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Public acceptability of policies to reduce urban air pollution: A population-based survey experiment

Aceptabilidad pública de las políticas de reducción de la contaminación atmosférica urbana: Un experimento a partir de encuesta poblacional

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ABSTRACT

Low-emission zones, congestion charges and pedestrian areas have the potential to improve urban air quality. However, the lack of public and political support for these policies is often a significant obstacle to their introduction. In this article, we present the results of two studies. First, we investigated the public acceptability of three policies to reduce urban air pollution: pedestrianization, low emission zones and congestion charges. Second, based on an experimental online survey, we examined the effect of various framing conditions on the acceptability of congestion charges. The results show, first, that public acceptability is higher for pedestrianization and low emission zones and lower for congestion charging. Second, we find a positive effect on acceptability of information emphasizing the benefits of congestion charges and of positive labelling, comparing the wording “environmental contribution” with “urban toll”; and a negative effect of making political ideology prominent. Our findings suggest that while some interventions aimed at mitigating urban air pollution may be more readily supported than others, their acceptability can be enhanced (or diminished) through careful design and effective communication.

Keywords: Acceptance, survey, urban air quality, congestion charge, Spain

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RESUMEN

Las zonas de bajas emisiones, las tasas de congestión y las zonas peatonales tienen el potencial de mejorar la calidad del aire urbano. Sin embargo, la falta de apoyo público y político a estas políticas suele ser un obstáculo para su introducción. En este artículo presentamos los resultados de dos estudios. En primer lugar, investigamos la aceptabilidad pública de tres políticas para reducir la contaminación atmosférica urbana: peatonalización, zonas de bajas emisiones y tasas por congestión. En segundo lugar, a partir de una encuesta experimental en línea, examinamos el efecto de diversas condiciones sobre la aceptabilidad de las tasas de congestión. Los resultados muestran, en primer lugar, que la aceptabilidad pública es mayor en el caso de la peatonalización y las zonas de bajas emisiones y menor en el de las tasas de congestión. En segundo lugar, encontramos un efecto positivo sobre la aceptabilidad de la información que enfatiza los beneficios de las tasas de congestión y del etiquetado positivo, comparando la redacción "contribución medioambiental" con "peaje urbano"; y un efecto negativo de hacer prominente la ideología política. Nuestros resultados sugieren que, aunque algunas intervenciones destinadas a mitigar la contaminación atmosférica urbana pueden contar con más apoyo que otras, su aceptabilidad puede mejorarse (o disminuirse) mediante un diseño cuidadoso y una comunicación eficaz.

Palabras clave: Aceptación, encuesta, calidad del aire urbano, tasas de congestión, España.

INTRODUCTION

Air pollution is currently the greatest environmental risk to the health of the population in Europe (European Environment Agency [EEA], 2021). Premature deaths due to heart attacks, strokes, diabetes and respiratory diseases attributable to fine particulate matter, nitrogen dioxide and ozone pollution amounted to about 307,000 in the European Union in 2019 (EEA, 2021). Even concentrations of suspended particulate matter (PM 2.5) below the annual maximum limit value of 25 $\mu\text{g}/\text{m}^3$ set by the European Union are associated with significant adverse health effects in the population (Beelen et al., 2014). The elderly, children, people with previous illnesses, and people with low incomes are particularly vulnerable to the adverse health outcomes and economic impacts derived from exposure to urban air pollution (EEA, 2018).

Reducing air pollution levels in cities to the levels set by the World Health Organization by 2021 (annual average limit of 10 $\mu\text{g}/\text{m}^3$) would translate into significant health benefits for urban populations. As cars are the main contributors to air pollution in cities, local governments are trying to reduce urban traffic from a combination of infrastructure, regulatory and economic policies (Nieuwenhuijsen & Khreis, 2016). Among these, the pedestrianization of urban centers, the introduction of low-emission zones (LEZs) and congestion charging are considered the most effective interventions to reduce urban traffic and improve air quality (Jonidi Jafari et al., 2021). The likely effects of these policies are numerous, including an increase in welfare and a decrease in noise, temperature, premature mortality and morbidity in the urban centers (Soni & Soni, 2016).

In Spain, the need to reduce urban air pollution has resulted in the gradual introduction of interventions for the calming of urban traffic such as 30km/h streets and low emission zones. Pedestrianization and other infrastructure interventions have been widely discussed in some Spanish cities but the introduction of these policies, with some exceptions, has advanced very slowly (OCU, 2020). LEZs, areas of the city where access to certain vehicles is restricted due to their emissions, have only been permanently introduced in Madrid and Barcelona, after the complaint brought by the European Commission, which referred the case to the Court of Justice in 2019 after finding systematic breaches of air pollution limits in both metropolitan areas. In both cities, their

implementation has been the subject of some public controversy. The Spanish Climate Change and Ecological Transition Law, in force since May 2021, establishes that cities with more than 50,000 inhabitants and those with more than 20,000 inhabitants that exceed certain emission limits must introduce a LEZ from 2023. So, many LEZs will have to be designed and implemented in the coming years.

Congestion charges, where cars accessing the central area must pay a toll, a measure introduced in cities such as London, Milan or Stockholm, have hardly been considered on the political agenda of local governments in Spain. However, the new regulation in force in Spain, states that "access and circulation in the EPZ may include the payment of a fee or toll, the amount of which may also vary depending on the condition of the vehicle, in accordance with the polluter pays principle". The recent guidelines by the Ministry of Ecological Transition ([Ministerio para la Transición Ecológica y el Reto Demográfico \[MITECO\], 2021](#)) argue in favour of congestion charges, stating that "tolls appear to be an effective measure to stimulate modal shift and reduce the volume of traffic, as they translate the negative impacts of the car into economic terms that are clearly perceptible to the public". It is considered that urban tolls "generate a constant flow of economic income that can sustain persistent actions in the improvement of public space for pedestrian mobility, in the development of cycling and public transport infrastructure, as well as the improvement of the public transport service" ([MITECO, 2021](#)).

Despite the potential benefits of these policies, the lack of public and political support, given their foreseeable impact on the daily lives of residents, is often a significant barrier to their introduction, especially for those measures that are potentially more effective, such as congestion charging ([Rienstra et al., 1999](#); [Eriksson et al., 2008](#)). As a result, the lack of public acceptance and support for certain measures considered effective in reducing air pollution and CO2 emissions sometimes translates into policy makers adopting only the policies that are preferred by most of the public (such as improving public transport) or the interest groups but do not solve the problem effectively and/or efficiently ([Givoni, 2014](#); [Stehr, 2015](#); [Anderson et al., 2017](#); [Gunningham & Sinclair, 1999](#)). A dilemma thus arises between the likelihood of policy success and policy effectiveness.

There are several options to mitigate this dilemma. Research shows, for example, that residents' attitudes toward congestion pricing tend to improve over time, primarily due to familiarity and the status quo bias ([Börjesson et al., 2016](#)). The status quo bias seems to explain, to some extent, support for congestion charges once they are introduced ([Börjesson et al., 2016](#); [Eliasson, 2014](#)) or else when their implementation seems inevitable ([Schade & Baum, 2007](#)). However, public support for road pricing schemes does not always increase after implementation. For example, in Copenhagen, Denmark, no differences were found in the public acceptance of a congestion charge scheme before and after a pilot implementation ([Gehlert & Nielsen, 2007](#)). In Lyon, France, local authorities and the operator of an implemented toll system were forced to significantly reduce toll levels and limit the toll area due to public resistance and non-acceptance ([Raux & Souche, 2004](#)). Other strategies to increase public support, and therefore political viability, for environmental and urban traffic reduction policies include providing information on the allocation of the revenues raised by the policy (e.g., explaining that part of the revenue will go to improving local public transport) ([Beiser-McGrath et al., 2021](#)), using a more positive labelling of the policy for its presentation to the public ([Baranzini & Carattini, 2017](#)), emphasizing the unique benefits of the policy ([Gärling & Schuitema, 2007](#)), policy-packaging ([Wicki et al., 2020](#)) or linking/unlinking policy to political ideology ([Unsworth & Fielding, 2014](#)).

Previous research also shows that public acceptance and acceptability (the latter understood as the degree of approval or favourability towards a measure prior to its implementation) of policies to reduce air pollution varies depending on the type of policy and its attributes, as well as on certain personal (e.g. sociodemographic characteristics, owning or not owning a car), attitudinal (institutional trust, perceived process legitimacy and specific beliefs and emotions related to the measure such as perceived effectiveness

and general or prior ones such as pro-environmental identity) and contextual factors (Grisolía et al., 2015; Jagers et al., 2017; Milenković et al., 2019; Ejelöv & Nilsson, 2020; Oltra et al., 2021). Social research in recent decades shows that congestion charges generally receive lower levels of public support than certain infrastructure measures (Bartley, 1995; Schade & Schlag, 2015). In general, non-coercive measures are perceived as more effective and fairer than regulatory or economic measures and therefore tend to receive greater public acceptance and support (Rienstra et al., 1999; Nilsson & Küller, 2000; Schlag & Shade, 2000; Joireman et al., 2001; Eriksson et al., 2008; De Groot & Schuitema, 2012).

In this article, we try to answer two specific research questions: a) What is the level of public acceptability of pedestrianization, low emission zones, and congestion charges as policies to reduce urban air pollution? b) how do various framing conditions affect the public acceptability of congestion charges as a policy to reduce urban air pollution? To this end, we conducted two studies. In the first study, based on an online survey with a sample of residents in cities with more than ten thousand inhabitants, we investigated the acceptability of three distinctive measures to improve urban air quality. In a second study, based on a survey experiment, we examined the effect of various manipulations (status quo, positive labelling, allocation of revenues, salience of benefits, and salience of political ideology) on the acceptability of a congestion charge. The choice of a quantitative approach is due to the need for measurement of the level of acceptability and the quantitative impact of the manipulations.

Spain is a good context for this study for several reasons. The 80 most populated Spanish cities are above the air pollution levels recommended by the World Health Organization. The inaction of local governments in Spain has been repeatedly denounced by the European Commission, which has led to the permanent introduction of low emission zones in Madrid and Barcelona. In Madrid, and recently in Barcelona, low-emission zones have been the subject of some political and public controversy. So have the plans for pacification, pedestrianization and the introduction of green axes. It is to be expected that the public controversy will be transferred to other Spanish cities with the obligation to introduce low-emission zones in 149 municipalities with more than 50,000 inhabitants by 2023. And that it will continue beyond this date, given the probable need to introduce more far-reaching measures than low-emission zones to control urban traffic and air pollution. All this will require a determined effort of public engagement on the part of the local administrations.

Our goal in this article is to study the public acceptance and support as an important part of political feasibility, recognizing that interest groups and other factors also play an important role. The acceptance of a policy measure will be determined by its specific attributes and the implementation process, the public beliefs and emotions related to the measure and its implementation, the prior attitudes and values of the residents and the socio-political context during the implementation of the policy (Eliasson, 2014; Börjesson et al., 2016; Jagers et al. 2017; Beiser-McGrath et al., 2021). Understanding public preferences and beliefs about policies to improve urban air quality and climate change, and the demonstration that the acceptance of these policies might vary with the design and adoption of different communication strategies at the time of implementation phase is critical.

HYPOTHESIS

In this paper we test two hypotheses. First, we hypothesize that acceptability is higher for infrastructure measures (pedestrianization) and lower for economic measures (congestion pricing) (Hypothesis 1). Second, we expect that information emphasizing the benefits of the measure, about the allocation of the revenues raised, about the conviction about a definite introduction of road pricing (status quo manipulation) and positive labelling will significantly improve the acceptability of a congestion charge

compared to neutral-positive information about the measure and making political ideology salience (Hypothesis 2).

METHOD

To examine these hypotheses, we used survey data from two studies. In the first study, with the objective of examining the acceptability of three policies to reduce urban air pollution (pedestrianization, low-emission zones and congestion charges), we designed a survey implemented online in September 2021 with a sample of the population living in the capitals of the provinces of Spain. The questionnaire was inspired by the Information Choice Questionnaire (Knippenberg & Daamen, 1996), a questionnaire originally devised with the aim of measuring informed attitudes in a more stable way that could anticipate the results of referendums and informed voting. In a second study, and with the aim of examining the effect of different manipulations (specific types of textual information) on the overall evaluation and public acceptability of congestion charges, we conducted a survey experiment with a sample of residents in Madrid. The data for the second study was collected online in November 2021.

PARTICIPANTS

One thousand and fifteen individuals participated in the first study. Participants living in the selected postal codes were recruited through Dynata, an accredited online panel survey organization. Quotas were made by gender, age and education to obtain a representative sample of the total population, not of any particular city. The final sample consisted of 49% women, 15% aged 18 to 29, 19% aged 30 to 39, 21% aged 40 to 49, 25% aged 50 to 65 and 20% over 65. 28% had elementary high school or lower education, 43% had higher high school or vocational training and 29% had university studies. The sample had a symmetrical distribution in relation to ideological self-positioning, with a mean of 4.7 on a scale of 0 to 10. In the survey experiment, the sample consisted of 700 participants: 53% male and 47% female; 19% aged 18 to 29, 28% aged 30 to 39, 28% aged 40 to 49, 21% aged 50 to 64 and 4% over 65%. Respondents were recruited through the same online panel used in study 1.

MEASURES AND PROCEDURE

All respondents in the first study received information about three policies to reduce urban air pollution: i) low emission zones (LEZ); ii) pedestrianization, including green axes and superblocks; and iii) congestion charges. The information consisted of a brief introduction to the intervention of about 150 words. In addition to this information, participants were provided with information on five consequences of implementing each intervention. This information was based on various general documents accessible online and reviewed by four experts. Each of the consequences was evaluated by participants on a five-point scale from “very negative” to “very positive.” Following the evaluation of the consequences, we asked participants to reflect on these consequences and provide us with their overall evaluation of the intervention, as well as their level of acceptance of its possible implementation. The following questions were used: “On a scale of 0 to 10, how would you rate this policy?” with a response scale from 0 to 10 (from very poor to excellent) and “Would you find its implementation in your city acceptable or unacceptable?” with a response scale of 1 to 5 (from totally unacceptable to totally acceptable) (Table 1).

Participants in the survey experiment were randomly assigned to six specific conditions with different types of information about the congestion charge. Depending on the experimental condition, we provided, via an introductory text, additional information about the congestion charge. In the control condition, participants were shown a two-paragraph information text about the main characteristics of congestion charges (see Table 2). In the other conditions, except in the positive labelling condition, a third paragraph was added with additional information about the congestion charge.

In the salience of benefits condition, an additional paragraph was provided highlighting and explaining the three main benefits of introducing a congestion charge in the city (a reduction in air pollution, a reduction in traffic, and an increase in revenue for the local government). In the status quo condition, following the design of Schade and Baum (2007), participants were provided with an additional paragraph suggesting the imminent introduction of a congestion charge in Madrid. In the allocation of revenues condition, the additional text emphasized the potential use of the revenue generated by the fee to improve public transport in the city. In the positive labelling condition, participants were provided with the same information as in the control condition but with the label “environmental contribution” instead of “urban toll” and “congestion charge” (Baranzini & Carattini, 2017). In the political ideology condition, in line with the Unsworth and Fielding’s (2014) study, it was first explained to participants that political ideology was associated with acceptance of congestion charges to then ask them about their political ideology. The participants in this experimental condition were then provided with the introductory text on urban tolls and an additional text about the confronted position of the local political parties on congestion charges.

The dependent variables in the second study were overall evaluation and acceptance. Both variables were measured identically to the first study.

Table 1. Example of information provided to participants in study 1.

Information about the policy	Information about the consequences
<p>An urban toll is a system whereby cars wishing to access a defined area of the city must pay a "congestion charge". The charge must be paid by the owner of the private vehicle entering, leaving or travelling through the defined area during a certain period of the day (e.g. from 7 a.m. to 6 p.m. on weekdays).</p> <p>In some cities, for example, the charge is 5 euros per day and is payable by all drivers entering the city centre between 7.30 am and 7.30 pm. City centre residents are exempt for the first 40 entries into the zone but must pay a reduced fee of 2 euros per entry thereafter. Payment to enter the zone is made by means of a sticker placed on the car or with an electronic transponder. The system works through automatic scanners that read the number plates of the cars.</p>	<p><i>Reduces air pollution.</i> Urban tolls often lead to a significant improvement in air pollution levels in the defined area. In Milan, for example, the urban toll managed to reduce by 20% the levels of particulate pollutants in the area delimited by the toll.</p> <p><i>The number of vehicles and traffic decreases.</i> In general, there is a reduction in the number of vehicles in the defined area. Thus, the frequency of traffic jams is reduced. In the case of Milan, a 35% reduction in the number of vehicles has been achieved.</p> <p><i>It generates revenue for the municipality.</i> In Milan, for example, the Area C toll has raised 13 million euros which have been spent on improvements to the metro, tram, bus and bicycle networks.</p> <p><i>It is one more tax to add to the tax system and can lead to social inequalities.</i> Congestion charges are considered regressive, in the sense that less well-off groups have to spend a higher proportion of their income than the better-off.</p> <p><i>Decrease in the number of accidents.</i> In some cities there has been a decrease in the number of traffic accidents and cycling accidents. In Milan, for example, the number of road accidents has decreased by 24%.</p>

Table 2. Example of information provided to participants in study 2.

Control condition	Condition 4 (positive labelling)
<p>Urban tolls <i>Please read this information carefully</i></p> <p>An urban toll is a system whereby cars wishing to access a certain area of the city must pay a congestion charge. The fee must be paid by the owner of the private vehicle entering, leaving or moving through the defined area during a certain period of the day (e.g. from 7 a.m. to 6 p.m. on weekdays). In some cities, for example, the charge is €5 per day and must be paid by drivers entering the city center between 7.30 am and 7.30 pm. City center residents are exempt for the first 40 entries into the zone, but must pay a reduced fee of €2 per entry thereafter. Payment for entering the zone is made through a sticker placed on the car or with an electronic transponder. The system works through automatic scanners that read the license plates of the cars.</p>	<p>Environmental Contribution <i>Please read this information carefully</i></p> <p>The environmental contribution is a system whereby cars wishing to access a certain area of the city must pay a contribution. The contribution must be paid by the owner of the private vehicle entering, leaving or moving through the defined area during a certain period of the day (e.g. from 7 a.m. to 6 p.m. on weekdays). In some cities, for example, the contribution is 5 euros per day and must be paid by drivers entering the city center between 7.30 am and 7.30 pm. City center residents are exempt for the first 40 entries into the zone, but must pay a reduced fee of €2 per entry thereafter. Payment for entering the zone is made through a sticker placed on the car or with an electronic transponder. The system works through automatic scanners that read the license plates of the cars.</p>

RESULTS

First, we examine whether our data support the hypothesis that non-economic interventions (pedestrianization and low-emission zones) receive greater support than economic measures (congestion pricing). Table 3 shows the descriptive statistics regarding participants' overall evaluation and acceptance of the three proposed measures.

The results in Table 3 show that pedestrianization was the policy best evaluated, with a mean evaluation of 7.75 and a modal evaluation of 10, followed by the low emission zone (mean evaluation of 7.17 and modal evaluation of 8) and the congestion charge (mean evaluation of 5.96 and modal evaluation of 7). Most respondents evaluated pedestrianization very positively (with values between 8 and 10), and the low-emission zones quite positively. The evaluation of congestion charges resulted in a more flattened distribution, as well as a greater polarization among respondents (a higher percentage of participants evaluated this measure with values of 0 and 2). An analysis using the t-test for related samples showed statistically significant differences in the overall evaluation of the three interventions ($t = -11.0$, $p = 0.00$; $t = 15.4$, $p = 0.00$; $t = 21.4$, $p = 0.00$).

Regarding the degree of acceptance of the introduction of the three measures, the results show also a significantly higher degree of acceptability for pedestrianization ($M = 3.95$) and LEZs ($M = 3.69$) relative to congestion charges ($M = 3.18$). 75 percent of respondents found the implementation of pedestrianization and green axes in their city acceptable, compared to 66 percent for the introduction of a ZBE and 44 percent for the introduction of a congestion charge scheme. An analysis using the t-test for related samples showed statistically significant differences in the acceptance of the three interventions ($t = -10.10$, $p = 0.00$; $t = 15.01$, $p = 0.00$; $t = 21.19$, $p = 0.00$).

With respect to Hypothesis 1, our results therefore show that pedestrianization is positively evaluated and widely accepted and is more positively evaluated and more widely accepted than the LEZ and the congestion charge.

We examine, next, whether it is possible to influence the evaluation and acceptability of congestion charges via the manipulation of the framing of the policy (Hypothesis 2).

Table 4 shows the overall evaluation and mean acceptability of congestion charges in the six experimental conditions. To examine the effect of the communication treatment on support for congestion rates, we conducted an analysis of variance with global evaluation and acceptability as dependent variables and the experimental condition as the independent variable.

Table 3. Descriptive statistics for participants' "overall evaluation" and "acceptance".

	<i>N</i>	<i>Min. value</i>	<i>Max. value</i>	<i>Mean</i>	<i>SD</i>
Overall evaluation					
LEZ	1017	0	10	7.17	2.31
Pedestrianization	1017	0	10	7.75	2.23
Congestion charge	1017	0	10	5.96	3.0
Acceptance					
LEZ	1017	1	5	3.69	1.05
Pedestrianization	1017	1	5	3.95	1.00
Congestion charge	1017	1	5	3.18	1.20

Table 4. Overall evaluation and acceptability of the congestion charge in study 2, according to experimental condition (mean, scales from 0 to 10 and 1 to 5).

	<i>Control</i>	<i>Status quo</i>	<i>Allocation of revenues</i>	<i>Saliency of benefits</i>	<i>Positive labelling</i>	<i>Political ideology</i>	<i>Brown-Forsythe (p-value)</i>
Global evaluation	6.1	6.1	5.8	6.8	6.5	5.0	5.9 (0.00)
Acceptability	3.2	3.3	3.2	3.5	3.4	3.0	3.2 (0.00)

The results show a significant effect of the experimental manipulation on the overall evaluation and acceptability of congestion pricing. Specifically, the overall evaluation of the policy was more positive in the salience of benefits ($M=6.8$) and positive labelling ($M=6.5$) conditions and more negative in the political ideology condition ($M=5$). The acceptance of the congestion charge showed a similar trend: the level of acceptance was higher in the salience of benefits ($M=3.55$) and positive labelling ($M=3.42$) conditions and lower in the political ideology condition ($M=2.99$). The differences were statistically significant (Brown-Forsythe = 5.9; $p=0.00$ and Brown-Forsythe = 3.2; $p=0.00$).

Further analysis via a Tukey's post-hoc test shows that the differences are statistically significant between the salience of benefits and political ideology conditions ($p=0.00$), between the positive labelling and political ideology conditions ($p=0.00$) and between the control and political ideology conditions ($p=0.02$). The differences between the control condition and the rest of the conditions are not statistically significant.

The results of the analysis partially support Hypothesis 2. The information emphasizing the benefits of congestion pricing and positive labelling produce a significantly more positive attitude towards the congestion charge among participants. In contrast, the information about political ideology generates a lower degree of support toward the policy among respondents compared to the control condition. The manipulation about the status quo and the allocation of revenues had no significant effect on the attitude toward the policy.

CONCLUSION

The European experience with environmental taxation indicates that a considerable level of public support and acceptance is a prerequisite for the implementation of some key environmental policies (Baranzini & Carattini, 2017). In this article, we examined the public acceptability of three types of policies to reduce urban air pollution (low-emission zones, pedestrianization and congestion charges). In addition, we examined the effect of various informational treatments aimed at increasing the acceptability of congestion charging.

Based on data from a survey with provision of information among residents of cities of 10,000 inhabitants, we find that public acceptability is significantly higher for pedestrianization and low emission zones and lower for congestion charges. This result reinforces results obtained in previous research (Bartley, 1995; Schlag & Schade, 2000) suggesting that certain measures, perceived perhaps as fairer than regulatory or economic measures, tend to receive greater public support. In addition, the data from an experimental online survey suggest that the framing and the information provided about the policy (congestion charging) can significantly influence the public evaluation and the acceptability of the policy. Specifically, emphasizing the unique benefits of the policy and a positive labelling can spur acceptability whilst making political ideology prominent causes significant, negative changes in public acceptability.

Interestingly, and contrary to our expectations following Baranzini and Carattini (2017), the information about the allocation of revenues did not produce a significant increase in acceptability. Participants informed about the use of tax revenues (to fund public transport services) were not more likely to accept the implementation of a congestion charging scheme. Similarly, although the influence of the status quo on the public acceptance of congestion charges has been consistently studied (Schade & Baum, 2007; Börjesson et al., 2016), our manipulation about the imminent introduction of the congestion charge (status quo condition) did not produce a significant or strong enough increase in acceptability among study participants.

The main policy implication of our findings is, therefore, that although certain interventions to reduce urban air pollution are initially more accepted than others, it is possible to improve (as well as to worsen) the acceptability of these measures through their design and communication. Positive labelling and emphasizing the specific benefits of the policy and, to a lesser extent, the perceived likelihood of the introduction of the policy, can significantly increase the acceptability of a proposed policy. We have also provided evidence that the salience of the political ideology and the partisan debate surrounding the policy can cause significant changes in acceptability. Therefore, depoliticizing urban interventions, emphasizing their unique benefits, positively labelling the policy and appealing to the status quo could improve the acceptability of future policies to reduce urban traffic and air pollution.

To our knowledge, this is the first study to compare the effect of different communication interventions on the acceptability of congestion charges. But the generalization of the results to the actual political support and voting around future or proposed policies to reduce urban air pollution or to mitigate climate change is uncertain. First, because our results are confined to the design of our research. For instance, although we provided information on the consequences of the three policies, it is possible that participants did not process with the necessary intensity all the information provided. Also, the communication interventions in the survey experiment might not reflect or might not have the power of the actual messages transmitted by the promoters, the stakeholders, and the media during the implementation phase of a policy. Media coverage, the action of interest groups, social influence and the economic cycle may also determine, to a large extent, the future political support for these policies. Qualitative research, and in particular, case study research, could provide valuable empirical evidence in this regard.

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