Public opposition and the neighborhood effect : how social interaction explains protest against a large infrastructure project

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Abstract

In the literature on public opposition against spatial projects, social acceptance is considered a key variable in predicting protest. However, the process by which low levels of social acceptance are translated into real protest actions has received less attention in academia. Social movement theories predict that protest participation is strongly affected by social interaction. This article aims to connect theories on locational conflict with the growing literature on the neighborhood effect in social mobilization by conducting an empirical study of rare and unobtrusive data of protest participation, on the neighbourhood level in particular.

Our case study focuses on opposition against a highway project in the city of Antwerp, Belgium. Based on a large, geocoded database with addresses of protesters and activists, we build a model to analyze activism and mobilization in neighborhoods. We control for the distance between the neighborhood and the project, as well as the socio-demographic profile of the neighborhood.

As expected, we find that distance has a significant impact on the occurrence of protest. Contrary to expectations, the aggregated socio-demographic profile of a neighborhood is not significantly related to levels of opposition. However, the presence of social capital and the presence of active protesters are good predictors of protest participation

in the neighborhood. These findings support theories on the collective efficacy of neighborhoods.

Keywords: NIMBY, locational conflict, Neighborhood effect, collective efficacy, Antwerp

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Introduction

Since the 70s, a growing body of scholarly literature has endeavoured to understand and predict public opposition to spatial projects. Such conflicts are sometimes referred to as locational conflict (Lake, 1987), land use conflicts (Forester, 1987) or land use disputes (Susskind, Wansem, & Ciccareli, 2003). In planning practice, public opposition has been referred to with the acronym NIMBY or Not in My BackYard (Dear, 1992), a term that has become controversial in academic literature (Burningham, 2000; Wolsink, 2006).

Theories of locational conflict and public opposition have traditionally focused on social acceptance as a predictor for opposition. Social movement literature however has long since recognized that, not only social acceptance, but also social interaction plays an important role in understanding mobilization and protest participation (Klandermans, 1997; McCarthy & Zald, 1977; Tilly, 1978). More recent work in urban geography has started to unravel the role of geography in shaping local activist networks (Loopmans, 2010; Nicholls, 2009; Sampson, 2012), particularly in an urban context. In line with this work, this article aims to connect theories of locational conflict with the growing literature on the neighborhood effect in social mobilization by conducting an empirical study of rare and unobtrusive data of protest participation.

Our case study is the Oosterweel connection—a planned highway around the city of Antwerp, Belgium. After 20 years of planning and more than 10 years of public opposition, the highway remains in its inception phase. In our paper we ask which neighborhoods have the highest rate of participation in protest actions and why. We use databases containing addresses provided by the principal action group, Ademloos, to map and explain levels of protest in different neighborhoods.

Our paper is structured as follows. First, we discuss some of the main theories on public opposition. Next, we review the theory and evidence of the neighborhood effect. Following that, we present the case of Oosterweel. Then, we discuss the data and measures. The remainder of the paper describes the results and discusses the theoretical and practical implications.

Social acceptance as a predictor of community protest

In the literature on public opposition, social acceptance is considered a main predictor for protest. In particular studies on siting processes of wind turbines have found a relation between individual perceptions of wind turbine technologies and one's willingness to accept the construction of turbines in the vicinity (Swofford & Slattery, 2010). Similar findings come from studies on different sorts of facilities, such as waste disposal (Groothuis & Miller, 1997), nuclear energy (Tanaka, 2004), human facilities (Takahashi & Dear, 1997), or affordable housing (Tighe, 2010).

Social acceptance is a multidimensional construct. Most scholars differentiate between general public attitudes toward a certain type of facility and the attitudes of host communities in which such facilities are located (Wüstenhagen, Wolsink, & Bürer, 2007). The disparity between general and local attitudes has given rise to the so-called NIMBY theory. Whereas general social attitudes towards a facility might be positive, local stakeholders around the site may have different perceptions since they must bear the negative impact of the project. The NIMBY theory is then explained as a typical social dilemma, in which non-acceptance is rational from an individual perspective, but undesirable from the perspective of society (Wolsink, 1994, 2000). As externalities and impact decrease with distance (Papageorgiou, 1978), one can expect that proximity is strongly related to negative perceptions. Empirical evidence for different types of

facilities supports the distance decay argument (Swofford & Slattery, 2010; van der Horst, 2007).

As an alternative to the rationalist framework, authors in social psychology have associated NIMBY behaviour with emotional, irrational behaviour, resulting from biased risk perceptions of externalities (Kasperson et al., 1988; Kunreuther, Slovic, & MacGregor, 1996). According to these scholars, laymen often perceive the risks associated with a project to be higher than the risk perceived by experts. Risk aversion leads people to overestimate the risks and underestimate the benefits of projects. These risk perceptions are often socially amplified (Kasperson et al., 1988).

In recent debates, there has been considerable criticism of the NIMBY framework and its use in empirical studies (Burningham, 2000; Wolsink, 2006). Some scholars have shown that protest to spatial projects might not be related to narrow "egotropic," pocketbook issues, but rather express wider "sociotropic" or environmentalist concerns (Michaud, Carlisle, & Smith, 2008; Wolsink, 1994). Moreover, externalities or perceptions of externalities of spatial projects are not the only factors that affect social acceptance. Several studies have demonstrated that the decision-making process itself can be a source of discontent. Procedural fairness of these processes and trust in developers also has a significant impact on the acceptance of potentially unfavourable policy outcomes (Herian, Hamm, Tomkins, & Zillig, 2012; Knudsen et al., 2015; Tyler, 1988; E. Wolf & Van Dooren, 2018b). Additionally, other variables such as place attachment (Devine-Wright, 2013) and individually perceived political efficacy play a role (Wolsink, 2000).

The role of neighborhoods in explaining public opposition

The literature on social movements has long since recognized that there are considerable barriers to forming protest movements (Coppens, 2011; Klandermans,

1997). Individual grievances are generally considered a necessary, but insufficient condition for protest groups to form. Equally important are the abilities and skills (Brady, Verba, & Schlozman, 1995), resources (McCarthy & Zald, 1977), and opportunities (Kitschelt, 1986) that groups with grievances have to transform their grievances into protest behaviour. There are valid reasons to assume that social interaction, especially on the neighbohood level, plays an important role in shaping the likelihood of engagement in protest behavior (Coppens, 2011; Loopmans, 2010; Nicholls, 2009; Sampson, 2012; Thijssen & Van Dooren, 2016). Following Galster (Galster, 2001), we define the neighborhood as a bundle of spatially based attributes, associated with clusters of residences, sometimes in conjunction with other land use. The attributes of a neighborhood are determined both by its spatial-physical characteristics and its social characteristics.

Within neighborhoods, we can discern between segregation effects and associational effects. Segregation effects can be defined as structural effects, in the sense that individuals with similar socio-demographic attributes tend to live together. Burgess and Park's ecological model (Park, Burgess, & McKenzie, 1925) explains segregation as the result of competition over residential space, taking into account the aggregated costs for individuals of housing and transport. The uneven and concentrated spatial distribution of individual capabilities and densities impacts neighborhood mobilization. As personal stakes and the willingness to protest might decrease with distance to a project, the uneven distribution of individual protest capabilities might distort the expected distance-decaying effect in theories on social acceptance. Some evidence supports the segregation effect. In a survey on Dutch opposition groups, Van Dijk and Van der Wulp found higher education levels among activists on the neighborhood level than in the general population (van Dijk & van der Wulp, 2010).

Associational effects, also referred to as the neighborhood effect, are emergent properties of the neighborhood (Sampson, 2012; Thijssen & Van Dooren, 2016). They are contextual effects because they cannot be defined at the individual level. Neighborhoods are social systems. Burges and Park noted that proximity and neighborly contact create the basis of the simplest and most elementary form of association, thus making the neighborhood the basis of political control (Park et al., 1925). The idea that relations and ties matter in political participation has been profoundly elaborated on by theories on social capital and social movements (Putnam, 2001) and theories on the role of geography in shaping activist networks (Miller & Nicholls, 2013; Nicholls, 2009). Social capital refers to connections among individuals, social networks, and the norms of reciprocity and trustworthiness that arise from them. Social ties are important in developing trust and shared norms among neighbors, developing a sense of community, exchanging important information, and establishing informal social control (Cantillon, Davidson II, & Schweitzer, 2003; Caughy, Brodsky, O'Campo, & Aronson, 2001; Kubrin & Weitzer, 2001).

Social networks are important channels of political mobilization (Dalton, Van Sickle, & Weldon, 2010; Klandermans, 1997; North, 1998), particularly networks that are based on interpersonal relations. Snow et al. found that face-to-face recruitment via private channels is the most effective strategy for mobilization (Snow, Zurcher, & Ekland-Olson, 1980). The key proposition is that people are more inclined to participate in political or civic activities when they are encouraged by someone with whom they have a personal connection (Lim, 2009). As face-to-face interaction is very labor intensive, the range of a mobilization campaign depends on how extensive the social networks are and how the movement makes use of them. Therfore, one can assume that interpersonal

interactions via private channels have a larger reach in neighborhoods with dense social networks than they do in socially fragmented neighborhoods, and neighborhoods with higher social capital are more effective in mobilization.

Empirical research on social capital and collective action in neighborhoods indicates a more nuanced reality. Drawing on the work of Wilson (Wilson, 2012), Sampson argues that residents of deprived neighborhoods are tightly interconnected through strong ties, but do not necessarily produce collective resources (Sampson, 2012, p. 150). According to Sampson, such strong existing ties in deprived neighborhoods generate basic reciprocal support and survival mechanisms, rather than producing collective actions on behalf of the neighborhood. Moreover, there is also evidence that weak ties—less intimate connections between people as a result of less frequent social interaction—can be equally important in establishing collective action (Granovetter, 1973; Nicholls, 2009). Sampson argues that although social ties and networks can be a necessary condition, they are certainly not a sufficient condition for collective action. Often the perceived political efficacy of a neighborhood is lacking, or the belief among residents that any action can and will result in meaningful and positive community change (Perkins & Long, 2002). Sampson defines collective efficacy as social cohesion among neighbors combined with their willingness to intervene on behalf of the common good. In a similar vein, many authors in social mobilization theory have stressed the importance of expectations of success in motivating people to participate in social movement activities, with the possible exception of very low risk activities (Klandermans, 1997; Klandermans & Oegema, 1987).

In the absence of a strong communal belief in efficacy, the availability of public symbols in the neighborhood such as posters or other tokens symbolizing social support for collective action may be important mediators for protest (Dumitrescu, 2012; Holtz-

Bacha & Johansson, 2017). In this respect we can discern three functions of public symbols. First, the public display is a form of coming out for the posting individual. It is a consecration of one's individual stance that often leads to a reinforcement of one's commitment to a public cause. Second, it creates a form of social desirability for the public cause in the social network of the posting individual. Third, to the extent that the number of posting individuals surpasses a certain threshold, some form of communal understanding on a topic can emerge. In sum, public symbols may over time expand to belief in collective efficacy.

The case of the Oosterweel connection in the city of Antwerp

Our study of public opposition concerns the controversy around the project of the Oosterweel-connection, which aims to close the ring motorway road around the city. On a typical business day, 270,000 cars and trucks use the current ring road, making it the most crowded and congested highway in Belgium. In 1995, the Flemish road agency started making plans to construct a new East-West connection under the river Scheldt to close the ring road, crossing the Oosterweel area, hence the name of the project. Figure 1 shows both the current Antwerp ring road and the plans for the Oosterweel-connection (dotted).

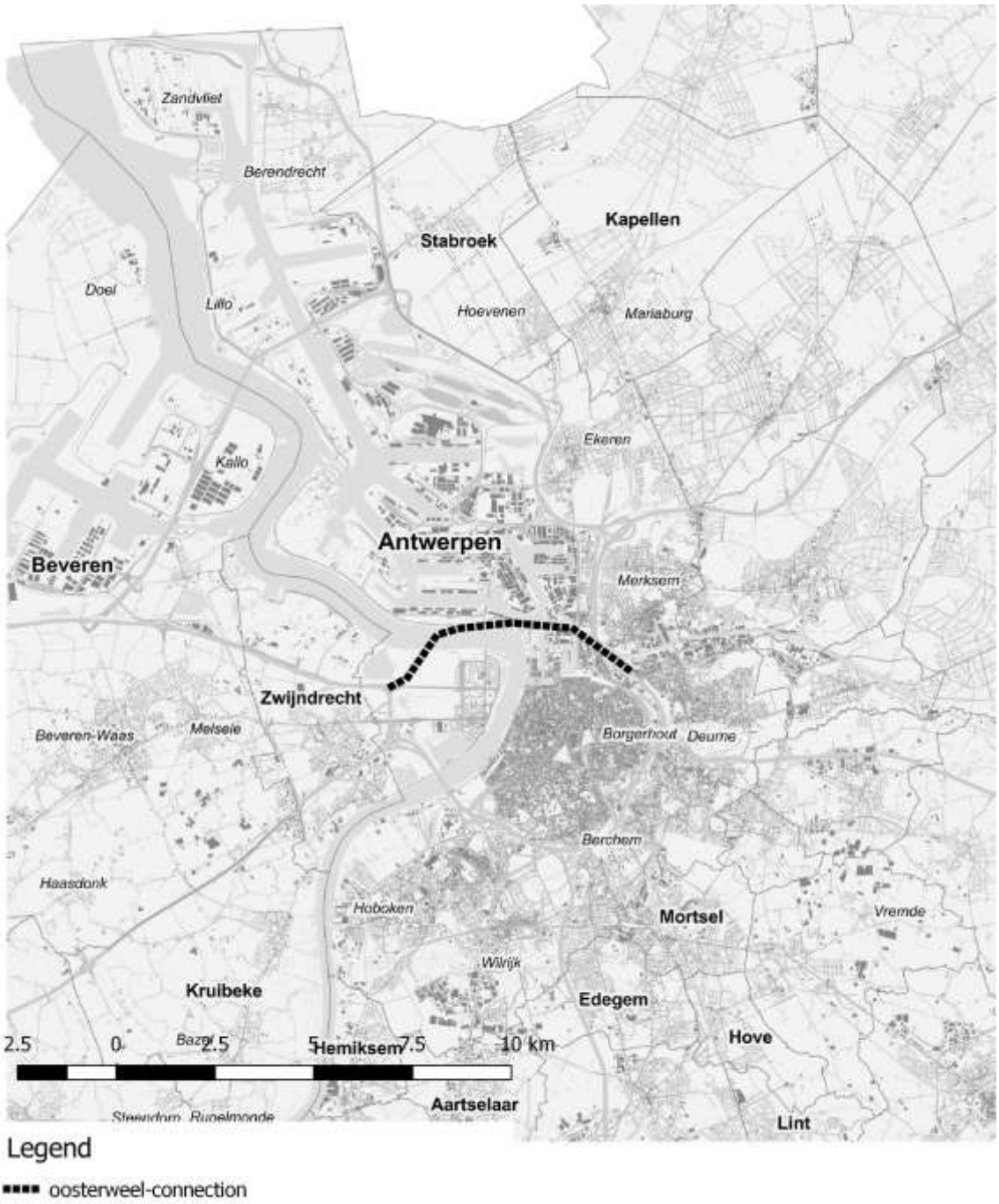

Figure 1: Oosterweel connection, based on GRB map Flanders

After the presentation of the plans in 2005, the trajectory has been contested by different local action groups for being too close to the city. The action group Straten-Generaal, mainly composed of citizens of the inner city of Antwerp, started to question the impact of the project on urban mobility and city development and the limited public

involvement in the planning phase. Beginning in 2008, a second group of residents from the left bank, united under the name Ademloos, started to oppose the project for its impact on the environment and air quality.

Although both action groups exist separately, they have collaborated extensively. Accordingly, their protest actions were highly coordinated and highly successful in terms of mobilization. The action groups developed an extensive website, organized urban events and manifestations, used regional celebrities and academics in their campaign, and used poster campaigns. Besides persuasive communication campaigns, the action groups also used petition rights to voice their concerns on several occasions. Flemish legislation grants the right to a hearing in parliament for petitions with more than 15,000 unique signatures. The groups collected signatures from citizens in Flanders to obtain speaking rights in the Flemish parliament in both 2008 and 2015. In addition to petitions for parliamentary hearings, the action groups also collected signatures to organize a local referendum in 2009. A majority of voters voted against the government's plans, leading to a major adaptation of the planned.

The Oosterweel case has received considerable academic coverage over the last several years (Govaert, 2011; E. E. A. Wolf & Dooren, 2017; E. Wolf & Van Dooren, 2018a; Wolf E.A. & Van Dooren W, 2018b), which has provided excellent in-depth background information on the case. In this paper however we focus on original data obtained from the action groups, which provides insight into the neighborhood effect.

Methods

Data

We obtained two distinct datasets from the action group Ademloos containing the names and addresses of protesters. The first dataset contained data on the individuals

who signed a petition to be heard in the Flemish parliament. The signatures were collected in second half of 2014 and were handed to the Parliament on March 26, 2015. The dataset contains 9740 physical signatures and 14,671 digital signatures. 241 signatures were declared invalid by the Flemish parliament. We geocoded N=24,652 addresses using the geocoding service of the Flemish Agency of Geographical information (AGIV)[i]. After manual cleaning, the geocoding process resulted in 22,202 address matches. Addresses with missing house numbers were assigned to the midpoint of the street. 9% of the addresses could not be matched due to the poor quality of the input data, such as non-existing addresses or switched data fields. Additionally, addresses outside Flanders or Brussels could not be geo-located and were disregarded. The second dataset contained data on the individuals that requested window posters from the action group Ademloos. In February 2011, Ademloos launched a public campaign on the Oosterweelverbinding to promote an alternative trajectory of Straten Generaal (see figure 2). The campaign aimed to influence the upcoming municipal elections in 2012. The posters could be ordered from the website of the action groups. Individuals could request posters online between February and April 2011. The dataset (N=1708) contains the names and addresses of individuals who requested one or more posters. Geocoding with CRABMATCH returned 1567 validated addresses, meaning 8% of the records were lost in the process.

Figure 2: Posters from Ademloos; Source Ademloos

After geocoding the addresses, both datasets were processed by a geographical information system (Qgis2.18.11). We aggregated the number of addresses in both datasets on the level of the neighborhood census tracts. The average population size of a census tract is around 3000 inhabitants and the demarcation reflect Galsters' definition of a neighborhood (Galster, 2001).

The urban region of Antwerp is larger than the city of Antwerp. Posters were distributed in the whole urban region. However, for our analysis of the neighborhood effect, we narrowed the study area to the city of Antwerp. This was justified by the fact that the city had a detailed online neighborhood monitor containing census tract data (N=299) that were not available on the regional level. Of particular interest in the online neighborhood monitor were data on the social capital and ethnic background of neighborhoods. Moreover, 15196 or 68.5% of the addresses from the petition data are located within the city of Antwerp.

The dependent variable and independent variables

The dependent variable was the level of neighborhood support for the action groups. We measured support for each statistical sector as the number of petitions divided by the total population of the statistical sector. Signing a petition is a form of action with a low threshold, at the bottom of what some scholars have called the "hierarchy of protest" (Van Laer & Van Aelst, 2010). The independent variables in this study are the neighborhoods' distance from the project, the number of active protesters in the statistical sector and the socio-demographic characteristics of the neighborhood. We measure the distance by calculating the mean of the shortest distance between the addresses from the petition in a statistical sector and the boundaries of the zoning plan for the construction of the Oosterweel (GRUP). The zoning plan indicates the outer boundaries of the Oosterweel project where construction will take place (see figure 1). As the protest against the Oosterweel project was motivated in part by the detrimental impact of the ring road on air quality, we also calculated the mean shortest distance to the existing ring road in a second model.

Active protest in a neighborhood was measured by the number of addresses requesting posters divided by the number of inhabitants in the statistical sector. Requesting and hanging a poster is considered a relatively strong form of political participation. The posters were free and could easily be requested from the website of the action groups. Requesters however needed to have information on the poster campaign and actively follow the website of the protest group. Therefore, poster requesters can be considered a proxy for the number of active protesters in the neighborhood.

The socio-demographic characteristics of the neighborhood are median income (in euros), the percentage of inhabitants with a migrant background, and social capital (table 1). Social capital is measured as the number of community initiatives per 1000

inhabitants. Community initiatives are typically low-threshold meetings with neighbours (street parties, barbeques, play areas on the street, etc.). The statistic on community initiatives were collected by the city since, most of the time, citizens need permission from the police to close the street for traffic. Moreover, the city often provides logistics to the organizers (tables, chairs, party tents, etc) and a small budget to buy some refreshments. We assume that such citizen initiatives are an indication of the social ties within neighborhoods.

Table 1. Summary statistics.

	N	Mean	Std. Deviation	Minimum	Maximum
Neighborhood activism (%population)	222	3,055%	2,371%	0,058%	11,429%
Distance to infrastructure (metre)	222	2 266,61	1 994,76	35,81	13 044,20
Median income (euro)	222	16 562,53 €	3 374,55 €	7 126,00 €	23 853,00 €
Migrant background (%)	222	26,5%	16,2%	2,7%	66,1%
Posters (%population)	222	0,302%	0,268%	0,000%	1,164%
Social capital (activities per 1000inh)	222	5,74	4,00	0,00	18,80

Results

Figure 3 maps the percentage of a neighborhood population that has signed the petition. The approximate location of the highway is also shown on the map. The white areas are uninhabited (industrial zones, parks, rivers). At first sight, it seems that proximity does matter, but not univocally. Some neighborhoods are further away from the planned Oosterweel highways, but nonetheless have high levels of protest, while other, more proximate neighborhoods are not so active.

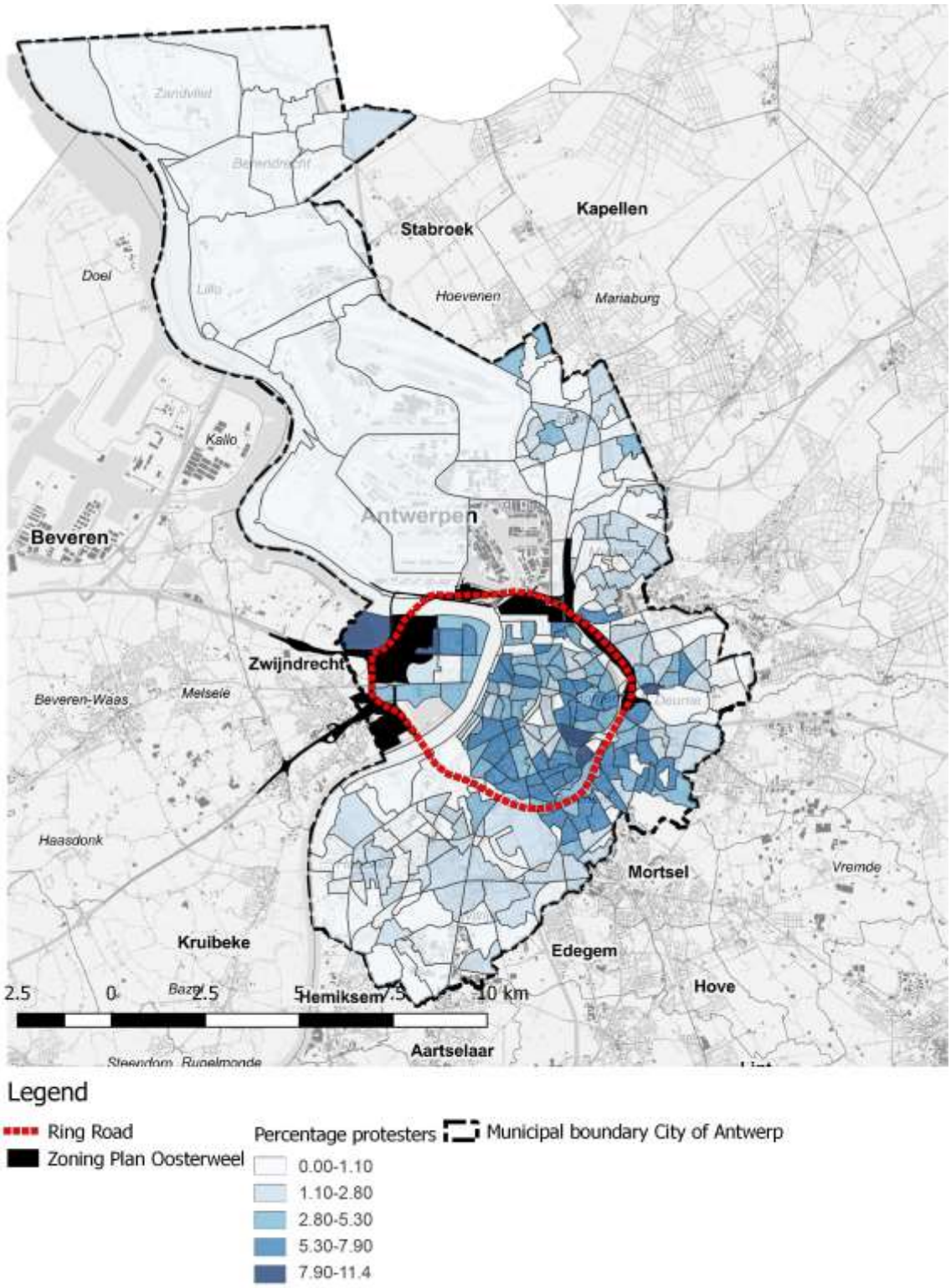

Figure 3: Spatial distribution of participants of the petition, N=15196

Table 2. OLS regression coefficients.

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1,299	1,797		,723	,471
	Median income (euro)	1,344E-5	,000	,019	,163	,871
	Number of immigrants (perc)	,008	,017	,058	,489	,625
	Active protesters (posters/inh)	4,430	,514	,500	8,621	,000
	Social capital (activities/1000 inh)	,078	,033	,131	2,357	,019
	Distance (m)	,000	,000	-,176	-2,743	,007
2	(Constant)	1,581	,470		3,364	,001
	Number of immigrants (perc)	,006	,009	,041	,677	,499
	Active protesters (posters/inh)	4,432	,512	,500	8,648	,000
	Social capital (activities/1000 inh)	,078	,033	,132	2,368	,019
	Distance (m)	,000	,000	-,175	-2,745	,007
3	(Constant)	1,807	,331		5,463	,000
	Active protesters (posters/inh)	4,421	,512	,499	8,642	,000
	Social capital (activities/1000 inh)	,075	,033	,127	2,308	,022
	Distance (m)	,000	,000	-,193	-3,312	,001

a. Dependent Variable: Perc_spreekrecht

Table 3. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,593[a]	,351	,336	1,9317%
2	,593[b]	,351	,339	1,9273%
3	,592[c]	,350	,341	1,9249%

a. Predictors: (Constant), distance, social capital, active protesters, median income, immigrants
b. Predictors: (Constant), distance, social capital, active protesters, immigrants
c. Predictors: (Constant), distance, social capital, active protesters,

Table 2 and 3 provides the OLS regressions results[ii] for protest in the city of Antwerp. As expected, distance to the highway infrastructure has a strong impact on the levels of neighborhood activism when controlled for population density and other factors. The

closer to the construction activities, the higher the levels of protest are. A second model using distance to the ring road yields similar results. This suggests that the effect of proximity is found along the whole stretch of the highway. The proximity of the highway may therefore create awareness for health and environmental issues that the action group *Ademloos* advocates for.

The results of the regression analysis provide no support for neighborhood segregation effects. Two socio-demographic variables, median income and the percentage of the population with a migrant background, are not significant. Neighborhoods with fewer inhabitants with a migrant background or a lower median income are equally likely to protest than more affluent or less diverse neighborhoods. The aggregated capabilities of resulting from residents' income and background do not affect protest levels. This finding is somewhat surprising, given that income and ethnicity are often found to be a predictor of protest capabilities (Brady et al., 1995, Thijssen & Van Dooren, 2016).

We found that both social capital and the presence of active protesters in neighborhoods predict protest participation in the Oosterweel case. Neighborhood initiatives that have no link with the protest against the Oosterweel project seem to provide social infrastructure on which protest can be built. Most likely, active protesters in a neighborhood use their social ties and networks to raise awareness for the Oosterweel case. Additionally, the number of inhabitants requesting a poster has a strong positive effect on neighborhood activism. This is not surprising since most posters requesters have likely signed the petition. Nevertheless, while only 1567 individual posters were geocoded, we geocoded no less than 15196 petitioners. Moreover, there is a 3-year delay between the time of registration for the poster data and time of registration for the dependent petition variable. Therefore, reverse causality whereby petition signatures trigger increased window posters is unlikely. As was predicted by the existing theory of

street-level communication through public symbols, posters have a long-lasting and significant effect on protest activities.

The findings support Sampson's concept of collective efficacy (Sampson, 2012) in which collective capacity is considered a necessary, but not sufficient explanation for effective mobilization. Neighborhoods with more poster requesters are more likely to have a higher percentage of residents involved in the signature campaign, as poster requestors convince their neighbours to sign the petition through face-to-face contact. According to Sampson, the perception of having control and impact and the idea that residents' actions will result in meaningful and positive community change plays a role. Neighborhoods with more posters create more trust in the effectiveness of collective action, as more residents display their willingness to participate in community protest.

Our data has limitations. It does not allow for the analysis of personal motives for protest participation. Although the proximity effect is strong, we lack data on individual motives to link social acceptance with protest behavior. This means that other factors beyond NIMBY might play a role in explaining the distance effect. Additionally, we do not have data on the number of posters that were displayed effectively. In order to gauge the net effect of these social mechanisms, they should be examined in combination with individual observations instead of aggregated variables. Further multilevel research and social network analysis is needed to determine the extent to which personal contact and perception on neighborhood efficacy play a role. Moreover, our data does not explain why certain neighborhoods have more active protesters and posters than others.

Conclusion

Protest against spatial projects has traditionally been studied by looking into social acceptance of project externalities. Our study of the Oosterweel highway confirmed the importance of distance. Neighborhoods in close proximity to the planned highway have higher levels of protest against the highway. Yet, proximity does not tell the whole story. Social interaction at the neighborhood level affects how individual grievances are translated into protest actions. Contrary to our expectations, we did not find segregation effects. Neighborhoods with higher median income and fewer people with a migrant background did not engage in higher levels of protest. The associational effect in neighborhoods was also at play. Neighborhoods with higher levels of social capital in terms of local activities and more tangible active individual protest behaviour have higher aggregate levels of protest. In particular, our paper provides empirical support for the importance of symbols, such as window posters, in increasing collective efficacy.

Due to the limitations of our data, we are unable to analyze the process by which individuals are recruited to protest activities. Our study suggests that social network analysis, as well as the analysis of the social dynamics of collective efficacy might provide a complementary perspective to the current frameworks of social acceptance. Whether protest is the result of face-to-face contacts with local activists or whether it is mediated through symbolic or collective efficacy remains an open question. Yet, our study does show that if we want to understand community protest against spatial projects, NIMBY arguments are not sufficient. We need to understand the social fabric of neighborhoods.

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[i] CRABMATCH is a free, non-commercial online tool of the Flemish government that identifies, validates, and enriches data with geographical information based on the reference address file CRAB (Centraal Referentie Adressen Bestand).

[ii] Because the dependent variable is a censored variable (i.e. a percentage between 0 and 100), we also implemented a TOBIT regression (Kleiber and Zeileis 2008). Visualization indicated that there might be a floor effect in the data (i.e. a cluster of variables near 0%) that might have skewed the distribution of the errors. The TOBIT regression however yields similar results to the OLS regression. Effect sizes and significance levels of the social capital variable and the poster variables are even slightly stronger compared to the OLS regression. Moreover, because we have no clear hypotheses regarding the effects of population size, it is not preferable to use negative binomial regression with count data and population size as offset. Hence, we opted to report the simpler OLS regression.