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Can anyone hate the bicycle? The hunt for an optimal local transportation policy to encourage bicycle usage

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Policies to promote bicycle usage in the city of Seville, Spain, are analysed, focusing on the development of a public hire-cycle system, and utilising a survey sample of 1530 citizens in the main parts of the historical old town and generalised ordered logit models. Despite the system being well-received and there being a growing number of users and a major modal shift towards the bicycle, it has had to contend with protests and reticence from some sectors of the population. Political and ideological variables are significant, and citizens' philosophy of a 'global city'. A policy of this type demands a proper citizen consultation process and a suitable communication campaign to illustrate its advantages in terms of environmental protection and social justice, otherwise the risk is run of hostility turning to vandalism and endangering the scheme's economic viability.

Keywords: sustainable cities; smart bikes; need for consensus; generalised ordered logit; vandalism

Introduction

The bicycle has developed immensely as a mode of urban transportation in many towns and cities. Interest in the bicycle is on the rise and due to its innumerable advantages the number of cities that are pursuing policies to promote its usage is increasing (Martens 2007). The bicycle would appear to be a mode of transportation that offers many benefits for the environment (see, for example, Chapman 2007). It is also a cheap mode of transportation with low maintenance costs (Horton 2006). Very flexible and relatively fast, it helps to reduce urban traffic congestion levels (Hopkinson and Wardman 1996), which is why it is a very practical means of travelling to one's place of study or work (see Kingham *et al.* 2001) or to the shops (see Moudon *et al.* 2005).

Thanks to all these advantages it comes as no surprise that the bicycle has come to be seen as a lifestyle choice (Horton 2006) that should be

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encouraged in order to reduce the number of negative marginal effects involved in the usage of private automobiles (Vandenbulcke *et al.* 2009) while also attempting, on many occasions, to mitigate the flaws of public transportation as an alternative to the private automobile (see Beirão and Cabral 2007, and Gardner and Abraham 2007 regarding commuters' attitudes towards public transportation and the private automobile). In fact, some authors go further and are very critical of the automobile. They propose support for automobile-free futures and put forward the bicycle as a clear strategy for sustainable future transport. They consider that the automobile and the political, cultural and economic institutions, norms and practices that sustain and promote an automobile-dependent type of transport and its centrality to global capitalism, are a great contributor to the environmental problems and socioeconomic injustice faced by contemporary society (see Paterson 2007).

There are many ways that bicycle usage can be encouraged, including the building of an extensive bicycle path/lane network (we refer you to the various proposals in this regard in Dill and Carr 2003, Krizek 2006). To complement this, a large number of cycle parks must be provided throughout the whole town/city (Pucher and Buehler 2005). Bicycle intermodality with the various types of public transportation must also be catered for (see Martens 2007 for example). Another possibility is to develop a public network of single-use hire bicycle stations for one-way trips. This policy has been well received in recent years thanks to the development of smart bicycles (see Bouf and Hensher 2007 or Pucher and Buehler 2008 for examples of these systems) which have reduced the threat of theft and vandalism, two of the greatest risks to bicycle development (see Line *et al.* 2010) and ones that can become deterrents to its usage (Vandenbulcke *et al.* 2009).

To optimise the success of all the previously mentioned public policies for promoting bicycle usage, firstly, any possible factors that might deter people from using bicycles as a mode of urban transportation must be taken into account, such as long distances (Kingham *et al.* 2001), the terrain (Rodríguez and Joo 2004), adverse climate (Parkin *et al.* 2008), a high likelihood of theft (Line *et al.* 2010) and high accident risk (Vandenbulcke *et al.* 2009). Other factors that need to be taken into account are an appropriately-designed cycle lane network (Dill and Carr 2003), the right choice of cycle lane/track for each area (Tilahun *et al.* 2007), and the carefully studied distribution both of bicycle parks (Pucher and Buehler 2005) and hire stations (Bouf and Hensher 2007, Pucher and Buehler 2008). And, as is logical, the personal characteristics of potential cyclists, such as age, level of physical fitness, lifestyle and general patterns of activity should also be borne in mind (see Rietveld and Daniel 2004).

Last, but by no means least, citizen attitude to these measures should not be overlooked and any marginal effects that might produce rejection by some citizen collective, often inherent in any public works project (see Castillo-Manzano and López-Valpuesta 2009), must be minimised. Rejection by a large

number of automobile drivers should not be undervalued, either, as projects of this type are often accompanied by a large reduction in the number of parking places (Krizek 2006) or, when they are part of wider ranging urban development, by the pedestrianisation of certain streets (Muñuzuri *et al.* 2005) often with the aim of reorganising the 'old town' and the historical parts of the town/city (Beriatos and Gospodini 2004), which results in restrictions on automobile access to these areas. This rejection might come in part from some residents in the pedestrianised areas and retailers' associations which, given the lack of alternative public transportation, see projects such as these as a deterrent to the access of potential customers who, for a variety of reasons, might oppose pedestrianisation (see Southworth 2005 for an analysis of the different effects of pedestrianisation).

Measures such as these for promoting bicycle usage often get a cool reception specifically in the historical old parts of the city and even face open opposition. And this despite the benefits of bicycles helping to reduce both traffic congestion and pollution there (Guiver *et al.* 2008), and thus contributing towards the upkeep and conservation of these areas and their historical buildings (Tweed and Sutherland 2007). In this respect, the automobile and the range of social and political institutions which sustain its dominance across urban space play an important role in these attitudes. The automobile has become deeply embedded in individual identities with an intricate constitutive association between automobiles, progress and modernity. So, in order to understand the possibilities for moving towards sustainability, it is first necessary to understand the social and political forces that have made cars so dominant (Paterson 2007).

The main purpose of this paper is to try to analyse, and if possible, understand, how it is possible for there to be movements that oppose bicycle usage and how these movements might be reconciled ideologically by a significant percentage of the population. At one extreme, this social response can degenerate into vandalism and theft, i.e. the main threat to the survival of a hire cycle system. This painful lesson was learned when the system first originated, with the collapse for these very reasons of the 'White Bike Plan' that had been launched in Amsterdam in 1965. The development of a public network of bike hire schemes can also be the target of legitimate citizen opposition, particularly when the systems can affect the aesthetics of specific places and a proper consultation process is not carried out about issues such as what the scheme might look like, or where to put the hire stations. This is compounded if we also bear in mind that in many cities bike hire schemes are used as a vehicle for advertising.

For this analysis we shall use as our context a specific and undoubtedly successful experience, the policies used to promote bicycle usage in the city of Seville, Spain. We shall analyse the development of a public bicycle hire system in this city. For this purpose, we have carried out a survey in the main pedestrian zones of the historical old town and used generalised ordered logit models. We shall try to discover what lessons can be learned from this

experience that can be extrapolated to other towns and cities and analyse, on the basis of what is learned, how an optimal local transportation and environmentally friendly policy to encourage bicycle usage should be taken forward.

Policies to promote bicycles in the city of Seville

Over the last five years, the city of Seville (pop. 704,198) has instigated a full and successful policy to promote bicycle usage. This policy has been accompanied by the progressive pedestrianisation of a large part of the historical old town, one of the most extensive in Europe, with a surface area of 335 hectares (830 acres), and other areas with large influxes of people, along with the reorganisation of traffic in a number of areas and restricted private vehicle access into the old town, except for residents. Bicycle promotion in Seville has been carried out against the backdrop of unsurpassable climate and terrain conditions and has led to a 10-fold increase in bicycle mobility in the city in the 2006–2009 period and usage peaking at 6.6% of mechanised trips, which is not only an unprecedented success on the national scale, but also worldwide. The main actions taken were the construction of an extensive bicycle lane network, which will soon reach a length of 120 km (72 miles), and the development of a public bicycle system managed by the JCDecaux company. The model is similar to others that the company has in place in cities in France, such as Lyon and Paris (see DeMaio 2009), and Spain, such as Cordoba, Gijon and Santander.

The public bicycle system came into operation in July 2007, under the name of SEVICI. There are currently over 2500 bicycles at more than 250 stations located throughout the whole city. The system receives no type of direct aid or subsidy from the city hall, although the company (JCDecaux) has been granted certain advertising rights for 20 years in exchange for implementing and managing the system and keeping it at a low, almost symbolic cost for citizens. The system has been extremely successful and already has more than 70,000 yearly commutation ticket holders, i.e. over 10% of the city's population. This policy for promoting bicycle usage has been complemented with other measures, such as the creation of a Bicycle Registration Plate Scheme with electronic anti-theft systems; the building of new facilities for parking bicycles in areas with the greatest influx of people, and specific measures to favour the intermodality of bicycles with other modes of transportation, such as the Bus–Bicycle project that provides metropolitan bus users with a free pass to use a bicycle to move around the city.

A specific department was created within the city hall to implement this integrated plan called the 'Department for Sustainability'. This was run by the minority party in the left-wing municipal coalition that governed the city, the Communist Party to be precise. From that time on, the Communist Party was therefore in charge of running this new department whilst the deputy mayor became the visible face behind the initiative.

Nevertheless, despite the public bicycle system and the major modal shift towards the bicycle being both highly successful and well received, this experience of promoting bicycle usage also had to face a variety of problems. Thus, the implementation and development of these policies has had to contend with protests and reticence from some sections of the population, and cycle hire stations have systematically been rendered inoperative.

Sabotage was especially virulent during the first two years that the system was up and running. According to JCDecaux, the company had to deal with a situation unlike that found in any other European city where the system was in place, and, especially, other cities with a comparable population. By way of example, only 15 months after the system had been brought into operation, 62% of the hire cycles had been stolen at least once and, of these, 12% of the total had not been recovered. There were also frequent episodes of all the cycle stations in a single district being put out of use over a single weekend – this usually coincided with construction work to extend the cycle lane in the district – and at the beginning of June 2008, 15% of all the bicycles, some 200 machines, had punctured tires. The stations and the bicycles themselves were vandalised by groups of people who did not hesitate to upload videos of their actions onto YouTube and who, compared to bicycle thieves, obviously had no profit motive in mind.

The situation became so serious that it put the financial sustainability of the system at risk and required solutions to be investigated. Eventually, the concessionary was compelled to introduce improvements in the system and these, together with greater policing and the passing of time, have led to a fall in the vandalism rate. Despite there being a significant fall in vandalism and theft, these are still the greatest threats to the hire system, and during the 12 months from September 2009 to September 2010, of the on-average 2650 bicycles available during this period, 213 were stolen and 1442 vandalised. Two hundred and forty anchorage points were also put out of use. According to JCDecaux, only three years after the system had been brought into operation all the bicycles had had to be replaced, either because of serious damages done to them or because they had been stolen.

Apart from this virulent vandalism, which seeks no economic benefit of any kind, more civic protests from some sections of the population against this policy to promote bicycle usage must be highlighted. Examples of this are the numerous protests against the cycle lanes being extended by residents who blocked traffic; or the claims filed before courts by citizens' platforms to demand greater sanctions for cyclists' behaviour, or even protests by taxi associations against the cycle hire system for illegal professional practice and unfair competition, since the service in question is semi-free as it is financed by revenue from the concession of advertising space. However, in this last respect, despite their initial protests, taxi drivers currently seem to have understood that the public bicycle system does not really compete with their business. It must also be highlighted that retailers' associations have also actively protested, especially against the removal of parking lots, which they regard as a strategic

weapon to compete with shopping malls (Guy *et al.* 2005). These associations form a powerful lobby in Mediterranean towns and cities (see Castillo-Manzano and López-Valpuesta 2009 for the case of Spain, and Lopes Balsas 2000 for the case of Portugal). We must also bear in mind the difficulties of promoting bicycle use in the context of an automobile-centred culture (Horton 2007). Opinions on the importance of the automobile to the economy, to our culture and above all to individual freedom are very common (Rosen 2002).

It might seem that the world of contemporary urban transportation politics is split between advocates for automobiles and champions of the bicycle, but this is not really true. There is little evidence to support this polarisation between automobile drivers and cyclists (Skinner and Rosen 2007), especially considering that bicycle usage can be very common among automobile owners too (Parkin *et al.* 2007), as has ended up being the case in Seville. There are other criticisms that are more difficult to classify which, *a priori*, also conceal a strong anti-bicycle feeling, such as the cycle stations and parks in the historical old town area detracting from the area's aesthetics. It is said that these modern fittings contrast with the old, historical buildings, and thus have a negative effect on the correct running of the cultural and religious activities that are inherent in these areas in a city like Seville, which has over 100 religious brotherhoods being involved in frequent activities and processions on the public highway throughout the whole year (although most take place in Holy Week).

To deal with the logical conflicts arising out of the shared usage of the public highway in a city such as Seville, which has no tradition of bicycle usage, on 18 April 2008 the city hall passed a new Bylaw on the Movement of Pedestrians and Cyclists. However, this new bylaw was also the cause of controversy. Two of its provisions have been especially controversial; that bicycles can be ridden at slow speed on sidewalks and in pedestrian zones, and that they can be chained to trees and urban furniture when there is no cycle park within a radius of 50 meters. The problems incurred by the co-existence of pedestrians and cyclists and the bad feeling between them that resulted from the application of this bylaw led to a number of claims being filed before courts. These all led to a ruling by the Andalusian High Court that annulled several articles in said bylaw and banned the usage of bicycles in certain downtown and shopping areas at times when these are crowded.

These cases are yet another indicator of the degree of dispute that bicycle development is causing in the city (see Fell 2008 on the way that informal tradition and conflicts of interest might hinder the development of environmental policies), the determinants of which will be analysed in the following sections.

Data

A survey was carried out between June 2009 and June 2010 in the main pedestrian zones of the historical old town, always within visual range of a hire

bike station and cycle park, to analyse how well the Seville smart-bike system (SEVICI) has been received by citizens in the city. The survey was carried out in three different waves in order to observe any evolution in citizens' opinions over the year as the system quickly consolidated. The total size of the sample considered was 1530. The specific data are set out in Table 1.

These surveys were used to construct the variables used in the analysis, which are described in Table 2 along with the main descriptive statistics.

The two variables in category e, *uglyot* and *pedmobdiff*, are the two possible negative marginal effects that we have asked citizens' about. Table 3 gives scores for these over the three waves.

As can be seen, although the majority of citizens do not perceive the existence of these negative marginal effects, the percentage that believes that they do exist is more important. To be precise, almost 35% agree or strongly agree that the facilities for parking and picking up public hire cycles detract from the aesthetics of the historical old town, and around 44% agree or strongly agree that these same facilities hamper pedestrian mobility in the historical old town.

Analysis of the determinants of aversion to policies to promote bicycle usage

We now go on to analyse the factors that affect the perception that inhabitants of the city and habitual visitors have of these possible negative marginal effects. For this, following Williams (2006), generalised ordered logit regressions are used in their *partial proportional odds version*.

Generalised ordered logit models belong to the discrete choice model family and are used to estimate relationships between an ordinal dependent variable with more than two outputs and a vector of explanatory variables. In our case, these will be the results obtained from questions that score how much SEVICI facilities detract from the aesthetics of the historical old town or hamper pedestrian mobility in the area. This opinion is shown by variables e.1. *uglyot*, and e.2. *pedmobdiff* (see section e, Table 2). These variables can be scored from 1 to 4 depending on the degree of agreement or disagreement with the question

Table 1. Interview campaign and data.

Field work	Place	Entrance point to City Hall square from city's main pedestrian streets		
	Period	June 2009	January 2010	June 2010
How information was obtained	Interview with closed questionnaire	19 questions		
	Universe	Citizens of Seville or frequent visitors to its metropolitan area		
Sampling	Sample size	297	527	706
	Sampling method	Random selection of passers-by		

Table 2. Variables and descriptive statistics.

Name	Explanation	No. obs.	Mean	Std. dev.
<i>a) Date of survey and personal characteristics</i>				
a.1. date	1 if survey is in Jun 09; 2 if Feb 10; 3 if Jun 10	–	2.267	0.765
a.2. gender	1 if male; 0 if female	781	0.511	0.500
a.3. age	Age of person surveyed (between 14 and 82 years)	–	32.687	14.714
a.4. education	0 if no formal education; 1 if school leaving certificate; 2 if high school diploma or professional training; 3 if upper grade professional training; 4 if shorter graduate degree; 5 if longer licentiate degree; 6 if PhD	–	2.576	1.505
a.5. resident	1 if resident of city of Seville; 0 otherwise	1111	0.727	0.446
a.6. sevicuser	1 if is SEVICI user; 0 otherwise	480	0.314	0.464
<i>b) Surveyee's employment status. Base category includes unemployed</i>				
b.1. full-time	1 if full-time worker; 0 otherwise	379	0.248	0.432
b.2. part-time	1 if part-time worker; 0 otherwise	155	0.101	0.302
b.3. self-employed	1 if self-employed; 0 otherwise	153	0.100	0.300
b.4. retired	1 if retired; 0 otherwise	45	0.030	0.169
b.5. homemaker	1 if homemaker; 0 otherwise	97	0.064	0.244
b.6. student	1 if student; 0 otherwise	649	0.425	0.495
<i>c) Reasons for visiting or being in old town</i>				
c.1. livethere	1 if lives downtown; 0 otherwise	241	0.158	0.365
c.2. work	1 if for reasons of work; 0 otherwise	348	0.228	0.420
c.3. leisureshape	1 if for leisure/shopping; 0 otherwise	1255	0.821	0.383
<i>d) Scoring of SEVICI, or urban transportation policies and municipal government management</i>				
d.1. userpubtransp	1 if frequent user of public transportation; 0 otherwise	718	0.477	0.500
d.2. scorepubtransp	Score given to quality of public transportation in Seville, from 0 to 10	–	5.637	2.039
d.3. pedestcenter	Degree of agreement with pedestrianisation of main streets in Seville old town, from 0 to 10	–	6.692	2.737
d.4. commanage	Score given to Communist Party's management within municipal government, from 0 to 10	–	3.512	2.492

(continued)

Table 2. (Continued).

Name	Explanation	No. obs.	Mean	Std. dev.
d.5. anticommu	Measures anti-communist bias in score given to City Hall. Obtained by subtracting score given to <i>commanage</i> variable (d.4) from score given to overall City Hall management from - 10 to 10	-	-0.871	2.050
d.6. Francostrs	1 if agrees that references to Franco dictatorship (1939-1975) should be removed from street names); 0 otherwise	656	0.437	0.496

e) Scoring of any negative marginal effects caused by smart bicycle system (SEVICI) stations (from 1 to 4): 1 if strongly agree (SA); 2 if agree (A); 3 if disagree (D); 4 if strongly disagree (SD)

e.1. uglyot	Considers that SEVICI facilities and those for general bicycle parking detract from the aesthetics of the historical old town	-	2.779	0.909
e.2. pedmobdiff	Considers that SEVICI facilities hampers pedestrian mobility in the historical old town	-	2.609	0.936

Table 3. Level of aversion to each of the possible negative marginal effects.

Variables	Categories	= 1	= 2	= 3	= 4
		Strongly agree (SA)	Agree (A)	Disagree (D)	Strongly disagree (SD)
e.1. Facilities detract from the aesthetics of the historical old town	Jun 2009	6.73%	17.85%	46.46%	28.96%
	Feb 2010	11.98%	22.81%	41.06%	24.14%
	Jun 2010	10.37%	27.70%	43.47%	18.47%
	Total	10.22%	24.10%	43.22%	22.46%
e.2. Facilities hampers pedestrian mobility in the historical old town	Jun 2009	8.08%	27.27%	43.77%	20.88%
	Feb 2010	15.94%	28.65%	35.67%	19.73%
	Jun 2010	14.20%	32.39%	37.36%	16.05%
	Total	13.61%	30.10%	38.02%	18.26%

set: 1 if strongly agree (SA), 2 if agree (A); 3 if disagree (D); 4 if strongly disagree (SD). The vector of explanatory variables used comprises the variables in sections a, b, c and d in Table 2.

As in all other discrete choice models, only the sign of the coefficient can be directly interpreted in generalised ordered logit models. So, to obtain more information for analysis we can use the marginal effects that provide us with a good deal more information about relationships between explanatory variables and the different values of the dependent variable (see Castillo-Manzano *et al.* 2011 for a detailed explanation of the marginal effects).

Table 4 and Table 5 show the estimations of the marginal effects at the mean for each of the dependent variables considered, e.1. uglyot, e.2. pedmobdiff. Only statistically significant coefficients are shown.

Discussion

The first thing that stands out is the more than significant percentages of citizens who observe negative marginal effects. The negative way that the responses evolved between June 2009 and June 2010 is also striking. Specifically, the percentage of people who agree or strongly agree that the smart-bike facilities detract from the aesthetics of the historical old town

Table 4. Marginal effects of the ‘detract from aesthetics’ dependent variable.

Dependent variable categories	Uglyot variable: considers that SEVICI facilities detract from the aesthetics of the historical old town			
	uglyot = 1 Strongly agree (SA)	uglyot = 2 Agree (A)	uglyot = 3 Disagree (D)	uglyot = 4 Strongly disagree (SD)
a.1. date				▽ 4.350%***
a.2. gender				
a.3. age	△ 0.335%***		▽ 0.443%***	
a.4. education				
a.5. resident				
a.6. sevicuser	▽ 3.905%***	▽ 9.443%***		△ 8.980%***
b.1. full-time				
b.2. part-time				
b.3. self-employed	▽ 4.534%***			
b.4. retired	▽ 4.588%***			
b.5. homemaker				
b.6. student				
c.1. livethere		△ 6.863%*	▽ 9.872%**	
c.2. work				
c.3. leishureshop		△ 7.829%**		
d.1. userpubtransp	△ 2.335%*		▽ 4.914%*	
d.2. scorepubtransp	▽ 1.176%***			
d.3. pedestcenter		▽ 1.036%**		△ 1.204%**
d.4. commanage	▽ 2.243%***	▽ 2.567%***	△ 3.865%***	
d.5. anticommu	△ 0.948%**	△ 1.745%**	▽ 2.347%**	
d.6. Francostrs				▽ 7.966%***

Note: *, ** and *** indicate coefficient significance at the 10%, 5%, and 1% levels, respectively.

Table 5. Marginal effects of the 'hamper pedestrian mobility' dependent variable.

Dependent variable categories	Pedmobdiff variable: considers that SEVICI facilities hamper pedestrian mobility in the historical old town			
	pedmobdiff = 1 Strongly agree (SA)	pedmobdiff = 2 Agree (A)	pedmobdiff = 3 Disagree (D)	pedmobdiff = 4 Strongly disagree (SD)
a.1. date		△ 3.015%*		▽ 2.763%**
a.2. gender				
a.3. age	△ 0.254%***		▽ 0.489%***	
a.4. education				
a.5. resident				
a.6. sevicuser	▽ 9.295%***	▽ 12.907%***	△ 11.215%***	△ 10.987%***
b.1. full-time	▽ 4.432%*	▽ 12.122%**	△ 12.290%**	
b.2. part-time		▽ 10.237%**		
b.3. self-employed	▽ 6.111%***		△ 10.973%*	
b.4. retired	▽ 6.986%***		△ 24.337%***	
b.5. homemaker		▽ 12.500%*		
b.6. student				
c.1. livethere	△ 5.927%*			
c.2. work				
c.3. leishureshop				
d.1. userpubtransp				
d.2. scorepubtransp	▽ 1.196%***	▽ 1.973%***	△ 2.170%***	△ 0.999%*
d.3. pedestcenter				△ 1.489%***
d.4. commanage	▽ 1.986%***		△ 1.568%*	
d.5. anticommu			▽ 1.631%*	
d.6. Francostrs		△ 7.356%**		▽ 5.445%**

Note: *, **, and *** indicate coefficient significance at the 10%, 5%, and 1% levels, respectively.

increases from under 25% to over 38%. Meanwhile, the number of people who consider that they hamper mobility increases from just over 33% to almost 47%.

The analysis of the determinants (see Tables 4 and 5) confirms that the simple passing of time (date variable) has exacerbated these perceptions. *A priori*, a positive evolution over time might have been anticipated, as the success and generally good reception of policies to promote bicycle usage as a means of urban transportation would result in less congestion in the streets and greater awareness of the possible advantages of bicycle usage, which would favour citizen perception. The fast uptake of commutation tickets also seemed to augur the development of more positive opinions. However, this was a kind of double-edged sword as the success and the swift rise in the number of users resulted in symptoms of hire bike system congestion and deteriorating facilities, which could in turn have led to the system's general image deteriorating.

However, it is the very users of the hire bike system who are championing it, as is proven by the fact that the sevicuser variable appears as one of the most significant determinants. So, when the people surveyed are users, there is

a dramatic fall in the likelihood in them coming out against the bicycle and considering that the system facilities detract from the aesthetics of the surroundings or hamper mobility; at the same time, this means that the hire system can be stated to have been well received by people who have tried it and use it frequently. Consequently, those who most oppose the system are therefore non-system users who have not tried it.

There is also a significant bias with regard to age that appears to be another of the determinants. The younger the person surveyed is, the less critical s/he is of the bicycle. In quantitative terms, as likelihood is expressed in years, a difference of 30 years would reduce the likelihood of an individual considering that the facilities detract from an area's aesthetics or hamper mobility by almost 15%. In this respect, the youngest have been those who have shown a more receptive attitude towards the bicycle since the measures to promote it started in Seville and who have taken active part in meetings and other bicycle-linked activities. The main goal of these meetings is generally to call for the bicycle lane network to be extended and for bicycle parks to be put in place. In other respects, two categories of citizens appear, on average, to be especially critical of the system and its detraction from the aesthetics of the historical old town. Precisely, if the person surveyed lives in the historical old town or is there for reasons of leisure or shopping (livethere and leisureshop variables), the likelihood that s/he would state that the facilities detract from the aesthetics of the area increases considerably.

In both cases this rejection could stem from the lack of understanding that policies for promoting the bicycle have met with amongst a number of residents' associations, retailers' associations and some pedestrians in general, who have, on occasion, stated their opposition to these measures. Protests by residents' associations against extending the cycle lane network in the town centre, retailers complaining about the removal of parking lots resulting from the measures to promote the bicycle, and numerous pedestrians reporting the antisocial behaviour of some cyclists have led to bad feeling towards the bicycle among the residents of the historical old town centre and even among people in the town centre for reasons of leisure or shopping who have endorsed the retailers' many protests. These protests by residents' and retailers' associations often referred to the lack of coordination and information regarding how the policies to promote bicycle usage were implemented. This could have been avoided with a good information policy and better coordination by the city hall with these associations when implementing these measures.

In other respects it can be seen that there is an empirical basis that upholds the hypothesis of comprehensive urban development models being perceived by citizens in different ways. There are clear positive correlations between the defence of bicycle promotion and the high scoring of public transportation and the pedestrianisation of certain downtown streets. Specifically, we see that the higher the score that those surveyed give to public urban transportation and the measures to pedestrianise the historical old town, the lesser the likelihood

that they state that the facilities of the hire bike system detract from the aesthetics of the historical old town or hamper mobility. This last finding warrants a closer look. It is precisely the pedestrians who are in favour of pro-pedestrian urban planning, with streets pedestrianised to the detriment of the automobile, who totally disagree that bicycles hamper pedestrian mobility or detract from their experience while they are walking. In other words, on average many of the supposed champions of pedestrianism who are threatened by bicycles are really defending the pre-eminence of automobiles over pedestrians or, put another way, who are concealing a clear anti-pedestrian philosophy.

A significant bias can also be seen with regard to some of the employment situation-related variables, with the self-employed and the retired being those who express a more positive attitude towards SEVICI facilities. One possible explanation could be the fact that a person who has a greater amount of available free time (retired) or greater flexibility with respect to his/her time (self-employed) is able to devote more time to general bicycle use. In the case of the former (retired), this could be for reasons of leisure or even as a healthy activity. Finally, the strong explanatory capacity of the politics-related variables (communist, anti-communist and Francoist variables) as a whole is striking. Firstly, there is a clear positive correlation between the absolute score that citizens give to the management of the Communist Party in the city hall and their perception of the possible marginal effects of SEVICI. The higher the score given by the respondent to the Communist Party's management, the lower the likelihood of him/her agreeing that SEVICI facilities detract from the aesthetics of the historical old town or hamper mobility.

Citizens' possible anti-communist bias is also significant. This is apparent when the Communist Party's management receives a lower score than the party's joint management in coalition with its social democratic partner in the city hall. A large anti-communist bias increases the likelihood of the person being in agreement with the statement that these facilities detract from the aesthetics of the historical old town or hamper mobility. Finally, when a citizen declares him/herself to be very conservative ideologically, and therefore against the removal of street names that refer to important figures from the fascist dictatorship of General Franco, there is a considerable increase in the likelihood that s/he agrees that the two marginal effects exist. Be that as it may, care must be taken when interpreting these variables as a whole as simply meaning that ideologically conservative people are less likely to support policies that favour the promotion of the bicycle. In fact, it is more likely that this negative reaction by ideologically anti-communist citizens is more related to excessive patrimonialism than to the Communist Party's bicycle project, assuming that they are trying to capitalise on any possible electoral gains to their benefit.

This close link between a project to promote the bicycle and a political party entails major risks, especially now that the Conservative Party has won the mayoral elections in the city and has displaced the social

democrat–communist coalition. Although they did not take up power until the second half of 2011, it is striking that one of the new mayor's first measures was to wind down the office for promoting bicycles and put advertising for the local beer on the hire cycles (turning the bicycles' front baskets into a kind of six-pack of beer bottles). This last measure was somewhat controversial given that the strict Spanish advertising law prevents alcohol and cigarette advertising at any sporting activity. Apart from this, broadly-speaking, the use of the hire bike system for static advertising and using the hire stations for marketing and the smart bikes as mobile billboards for brands also usually results in social rejection. These alliances of the bike hire systems with advertisers go against a green discourse, and consequently meet with opposition from followers of a truly green lifestyle. Curiously, the lack of advertising during the survey period must have lessened any negative visual impact on the historical old town.

Conclusions

The main topic of discussion about environmental policy in Spain in the winter of 2011 was the way that the majority of large cities in the country frequently, and alarmingly, exceeded air pollution limits. In this debate, the better air quality in Seville, which falls appreciably under these limits, has been attributed to its model of urban development, which promotes pedestrianisation, public transportation and, most especially, the bicycle. With regard to this, Seville has experienced the steepest rise in trips made by bicycle recorded to date on the European scale.

A recent study by the Seville City Hall Environment Department Office shows that thanks to bicycle use CO₂ emissions have been reduced by 62,833 tonnes. This is a 25% reduction in the pollution produced in the city and almost a 4.6% fall in mobility-generated emissions for 2007. Savings of 246,406 kWh of energy have also been achieved, a 7% decrease on data recorded for 2007. However, this great success has been accompanied by negative perceptions on the part of Sevillian society; for a significant percentage of citizens the possible negative marginal effects of bicycles, and especially of the hire cycles, clearly take precedence over any possible positive effects that there might be for the city and its environment. The anti-bicycle movement has acted with varying degrees of aggression; from media protests and court cases to demonstrations with cycle lanes being blocked and, even, in its most virulent form, generalised vandalism. This, and theft (see Rietveld and Daniel 2004, Vandenbulcke *et al.* 2009 on their importance), are the main two factors that could put the survival of a public bicycle hire system at risk (see DeMaio 2009 on the experience of JCDecaux in Paris).

The local media have played a major role. For the most part, the measures to promote bicycle use have received praise and support in the local media, but it should not be forgotten that some of the media have taken a critical view of the measures, especially those with a more conservative ideology and who are

therefore opposed to the Communist Party, which was behind the measures. Many of these criticisms must surely have impacted on public opinion to a certain extent. However, these strong criticisms have also led to the creation of a more or less informal social movement in defence of bicycles. The movement made its voice heard by sending letters to these newspapers, for example, as well as posting numerous opinions on forums and blogs, not so much in defence of the bicycle as against such a critical attitude towards the bicycle. Its understanding was that many of these criticisms represented a systematic strategy of political opposition rather than the actual rejection of the bicycle itself. Obviously this has only furthered polarisation of the debate.

In this line, there is a clear risk of citizens politically opposed to the political group that drives the policies to promote the bicycle taking up a strong contrary position irrespective of the successes achieved by the policies. The risk is greater still when – as in the case of Seville – the party behind the project develops a strategy to try to capitalise on all the electoral ‘returns’. A feature common to the increasing numbers of towns and cities championing sustainable mobility is the implementation of measures to prevent excessive automobile use, for which the use of alternative transportation is being encouraged, including the bicycle. This does not make it any easier for cities like Seville, where any measure to promote alternative modes of transportation is likely to clash head on with automobile users. In this scenario, pro-automobile measures are defended, whilst pro-cycling measures are only promoted. Social movements have sprung up in this context demanding recognition of equal rights to enjoy the city framed within the principles of environmental sustainability and social justice. Sustainable development has three widely-agreed ‘meta goals’: sustained economic development; environmental protection – inter-generational equity; and social justice – intra-generational equity (Feitelson 2002). As there are trade-offs between these goals in the context of plans for sustainable transportation systems, all three must be addressed and considered collectively (Mitchell 2005).

Seville City Hall has made a clear commitment to a sustainable city model until 2011 which has been well received by all the collectives that support these social movements and believe that environmental protection and social justice should be an essential ingredient of any sustainable transportation strategy (Agyeman and Evans 2004, Laurent 2011). In the framework of this sustainable urban transportation policy, the bicycle has become an object of environmental discourse. Thus, the bicycle is mobilised into the articulation of green discourse, as an iconic object of a green lifestyle (Horton 2006).

Finally, one other issue that is crucial to the success of policies of this type is a suitable implementation procedure which must be carefully designed and widely agreed upon by all the stakeholders involved. This lesson can be learned from the findings in the case of Seville. An integrated policy for promoting the bicycle with the building of over 120 km (72 ml) of cycle lanes and the provision of thousands of cycle parks both for private bicycle owners and for public hire

cycles must be a city project, and not, as it has been in Seville, the project of one political party, in this case the Communist Party, which barely represents 10% of the electorate in the city. This requires extreme care to be taken in dealings with the other political parties with whom agreement has to be reached on the strategic lines of these policies, and also with the different social agents involved, where intelligent pedagogy should be used as the basic tool. This pedagogy should highlight the advantages that the system has for everybody (see Latta 2007 on the need to enhance citizen participation in meaningful deliberation over decisions that affect them, as a public form of pedagogy).

More open and participatory planning should also be sought for the specific construction work done on the public highway (the building of cycle lanes or large bicycle parks, for example). In major urban projects such as this, urban development managers should not simply hide behind the ordinary public information procedure, which gives a deadline for representations about projects to be presented. Experience shows that this is an imperfect procedure that often does not lead to the participation sought but on most occasions leads to the majority of affected parties' representations being made too late and not in the right way (see Læssøe 2007 on citizen participation in the field of environmental policies). The solution therefore lies in putting more robust coordination, participation planning and control procedures in place for these strategic public works which allow the effective participation of professional and residents' associations in key aspects, such as the setting of timeframes and scope (see Fell 2008 on the need for the legitimate consent of a majority of interested parties to avoid costly conflicts of interest in any kind of environmental policy).

What was lacking when the bicycle hire system was developed in Seville was a suitable consultation process to gauge citizens' opinions on issues such as the possible effects of the scheme on the aesthetics of historical areas, how the scheme might seek to minimise these effects or where to locate the hire stations (see Raco 2000 on the need to gain the support of citizens' and retailers' associations for new urban policies to be successful). Prior information campaigns would also have been very useful for heightening awareness of bicycle use and hire systems of this type (see Castillo-Manzano and Sánchez-Braza 2011 for an example of the importance of a solid marketing policy to successfully implement urban transport planning policies), driving citizenship and respect among the various users of public space, and demonstrating their advantages and positive aspects in terms of environmental protection and social justice (see Tompkins and Adger 2005 and Wolsink 2010 on the need for careful strategic governance, especially when adopted measures cause shifts in citizens' entrenched mindsets). In fact, instead of producing negative marginal effects in some more peripheral areas of the historical town centre, the development of the bicycle hire scheme has contributed to the areas' regeneration, as the installation of the hire stations has also required the remodelling of deteriorated public spaces and squares that were refurbished for the facilities to be sited there.

Proper communication campaigns on these measures would have helped to give a positive image of the system's utility and contributed to minimising the perception of its possible negative marginal effects, focusing on them positively and making citizens see them as a chance to regenerate and enhance certain areas, or as a positive symbol of a rejuvenated city that is aware of and committed to a sustainable mode of urban transportation, rather than regarding them as obstacles on the public highway or cycle stations that detract from the beauty of the old city center (see Halperin and Scheld 2007 and Bader 2011 on the regeneration and gentrification of certain areas of the city, which makes them more appealing to live in; in any event, as Slater 2006 and Paton 2010 state, gentrification is not necessarily a universally positive process).

In addition, the legal framework for municipal bylaws on which the new mobility model is based should also always appear well-balanced. Therefore, for the very reason that the weakest party is usually favoured, the cyclist should be favoured in any conflicts with automobiles, and the pedestrian should have primacy in any conflicts with the bicycle in the shared use of sidewalks. Finally, if success is achieved when all these measures have been implemented, it should be marketed once again as the joint success of the whole city and not just of the managers concerned.

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