The impact of social networks on leadership behaviour

The impact of social networks on leadership behaviour

Dimitrios C Christopoulos[1,2]

Abstract

Dominant streams in leadership literature conceptualise it either as a role within sociopolitical structure or as a behavioural predisposition of agents. Leadership roles are determined by decisional power, most typically related to the hierarchical and structural position of agents within sociopolitical networks. Limitations in attaining meaningful predictions of leader potential can be related to the separation of leadership as an agency attribute from leaders as structurally embedded agents. Social network analysis allows for the contingent examination of both. In this article, a number of hypotheses are tested via an empirical case study where interaction and affiliation networks across multiple decision experiments are coupled with attribute and psychometric data of the actors. In this quasi-experimental setting, leadership emergence is studied among four groups of undergraduate students faced with a decision choice in an iterative political simulation game. Findings suggest that in egalitarian political systems, centrality in social networks is directly associated with political success, while in political systems imbued with power inequalities successful actors are idiocentric brokers. Methodologically, this study frames role simulation games as quasi-experimental tests. Group interactions can be controlled, but vitally also incorporated in studies of perceptions, behaviours and group outcomes. The use of attitudinal micro-surveys, psychometric tests, observation and relational surveys is combined for a comprehensive mapping of group dynamics suited to questions of agency. In conclusion, there are a number of insights offered on deploying these methods in tandem and the challenges inherent in such a research design.

Keywords

leadership experiments, educational simulations, social networks, exceptional agents, research design

Leadership and social networks

Accounts of exceptional agency in political action often fail a litmus test of objectivity. Glorious leaders and inventive political entrepreneurs are coached in superlative terms that distract from an objective examination of their impact on decisions or collective goals. To decouple political action from notions of heroic agency requires examining actors as being potentially exceptional. This has to be done in tandem with an examination of the relational structures that could facilitate exceptional action. Leadership and political entrepreneurship are the most commonly theorised exceptional political behaviours. In the present research design, we capture exceptionality as a behaviour, as a reputation and as a process. We consider this important for constructing realistic models of political outcomes which would provide comprehensive descriptions of political agency. As Hollander (1978) has convincingly claimed, leadership is produced by the right combination of leaders, followers and situations.

Situations obviously determine opportunity structures and are fundamental in the likelihood for leaders to emerge. The implication is that we cannot consider agents *in vitro*, devoid of their structural context. Decision 'situations' entail an actor's relational environment, what is often termed their social network. Leaders only exist within such a social context. In that respect, we can consider the structure of actors' relations to determine who among them are better placed to take advantage of opportunities for action.

[1]Public Governance and Sustainable Development, MODUL University Vienna, Vienna, Austria
[2]Department of Geography, Luxembourg Institute of Socio-Economic Research (LISER), Esch-sur-Alzette, Luxembourg

Corresponding author:
Dimitrios C Christopoulos, Public Governance and Sustainable Development, MODUL University Vienna, Vienna, 1190, Austria.
Email: dimitriscc@gmail.com

Within groups, 'decision making almost always involves some form of leadership' (Dyer et al., 2009: 781). At the most elemental level of decision making, even an incremental action can generate a new outcome. The process can be construed as leadership if it results in a change in group dynamics or behaviour. Leadership is therefore inextricably linked with action, which is why it is often judged by the perceived effectiveness of agents in attaining outcomes. Evidence of leadership can therefore be sought in instances of change in relational structure or outcomes. Leadership can be conceptualised as the point at which an actor acquires agency, if the effect of the underlying action is transformative for a group.[1]

We contend here that it is not necessary to associate leadership with 'heroic' individuals or indeed with extraordinary outcomes. This is reinforced by work demonstrating that a dominant individual or dominant group is not necessary for social outcomes to be generated (Dyer et al., 2009). A leader seen as one of potentially many agents whose actions alter the way a group behaves constitutes a much more realistic model of human behaviour as related to political decision making. In that respect, we are predominantly interested in mapping the social position and psychological predispositions of all agents in a social system. Social position can be surmised by the place actors occupy within their social networks and the status conferred through social hierarchies, while their predisposition (their propensity to act) can be inferred through psychometric evaluations of their personality or assessments of their actual behaviour.

When not confused by the messianic metaphysics of great leaders as heroic saviours, leadership is most often associated with generalised assumptions of charisma:

> Charisma refers to the ability of a leader to exercise diffuse and intense influence over the beliefs, values, behaviour, and performance of others through his or her own behaviour, beliefs, and personal example. (House et al., 1991: 366)

So, charisma is seen to be determined by the personality of the leader, the relationship between leader and follower and the position of leaders in social structure (House et al., 1991: 366). Charismatic leaders are seen to have an exceptional communication style that includes a captivating voice tone, making direct eye contact, showing animated facial expressions, while having a powerful, confident and dynamic interaction style (Kirkpatrick and Locke, 1996: 38). Political scientists have considered this type of charisma to be associated with rhetorical competence directed at changing the order of preferences of other actors (McLean, 2002; Riker, 1986). At the same time, Balkundi et al. (2011) have found evidence that actors consider charismatic those that are central, implying that actors could consider charismatic formal leaders because of their hierarchical role.

It is symptomatic of the glorifying assumptions of some authors in the leadership literature that these agents are assumed to be endowed with universally positive attributes.

They are seen to be inspirational, effective, creative and powerful. They are assumed to be able to transform social groups and provide aspiration and vision to those they lead (Bass, 1985; Burns, 1978). Great leaders are seen to make a difference by transcending the ethos of their times. They make a difference by being different themselves (House et al., 1991).[2] All these notions have been criticised as a romantic view of leaders, which amplifies their role in social change (Meindl et al., 1985). James Meindl (1995: 330) has further argued that the personality of the leader is not a significant substantive and causal force on thoughts and actions of followers. Leadership is often subjective, borrowed from vernacular use, while it constitutes a composite of a number of different processes both at the individual and at the group and societal level (Meindl, 1995: 339). Meindl (1995) hypothesises that centrality will be inversely correlated with the group mean leadership construction (p. 337).[3] This hypothesis can also be related to the work of Sparrowe and Liden (2005) who find that sharing trust ties with a leader is only beneficial if the leader is central in the organisational advice network.

The role of followers is also fundamental while it has been often overlooked. The follower needs to be not only amenable to presumed manipulation but also receptive to leadership.[4] This is obviously related to the distribution of power within social groups and the potential for such power relations to be ritualised, to get institutionalised and to acquire permanence. Understanding the role of followers is also fundamental for comprehending social dynamics in situations where leadership is fluid or contested. To that end, it is not adequate to just model the behaviour of the occasional leader but of the whole social system which they affect. Gary Yukl (1999) has pointed to the fact that 'most people have dual roles as a leader and follower' (p. 40). Looking at decision making in teams, Friedrich et al. (2009) find evidence that group tasks are achieved by collective leadership, where a number of individuals emerge as leaders to guide a group through specific challenges. This is a finding also supported by the work of Schreiber and Carley (2008) who call for a paradigm shift away from notions of 'heroic' leadership (p. 326).

Political agents are most often assumed self-interested utility maximisers (Arce, 2001; Holcombe, 2002), while belief and value systems are assumed to determine their behaviour (Jenkins-Smith and Sabatier, 1994). There is a long tradition in political science of assuming that 'beliefs also provide norms, standards, and guidelines that influence the actor's choice of strategy and tactics … [while] a belief system influences but does not unilaterally determine, decision making' (George, 1969: 191). Preoccupation with decision making among leaders has also prompted interest in an agent's cognitive map, political culture and ethics (George, 1969).

In the organisational behaviour literature, leadership interventions (as training, workshops, etc) are found to have

on average 66% positive outcomes compared to 34% for control groups based on a meta-analysis of 200 lab and field studies (Avolio et al., 2009). The implication is that leadership behaviour can be learned and actors can adjust their behaviour to attain leadership outcomes. Dansereau et al. (1995) have also made the pertinent point that leaders change styles over time depending on the situation. While Ron Burt has further suggested that exceptional agents are probably those capable of shifting roles between brokerage and closure to suit the challenges of particular situations (Burt, 2005; personal correspondence). Indeed it can be argued that leadership is associated with privileged positions in social structure, that is, the centrality or brokerage of actors. In the case of brokerage, Burt (2005) views leadership as one of the benefits of brokerage. When actors attain leadership based on some form of expertise, then their brokerage roles imply boundary spanning actors (Fleming and Waguespack, 2007). But in the context of political contest, leadership is more directly associated with reputation (Ahlquist and Levi, 2011) and brokerage facilitates the coordination tasks associated with a leadership role (Mehra et al., 2006). It is a fair assumption that leader effectiveness depends on the ability of the leader to broker different clusters within their political support base. Indeed it is possible that an ability to maintain structural holes between clusters gives a leader the ability to capitalise on their brokerage (Burt, 2005). At the same time, leaders, by their prominence, are susceptible to being perceived as Janus-faced since strong ties matter more than weak ones when the stakes are high (i.e. issue salience) (Krackhardt, 1990, 1992) and a leader in a brokerage position would be torn between different group norms. The study of networks of power is inevitably linked to theories of structural balance and insights that can be derived from Simmel and Heider (Krackhardt and Handcock, 2007). At the same time, effective leadership is not solely determined by the interpersonal and relational skill of agents. We should also note the relevance of cognition and charisma examined in other parts of this article.

A strong preoccupation with agency can be seen as instrumentalist, while at the other end of the theoretical spectrum there are those that claim that agents play little role in social change and that social factors and institutional settings determine the behaviour of individuals. What can be broadly termed a structuralist argument maintains that agents are constrained within structures on which they have very limited control. It is not necessary to be drawn into the structure and agency debate or even to try the impossible task of operationalising Giddens' (1984) concept of structuration to recognise that we have to integrate structural characteristics to accounts of agency. Bob Jessop (2002) has offered a valuable insight in that respect: structure and agency logically entail one another, and therefore, an analysis of agency should entail an analysis of structure. Anthony Giddens' (1984) and Nikos Mouzelis (1995) have developed a theoretical argument on the duality of structure: structure is both the means

and the outcome of human action.[5] It is therefore counterproductive to attempt to distinguish one from the other. A contingent representation of structure and agency can be achieved via an analysis of actor social networks.

Social networks, cognition and exceptional agency

There is a growing literature within Social Network Analysis (SNA) on exceptional leaders. This is most often published within the field of organisational behaviour and psychology. There are a number of pertinent insights that political science can draw from this. The structure of organisations is seen to determine 'opportunities and constraints for emergent leaders' (Balkundi and Kilduff, 2006: 422). Effective leaders are 'aware of the relations between others; the strength and quality of ties among others; benefits and contributions of others to the network and the existence of cleavages' (Balkundi and Kilduff, 2006). The actions of rivals, social mobility, change in political resources among other actors and clustering within the social environment constitute fundamental information for effective political action. Of course all this assumes that political outcomes are the product of strategic action and intentional positioning among actors. This may not be the case. Political and social outcomes can be the result of random coincidence or the outcome of a process of a high order of complexity. In such a case, actors could not be expected to be effective strategists.[6] The extensive literature on leadership emergence (review in Ensari et al., 2011) has considered the way political leaders fit prototypical qualities among a group (Foti et al., 1982) to emerge as leaders. Under the assumptions of this theory, leaders emerge through a competitive process that favours those that meet the task needs of the group (Foti and Hauenstein, 2007).

But a number of cognitive distortions determine leadership perceptions. Humans, in perceiving their relational topology, regularly simplify social structure acting as 'cognitive misers' (Krackhardt and Kilduff, 1999) and typically amplify the centrality of prominent actors. Distorting heuristic shortcuts are well documented in prospect theory (Kahneman and Tversky, 1979) and have been shown to regularly affect social agent assessment of opportunities and risk. The cognitive processes involved in purposeful action are shown to entail a 'tension between reason and emotion' (Frith and Singer, 2008: 3875), while the context of interference between emotions and reason is influenced by 'our sense of fairness, altruistic punishment, trust and framing effects' (p. 3879). At the same time, affect and cognition are seen to be inextricably linked (Avolio et al., 2009: 780). This points to the limits of models of rational action as employed in game theoretic accounts.

According to Balkundi and Kilduff (2006), leadership can be explored with sociometric analysis by looking at evidence of an agent's popularity, leadership and 'borrowed glory'

(p.433). Popularity can be measured by indegree centrality (number of incoming ties) as it has been demonstrated that high indegree has a positive effect on team performance (Balkundi and Kilduff, 2006). Betweeness centrality (being an intermediary between others) has also been associated with leadership (Balkundi and Kilduff, 2006). While borrowing the glory of others implies being strategic in associating with others. Effective leaders therefore have high eigenvector centrality (globally best connected, taking account of local clusters) (Balkundi and Kilduff, 2006).

In this study, we will therefore test for effects of centrality on leadership by examining the following research questions:

> *RQ1*. Perceptions of political leadership are positively associated with the standard measures of network centrality (namely, degree, Bonacich, eigenvector and betweeness centrality).

This hypothesis is closely related to earlier work that associates centrality and power (Christopoulos and Ingold, 2015; Knoke et al., 1996; Laumann and Pappi, 1976).

An influential analysis combining psychometric with sociometric data by Kalish and Robins (2006) finds that individualistic and neurotic actors tend to maintain structural holes in their ego networks. Brokerage is directly associated with entrepreneurship and is typically considered as exceptional behaviour. Actors capable of bridging structural holes in social structure are assumed to engender personal and social benefits. We have used a scale developed by Burt et al. (1998) that measures the personality constraints on agents to capture those that are most likely to take exceptional structural positions. We accordingly examine the following:

> *RQ2*. Agent personality constraint is associated with brokerage roles in the social network.

Burt et al. (1998) found that people with low network constraint tended to be independent (idiocentrics) who thrived on change.

Of particular relevance to an analysis of political leadership is the behaviour of political agents in environments where domination is not feasible or where it is unlikely. In most contemporary representative democratic systems, the most common strategy of political actors is one of coalition building and of managing their ties to powerful other actors. Coalition building decouples rank and power; 'strategizing individuals must … base their decisions not only on observables, … but also on details of the differentiated relationships between individuals within the group' (Barrett et al., 2007: 562). Political actors depend on understanding the strength and type of relations among other actors in their environment. Indeed their ability to form coalitions depends on the

accuracy of their horizon of observability (i.e. knowing the friends of their friends).[7] It also depends on whether they can have a good cognitive map of sociopolitical exchange; indeed the degree to which they can achieve exceptional actions could very well depend on having an accurate cognition of political space (Christopoulos, 2006).[8]

Humphrey (1976) has proposed that primates have to deal with an ephemeral and ambiguous social environment that leads them to develop 'social intelligence'. Indeed social structure complexity involves interactions between individuals, the quality and frequency of relations, as well as the patterns of social structure (Hinde, 1976). Taking into account the fact that the relational environment is relatively fluid and that social environments are rarely homogeneous gives a measure of the cognitive task facing social agents. Ability to navigate the constantly shifting social network maize determines the success of political agents.[9] This underpins our interest in social complexity and the multiplex parallel agent relations.[10] Social actors have to maintain multiple roles within an environment that is too complex for any single actor to comprehend. Pentland (2007) has developed these arguments to claim that group decisions take advantage of collective human intelligence.[11]

Schreiber and Carley (2008: 327) have suggested that to advance our understanding of the agency of leadership, we need to also take a longitudinal perspective as well as conduct a multilevel analysis of the complex organisations within which agents are embedded. This would account for the fact that agents are not homogeneous just because they belong to the same interaction system. There is indeed a call for theories that would be geared to account for the dynamic, heterogeneous and path creative possibility of leadership action within network systems (Kilduff et al., 2008: 97) as well as the spatial geometry of their interaction space (Vallacher and Nowak, 2008).

The political capital of exceptional agents

Political capital has been hypothesised to consist of a multitude of different resources. Most often, it is confounded with social capital (Lin, 2002) or is perceived as a reputational resource of agents. Indeed transactional political capital can be seen as some form of credit conceptualised as 'exchange units' expended by leaders attempting to influence followers (House et al., 1991: 364). In Sørensen and Torfing (2003), 'political capital refers to the individual powers to act politically that are generated through participation in interactive political processes linking civil society to the political system' (p. 610). They refer to access to decision making as endowment, capability to make a difference as empowerment and their perception of themselves as political identity (Sørensen and Torfing, 2003). Diverging from the definition offered by Sørensen and Torfing (2003) who consider endowment to also entail rights and competencies of actors

(p. 624), we instead define two key determinants of actor political capital: (1) an actor's endowment of political resources and (2) their empowerment through political institutions or social structure.

Endowment is an intangible resource that actors project and deploy in their political space, and empowerment is the institutional and sociopolitical structure that determines their opportunities and constraints. In classic definitions of political power (Lukes, 2005; Scott, 2001), political capital endowment is considered as a resource that accrues to political agents. And although the vagaries of political life can distort the distribution or success of political endeavour, it should be acknowledged that this resource grows commensurate with the political power of actors. Political capital is sometimes employed synonymously to reputation or power but it should not be confused as identical. So, political capital endowment could be seen as an actor-controlled resource that gets augmented the more successful an actor is at achieving specific political outcomes. Sørensen and Torfing (2003) have found that 'those that have a considerable amount of political capital increase it even further by virtue of their participation in governance networks' (p. 632). In political systems, not all agents have the same initial endowment. Or as Sørensen and Torfing (2003) claim, the operating principle seems to be 'to those who have, more shall be given' (p. 627).[12] An uneven distribution in the initial level of political capital of agents makes a difference on their ability to further accumulate this resource:

> *RQ3*. Initial political resource allocations affect the success of agents at amassing endowment political capital.

If this statement can be generalised, there are obvious implications for democratic political systems. If early uneven distribution of political resources could exaggerate an actor's political power, then representative democracies are not equipped with the institutional structures that would produce a level playing field for political participation.

Empowerment political capital is measured here through an analysis of the social structure and interaction between the agents in the quasi-experimental setting of a decision simulation. Assessing political decisions accounts for the institutional and organisational constraints of agents.[13]

Methodology: a decision simulation in a quasi-experimental research design

Participants

To test some assumptions in the literature and to create a reliable setting for measuring the effect of social networks on decision making and the emergence of leadership, we have monitored the behaviour of four small groups of second- and third-year undergraduate student volunteers during a series of decision simulation games. This constituted part of an assessed course on European Union (EU) politics that students attended during Fall 2009 in England (procedural details in Appendix 1). A total of 36 students (average age: 22.5 years; standard deviation (SD): 3.56) were randomly assigned to four different groups.[14] A protocol was designed to control for the accrual of political capital in political action and to measure their political behaviour taking account of their pre-existing and evolving social networks. We also captured their propensity for action and their impressions of the leadership of others.

Procedure

The volunteers were surveyed on multiple aspects of their interaction over an 8-week period during which they had to decide on four different policy questions in four meetings that lasted 50 minutes on average. The decision task implied they had to reach a majority decision. Votes were by secret, attributable ballot. After each vote, their voting choice was made public. During the four events, students took between one and four ballots to reach a majority decision. In total, groups held between seven and nine ballots in the course of the four sessions. Multiple decision choices on a variety of topics within a decision game render this a quasi-experimental design. Hypotheses are therefore explored inductively in the present design.

Treatment and control groups

The experimental group had differential initial voting weights that were amended upwards by 20% every time they were on the majority coalition. In effect, their political capital increased if they were successful at placing themselves on a winning coalition. To do so, they would need to have a fair understanding of the relations among others. By announcing their voting preferences after they all had cast their votes, actors became subject to relational dynamics including non-reciprocation costs. By recognising that there are multiple future iterations of similar decisions, actors were expected to treat each voting event as part of a series of iterated games. Difference in voting weights was on the order of 1:3 at the beginning of the decision simulations and reached 1:7 by the end of the voting iterations, reflecting the consistency of success of some actors in the decision experiments. Actors in control groups had equal voting weight across all decision games. The experimental condition was designed to represent political environments where political actors are endowed with differential intangible resources and where their success in political interaction is reflected in the growth of those resources and influence. This intangible resource is well captured by the theoretical notion of endowment political capital.[15]

Micro-surveys

In order to maintain the interest and engagement of student volunteers, surveys were short and frequent. In this way, we are confident of marginal cross-contamination of the different types of data collected (attribute, sociometric and psychometric). Each survey instrument was designed to take less than 10 minutes to complete. These consisted of a longitudinal survey on social interaction (four issues), a survey on their cognitive assessments of social structure, a short psychometric survey of their personality[16] and a survey on leadership attributes of others in their group.[17] Reported analysis is based on surveys that have attained over 81% response rates except for leadership assessments of team members where we managed just over 52%. Surveys were completed by volunteers with minimal inducements or sanctions which made 100% response rates unlikely. Volunteers who participated in less than three of four events have been eliminated from this analysis.[18] This attrition poses obvious limitations on the analysis and interpretation of results.

Operationalisation

We next outline concept proxies and list the variables employed. We seek to make data and validity limitations apparent and explicit. To investigate the relationship between network centrality and leadership (RQ1), we have employed an assessment of reported peer leadership. Respondents were requested to rate 'colleagues on their leadership in building successful coalitions during the simulation game' on a 5-point Likert scale.[19] They were also asked to rate a number of attributes such as respect, trust, confidence, domination and communication skill. We aggregated and binarised the data to indicate a positive perception of leadership and other attributes for the top 2 choices of the Likert scale. Centrality measures reported are among those most frequently employed, namely: degree centrality (number of ties), betweeness centrality (number of times an actor is in the geodesic between others), eigenvector centrality (a centrality measure that takes account of global connectedness) and Bonacich power (a centrality measure that weights the effect of being connected to well connected others).

The instrument measuring personality constraints and its association with brokerage (RQ2) is borrowed from Burt et al. (1998). A 10-item scale generates a score. High values on this scale, according to the authors, indicate actors in search of authority that thrive on change, while low values indicate actors that value security and stability. Again the scale was binarised, with positive values for those with above-average scores within their cohort.

Finally, to account for the effect of the variations between treatment and control groups in the allocation in voting rights and aggregation of political capital (RQ3), we measured the ratio of times an actor was on the winning coalition (winner variable) and account for their initial voting endowment.

Controls

In the present quasi-experimental design, we do not control for decision options of agents or the process through which they reach a decision. Original positions were not mapped, and therefore, actor motivation is assumed to be associated with experimental incentives and the natural competitiveness of agents. The ability of agents to engage in discussion and exchange information or opinion beyond the confines of the decision game environment further limits the generalisability of conclusions that can be offered here.

Empirical evidence

We first conduct a multidimensional scaling (MDS) analysis of the actor attribute, sociometric and behavioural variables to explore the associations between them (Graph 1). The data set is aggregated for the treatment and control groups.

As evident in the MDS graphs for both parts of the data set, there is a distinction between attribute variables (communication skills, confidence etc), sociometric variables (indegree, outdegree, etc), psychometric assessment and frequency with which they have been on the winning coalition. These groupings are more clear in the case of the treatment group.

A general analysis of the four groups in this study indicates that they have developed different network dynamics. After 8 weeks of interaction, we see evidence of a difference in core-periphery structures and centralisation. Table 1 details these differences in sociometric values.

There is great variation in elemental network structure. The differences are larger among the treatment groups than among the control groups, which are relatively homogeneous. As evident from looking at the graph depiction of the four groups (Graph 2), there is wide variation in network structure here. Treatment 1 is very centralised, has a pronounced core-periphery structure and has low density and low levels of transitivity, compared to the other groups. Treatment 2 and control 2 have very similar network structure, while control 1 has higher reciprocity but lower transitivity from the latter two. This mixed picture of network structure, although not ideal for exploring the hypotheses set, we consider realistic of group dynamics. Thankfully, for the philosophers of free will, human agents are not cellular automata. At the same time, the variations in network structure could pose some problems of interpretation and indicate the need for further experiments and a validation of results on the basis of simulations.

Peer-assessed leadership is found to be positively and significantly associated with different measures of centrality for the control but not the treatment groups. It is correlated to agent popularity (indegree centrality), brokerage (betweeness centrality), global connectedness (eigenvector centrality) and connectedness to powerful others (Bonacich power)
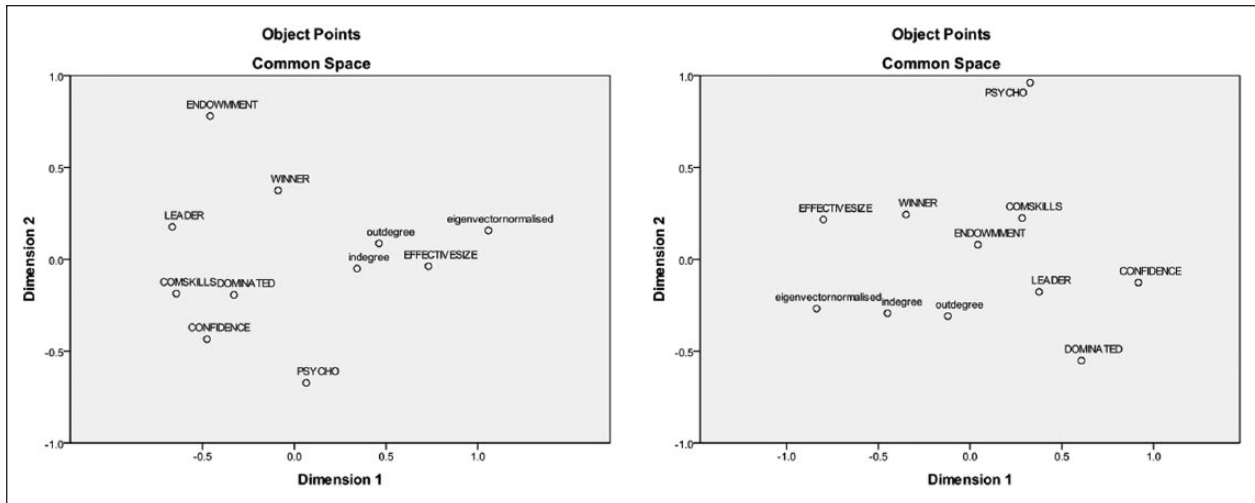
Graph 1. MDS of key variables in the treatment and control groups.
Proxscal, Euclidean distance model; normalised raw stress .014 and .018, respectively.

Table 1. Treatment and control group differences in network structure.

	Density	Transitivity[a]	Transitivity[b]	Graph clustering	Reciprocity	Centralisation
Treatment 1	0.155	17.6	5.8	0.267	0.272	67.7
Treatment 2	0.321	57.1	27.9	0.622	0.384	44.7
Control 1	0.375	38.5	17.7	0.489	0.500	35.9
Control 2	0.319	63.6	32.1	0.498	0.352	33.4

Directed data of interactions between groups.
[a]Percentage of ordered triples in which $i \rightarrow j$ and $j \rightarrow k$ that are transitive.
[b]Percentage of triangles with at least two legs that have three legs. Definitions of concepts in Wasserman and Faust (1994).

in the control groups (Table 2). For the more politically realistic case of treatment groups, where political power varies among actors, we find no strong evidence of an association. Beyond the obvious small n limitations of this analysis, we could assume that equal voting weights (control condition) create the preconditions for central actors to benefit from their structural position and dominate by exercising leadership. An inherited differentiated power structure (treatment condition) allows network peripheral actors to dominate resources without obliging them to invest in social interaction. Actors with high levels of political capital do not need to be central to create a pull to their position at the time of coalition formation.

In Graph 3, we have a clear depiction of the variation in success between the treatment and control groups. In the control groups, the most central actors are the most successful. Social centrality translates to influence in political interaction. In the treatment groups, the opposite seems to be the case. Peripheral actors (even an isolate) are most successful in coalition formation. Leadership of the group is determined by the relative weight of the initial endowment. This seems to follow the biblical parable in Mathew 13:12, 'those that have will be given more'. A linear regression with the dependent variable being the percentage

of times on the winning coalition finds a significant association with initial endowment for the treatment groups (adj. R^2: .238; b: .532; sig.: .023), while in the control groups the significant association is with eigenvector centrality (adj. R^2:.364; b: .634; sig.: .005).

This preoccupation with initial political allocations is the theme of our third hypothesis. Initial political resource allocations indeed affect the success of agents at amassing endowment political capital. We employ logistic regression to attempt and determine whether being on a winning coalition can be predicted through attributes or sociometric characteristics of agents.

The only significant predictor variable in both the linear and the logistic regression for treatment groups is leadership. Explaining low levels of variance does not allow us high predictive validity, while the exclusion of all other variables denies us the option of comparatively assessing the effect of different variables on the dependent variable. However, control groups demonstrate stronger associations. Whether a person was highly central between others and whether they dominated the discussion were significantly and linearly associated with the possibility of being in a winning coalition. Their overall network centrality (eigenvector) was also associated with their probability of being in a winning coalition in
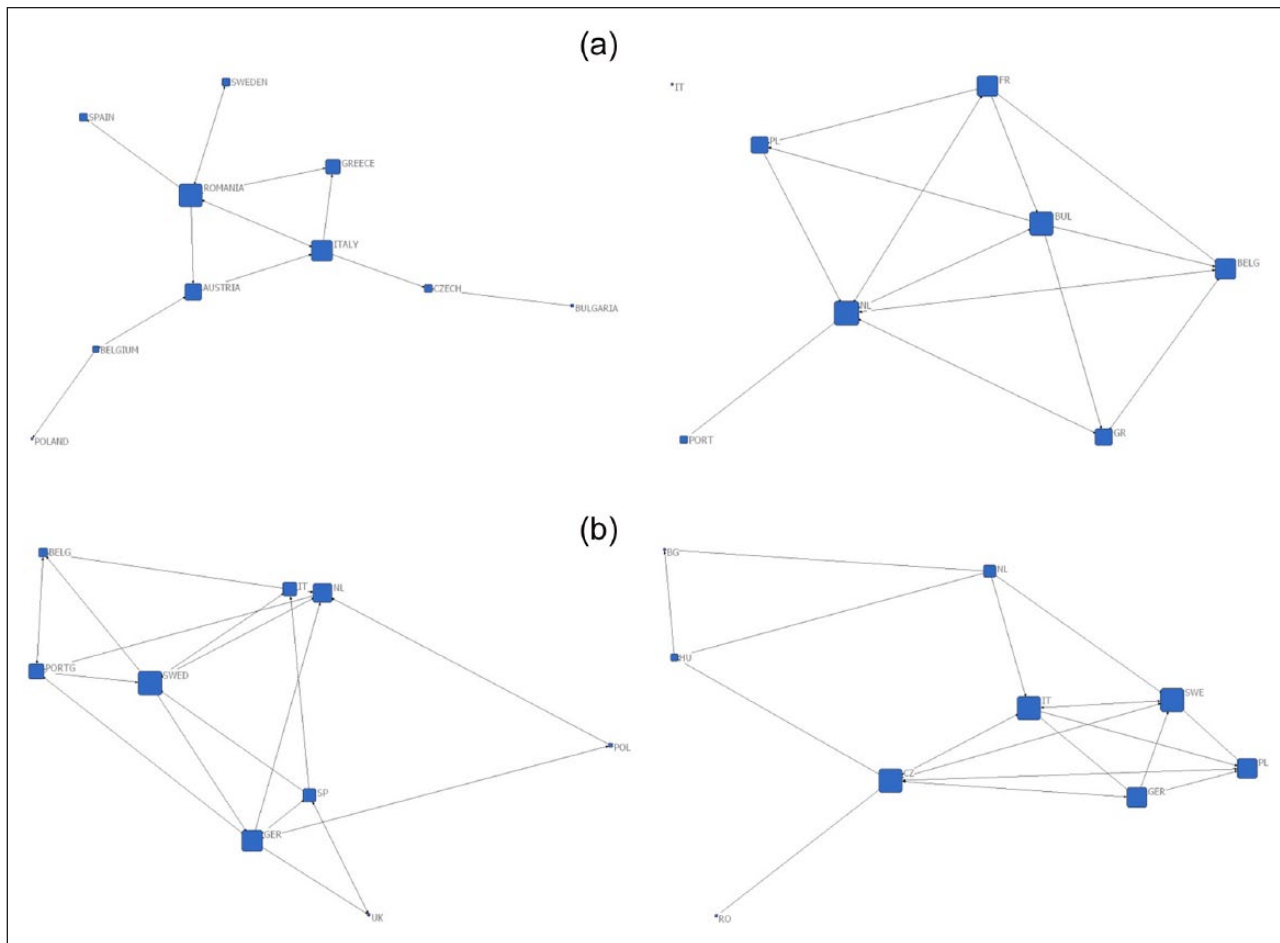
Graph 2. Multidimensional scaling of reported interactions between agents: (a) T1 and T2 and (b) C1 and C2.
Data dichotomised, eigenvector weighted.

Table 2. Correlations of leadership and authority assessments with network centrality.

		Indegree	Inbonacich	Eigenvector normalised	Betweeness
Leadership	Treatment	−.134	−.132	−.231	.048
	Control	.434*	.485**	.776***	.577**
Authority	Treatment	.255	.299	.251	.473**
	Control	.054	.075	.396	.165

Significance indicated at *<.1; **<.01; ***<.001.

the logistic regression model. Overall, as with the correlations, the control groups produce more robust results, (Table 3).

Discussion

The statistical analysis indicates a relationship between political endowment and political impact.[20] An unequal distribution of power in the treatment groups skews the probability of actors to gain more power. When there is substantial variegation of power, then there are also many structural holes. Actors with most power are not always prepared to play the role of brokers. Indeed they are likely to be less social than others and have fewer connections than average.

It appears that social space in the control groups is more dynamic, with actors' centrality more directly associated with their success in the game.

We found evidence of support to an association between centrality and group perceptions of leadership for the control but not the treatment groups (RQ1). At the same time, there was only marginal association between our psychometric proxy for authoritative behaviour and betweeness centrality on the treatment group (RQ2). This was the only significant association observed indicating that the measure does not correlate well with centrality in our data set. As originally assumed, centrality was the key predictor of the success of agents for the control groups, while initial endowment was
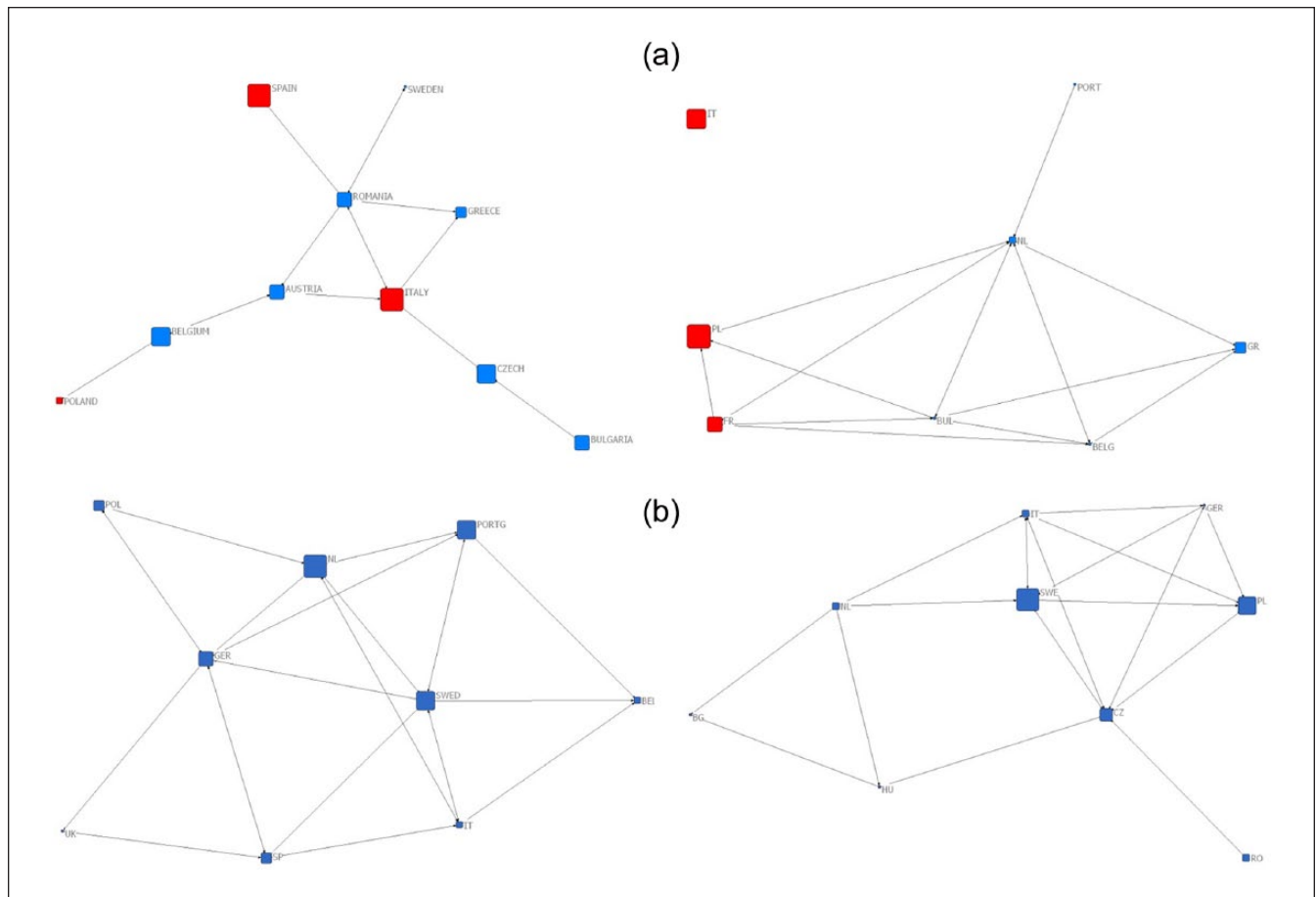
Graph 3. Multidimensional scaling of reported interactions weighted by success in coalition formation: (a) T1 and T2 variations in endowment political capital and (b) C1 and C2 equal endowment in political capital.
Red nodes are endowed with higher voting weights at the beginning of the series of simulations.

Table 3. Success as measured by being on the winning coalition.

Logistic regression				
	Nagelkerke R^2	Independent variables	B (exp)	Sig.
Treatment	.300	Leadership	2.35	.060
Control	.664	Eigenvector	.296	.044
Linear Regression				
	Adj. R^2	Independent variables	B	Sig.
Treatment	.185	Leadership	.482	.043
Control	.554	Betweeness	.473	.016
		Dominated	.465	.018

the highest predictor in treatment groups (RQ3). The peripheral position of actors with most resources in the treatment groups was instructive of their role in the network.

The two key insights of our analysis is the association of brokerage to leadership (RQ2) and evidence of the Matthew effect in the groups studied (RQ3). Beyond the obvious caveats to generalisation offered in other parts of this article, it is important to point out that each of these findings merits

further research attention. Brokerage here is associated with a crude proxy of brokerage, betweenness centrality, which entails both medial and radial features (see Brandes et al., 2012). More sophisticated measures of brokerage such as honest brokerage or Burt's structural hole measures (see Christopoulos and Ingold, 2015) hold the promise of a more accurate picture of privileged network positions to perceived leadership. At this point, we can merely deduce that

the psychometric profile of agents is associated with their brokerage in political networks. This is not surprising and has been confirmed in a number of studies of organisational behaviour beyond political settings (Avolio et al., 2009). The fact that a strong Matthew effect is detected under quasi-experimental conditions in political networks is well within theoretical expectations. What has not been determined with the present analysis and remains to be resolved in tests of higher explanatory power is the relative impact of networks versus actor power. In other words, it is evident that political power (as political capital) and relations affect the leadership effectiveness and reputation of actors, but what has not been determined is the relative impact of each one to actor effectiveness.

Research design implications

The use of role simulation games to teach political science is well established (Asal and Blake, 2006; Gredler, 2004), but their use in collecting relational data is less common (Enfield et al., 2012). In this project, we use role simulations in order to deal with the research challenge of situating actors within the context of group decisions. This design has allowed us to investigate the effect of actor affiliations in their success on leading others. It also allowed examining a fundamental research hypothesis of political action, namely, the effect of unequal distributions of power on its aggrandisement. A high degree of realism in the simulation was feasible due to the familiarity of volunteers with the decision context. This includes the rules and practice of weighted voting within majoritarian executive meetings, such as the ones of the EU Council under Treaty of Nice rules. At the same time, the high levels of simulation granularity (i.e. the use of a realistic scenario) increase not only student motivation (Gredler, 2004) but also the complexity of data collection while it can proliferate potential confounding factors. Appendix 1 presents an outline of the simulations protocol. Beyond apparent limitations associated with small n studies, there are a number of other caveats which are considered next.

The research design stipulates the collection of five different types of data from a group tasked with taking a policy decision. These are as follows: (a) relational data, (b) psychometrics, (c) attitudinal data, (d) cognitive data and (e) voting and decisions. Different instruments and protocols had to be devised for each one of these data types as outlined in Appendix 1. The use of micro-surveys of three to four questions was designed to take less than 10 minutes to complete, so as to limit participant fatigue. These instruments were not tested for sequence effects as they were administered separately, but this concern merits further methodological scrutiny. A key concern in deploying a barrage of such instruments is the compatibility of the underlying assumptions to the methodological traditions informing them. As firmly empiricist, all are judged fundamentally compatible on their epistemological assumptions, although the observational task (e) could be conceived as interpretivist under

certain conditions. In such a case, an analysis of this type of data could follow a mixed-methods design. The key challenge with the current research design was to ascertain content and construct validity of individual instruments while guaranteeing they would not 'cross-contaminate' answers in follow-up instruments. For that reason, (c) attitudinal and (d) cognitive data were sequenced to be collected after simulated decisions had been reached. Participants were therefore innocent of the study's research questions on leadership and could only have recognised a research interest on their social networks. Overall, the use of quasi-experimental designs for the study of political action and behaviour is strongly supported by the findings attained in this series of experiments. The methodological direction employed has offered insights to a number of substantive research questions that lay beyond our reach before such a design was employed.[21]

Conclusion

This study looked at how group leadership is affected by the power of agents and their social networks. An attempt has been made to associate the decisional power of agents with their social networks by looking at how their network position may impact their effectiveness while forming coalitions. A core assumption is that the role of exceptional agents, the leaders and political entrepreneurs of academic folklore impacts decision systems. An underlying assumption has been that social networks as they reflect on the affinity between agents could also be predictors of their collaboration. This is going beyond mainstream studies of influence through network analysis, where political interaction networks are documented to affect decision making, by their impact on influence and power flows (Christopoulos and Ingold, 2015; Christopoulos and Quaglia, 2009; Henning, 2009; Knoke et al., 1996; Pappi and Henning, 1998).

The aim of this study has been to identify those agents most likely to be successful in political decision making. This was situated in a critique of the literature on leadership and political entrepreneurship to suggest that agent roles should not be considered as binary states and that their impact on decision making is likely to change through time. Network analysis, with the production of agent relational metrics, allows for a useful classification of the relational capacity of agents. Network capacity can be seen as a composite proxy of multiple actor attributes. By mapping their relative position to one another, relational advantage is made explicit.

This study found that leadership and network centrality are associated in balanced power systems, but not in political systems where some actors are more powerful than others. In those latter groups, there is evidence of an association between idiocentric personalities and brokerage roles. Concurring with Sørensen and Torfing (2003) and Torfing (2003), there is evidence that starting with higher political resources leads to political capital aggregation. A number of early democracies recognised the threat to the rule of the

many by unequal distributions in political capital among their citizens. Different forms of ostracism were devised as blunt remedies.[22] The aggregation of political capital provides a challenge to democratic institutions. In ancient societies, such power concentration was often associated with strong familial or clan ties, and their political expression was nepotism. It is beyond the scope of this study to explore the implications of the 'Matthew effect' on the health of democratic institutions, but it represents a fertile and important future direction of theoretical inquiry.

More sophisticated hypotheses on the effect of social network on political action will have to wait until more comprehensive data sets are created. Can perceptions of leadership be related to political attainment? Furthermore, does the accuracy of an agent's cognitive social/political map determine their political advantage? Do actors switch roles across different political settings and do they indeed shift between exceptional–ordinary, leader–follower, brokerage–closure and centre–periphery roles across time? Successful political actors are assumed to have high social intelligence, exhibit role ambiguities and be more accurate in their exercise of heuristic shortcuts. Understanding their behaviour would require a longitudinal assessment that would involve capturing many different types of data. Quasi-experimental designs offer a way to record such data and substantiate insights that can complement those gained through qualitative in-depth studies of exceptional actors or computed simulations of political agency.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Notes

1. There is a long tradition of examining cooperative decisions via the outcomes of cooperative games (Axelrod, 1997; Axelrod and Hamilton, 1981). Frameworks such as the prisoner's dilemma which do not lend themselves to a typical multiplayer, multi-strategy, non-zero-sum political environment are used. Beyond useful theoretical insights on the present value of future risk or the distinction between individual and collective risk (Read and Shapiro, 2014), this literature typically simplifies power to adversarial representations that lack credence in most political contest.

2. The most frequently employed leadership psychometric instrument is called the multifactor leadership questionnaire where personality traits called transformational and transactional leadership are measured (Avolio et al., 2009; Schriesheim et al., 2009).

3. James Meindl (1995: 336) also hypothesises isopraxism. He suggests that group level processes are in place that cause members of groups to share leadership concepts and through social influence develop similar leadership behaviours.

4. Barling et al. (1996) claim that 'charisma and transformational leadership are often used synonymously' (p. 827). The latter is best understood to entail charisma, intellectual stimulation and individualised consideration towards followers. See also Bono and Ilies (2006) and Reicher et al. (2007).

5. A good critique and appraisal of Giddens' work can be found in Jessop (2005) who claims that 'one cannot adequately conceptualise structural constraints outside specific time-horizons and spatial scales of action' (p. 53).

6. The centrality of leaders is found to affect team performance (Balkundi and Harrison, 2006).

7. The work of Noah Friedkin (1998) is instrumental in understanding the constraints imposed by the network horizon of agents.

8. Cognition in a dynamic social environment cannot be divorced from an actor's agency. Dynamic interactions are cognitive acts while a 'task is carried out partly in the individual's head and partly in its environment' Barrett et al. (2007: 571). The limited psychometric instruments of this study do not allow us to make a strong claim for measuring personality states, and it is possible that we are only capturing behavioural traits of the agents studied. Cognitive bias associated with decision making and the selection of leaders are examined in evolutionary leadership theory (van Vugt and Ronay, 2014). Exceptionality can also be associated to the 'acuity of leader cognitions' Balkundi and Kilduff (2006: 422).

9. It has been argued that social understanding may be a form of pattern recognition involving active perceptions (Noe, 2004).

10. Yuval Kalish has described leadership emergence as fluid (personal correspondence).

11. It has been further argued that we should distinguish between individual and collective cognition and therefore address the question of whether leadership is a property of individuals or systems (Lord and Emrich, 2001).

12. This has also been called the Matthew effect (Merton, 1968) and accumulated advantage (Watts, 2004).

13. A comprehensive account would integrate the political identity of agents and the relevance of identity to political culture. See Christopoulos (2008) for a critique of the policy networks literature on that score.

14. Figures exclude an outlier who would raise the average age to 23.9 years and the standard deviation (SD) to 8.2 years. The ratio of males to females is 2.6:1 which is typical for the field of social science from which students were recruited.

15. This is deemed to be a field-experiment as there are a number of possible confounding factors that cannot be controlled for (Margetts and Stoker, 2010; Stoker, 2010).

16. This was the same instrument (with minor alterations) employed by Burt et al. (1998) that identified those with low scores with those seeking security and stability, while those with high scores are perceived as independent outsiders, in search of authority and thriving on change.

17. There was also a simulation evaluation that does not constitute part of the study and a video record of the last decision event for all groups that was employed to determine discussion dominance.

18. Between one and two people per group (six in total) are eliminated through this 'low-motivation' filter. These were people who typically only participated once and appear socially peripheral in the affiliation networks of their group.

19. We note the limitations in employing peer assessment without a reference to the social networks of the assessors and the assessed, as discussed in Luria and Kalish (2013).

20. Obviously, any attempt at inferential tests of significance should take account of network dependence (Robins et al., 2012). As our conclusions are not attempting generalisations, the use of sophisticated simulations via the use of Markov chain Monte Carlo (MCMC) models is not reported here.

21. A follow-up series of experimental designs has been implemented and the results are currently analysed.

22. Ostracism in 6th-century Athenian democracy, according to the Cleisthenes constitution of 507 BC, provided for the banishment for 10 years of one citizen each year whose power was deemed to threaten the demos. Its restricted use has led commentators to note (Rhodes, 1986; Thomsen, 1972) that it functioned as a mechanism for diffusing political conflict.

References

Ahlquist JS and Levi M (2011) Leadership: What it means, what it does, and what we want to know about it. *Annual Review of Political Science* 14: 1–24.

Arce M (2001) Leadership and the aggregation of international collective Action. *Oxford Economic Papers* 53: 114–137.

Asal V and Blake EL (2006) Creating simulations for political science education. *Journal of Political Science Education* 2(1): 1–18.

Avolio BJ, Reichard RJ, Hannah ST, et al. (2009) A meta-analytic review of leadership impact research: Experimental and quasi-experimental studies. *The Leadership Quarterly* 20: 764–784.

Axelrod R (1997) *The Complexity of Cooperation: Agent-Based Models of Competition and Collaboration*. Princeton, NJ: Princeton University Press.

Axelrod R and Hamilton WD (1981) The evolution of cooperation. *Science* 211(4489): 1390–1396.

Balkundi P and Harrison DA (2006) Ties, leaders, and time in teams: Strong inference about network structure's effects on team viability and performance. *Academy of Management Journal* 49(1): 49–68.

Balkundi P and Kilduff M (2006) The ties that lead: A social network approach to leadership. *The Leadership Quarterly* 17(4): 419–439.

Balkundi P, Kilduff M and Harrison DA (2011) Centrality and charisma: Comparing how leader networks and attributions affect team performance. *Journal of Applied Psychology* 96(6): 1209–1222.

Barling J, Weber T and Kelloway EK (1996) Effects of transformational leadership training on attitudes and financial outcomes: A field experiment. *Journal of Applied Psychology* 6: 827–832.

Barrett L, Henzi P and Rendall D (2007) Social brains, simple minds: Does social complexity really require cognitive complexity? *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 362(1480): 561–575.

Bass BM (1985) *Leadership and Performance beyond Expectations*. New York: Free Press.

Bono JE and Ilies R (2006) Charisma, positive emotions, and mood contagion. *The Leadership Quarterly* 17: 317–334.

Brandes U, Kosub S and Nick B (2012) Was messen Zentralitatsindizes. In: Henning M and Stegbauer C (eds) *Die Integration von Theorie und Methode in der Netzwerkforschung*. Wiesbaden: VSVerlag fur Sozialwissenschaften, pp. 33–52.

Burns JM (1978) *Leadership*. New York: Harper & Row.

Burt RS (2005) *Brokerage & Closure*. Oxford: Oxford University Press.

Burt RS, Jannota J and Mahoney J (1998) Personality correlates of structural holes. *Social Networks* 20: 63–87.

Christopoulos D (2006) Relational attributes of political entrepreneurs: A network perspective. *Journal of European Public Policy* 13: 757–778.

Christopoulos D (2008) The governance of networks: Heuristic or formal analysis? *Political Studies* 54: 475–481.

Christopoulos D and Ingold K (2015) Exceptional or just well connected? Political entrepreneurs and brokers in policy making. *European Political Science Review* 7(3): 475–498.

Christopoulos D and Quaglia L (2009) Influence and brokerage: Network constraints in EU banking regulation. *Journal of Public Policy* 29: 179–200.

Dansereau F, Yammarino FJ and Markham SE (1995) Leadership: The multiple-level approaches. *The Leadership Quarterly* 6: 251–263.

Dyer JRG, Johansson A, Helbing D, et al. (2009) Leadership, consensus decision making and collective behaviour in humans. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 364: 781–789.

Enfield J, Myers RD, Lara M, et al. (2012) Innovation diffusion: Assessment of strategies within the diffusion simulation game. *Simulation & Gaming* 43(2): 188–214.

Ensari N, Riggio RE, Christian J, et al. (2011) Who emerges as a leader? Meta-analyses of individual differences as predictors of leadership emergence. *Personality and Individual Differences* 51(4): 532–536.

Fleming L and Waguespack DM (2007) Brokerage, boundary spanning, and leadership in open innovation communities. *Organization Science* 18(2): 165–180.

Foti RJ and Hauenstein NM (2007) Pattern and variable approaches in leadership emergence and effectiveness. *Journal of Applied Psychology* 92(2): 347–355.

Foti RJ, Fraser SL and Lord RG (1982) Effects of leadership labels and prototypes on perceptions of political leaders. *Journal of Applied Psychology* 67(3): 326–333.

Friedkin NE (1998) *A Structural Theory of Social Influence*. Cambridge, NY: Cambridge University Press.

Friedrich TL, Vessey WB, Schuelke MJ, et al. (2009) A framework for understanding collective leadership: The selective utilization of leader and team expertise within networks. *The Leadership Quarterly* 20: 933–958.

Frith CD and Singer T (2008) The role of social cognition in decision making. *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 363(1511): 3875–3886.

George A (1969) The 'Operational Code': A neglected approach to the study of political leaders and decision making. *International Studies Quarterly* 13: 190–222.

Giddens A (1984) *The Constitution of Society*. Cambridge: Polity Press.

Gredler ME (2004) Games and simulations and their relationships to learning. In: Jonassen DH (ed.) *Handbook of Research on Educational Communications and Technology* (2nd edn). Mahwah, NJ: Lawrence Erlbaum Associates, Inc., pp. 571–581.

Henning C (2009) Networks of power in the CAP system of the EU-15 and the EU-27. *Journal of Public Policy* 29: 153–177.

Hinde RA (1976) Interactions, relationships and social structure. *MAN* 11: 1–17.

Holcombe RG (2002) Political entrepreneurship and the democratic allocation of economic resources. *Review of Austrian Economics* 15: 143–159.

Hollander EP (1978) *Leadership Dynamics*. New York: Free Press.

House RJ, Spangler WD and Woycke J (1991) Personality and charisma in the U.S. presidency: A psychological theory of leader effectiveness. *Administrative Science Quarterly* 36: 364–396.

Humphrey N (1976) The social function of intellect. In: Bateson PPG and Hinde RA (eds) *Growing Points in Ethology*. Cambridge, MA: Cambridge University Press, pp. 303–317.

Jenkins-Smith HC and Sabatier PA (1994) Evaluating the advocacy coalition framework. *Journal of Public Policy* 14: 175–203.

Jessop B (2002) *The Future of the Capitalist State*. Cambridge: Polity Press.

Jessop B (2005) Critical realism and the strategic relational approach. *New Formations* 56: 40–53.

Kahneman D and Tversky A (1979) Prospect theory: An analysis of decisions under risk. *Econometrica* 47: 263–292.

Kalish Y and Robins G (2006) Psychological predispositions and network structure: The relationship between individual predispositions, structural holes and network closure. *Social Networks* 28: 56–84.

Kilduff M, Crossland C and Tsai W (2008) Pathways of opportunity in dynamic organizational networks. In: Uhl-Bien M and Marion R (eds) *Complexity Leadership*. Charlotte, NC: Information Age Publishing, pp. 83–99.

Kirkpatrick SA and Locke EA (1996) Direct and indirect effects of three core charismatic leadership components on performance and attitudes. *Journal of Applied Psychology* 81: 36–51.

Knoke D, Pappi FU, Broadbent J, et al. (1996) *Comparing Policy Networks: Labor Politics in the US, Germany, and Japan*. New York: Cambridge University Press.

Krackhardt D (1990) Assessing the political landscape: Structure, cognition, and power in organizations. *Administrative Science Quarterly* 35(2): 342–369.

Krackhardt D (1992) The strength of strong ties: The importance of philos in organizations. In: Nohria N and Eccles R (eds) *Networks and Organizations: Structure, Form, and Action*. Boston MA: Harvard Business Press, pp. 216–239.

Krackhardt D and Handcock M (2007) Heider vs Simmel: Emergent features in dynamic structures. In: Airoldi EM, Blei DM, Fienberg SE and et al. (eds) *Statistical Network Analysis: Models, Issues, and New Directions*. Berlin, Heidelberg: Springer, pp. 14–27.

Krackhardt D and Kilduff M (1999) Whether close or far: Social distance effects on perceived balance in friendship networks. *Journal of Personality and Social Psychology* 76: 770–782.

Laumann EO and Pappi FU (1976) *Networks of Collective Action: A Perspective on Community Influence Systems*. New York: Academic Press.

Lin N (2002) *Social Capital: A Theory of Social Structure and Action*. Cambridge, UK: Cambridge University Press.

Lord RG and Emrich CG (2001) Thinking outside the box by looking inside the box: Extending the cognitive revolution in leadership research. *The Leadership Quarterly* 11(4): 551–579.

Lukes S (2005) *Power: A Radical View*. Basingstoke: Palgrave Macmillan.

Luria G and Kalish Y (2013) A social network approach to peer assessment: Improving predictive validity. *Human Resource Management* 52(4): 537–560.

McLean I (2002) William H. Riker and the invention of Heresthetic(s). *British Journal of Political Science* 32(3): 535–558.

Margetts H and Stoker G (2010) The experimental method: Prospects for laboratory and field studies. In: Marsh D and Stoker G (eds) *Theory and Methods in Political Science* (3rd edn). Basingstoke: Palgrave Macmillan, pp. 308–324.

Mehra A, Dixon AL, Brass DJ, et al. (2006) The social network ties of group leaders: Implications for group performance and leader reputation. *Organization Science* 17(1): 64–79.

Meindl JR (1995) The romance of leadership as a follower-centric theory: A social constructionist approach. *The Leadership Quarterly* 6: 329–341.

Meindl JR, Sanford SD, Ehrlich D, et al. (1985) The romance of leadership. *Administrative Science Quarterly* 30: 78–102.

Merton RK (1968) The Matthew effect in science. *Science* 159(3810): 56–63.

Mouzelis N (1995) *Sociological Theory: What Went Wrong?* London: Routledge.

Noe A (2004) *Action in Perception*. Cambridge, MA: MIT Press.

Pappi FU and Henning C (1998) Policy networks. *Journal of Theoretical Politics* 10: 553–575.

Pentland A (2007) On the collective nature of human intelligence. *Journal of Adaptive Behavior* 15: 189–198.

Read JH and Shapiro I (2014) Transforming power relationships: Leadership, risk, and hope. *American Political Science Review* 108(01): 40–53.

Reicher S, Haslam S and Platow M (2007) The new psychology of leadership. *Scientific American Mind* 4: 22–29.

Rhodes PJ (1986) Political activity in classical Athens. *The Journal of Hellenic Studies* 106: 132–144.

Riker WH (1986) *The Art of Political Manipulation*. New Haven, CT: Yale University Press.

Robins G, Lewis J and Wang P (2012) Statistical network models. *Policy Studies Journal* 40: 375–401.

Schreiber C and Carley KM (2008) Network Leadership: Leading for Learning and Adaptability. In: Uhl-Bien M and Marion R (eds) *Complexity Leadership*. Charlotte, NC: Information Age Publishing, pp. 291–332.

Schriesheim CA, Wu JB and Scandura TA (2009) A meso measure? Examination of the levels of analysis of the Multifactor Leadership Questionnaire (MLQ). *The Leadership Quarterly* 20: 604–616.

Scott J (2001) *Power*. Cambridge: Polity Press.

Sørensen E and Torfing J (2003) Network politics, political capital, and democracy. *International Journal of Public Administration* 26(6): 609–634.

Sparrowe RT and Liden RC (2005) Two routes to influence: Integrating leader-member exchange and social network perspectives. *Administrative Science Quarterly* 50: 505–535.

Stoker G (2010) Exploring the promise of experimentation in political science: Micro-foundational insights and policy relevance. *Political Studies* 58(2): 300–319.

Thomsen R (1972) *The Origin of Ostracism: A Synthesis*, vol. 4. Oslo: Gyldendal.

Vallacher RR and Nowak A (2008) Dynamical social psychology: On complexity and coordination in human experience. In: Uhl-Bien M and Marion R (eds) *Complexity Leadership*. Charlotte, NC: Information Age Publishing.

van Vugt M and Ronay R (2014) The evolutionary psychology of leadership theory, review, and roadmap. *Organizational Psychology Review* 4(1): 74–95.

Wasserman S and Faust K (1994) *Social Network Analysis: Methods and Applications*. Cambridge, NY: Cambridge University Press.

Watts DJ (2004) The 'new' science of networks. *Annual Review of Sociology* 30: 243–270.

Appendix I

Procedure protocols and data collection: decision making in a multimethod simulation game

General context. This simulation game is designed to measure the interaction of political actors in a competitive decision-making environment. It is unique in collecting a great number of different data related to the decision process. In this study, four groups were monitored over four decision games that were organised fortnightly over an 8-week period.

We measured (a) the interactions among actors as reported in a series of network surveys, (b) the degree to which actors are idiocentric through a psychometric test, (c) attitudinal data, (d) cognitive maps of relational space through the assessment of the interaction among others in their group and (e) their decisions and votes in each session. We also took (f) video recordings of their interactions during the last decision game. We did not, in this instance, collect data on (g) their political preferences and (h) decisional preferences before group interaction.

Volunteers were asked to debate and take four decisions while assigned roles as representatives of a number of European Union (EU) member states. The topics were chosen for their prominence. These roles were randomly assigned. The decisions consisted of formulating new policy and the selection of key personnel:

1. Implementation of EU common asylum policy;
2. Implementation of the political solidarity clause in the Lisbon Treaty;
3. Selection of President of the EU Council;
4. Selection of an EU Foreign Minister.

Following is an example of abridged instructions for the second game:

> Make a statement on how your country interprets article 42.7 (political solidarity) in the Lisbon Treaty and what are the foreseen areas of conflict in creating common interests in CFSP from your country's perspective. You are expected to vote on EU action in Iran, Iraq or Palestine.

Student actors were issued with information on the policy context. They were instructed that they did not have to follow the original position of the countries they were assigned to study during the voting process and indeed were encouraged to seek coalitions with other actors in order to get their preferred policy option approved.

Procedure rules (instructions to participants)

1. You are assigned a country randomly at the beginning of term, which you will represent in all subsequent games;
2. The voting importance of a country is either (a) signified by a value that we will call its political capital (PC) or (b) is equal among all countries depending on which group you are assigned;
3. Voting is conducted by secret on named ballots;
4. Simple majorities in favour win a ballot;
5. There will be a total of four decision rounds;
6. Decision games will last for half an hour and preparations for each game will take 20 minutes.

For groups assigned PC votes (a), the following rules also apply:

7. Supporting a decision you assign that position your PC votes;
8. When you are on the winning coalition, you gain 20% on your PC votes that increase your voting weight on the next round;
9. Amended PC weights are visible to all on actors' name plates.

Rewards. A winner will be identified for each class determined by the number of times they are on the winning coalition. Those on the majority coalition after each decision round receive a small treat to re-enforce attainment. Overall, winners are rewarded with book tokens after each game. Minor re-enforcements were deemed necessary to maintain student motivation and trigger competitiveness for being on a winning coalition.

Example of calculating PC votes

EU response to the conflict between Georgia and Russia over Abkhazia.

	Position 1	Position 2	Position 3
	Favour Georgia	No policy change	Favour Abkhazia
	Germany 29 PC	UK 29 PC	Spain 27 PC
	Poland 27 PC	Portugal 12 PC	Sweden 10 PC
Total	56 PC	41 PC	37 PC

Stage 1. Agenda-setting decision between three policy options. Country vote is cast as follows:

Stage 2. As no overall majority is reached, option with least votes eliminated and new voting round commences between the top 2 preferences. Germany and Poland increase their PC weight by being associated (voting) with the first ranked position. Germany would now have a larger relative weight: $W_{Gt2} = (W_{Gt1} \times 0.2) + W_{Gt1} = (29 \times 0.2) + 29 = 35$ PC (rounded) for the next decision round.

Author Biography

Dr Dimitris Christopoulos is Assistant Professor at MODUL University Vienna and Senior Visiting Fellow at LISER, Luxembourg. He is engaged in research on policy networks, political entrepreneurship, leadership and sustainability governance. He edits the journal Connections and co-convenes the Political Networks group of ECPR. He has published with the Journal of European Public Policy, the Journal of Public Policy, European Urban and Regional Studies and Regional and Federal Studies among others.