the variable turns out to be not significant. In other words, disagreement in the dyad does not increase the likelihood of changing discussant. Then, our main hypothesis about selection mechanisms seems to be not supported by the data.

6.2 Influence mechanisms

Models presented in Table 6.6 accounts for several hypotheses that have been made in paragraph 3.2.

Table 6.6 Testing influence processes (4 logistic regression models)

Dep. var. vote change	Model 2a	Model 2b	Model 3a	Model 3b
Certainty of voting behavior in w1	-0.33***	-0.33***	-0.31***	-0.31***
	(0.03)	(0.03)	(0.03)	(0.03)
Disc. disagreement	0.77***		0.80***	
	(0.15)		(0.16)	
Disagreement in relatives circle		0.56**		0.66***
		(0.23)		(0.25)
Disagreement in friends circle		-0.29		-0.29
		(0.28)		(0.29)
Constant	1.28***	1.45***	0.99***	1.10***
	(0.28)	(0.27)	(0.29)	(0.28)
Observations	1,447	1,651	1,402	1,588
Log Likelihood	-702.20	-859.79	-645.87	-785.32

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As showed in Model 2a of Table 6.6, disagreement in the dyad is a strong predictor of the vote choice change in the second wave. In other words, consistently with other studies (Mutz 2002, Bello Rolfe 2014), influence mechanism seems to hold, conversely to selection one. Marginal effects show that a situation of disagreement between discussant and his/her respondent in wave 1 leads to a 14-point higher propensity to change his/her vote choice. Moreover, as easily conceivable, the strength of the decision, that is, the certainty with which people were going to vote for the party, represents a strong predictor of the probability of changing mind too. For what concerns Model 2b, things are slightly different. As anticipated in paragraph 5, Model 2b tests the hypothesis that disagreement into the network, by and large, should influence the propensity to be more volatile and, thus, to change vote choice in time. As pointed out above, in order to measure the level of disagreement among the dyads a respondent has, two measures have been employed. Similarly to measures employed in chapter 5, these represent a rough assessment of the general disagreement in

the network, according to the individual. Respondent are asked to provide, form 0 to 1, proportions of how many relatives (and friends) have more or less their political opinions. Complement of the variable to 1 gives us a sort of aggregate measure of the level of disagreement between respondent and his/her relational system. Coefficients in Model 2b show that family disagreement is significant. Moreover coefficient sign is in the direction expected by the hypotheses: the more perceived disagreement is present, the more volatile is the vote. Conversely, friends' coefficient is not significant: this can represent a partial corroboration of our hypothesis, since we have hypothesized that the effect of friends would have been weaker compared to that of relatives. For this latter coefficients we can say, looking at marginal effects, that an individual in disagreement with 100% of his/her network will have a propensity to change vote choice from wave 1 to wave 2 that is 10 points higher with respect to an individual who is declared to be in disagreement with no other individuals in the familiar network. Finally, it is important to stress that certainty of the voting behavior, as expected, remains significant and consistent with the hypotheses. The other two models are fitted to control for possible bandwagon effects, produced by the fact that, from wave 1 to wave 2, elections were held. The surprising gap with which Matteo Renzi's PD outstripped its main competitors has been hypothesized to be a possible source of biases in the post-electoral answers. The "spiral of silence", as well as the "unsophisticated voter" mechanisms have been introduced to explain this possible source of vote choice misreporting. In order to take into account this source of bias, a very rough solution has been introduced: Model 3a and 3b are fitted with a subsample of cases that erases people who changed their vote choice from any party in wave 1 to Pd in wave 2. Although the roughness of the solution, Model 3a shows us that, from the dyadic relation point of view, nothing changes. Certainty of the vote choice remains negative and significant and disagreement remains a predictor of the probability of changing vote choice. As well as in Model 3a's, Model 3b coefficients do not substantively change the interpretation of the mechanisms. Family effect remains significant and positive in predicted changes in voting behavior, while the effect of less strong ties (namely, friends) does not provide a significant coefficient. Also in this case, the certainty of the vote choice remains negative and significant.

6.3 Directional influence

So far, results have focused on adapting models from Bello and Rolfe (2014) to the Italian situation during the 2014 European Elections. Consistently with previous results, it has been showed that little empirical evidence can be provided in favor of selection mechanisms, while there are proof about mechanisms that are compatible with an influence process. However, as previously stated,

these proofs are only indirect. In other words, the fact that disagreement can lead an individual to change his/her vote choice does not assure us of the fact that the change of individual is towards the party voted by his/her discussant. As pointed out above, several influence mechanisms, with different outcomes, can be investigated: for instance, given a respondent and his/her discussant, the first can be pulled towards the second's opinion, the second can be pulled towards the first's opinion or both the discussants can agree to vote some sort of halfway. In this work, given the stress we gave to environmental effects and individual responses to them, only first case will be taken into account. As pointed out in the previous paragraph, two models will be fitted in order to provide a directional test of the influence. The first model is fitted among those who have switched vote choice in the post-election wave.

Table 6.7 Testing influence processes directionally (2 logistic regression model)

Dep. var. vote switch	Model 4	Model 5
Disc. vote choice in w1	0.52**	0.53*
	(0.24)	(0.29)
Ptv for the party	0.04	-0.04
	(0.03)	(0.04)
Constant	-2.91***	-2.85***
	(0.15)	(0.18)
Observations	2,210	1,903
Cases	380	328
Log Likelihood	-536.67	-375.23

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The matrix for these models is a stacked data matrix: that means that cases, instead of representing individuals, represent a choice*individual combination. The dependent variable is 1 if the respondent have switched towards a certain party and 0 for other choice*respondent combinations. The relevant predictor, on the other side, is the party the discussant had voted for in the first wave, according to the respondent. As it is possible to assess from Model 4 in Table 6.7 the effect of discussant's vote choice is positive and significant: in other words, discussant's vote choice for a generic party enhances the probabilities respondent has to switch towards the same, generic party.

Model 5 in Table 6.7 is fitted among respondents who changed to a party that is not the PD. In this way, the test of the second model assumes that all respondents that were genuinely convinced to vote for PD in the second wave are actually misreporting their vote choice after the elections. This

is, obviously, a hardly defensible assumption, and, however, should provide an estimate that is clearly under-estimated. As pointed out above, by employing the further sub-sampling, we are playing against ourselves: if the coefficient remains positive and significant, that means that the directional influence effect exists despite of the erase of cases that should only make the coefficient bigger. As showed in Model 5, even though the significance of discussant's vote choice coefficient is lower (the parameter is significant to 10%), the magnitude of the coefficient is unaltered: in other words, even putting extremely strong assumptions, it seems that a directional effect can actually be identified.

7. Discussion

In chapter 3, it has been stressed how a systematic theory of environmental effects would have risked to fall into sociological determinism if it had not included a set of arguments about how individual can react to stimuli coming from their network. Following Huckfeldt (1986), it has been argued how people can respond to their environment in, basically, two ways: citizens can conform, leading in this way to assimilation responses, or, rather, they can adopt strategies in order to provide conflict responses. As pointed out above, Huckfeldt conceptualization of the environment concept (especially when referring to conflict and assimilation) treated the "environment" theoretical construct in a broad sense. In this work, conversely, responses to the environment have been conceptualized as *relational* responses, that is, network responses. Thus, the concept of political disagreement has been identified as the engine of relational mechanisms that can be enacted by individuals in dyadic relations. Citizens can conform to their environment, providing agreeable answer to political stimuli, or, rather, they can provide dissonant responses, answering to their discussants' political ideas with disagreeable opinions. As stressed many times in this work, a large part of the literature has, since the first, seminal works on the topic (Berelson Lazarsfeld McPhee 1954), assumed citizens as agreement-seekers: in other words, the tendency people have in their political relations is, generally speaking, to conform to the ideas of the dominant opinion with respect to be involved in political quarrels. As showed since Leo Festinger's studies, indeed, disagreement leads to stressful situations and, consequently, to cognitive dissonance reduction strategies (Festinger 1957). The argument that sees citizens as agreement-seekers was undermined by several works (Mutz 2002, Huckfeldt Johnson Sprague 2004) that showed how situations of persistent disagreement, in addition to being empirically observed, are theoretically sustainable. These studies showed how disagreement is sustainable in a quite large number of cases and that structural characteristics of the political relation among citizens – namely, autoregressive influence

and network density – can make more or less difficult to sustain these situation of disagreement and that, generally speaking, disagreement is a fundamental characteristic of deliberative democracy (Huckfeldt Johnson Sprague 2004).

As pointed out above, persistent agreement and disagreement are not the sole conditions in which citizens live but other relational dynamic mechanisms can be recognized: in this chapter, in particular, two mechanisms have been tested: selection and influence (Bello Rolfe 2014). Both the mechanisms start from a situation of disagreement, but the individual/relational strategies discussants are hypothesized to follow, as well as social mechanisms involved, are different. From one side, selection strategies simply consist in filtering out disagreeable discussants. In other words, if A presents different opinions with respect to B, it will be more likely that B will be no longer a discussant of A. Results of previous research (Bello Rolfe 2014) found limited evidence to the employment of this mechanism and our results are not different. Results presented in paragraph 6 show that disagreement in a previous period of time does not lead to higher probabilities of change discussant. However, the social circle to which discussants belong to, contributes to explain changes in discussants' identification: people belonging to closer circles (such as relatives) are less likely to be filtered with respect to friends and acquaintances. Moreover, contrarily to theoretical expectations, politically sophisticated people tend to maintain their discussants in time compared to non-sophisticated ones.

For what concerns influence, the hypotheses are sustained by the data. It has been showed that levels of disagreement with the main discussant, as well as with the broader network, influence the propensity of change vote choice. As stressed several times in this work, this result can be accepted as an indirect proof of the influence mechanism. Basically, if the relation tells us about the fact that disagreement increases the propensity to change vote choice for the respondent, does not tell us anything about the direction of this change. In order to test directionally influence mechanism, a different technique (based on stacking) has been employed. Results of this latter model show that influence mechanism holds also directionally.

The pre-post election structure of the data was, moreover, hypothesized to lead to several misreporting that could have affected vote choices in the post-election wave. In particular, since Matteo Renzi's PD obtained a striking victory (victory that was not anticipated by pre-election polls) it has been argued that bandwagon effects could arise. A very trenchant choice has been made (creating a subsample that expunged from the analysis people who have moved from any party in wave 1 to PD in wave 2), but all the effects summarized above held.

The chapter presents some limits, especially from the data-related side. First of all, we can state, that a better understanding of the dyadic processes that are enacted during and immediately after an

election campaign can be reached by the employment of more complete network data. Employing information relating to a single discussant, although leading to the same results obtained by Bello and Rolfe (2014), could be insufficient to isolate processes that could turn out to be significant with information on more discussants. For instance, it is possible that selection processes can be enacted by individuals who are not main discussants and, thus, we could hypothesize that the more a discussant is important in one's network, the more he/she will be durably inside that network.

If we were aimed at summarizing our results, and at interpreting deeply what they mean substantively, we should arrive at the conclusion that conforming strategies exert stronger influence on citizens compared to responding to the environment in a conflictual way. Influence, according to out and other results (Bello Rolfe 2014), is unavoidably stronger than its conflictual equivalent, selection. Our results, however, do not demonstrate that negative homophily processes are absent: more likely – being homophily processes, by their nature, more stable than influence ones and, thus, more difficult to detect – homophily patterns can be tested only by means of more refined data.

Moreover, some empirical results have no theoretical covering: an example is the fact that a non-negligible percentage of respondents in our panel passes from a situation of agreement to a disagreeable relation. This is clearly against the idea of people intended as agreement-seekers, and more refined data (and longer panels) could help us in providing theories that can adequately understand these processes.

7 Discussion

The aims of this work have been various: the main aim was to construct a theory that collects arguments coming from different frameworks that can be found in the literature, providing a general set of theoretical arguments that systematizes environmental effects on voting attitudes and behavior, as well as responses that the individual can give to these pressures.

We showed how environment can be fruitfully divided in network and context. Network effects, according to Huckfeldt and Sprague (1987), are those that drive individuals towards certain political choice or, rather, contribute to maintain, or crystallize electoral choice. Context represents the larger environment which individuals are subjected to. According to our theoretical framework, characteristics of the context crucially shape the propensity that individual has of interacting with discussants who present certain characteristics. This effect, exerted by an environmental level towards another – lower – level, has been showed in different ways, especially along chapters 4 and 5.

Synthetically, results of chapter 4 can be summarized as follows:

1) Relational and contextual environments, namely networks and local place, taken singularly, exert some sort of pressure on individuals.

2) These two environments, moreover, interact among each other, that is, concordant environments lead to a reinforcement of the pressure towards individual.

3) This is particularly valid for people exposed to cohesive ties.

Results of chapter 5, rather, can be listed as follows:

1) Diffusion processes can be intended as an interaction between relational and contextual environments over time and, at the individual level, can be fueled by the exposure to less cohesive circles.
2) This diffusion is mediated by an exogenous measure of viability for the party, that has been interpreted as the threshold for the adoption.

In these chapters it has been stressed the relationship between contexts and different circles (namely, different subgroups in which the network can be divided). The main characteristics of circles is the cohesiveness of these latter, that is, the propensity to be surrounded by intimate ties or, conversely, by weak ties. It has been argued how different intimacy (or "tie strength") levels lead to different ways in which networks can alter the relation between individual, his/her network and contexts (and, in particular, the sensitivity to the context). As expected both in chapters 4 and 5, the

more the relation is intimate, the more it alters the relationship with the broader climate of opinion (that is, the context), making individual less sensitive and more coerced towards this latter. More specifically, as stressed before, the more a circle is intimate, the more it represent some kind of "social bubble" in which the individual has a distorted idea of the larger climate of opinion. Moreover, people who live their everyday life in these social bubble tend to be more coerced by their discussants in adopting a "normal" (that is, consistent with the group) behavior (Berelson Lazarsfeld McPhee 1954). Conversely, citizens who are embedded in less intimate network are more aware of the larger climate of opinion that, at the same time, is also less coercive. The third main argument of the work is related to the idea that the individual is not simply a passive recipient of environmental effects, but, rather, he/she can respond to these effects by means of relational strategies. It has been exposed that four possible, theory-driven, outcomes can be listed: together with persistent agreement and disagreement, a concordant and discordant static response to the environment, we can also witness other two responses, influence and selection, that, contrarily to the former two, are intrinsically dynamic.

Synthetically, chapter 6 provided the following results:

1) There is much more evidence concerning – as relational response to the environment – influence with respect to selection. This is consistent with previous literature.
2) Influence effects hold both for non-directional and in directional ways, that is, respondent is influenced by his/her discussant toward the party supported by the discussant in t_0.

The following paragraph (paragraph 1) investigates main results of the three empirical chapters and assesses whether these are consistent with chapter 3 theoretical framework. Paragraphs 2, 3 and 4 stress theoretical argues concerning the three topics we have briefly outlined above, that is, the relations among environmental levels, the importance of network intimacy and the role of the individual characteristics. Finally, the last paragraph will be focused on the methodological challenge we faced throughout the work, arguing how more refined data and methods would extend our knowledge.

1. Summary and main results

In chapter 4, the effect of geographical context in shaping the network has been tested. According to hypotheses exposed in chapter 3, the distribution of political preferences in a geographical (sub-national) space can affect the structure of the networks by providing the opportunities one has in encountering a certain party supporters. By means of multilevel regression models, we have found

that, as expected, network exposure (in this case, operationalized by the exposure to the so-called main discussant) represents some kind of "filter" of the broader context: it has been argued that the network affects the perception that individual has about the broader climate of opinion, boosting or depressing the effects of the context. In this case, it has been stressed that the two levels (the contextual and the network one) *interact*. If the two levels tend to be coherent, the network effect boosts the positive effect the reference individual has toward a certain political opinion (in this case, toward a better evaluation of the party). When the network is against a certain party it has been showed that, no matter about the strength of the party in the broader context, the propensities to vote for it are firmly low. This has showed, moreover, that this filtering capacity is enacted by the network only when referring to relative network. Testing strategy has led to the employment of a technique known as "stacking" (van der Eijk et al. 2006). Stacking the data matrix, providing adjustments to individual characteristics variables, has been demonstrated to be a good compromise for the study of multiparty systems, especially in situations in which what we are looking for is effects that encompass the idea of generic party (Franklin De Sio 2011) and we are not focused on the effect that a single variable exerts on a single party.

chapter 5 provided a stronger evidence of the shaping effect that had been theorized above. Employing, as case study, the rise of Movimento 5 Stelle in 2013 elections, it has been demonstrated how the shaping effects enacted by contextual level affected the prevalence of Movimento 5 Stelle supporters over time, and this has contributed to enhance the probability if being affected and, thus, converted to the new alternative. The testing strategy, rather than focusing solely on regression techniques, was based on a quite heterodox application (compared to usual simulation strategies) of agent-based modeling. As stressed in chapter 5, the usual aim that agent-based models realize are related to the logical consistency of the mechanisms hypothesized. Firstly, the model tends to be externally valid, in addition to internal validity (Liu 2011). Secondly, it assumes that agents are connected among them by a network that presents structural characteristics that define the intimacy among agents. The agent-based model showed several characteristics of the diffusion process of the Movimento 5 Stelle, but gave also useful insights of the relation between contexts, networks and individuals (see below).

As pointed out in chapter 3, conceptualized in this way, the whole theory would fall into some sort of sociological determinism, or, at least, into a "weaker", probabilistic version. A person who is affected by a combination of contextual and network would have, according to the theoretical argument exposed so far, a certain probability of being influenced, no matter about the individual and relational characteristics one has. The idea is to take away, from the "realm of chance", theoretically meaningful strategies that the individual can adopt in order to change relational and

individual outcomes and provide a theoretical framework that accounts for those strategies, their structural characteristics and the reasons why people adopt them. Four main theoretically relevant strategies have been found: the first is the so-called persistent agreement, that is, the "normal situation" in which, given two or more periods of time, the reference individual and his/her discussant are in agreement. Conversely, persistent disagreement (Huckfeldt Johnson Sprague 2004) has been detected as a situation that can be sustained by citizens, given certain "structural" conditions. However, two other relational strategies, that we have defined dynamic, can be detected: according to the first one (selection) it is expected that disagreeable discussants can be expunged from the people with which one is in relation with. The second strategy, influence, expects that people can be actively influenced, or can influence their discussant, in order to arrive, from a situation of disagreement, to an agreeable relation. In chapter 6, it has been showed that, besides others, influence and, in a weaker way, selection relational mechanisms are adopted by people to contrast or, rather, to accept, environmental – namely, dyadic – stimuli.

2. Environmental interdependency

Results of chapters 4, 5 and 6 contributed to test some of the expectations that were exposed in chapter 4, and, moreover, contributed to raise some questions related both to the methodological and to the theoretical sides. Similarly to Huckfeldt and Sprague (1995) we have showed "that democratic citizenship involves something more than individually isolated and politically independent citizens making choices that are socially and politically divorced from their surroundings". Especially in chapter 5, the strict relation between the shaping effects that context displays and the immediate reaction of the network has been exposed. In this process, the most relevant role is covered by what has been called the dialectic relationship between the individual and his/her network, that is, the fact that once political communication is hugely present in a social system (and that is truer during an election campaign), individuals are, at the same time, both subjected to the political influence enacted by someone else and actors of political influence. In a certain way, a diffusion process is one of the social processes in which this dialectic relation is better observable, because it allows to show, starting from an individual who is not "converted" to the novelty, the process according to which he/she is exposed to the novelty itself by means of interactions, is converted to that novelty and, finally, contributes to be part of the ego-network of someone else. In other words, by employing diffusion processes, it is possible to outline efficiently a relation that is permanent inside a social system, but is usually difficult to isolate, both theoretically and empirically. The interdependency among individuals, however, is not the only

dialectical relation that we can find in our theoretical framework. In addition to this type relation that can be called *horizontal interdependency*, it is possible to witness quite clearly also a *vertical interdependency*. Also in this case, the simulation in chapter 5 is enlightening. The role of the individual, the network and the context are strictly entangled: conversions among individuals change the propensity to be exposed by discussion network and, at the same time, change the contextual structure of opportunities. The structure of opportunities enhances the probability to be exposed, and that of being converted to the innovation by people who have not (yet) converted. Thus, even though we have differentiated theoretically and analyzed environmental levels and individual, it is worth to stress that these subdivisions are just a matter of theoretical and technical convenience, given that environmental stimuli and individual answers happen at once, as a part of a unique process. The subdivision between the reference individual and other citizens (people who belong to the reference individual's ego-network) is, consistently with what said above, a theoretical simplification that allows us to easily differentiate the individual and his/her environment. There is another theoretical workaround that has been employed in order to simplify theoretical argument and analysis: geographical and temporal contexts have been differentiated in order to make easier theoretical arguments about the effect exerted by these on the networks. Actually, no only-geographical effect exists and we cannot talk, in real world, about only-temporal context. More realistically, a spatio-temporal context, that is, the change in time of geographical sub-national patterns of party support is the one that actually contributes to shape the discussion network.

3. Strength of relations

As pointed out above, one of the leitmotifs of this work is related undoubtedly to the strength of the relations that individual have with their network. Strength has been represented in various ways, but its role in shaping attitudes and behavior is assumed to be, qualitatively, the same. Intimacy affects the differences with which people can be exposed to networks and, indirectly, contexts. In chapter 3, it has been argued how cohesive circles and non-cohesive ones differ for their capacity to coerce individuals who belong to them at different levels: individuals exposed to typically homogenous familiar groups tend to be more coerced by their relational surroundings situation with respect to people who are prevalently embedded in weak ties or in typically non-homogenous non-relative circles. This characteristic of different social circles presents, however, some sort of trade-off. Coercion, indeed, leads to the make relatively unlike the exposure to innovative ideas, or just ideas that belong to minorities in the group. Conversely, non-cohesive social groups tend to be constituted by weak ties and, given this characteristic, they allow the individual to be more

embedded to the "real public opinion". People who are exposed to a circle that present – with fewer biases compared to close, homogenous circles – a clearer image of public debate and the "balance of forces" that characterize a certain public opinion.

Throughout the work, we talked mainly about familiar and non-familiar circles, although, in many studies, the effects of friends, for instance, are treated as separated. In our work, however, friends' effects – who are known to exert a stronger influence compared to other people – are usually not significantly different from those exerted by acquaintances (see chapter 6). Moreover, when explicitly assumed that the "dividing line" between circles is related to the relative/non-relative cleavage, models turn out to fit well (see chapter 4 and the second part of chapter 5). Comparing this result with, for instance, US research (Huckfeldt Sprague 1995, Huckfeldt et al. 1995), where intimacy usually affects differently people, depending on the fact a person is a relative, a friend or a simple acquaintance, Italian data seem to behave in a different way. The clear difference between relatives and non-relatives could be related to the importance of the family in other spheres of social activities (such as the importance of family from the economic life, see Esping-Andersen 2013).

4. The role of the individual

Another point on which we lingered on is the role of the individual. Given that a large part of the work is based mainly on how the environment can influence citizens, the role of this latter has been declined in terms of strategies that citizens can enact in order to respond to the environment. In other words, no huge work has been made in order to relate individual characteristics to vote choices, but, rather, once we establish the role of the environment in shaping voting decisions and attitudes, we stressed mechanisms that allow individuals to permit this influence or, contrarily, to avoid it. As pointed out above, we stressed two main points in our work: first of all, results are consistent (see also Bello Rolfe 2014) in finding that influence actually exert a stronger effect with respect to selection. In other words, people, once in a situation of disagreement, tend to be influenced by, or influence their discussant instead of avoiding discussion with that individual. This is a strong evidence of the fact that people are, as stressed above, agreement-seekers and that avoiding conversations with a disagreeable person is more difficult than expected. However, it has been found that agreement-seeking, if it is sustained by some of the outcomes of our analyses, demonstrates to be less sustained by other results: for instance, a large share of people shows to behave in a counter-intuitive fashion, that is, being in agreement in a certain time and in disagreement in the subsequent moment. This idea, as pointed out above, should be investigated with exploratory analyses in order to assess possible causes to this phenomenon.

An underdeveloped side of the work is the relative little empirical deepening of how individual characteristics can mediate different environmental effects. For instance, as stressed throughout the literature (Zaller 1992) different levels of political sophistication can make the individual more or less permeable towards environmental effects. As pointed out by Sidanius and Lau (1989) in their context-related theory of extremism, political sophistication allows people to be more protected toward disagreement and to sustain their argument even though they are not popular in the context. On the contrary, people who are not able to sustain coherently their opinion and defend it are more prone to avoid disagreeable opinions and, thus, tend to be more agreeable. Few results concerning individual characteristics and relational strategies do not sustain neither disconfirm this argument: as pointed out in chapter 6, indeed, people who have a larger amount of political knowledge (and, thus, of sophistication) are more likely to maintain in time their political discussants compared to people who are less sophisticated. This could mean that less sophisticated people are less prone to sustain disagreement compared to more sophisticated ones or, rather, that these latter tend to be surrounded by agreeable people and are less prone to be in disagreement. With this respect, it is important to state that the work did not provide any conclusive answer, and more research is needed in order to assess the relation between exogenous individual characteristics and relational dyadic strategies that are enacted during and after election campaigns.

5. From concepts to results: techniques and data

In addition to theoretical arguments one of this work's aims was to provide, in the wake of what we have called the third generation of "social logic of politics" scholars, new methodological instruments that could account for the complex set of relationships that are implied by these theories. The main technical challenge that a European student of social-related voting behavior must deal with is the fact that, as stressed many times along this work, a large part of previous empirical tests in this topic are made on two-party systems. It must be stressed that, usually, hypotheses related to the social logic of politics are not focused on a single party, but, rather, hypothesized mechanisms tend to be general and to encompass every party in the political spectrum. Examples of these hypotheses can be found both in chapter 4 and 6. We are not interested to assess whether the contextual or network prevalence of party X could lead to the change of propensity to vote for party X. Rather, we are interested in assessing relations between individual and environmental level that concern every party in the political spectrum. The stacking procedure has been employed in order to assess a relation between a generic party and a generic propensity to vote for that party of both respondents and discussants with whom the former are in relation with.

Results show us that stacking can be employed usefully in providing results for network and contextual effects in multiparty systems – such as many of the European systems – and, in case we could have comparative data, among different constraints sets. The stacking procedure was slightly modified in chapter 6 in order to test systematically influence processes in a directional way and, as it can be seen, it demonstrated to be a quite ductile technique that can be employed in order to test many theoretical statements.

In addition to stacking procedures, the employment of agent-based modeling and, especially, of a model that aimed at being externally valid showed to be extremely promising in studying shaping processes enacted among individuals, networks and contexts that are usually extremely difficult to test systematically by means of simple regression models. As stressed in chapter 5, the complex set of relations exemplified by a process of diffusion cannot be efficiently tested by employing usual statistical methods: only indirect proof of our theoretical arguments can be extracted from these techniques' results. By means of agent-based models, the whole mechanism is simulated, and aggregate results of this complex process can be analyzed in order to assess whether relational and individual mechanism are actually going into the right direction. As pointed out in chapter 5, an additional attempts to test a diffusion process with case study data was made, by providing a externally valid simulation, that is, a simulation that is aimed at reproducing, instead of a generic process, the mechanisms that were going on during the election campaign of 2013, concerning the Movimento 5 Stelle pre-election trend. It is important to stress that, aiming at simulating not just a generic process, but rather *that* process, exposes the analysis to a series of technical problems and workarounds, which, given the relatively low amount of literature in political sciences, should be deepened in other works: for instance, the routine briefly explained in chapter 5 (and extended in Appendix 2 and 3), that should have make the simulation consistent with the real data, leads to a number of theoretical, technical and computational difficulties in many sides of the model, from the choice of initial values to the employment of sensitivity analyses. All these problems will be, hopefully, deepened in subsequent works, also because the role of externally valid agent-based modeling, according to who writes, could become crucial in the following years, making these techniques one of fundamental instrument of political and social sciences.

Appendix 1

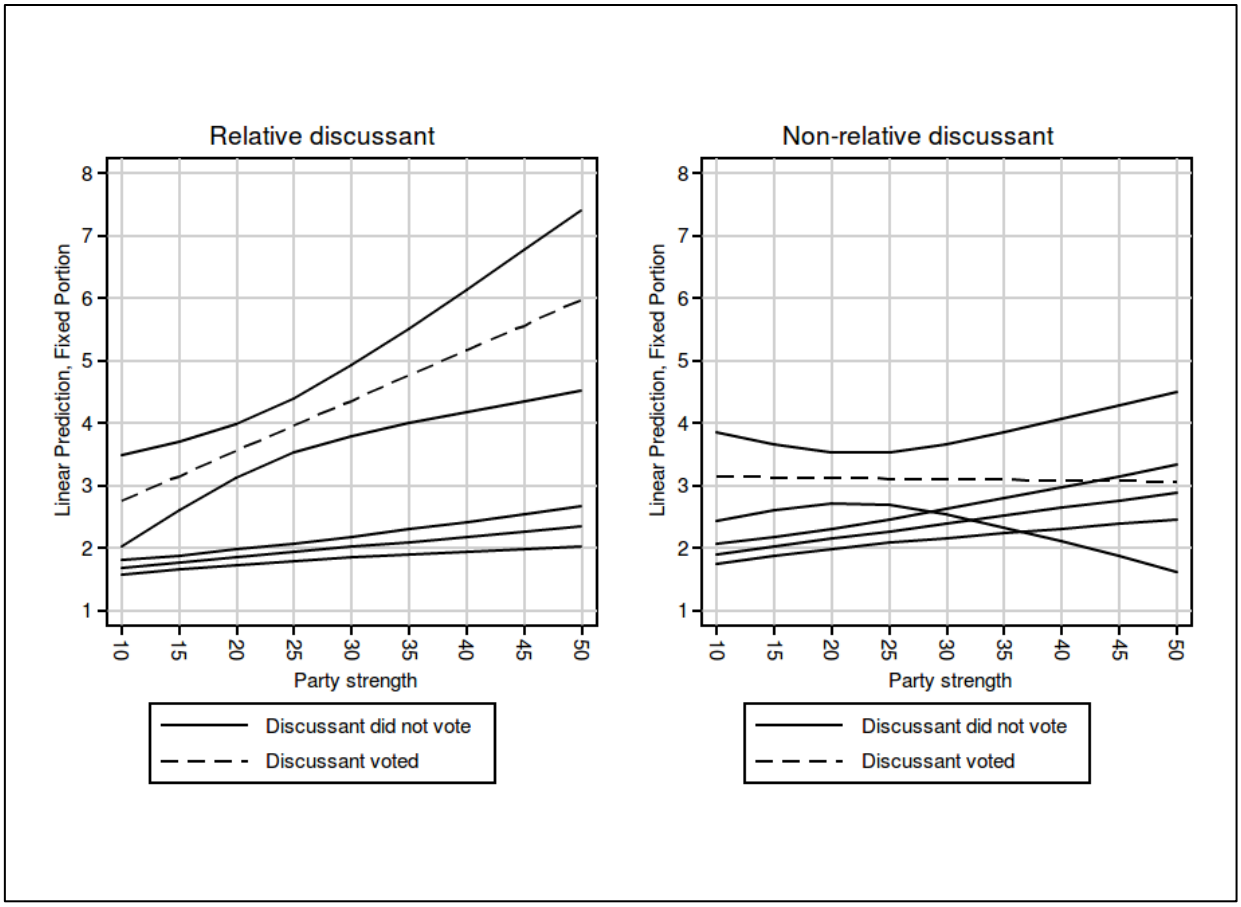
Tables and linear predictions for regression models in chapter 4 – Strength of the parties at the provincial level.

Table A1.1. Multilevel regression models

	Model 1		Model 2		Model 3	
Dependent variable: Ptv	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Discussant voted for the party	1.39***	(0.15)	0.94**	(0.43)	0.42	(0.60)
Local vote for the party (Prov)	0.02***	(0.00)	0.02***	(0.00)	0.02***	(0.00)
Non-relative discussant (ref. relative)					0.13	(0.15)
Disc. Voted * Local vote			0.02	(0.02)	0.06**	(0.03)
Disc. Voted * Non-relative					1.09	(0.85)
Non-relative * Local vote					0.01	(0.01)
Disc. voted * non-relative * Loc. Vote					-0.09**	(0.04)
Left-Right Distance	-0.52***	(0.01)	-0.53***	(0.01)	-0.52***	(0.01)
Edu. lvl. (y-hat)	0.59***	(0.14)	0.59***	(0.14)	0.59***	(0.14)
Gender (y-hat)	0.18	(0.31)	0.18	(0.31)	0.18	(0.31)
Age (y-hat)	0.24**	(0.09)	0.24**	(0.09)	0.24**	(0.09)
Social class (y-hat)	0.23**	(0.09)	0.22**	(0.09)	0.22**	(0.09)
Constant	3.68***	(0.09)	3.70***	(0.09)	3.65***	(0.10)
Level-2 Variance	2.18***	(0.01)	2.18***	(0.01)	2.17***	(0.01)
Observations	4,181		4,181		4,181	
Number of groups	1,113		1,113		1,113	
Log Likelihood	-9,557.60		-9,556.97		-9,547.37	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure A1.1. Linear prediction (fixed portion) for Models 3 (relative and non-relative discussant)



Appendix 2 – The ABM initialization process

As pointed out in chapter 5, the initialization process of the agent-based model is non-straightforward. This appendix will briefly explain the problem and the workaround that has been employed in order to be able to run the model.

1 The problem

As pointed out in chapter 5, what we are going to provide with the ABM presented above is an externally valid simulation (Liu 2011). Moreover, we want to have an externally valid simulation that provides also relational measures valid in accordance with the real data. These two requirements of the simulation need to be deepened by means of examples in order to understand the workaround we propose.

Imagine a lattice structure as that exposed in Table A2.1, left panel. The lattice structure is composed of 9 agents who can be A agents or B agents. Imagine that A and B represent parties support. If we did not need any relational validity criteria, but, rather, we were interested only in individual criteria, making the ABM valid would be quite easy. Imagine that we have real data that tells us that A agents are 44% of the real-data sample, while B agents are 56% of the same sample. We can validate our ABM by assigning a definite probability to every cell in the lattice and by comparing it with a random number drawn from a uniform distribution. Written in pseudo-code, this operation should be something similar to what exposed below:

```
FUNCTION indiv
FOR (i=1, i<=3, i++)
FOR (j=1, j<=3, j++)
rnd = DRAW_RANDOM_UNIFORM(0,1)
IF rnd <0.44 THEN matrix[i,j] = A
ELSE matrix[I,j] = B
```

The routine, for every cell *i,j* of the matrix, draws a random number from a uniform distribution. If the random number is below 0.44, the agent is an agent A, otherwise, the agent is B. In this way, it is possible to obtain randomly lattice structures that respect the requirement of having a 44% of A agents and a 56% of B agents. A agents and B agents could be distributed in several ways, such as in central and right panel of Table A2.1.

Table A2.1. Validating an ABM only with individual characteristics

?	?	?
?	?	?
?	?	?

A	A	A
B	B	B
B	A	B

A	B	B
B	A	A
A	B	B

However, we are not only interested in providing simple individual validity, but also relational one. That means that the position of A and B agents must be validated by the aid of real data. Since we have just two types of agents (A and B agents), we need only a distribution that tells us, in the real data, how agents should be placed on the lattice. Imagine that we actually have the data, and that the distribution can be depicted as follows. 33% of agents is surrounded by 60% of agents who agree with them (that is, A agents are surrounded by 60% of A agents and 40% of B agents), 44% of agents agree with 66% of surrounding agents, 11% of agents agree with 75% of agents and 12% of agents agree with 80% of surrounding agents. Both the individual and relational requirements are depicted in Table A2.2, left and right panel

Table A2.2. Individual and relational validation requirements

A or B agents	%
A agents	44
B agents	56
Total	100

Agreement	%
With 60%	33
With 67%	44
With 75%	11
With 80%	12
Total	100

The requirements showed above can, of course, be fulfilled by recurring to a closed solution. It is possible to start from one part of the lattice and providing some pseudo-random procedures that, iteratively, could lead to a solution of the problem. In this case, however, we opted for a quicker and effective method, that can be defined a random search method.

2 The random search method: theory and pseudo-code

A brute-force search, sometimes called "exhaustive search", is a widely used method of finding non-closed solutions in computer sciences, mathematics (Slaney Fujita Stickel 1995), cryptography (Sasaki Aoki 2009) and biology (Holm Park 2000). One of the main characteristics of the brute-

force search is that, given a problem that can have finite solutions, brute force search tries every possible parameter combination until the subroutine fits. A more promising solution for our case is a variant of the brute-force method, based on random number generators (the so-called "random search"), that, thus, does not exhaust every possible combination of parameters.

The main advantages of this family of search methods is surely the fact that the algorithm does not need closed solutions (that is, the researcher is not requested to provide some kind of mathematical workaround to find iteratively parameters combination that fulfill validation requirements). The only possible drawback of this kind of procedure is the fact that it can be demanding in terms of computational power and CPU employment.

A random brute-force procedure to find a structure of the lattice that fulfill the two requirements, the individual and the relational one, can be written in pseudo-code as follows.

```
FUNCTION indiv
FOR (i=1, i<=3, i++)
FOR (i=1, i<=3, i++)
rnd = DRAW_RANDOM_UNIFORM(0,1)
IF rnd <0.44 THEN matrix[i,j] = A
ELSE matrix[i,j] = B

FUNCTION validate
WHILE (mat_validated=0)
RUN indiv
rel_table = CONSTRUCT_REL_TABLE(matrix)
IF rel_table = real_rel_table THEN mat_validated=1
ELSE mat_validated=0
```

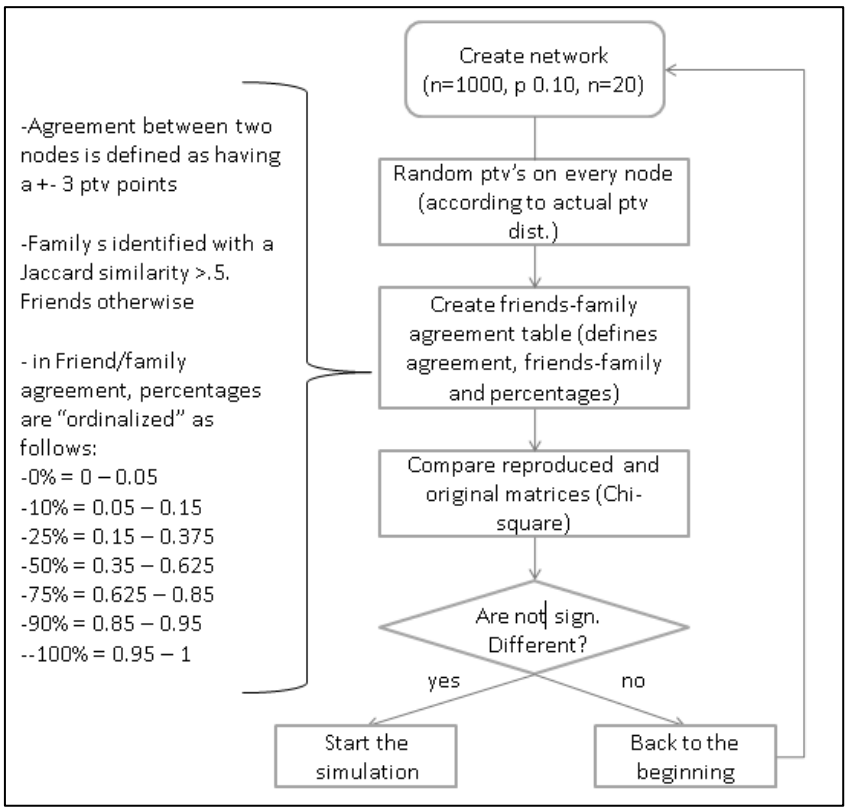
The pseudo-code is constituted by two functions: the aforementioned indiv function provides a matrix in which the sole individual characteristics are controlled. The validation function is based on two different steps. A function constructs the relational table of the random-lattice just created. In this case, it is not important how the relational table has been created. The second step compares the reproduced data with the real ones. If the reproduced table is different from the real-data one, the iteration restart by producing another random lattice whose adherence to real data will be tested. The process ends when the two lattices are equal (in this case, the third lattice of Table A2.1 is one of the solutions of the process).

3. The solution in our ABM

So far, we have focused on a simplified case with respect to the ABM in chapter 5. First of all, the example deepened above is based on lattice data and, contrariwise, the ABM is developed with network data. Secondly, the example presented above must control for just one source of agreement/disagreement, while, instead, chapter 5's ABM presents two different "agreement rules" (with friends and with relatives). In other words, an agent must be in agreement with a certain proportion of friends and familiars. During the initialization, once randomly inserted, individual characteristics serve to construct a simulated relational table that will be compared to the real-data one.

In Figure A2.1 it is exposed a flowchart representing the initialization process and the random search of a data-driven network.

Figure A2.1. Flowchart of the ABM initialization



The first step is the creation of a Watts-Strogatz random network with 1000 agents, re-writing probability of .10 and 20 neighbors on average (Watts Strogatz 1998). In it important to underline that sensitivity test have been made in order to assess whether the network structure could influence the outcomes of the simulation. Simulation has been run with a structure cases/p/neighbors equal to

100/0.001/8, 200/8/0.0025 and 500/16/0.0025. No relevant differences in the outcomes have been registered.

Once created the network, data-driven ptv's are randomly assigned to every agent (the proportion of different ptv for the Movimento is extracted from the actual distribution in the fist week data). Given the ptv's, binary vote choice (declaring to vote or not for the Movimento) can be extracted from the data without problems (see table 5.3). Ptv's will serve for two aims: the first is to operationalize the threshold, the second is to operationalize agreement between the agent and its network, that will serve, in turn, to compare the data-driven and the simulated matrix. As pointed out in chapter 5, agreement between two agents is coded in the simulation as a difference of less than 3 points in Movimento's ptv. If $agent_1$ has a ptv equal to 2 and $agent_2$, say, has a ptv equal to 4, the two agents are in agreement. Moreover, as pointed out above, relatives and friends are operationalized as having Jaccard similarity index, respectively, larger than .5 and lower than .5. Having stated these two properties, every agent is in agreement with a certain share of its friend or relative circle. As stressed in chapter 5, these shares of agreeable agents must be "ordinalized" in order to make them compatible with the cross-tabulation exposed in table 5.3, as pointed out in figure A2.1[39]. In this way we can employ two different tables: the first one is the data-driven table, the other one is the simulated table, constructed accordingly to the aforementioned rules, as in table A2.3:

Table A2.3. Real and simulated cross-tabulations: example

Real data

Relatives \ Friends	0	.1	.25	.50	.75	.90	1
0	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}	a_{17}
.1	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}	a_{26}	a_{27}
.25	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}	a_{36}	a_{37}
.50	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}	a_{46}	a_{47}
.75	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}	a_{57}
.90	a_{61}	a_{62}	a_{63}	a_{64}	a_{65}	a_{66}	a_{67}
1	a_{71}	a_{72}	a_{73}	a_{74}	a_{75}	a_{76}	a_{77}

Simulated data

Relatives \ Friends	0	.1	.25	.50	.75	.90	1
0	s_{11}	s_{12}	s_{13}	s_{14}	s_{15}	s_{16}	s_{17}
.1	s_{21}	s_{22}	s_{23}	s_{24}	s_{25}	s_{26}	s_{27}
.25	s_{31}	s_{32}	s_{33}	s_{34}	s_{35}	s_{36}	s_{37}
.50	s_{41}	s_{42}	s_{43}	s_{44}	s_{45}	s_{46}	s_{47}
.75	s_{51}	s_{52}	s_{53}	s_{54}	s_{55}	s_{56}	s_{57}
.90	s_{61}	s_{62}	s_{63}	s_{64}	s_{65}	s_{66}	s_{67}
1	s_{71}	s_{72}	s_{73}	s_{74}	s_{75}	s_{76}	s_{77}

Instead of a_{11}, a_{12} or s_{11}, s_{12} etc. we will find the cell percentage of every combination of agreement. If, say, 30 agents are in agreement with 50% of friend and 50% of relatives, s_{44}, the cell of the 50%-50% combination will be 3 ((30/1000)*100). Obviously, real-data matrix remains fixed during the

[39] As for networks characteristics, several sensitivity tests have been made in order to assess whether different agreement, friends/relative and percentage parameterizations could influence outcomes. It actually turned out that these combinations are the sole realistic ones that allow the random search procedure to fit and provide a suitable network.

random search procedure. How do we assess whether the difference between the two tables is significant or not? For our purpose, it is possible to say that assessing the difference between these two tables is very similar to a chi-square test, in which the real-data matrix is the expected data matrix, and the simulated data is the observed matrix. A simple Pearson's test of independence will provide a chi-square statistics, that will assess the probability that the two matrices are statistically different (Greenwood Nikulin 1983). If the two matrices are not different at a threshold of 10% (this happens in case the differences between the random matrix and the real-data matrix are small) we accept the null hypothesis, we state that the two tables are not significantly different[40] and the routine will use the network just constructed to start the simulation. The random search procedure, in the contrary, continues in case of the two matrices are statistically different, starting from the beginning of the initialization subroutine (producing a new network with, for each node randomly assigned ptv's).

[40] In the code presented in table 5.3, the chi-square is made by means of log-linear models (Agresti 2014). Of course, the two procedures are mathematically equivalent.

Appendix 3

Below is exposed the commented source code of the agent-based model presented in chapter 5 and the initialization process presented in Appendix 2. This is a single-core version of the algorithm. For the results in chapter 5, a multiprocessor version of the code, implemented by employing Rmpi package on the CISCA Cluster of the University of Trento and available on request, has been employed.

```
######## BEGIN ########


rm (list = ls())


### load libs

library(igraph)

library(reshape2)

library(MASS)


### Load the original matrix from the data

amifam_orig <- matrix(c(0.50,0.00,0.10,0.00,0.10,0.10,0.00,

                        0.20,0.40,2.01,0.81,0.50,0.20,0.00,

                        0.10,1.61,5.74,6.24,3.42,1.41,0.40,

                        0.00,0.40,3.22,9.67,11.68,3.83,2.32,

                        0.20,0.40,1.51,5.14,9.57,7.35,2.32,

                        0.10,0.10,0.60,1.51,3.32,6.95,2.72,

                        0.00,0.00,0.10,0.10,0.50,0.50,2.01),ncol=7,nrow=7)


### Gives column and row names

colnames(amifam_orig) <- c("0","0.1","0.25","0.5","0.75","0.9","1")

rownames(amifam_orig) <- c("0","0.1","0.25","0.5","0.75","0.9","1")


### entire numbers
```

```
amifam_orig <- round(amifam_orig,digits=0)

#### Set parameters
cases <- 1000
neigh <-10
rrpr <- 0.01
days <- 41
agrtol <-3

### Generate the random network
 g <- watts.strogatz.game(1, cases, neigh, rrpr)

###  Generate similarity matrix
 jaccard.sim <- similarity.jaccard(g)

### Adjency matrix
adj <- get.adjacency(g)

### Erase elements of Jaccard  similarity matrix who are not conncected.
jaccard.adj <-  matrix(0,ncol=cases,nrow=cases)

#### Create final jaccard matrix
      for(i in 1:cases) {
        for(j in 1:cases) {
          if (adj[i,j] ==1) {
            jaccard.adj[i,j] <- jaccard.sim[i,j]}
        }
      }


      ### some info about the graph
```

```
      degree(g)
      mean(closeness(g),normalized=TRUE)
      ### construct ptv structure

      chisq <-1

##### brute force method subroutine
      while(chisq>0.10) {

ptvm5s <- matrix(0,nrow=cases)

### Create ptv's on cases according to real data
        for(i in 1:cases) {
          count <- runif(1,min=0,max=100)
          ptvm5s[i][count<= 43.91]<-0
          ptvm5s[i][count> 43.91 & count<= 50.86]<-1
          ptvm5s[i][count>50.86 & count<=55.39]<-2
          ptvm5s[i][count>55.39 & count<=59.21]<-3
          ptvm5s[i][count>59.21 & count<=64.35]<-4
          ptvm5s[i][count>64.35 & count<=72.91]<-5
          ptvm5s[i][count>72.91 & count<=79.15]<-6
          ptvm5s[i][count>79.15 & count<=85.50]<-7
          ptvm5s[i][count>85.50 & count<=89.63]<-8
          ptvm5s[i][count>89.63 & count<=92.04]<-9
          ptvm5s[i][count>92.04 & count<=100.00]<-10
        }

### set ptv difference between agents
        ptvdiff <- matrix(0,ncol=cases,nrow=cases)
```

```
        for(i in 1:cases) {
          for(j in 1:cases) {
            ptvdiff[i,j] <- ptvm5s[i]-ptvm5s[j]
          }
        }

        totfam <- matrix(0,nrow=cases)
        totami <- matrix(0,nrow=cases)
        countami <- matrix(0,nrow=cases)
        countfam <- matrix(0,nrow=cases)

        ### Algorithms assumes that nodes with jaccard distance less than .5 are
"friends" while
        ### people with jaccard dist >= .5 are family
        ### Algorithm also assumes that "having the same opinion is having a ptv
that is +3/-3 between the two nodes"

        for(i in 1:cases) {
          for(j in 1:cases) {
            totami[i][jaccard.adj[i,j]>0 & jaccard.adj[i,j]<=.5] <- totami[i]+1
            totfam[i][jaccard.adj[i,j]>0 & jaccard.adj[i,j]>.5] <- totfam[i]+1
            countami[i][jaccard.adj[i,j]>0 & jaccard.adj[i,j]<=.55 &
ptvdiff[i,j]>=-agrtol & ptvdiff[i,j]<=agrtol] <- countami[i]+1
            countfam[i][jaccard.adj[i,j]>0 & jaccard.adj[i,j]>.45 &
ptvdiff[i,j]>=-agrtol & ptvdiff[i,j]<=agrtol] <- countfam[i]+1
          }
        }

        aminet_s <- countami/totami
        famnet_s <- countfam/totfam

        ### aglorithm assumes some thresholds for aminet and famnet
```

```
aminet_s2 <- matrix(0,nrow=cases)

aminet_s2[aminet_s <= 0.05] <- 0
aminet_s2[aminet_s > 0.05 & aminet_s <= 0.15] <- 0.10
aminet_s2[aminet_s > 0.15 & aminet_s <= 0.375] <- 0.25
aminet_s2[aminet_s > 0.375 & aminet_s <= 0.625] <- 0.50
aminet_s2[aminet_s > 0.625 & aminet_s <= 0.85] <- 0.75
aminet_s2[aminet_s > 0.85 & aminet_s <= 0.950] <- 0.90
aminet_s2[aminet_s > 0.950 & aminet_s <= 1] <- 1

###

famnet_s2 <- matrix(0,nrow=cases)

famnet_s2[famnet_s <= 0.05] <- 0
famnet_s2[famnet_s > 0.05 & famnet_s <= 0.15] <- 0.10
famnet_s2[famnet_s > 0.15 & famnet_s <= 0.375] <- 0.25
famnet_s2[famnet_s > 0.375 & famnet_s <= 0.625] <- 0.50
famnet_s2[famnet_s > 0.625 & famnet_s <= 0.85] <- 0.75
famnet_s2[famnet_s > 0.85 & famnet_s <= 0.950] <- 0.90
famnet_s2[famnet_s > 0.950 & famnet_s <= 1] <- 1

###

amifam_rep <- as.matrix(prop.table(table(aminet_s2,famnet_s2)))
amifam_rep <- round(amifam_rep * 100)
zero_mat <- matrix(0,nrow=7,ncol=7)
afamrep1 <- dim(amifam_rep)[1]
afamrep2 <- dim(amifam_rep)[2]
```

```
        amifam_rep<- cbind(amifam_rep,matrix(0,nrow=(afamrep1),ncol=(7-
afamrep2)))

        afamrep1 <- dim(amifam_rep)[1]

        afamrep2 <- dim(amifam_rep)[2]

        amifam_rep<- rbind(amifam_rep,matrix(0,nrow=(7-
afamrep1),ncol=(afamrep2)))

        colnames(amifam_rep) <- c("0","0.1","0.25","0.5","0.75","0.9","1")

        rownames(amifam_rep) <- c("0","0.1","0.25","0.5","0.75","0.9","1")


        orig <- melt(amifam_orig)

        orig$type <- "orig"


        rep <- melt(amifam_rep)

        rep$type <- "rep"


        all <- rbind(orig,rep)

        names(all) <- c("fam","ami","n","type")

        all$fam <- as.factor(all$fam)

        all$ami <- as.factor(all$ami)

        all$type <- as.factor(all$type)


### test, by means of a loglinear model, the difference between the generated
matrix

### and the original one. If difference is not significant we found a suitable
matrix for the ABM

        fm <- loglm(n~fam + ami + type + fam:ami, all)

        print(c(fm$lrt))

        chisq <- pchisq(fm$lrt, fm$df)

        print(chisq)

}


### Add vote choice on the basis of real data
```

```
votem5s <- rep(0,cases)
rndcnt <- 0
for (i in 1:cases) {
  rndcnt <- runif(1,min=0,max=100)
  votem5s[i][ptvm5s[i]==0 & rndcnt <=0.23] <- 1
  votem5s[i][ptvm5s[i]==1 & rndcnt <=1.45] <- 1
  votem5s[i][ptvm5s[i]==3 & rndcnt <=5.26] <- 1
  votem5s[i][ptvm5s[i]==4 & rndcnt <=9.80] <- 1
  votem5s[i][ptvm5s[i]==5 & rndcnt <=11.76] <- 1
  votem5s[i][ptvm5s[i]==6 & rndcnt <=25.81] <- 1
  votem5s[i][ptvm5s[i]==7 & rndcnt <=31.75] <- 1
  votem5s[i][ptvm5s[i]==8 & rndcnt <=56.10] <- 1
  votem5s[i][ptvm5s[i]==9 & rndcnt <=54.17] <- 1
  votem5s[i][ptvm5s[i]==10 & rndcnt <=97.47] <- 1
}

#### generate talk variable
talk <- rep(0,cases)
rdncnt <- 0
for (i in 1:cases) {
  rndcnt <- runif(1,min=0,max=100)
  talk[i][rndcnt <=2.13] <- 0
  talk[i][rndcnt >2.13 & rndcnt <=8.51] <- 1/7
  talk[i][rndcnt >8.51 & rndcnt <=22.59] <- 2/7
  talk[i][rndcnt >22.59 & rndcnt <=47.01] <- 3.5/7
  talk[i][rndcnt >47.01 & rndcnt <=57.35] <- 5.5/7
  talk[i][rndcnt >57.35 & rndcnt <=100.00] <- 7/7
}
#### create matrices of simulation-based  data before starting the ABM
#### votem5s -  cases x days
```

```
votem5s_t <- matrix(0,ncol=(days+1),nrow=cases)
votem5s_t[,1] <- votem5s



#### ptvm5s -  cases x days
#### register ptvs day by day
ptvm5s_t <- matrix(0,ncol=(days+1),nrow=cases)
ptvm5s_t[,1] <- ptvm5s

#### convinced by familiar or friend?

famconvin <- matrix(0,ncol=(days+1),nrow=1)
amiconvin <- matrix(0,ncol=(days+1),nrow=1)

### simulate the whole process
y <-1
for(y in 1:days){
  print(y)
  votem5s_t[,y+1] <- votem5s_t[,y]
  for(i in 1:cases) {
  listjs <- 0
    for(j in 1:cases) {
      if(listjs==0 & adj[i,j]==1){
        listjs <- c(j) }
      else if (listjs!=0 & adj[i,j]==1){
        listjs <- c(listjs,j)
      }
    }
   discuss <- sample(listjs,1)
   rndtalk <- runif(1,min=0,max=1)
   ptvm5s_t[,y+1] <- ptvm5s_t[,y]
```

```
   rnddisc <- runif(1,min=0,max=1)

   randconv <- runif(1,min=0,max=10)

### If ego declared to vote for M5s and alter not, convincing process starts

      if (votem5s_t[i,y]==1 & votem5s_t[discuss,y]==0 & randconv <
ptvm5s_t[discuss,y] & rndtalk < talk[i] & rnddisc < talk[discuss]) {

       votem5s_t[discuss,y+1] <- 1

       count <- runif(1,min=0,max=100)

       ptvm5s_t[discuss,y+1][count<= 0.60]<-0

       ptvm5s_t[discuss,y+1][count> 0.60 & count<= 1.19]<-1

       ptvm5s_t[discuss,y+1][count>1.19 & count<=2.38]<-3

       ptvm5s_t[discuss,y+1][count>2.38 & count<=5.36]<-4

       ptvm5s_t[discuss,y+1][count>5.36 & count<=11.31]<-5

       ptvm5s_t[discuss,y+1][count>11.31 & count<=20.83]<-6

       ptvm5s_t[discuss,y+1][count>20.83 & count<=32.74]<-7

       ptvm5s_t[discuss,y+1][count>32.74 & count<=46.43]<-8

       ptvm5s_t[discuss,y+1][count>46.43 & count<=54.17]<-9

       ptvm5s_t[discuss,y+1][count>54.17 & count<=100.00]<-10

       if (jaccard.adj[i,discuss]<0.5000) {

         amiconvin[y+1] <- amiconvin[y+1]+1

       }

       else {

         famconvin[y+1] <- famconvin[y+1]+1

       }

      }

### If ego declared not to vote for M5s and alter did, convincing process starts

      else if (votem5s_t[i,y]==0 & votem5s_t[discuss,y]==1 & randconv >
ptvm5s_t[discuss,y]) {

        votem5s_t[discuss,y+1] <- 0

        count <- runif(1,min=0,max=100)

        ptvm5s_t[discuss,y+1][count<= 52.73]<-0

        ptvm5s_t[discuss,y+1][count> 52.73 & count<= 60.97]<-1

        ptvm5s_t[discuss,y+1][count>60.97 & count<=66.42]<-2
```

```
        ptvm5s_t[discuss,y+1][count>66.42 & count<=70.79]<-3
        ptvm5s_t[discuss,y+1][count>70.79 & count<=76.36]<-4
        ptvm5s_t[discuss,y+1][count>76.36 & count<=85.45]<-5
        ptvm5s_t[discuss,y+1][count>85.45 & count<=91.03]<-6
        ptvm5s_t[discuss,y+1][count>91.03 & count<=96.24]<-7
        ptvm5s_t[discuss,y+1][count>96.24 & count<=98.42]<-8
        ptvm5s_t[discuss,y+1][count>98.42 & count<=99.76]<-9
        ptvm5s_t[discuss,y+1][count>99.76 & count<=100.00]<-10
        if (jaccard.adj[i,discuss]<0.5000) {
          amiconvin[y+1] <- amiconvin[y+1]+1
        }
        else {
          famconvin[y+1] <- famconvin[y+1]+1
        }

     }

  }
print(famconvin[y+1])
print(amiconvin[y+1])
}

### collect the results and plot M5s trend during the campaign
res <- as.data.frame(matrix(NA,nrow=(days+1),ncol=0))

res$day <- seq(1,days+1)

res$m5sv <- 0

for (i in 1:days+1) {
  res$m5sv[i] <- table(votem5s_t[,i])[2]
```

```
}
res$m5sv <- (res$m5sv/cases)*100
plot(res$day,res$m5sv)
```

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