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Wouter Van den Berghe, Nicola Christie



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International and intercultural differences in arguments used against road safety policy measures

Authors: Wouter Van den Berghe^a, Nicola Christie^b

^aVias institute, Haachtsesteenweg 1405, 1130 Brussels, Belgium

^bUCL (University College London), Department of Civil, Environmental and Geomatic Engineering, Gower Street, London WC1E 6BT, United Kingdom

Corresponding author: Wouter Van den Berghe, wouter.vandenbergh@vias.be & wouter@tilkon.be

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Abstract

Policy measures in the field of road safety are not easily implemented for several reasons. Interventions can be undertaken in a multitude of policy areas, but it is often uncertain how effective the measures are. Moreover, policymakers may be reluctant to implement road safety policy measures because of the expected high costs and/or perceived low public support. To understand the arguments used against policy measures for road safety, a survey was conducted in ten countries (China, the United States, the United Kingdom, Belgium, Austria, Sweden, Greece, France, Nigeria, and Argentina). Respondents were presented with ten possible road safety measures and asked whether they would support or oppose them, what arguments their opinion was based on, and what the effect of the measure would be on them individually. This paper describes the main findings of the research and then zooms in on three counterarguments: restriction of mobility, discrimination, and unjustifiability of state interventions, as well as on three of the measures considered—compulsory use of ISA systems, mandatory cycle helmets, and screening of older motorists. With this research, previous results on the level of public support have been confirmed, and new insights have been gained. If people feel safe when using a particular transport mode, they are less conscious of the need for additional or stricter measures affecting their transport mode. The perceived restriction of human liberties, fear of discrimination, and resistance to state interventions fuel opposition against measures. Moreover, people from different countries vary in what they consider fair and unfair, which is linked to the national culture and social organization. Even if a measure was perceived to be unfair from a certain perspective (e.g., discrimination), some respondents supported the measure. Our research also illustrates that even people who recognize that a measure would be effective might oppose it because they think it is not justified from at least one perspective, for instance, an excessive restriction of freedom.

Keywords: policy measures, public support, road safety, arguments

1 Introduction

1.1 Public support for policy measures in road safety

It is not easy for policymakers to decide which measures should be taken to improve road safety. Interventions could be undertaken in a multitude of policy areas - see, for instance, the broad range of possible measures that are documented in the Road Safety Decision Support System developed by the European SafetyCube project [1,2]. However, it is often uncertain how effective measures will be and the extent to which they will result in the intended benefits. Measures that may be effective or cost-effective in one context may be less effective in another [3]. Moreover, policymakers may be reluctant to implement road safety policy measures because of the expected high costs and/or perceived low public support. Opposition to measures is rooted in people's beliefs about several issues, including effectiveness, costs, burdens, restrictions on freedom, possible discrimination, and so on. A considerable array of interest groups also has a stake in road safety—public services, road users, private industry, the medical world, etc.—and they may have different arguments to support or oppose a particular measure.

An understanding of the factors that contribute to people's support for road safety measures can enlighten politicians and is useful if one seeks to increase the level of support for such measures. Public support for road safety has been analyzed in several countries for one or more policy measures. Most of these studies were based on national opinion polls and surveys. Despite the differences in the measures, the formulation of the survey questions, the scale used to measure the level of support, the countries in which the survey was organized, and the year in which the survey was conducted, public support for both existing and planned measures was found to be often quite high, with the majority or even a (very) large majority of the survey respondents supporting the measures considered. Examples are a Dutch study using survey data from the 1990s that showed that all safety measures mentioned in the questionnaire were (largely) supported by a majority of the over 5,700 respondents [4]; a study [5] summarizing findings from 26 American studies that revealed generally high levels of support for existing or proposed road safety measures; a national survey in New Zealand, in which 80% of the respondents stated that the speed limits on the roads they usually drove on were about right, and enforcement of the current speed limits was supported by the majority of New Zealanders [6]; and a representative survey of 2,000 U.S. drivers that showed that 64.7% of the respondents were in favor of conducting sobriety checkpoints at least monthly, and 70.1% were in favor of a law that required all cars to have seat belt reminders that continuously chime until the seat belt is buckled, including for rear-seat passengers [7].

1.2 Factors that can influence support for policy measures

Studies analyzing public opinion on policy measures in road safety often list a few factors or variables that are associated with differences in the level of support. Many studies have found *gender* to be a statistically significant predictor of support for policy measures in road safety, with females almost universally showing higher support than men, in particular in relation to alcohol [11–16]. Older people are frequently inclined to be more in favor of road safety measures (for example, Runyan and Earp [10] and Robertson and Vanlaar [13]), albeit less systematically so than women.

Arguments for supporting or opposing policy measures are often linked to the perceived *consequences and effects* of the measures. For example, Eby et al. [12] found that support for lowering the blood alcohol concentration (BAC) limit for drunk driving was partially tied to beliefs about the impacts of a change in BAC standards. In relation to making alcohol interlock systems mandatory in the vehicles of people convicted for driving under the influence of alcohol, McCartt et al. [11] found that most people favoring the measure thought that it would prevent alcohol-impaired driving, save lives, or prevent crashes. Among respondents who were opposed, one-third cited concerns about privacy or government interference. Studies that examined the support for alcohol-

related measures, such as lowering the BAC limit or making alcohol interlock systems compulsory in certain cases, have shown that *drinking behavior* and *drunk driving* are associated with higher opposition to such measures [13, 15,17,18]. Tapp et al. [16] identified reasons to support or oppose 20-mph speed limits in urban areas. The main reasons for support were fewer serious accidents, children who could play safely, and streets that were more pleasant to live in; opposition was mainly related to the expectation that the limit would not be respected, that the measure would not be enforced effectively, and that it would lengthen travel times.

Almost 40 years ago, Runyan and Earp [10] found that attitudes toward *government regulation*, views about personal *freedom*, and views about *policy effectiveness* were significant predictors of policy preference in relation to seatbelts and passive restraints. A study on the use of red-light cameras [17] revealed that the main reasons for opposing such cameras were the perceptions that cameras make *mistakes* and that the *motivation* for installing them is revenue, not safety.

Runyan and Earp [10] learned from an experiment with 318 graduate students that exposure to effectiveness *information* was significantly associated with favoring mandatory seat belts or passive restraints over the existing regulations at that time. Downs et al. [11] found increased support for alcohol interlocks among those who had heard about them. Smith et al. [18] showed that there was considerable public support for evidence-based road-related laws, such as introducing red-light cameras and mandatory cycle helmets for children, and that overall support was augmented by exposure to research data.

Other factors that have been shown to be associated with the level of support for a particular road safety policy measure include information on evidence [8, 15, 18], cost [9, 19], privacy [19], income level [14,17], and knowledge about the measure [14]. It is also worth noting that very few authors found education level to be a statistically significant predictor of support for measures.

Some of the findings reported in this section refer to existing theoretical frameworks and models that can help explain the resistance to policy measures. Examples are theories on psychological reactance [20], [21], cognitive dissonance [22] and technology acceptance [23]. However, although such theories can be relevant for studying one particular measure – or a set of related measures – they do not adequately cover all relevant factors that could affect support for road safety policy measures. For instance, context dependent factors such as traffic regulation and enforcement seem to be largely ignored in such frameworks, often because studies are conducted within one country only.

Several studies have revealed *regional* differences within a country in terms of support for measures. Debinski, Smith, and Cielek [5] observed that road safety measures that enjoyed national support might not have local support. In Belgium, the country's two main regions, Flanders and Wallonia, often differ both in their driving behavior and the support for measures [24]. Similarly, in France, opposition to reduced speed limits on roads outside urban areas was higher in rural areas than in urban areas [25]. Albalade [26] revealed that population density was a factor determining opinions on speed limits. Shults and Bergen [8] identified regional differences in support for alcohol interlock measures. Munnich and Loveland [9] observed the greatest difference in support for mandatory motorcycle helmets when comparing the most rural areas to others. Such regional differences often appear to be associated with differences in culture, behavior in traffic, road infrastructure, and socio-economic characteristics of these regions.

1.3 Differences between countries in public support for measures

A limitation of the results mentioned above is that they refer to only one country and relate to specific measures. Such findings may not be generalizable outside these countries or to other measures. Only a limited number of studies have examined the support for a range of road safety policy measures across several countries. These include the international survey initiatives "Social

Attitudes to Road Traffic Risk in Europe” (SARTRE) and “E-Survey on Road Users’ Attitudes” (ESRA), [23,26]. The GRATS project [31,32], which uses questions similar to those in ESRA and SARTRE, is another example of a truly international approach, although it focuses more on behavior than on support for measures.

The publications based on the SARTRE and ESRA1 surveys illustrate the considerable differences between countries in support for measures. Almost universally, women are more supportive of road safety policy measures than men, and in general, young adults are the least supportive age group. It should be noted that SARTRE only covered European countries, and Europe also predominated in ESRA1. Therefore, the findings cannot simply be generalized to the global level, particularly given the lower economic development level, cultural differences, and higher crash fatality rates in Africa, Latin America, and most of Asia. Moreover, none of the publications based on SARTRE and ESRA thoroughly examined the variables that were related to differences in support for policy measures, with the exception of gender, age, and “country” (in particular [29]).

2 Methodology

2.1 Use of contentious measures

One way to determine the factors affecting support for measures is to confront people with “contentious” measures. Policy measures are contentious when strong opposition from particular stakeholders can be expected and/or when there is some kind of “taboo” because the measures violate established rules or principles. A balance of compromise is often to be sought between health improvements (fewer road injuries) and restrictions in mobility. Another tension that often arises is between benefits for society as a whole and individual constraints—not unlike the measures that have been taken in the context of the COVID-19 pandemic.

At the core of the research undertaken are a set of ten contentious measures that were included in a survey conducted in ten countries. To allow generalization of the results, the set of policy measures needed to be sufficiently varied. The selection criteria for inclusion were as follows:

- (1) be implementable (in principle) over the next decade in the countries considered to avoid respondents regarding it as an imaginary measure,
- (2) make sense in all the countries in which the interviews and the dilemma survey were conducted to avoid conducting international comparisons meaningless,
- (3) be neither too controversial—so that almost all interviewees would oppose it—nor too obvious—so that almost all interviewees would support it,
- (4) include at least one dimension of “unfairness”—so that at least some interviewees might consider the measure to be unfair or not worthy of support.

Moreover, when considered together,

- (5) the set of measures should target different road users—not just motorists;
- (6) the set of measures should cover different types of trade-offs and concern a range of ethical issues, such as avoiding harm, freedom, equity, and responsibility.

Using these criteria, the ten measures listed in Table 1 were selected. The acronym in the first column is often used in the text, tables, and graphs in this study.

[Table 1 here]

It is well known from the literature that people take a different view on measures once these have been implemented. Once a measure has been trialed out or implemented, opinions are often more favorable [25], [33]. To allow comparison across countries, the measures selected were not yet

implemented in almost all the countries considered. In a few cases the measure or a similar one existed: SCR in Greece, ZER and partially PAY in Sweden, and cycle helmets for children in France and Sweden.

The question was formulated in the survey as follows:

“The following questions are about a number of measures that could be taken in order to prevent traffic accidents and injuries. You will be asked your opinion about these possible measures. In an effort to reduce the number of people injured in road traffic accidents, one could consider the following measures. Please indicate to what extent you would oppose or rather support these measures to become legally required:

(1) Zero tolerance for driving under the influence of alcohol (0,0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...).”

This was followed by nine other measures. The sequence of the measures was randomized in the survey. A 5-point Likert scale was used for answering the questions, with the following terms: “Oppose,” “Somewhat oppose,” “Neither oppose or support,” “Somewhat support,” and “Support.” In this paper, we use the respondent’s score, after conversion of the answers to a scale between 0 and 100, as an indicator of the level of public support.

2.2 Dilemma survey sample and approach

The data discussed in this paper were collected through a web-based survey using online internet panels. Online panels consist of people who agree to provide information and/or express their opinions on a regular basis. For a particular survey, companies maintaining such online panels select a sample of panel members who meet the criteria given by the survey designers.

To facilitate the generalization of findings and to understand which support factors are strongly dependent on the national context, the survey needed to include a sufficient number of countries with different levels of road safety performance, regulations, and cultures. For that reason, the survey was organized in six European and four non-European countries: Austria, Belgium, France, Greece, Sweden, the United Kingdom, the United States, Argentina, Nigeria, and China. Furthermore, for the United Kingdom, France and the United States, only part of the country was targeted. For the United Kingdom, the sample was limited to “Greater London” (people living within the M25 ring road). The idea was to have people from an urban, densely populated area with a well-developed public transport network. On the other hand, the French sample only included respondents from the more rural regions of western France: *Normandie*, *Bretagne*, *Pays de la Loire*, and *Nouvelle Aquitaine*. In the United States, two large states were chosen with different road safety regulations: California and Texas. In Belgium, the Flemish and Walloon regions were analyzed separately. For the other countries—Sweden, Greece, Austria, China, Argentina, and Nigeria—the sample was representative for the whole country. Since the sample includes a mixture of countries and parts of countries, we will refer to the twelve sample sets as “regions,” rather than as countries. For all regions, the national language was used (English for Nigeria).

2.3 Some characteristics of the sample

The survey was conducted among the adult population. In each of the twelve regions, the initial aim was to have approximately 480 valid cases per region, with an equal number of respondents in three age groups—18–25, 36–47, and 58–69—and within each age group, an equal number of men and women. This would give a figure of 80 respondents for each of the six age–gender combinations. This sampling approach does not generate a fully representative set of the adult population in each

region, but the classification was made in order to have sufficiently large samples when comparing age and gender groups.

Data collection started on November 14, 2019. The survey was closed on December 14, 2019. All data processing and analysis was performed using Microsoft Excel and IBM SPSS 25–27. The cleaned dataset for the dilemma survey contained 5,587 records. Table 2 presents some characteristics of the database. Because of the thorough cleaning process, the initial target of approximately 480 respondents was attained in only seven of the twelve regions. When ignoring Nigeria, the average sample per age-gender group was 72 rather than the 80 aimed for initially. The average length of interview (LOI) of the cleaned and final sample was 16 minutes. The LOI was higher in the case of Nigeria and, to a lesser extent, Argentina. This phenomenon is probably related to slower internet connections.

[Table 2 here]

The gender distribution was almost 50/50. The distribution across age groups was very balanced: 31.7% for the 18–25 group, 31.5% for those 36–47, 32.2% for ages 58–69, and 4.6% for respondents with ages outside these age groups (259 cases, not in the table). The groups showing the biggest discrepancies with the original targets were the oldest age group in Nigeria and the youngest in Greater London. For most analyses, data weighting was used so that for each country the six gender-age groups had equal weight, except the oldest age group for Nigeria, which was left out because of the very low sample.

3 Overall findings

3.1 Support for policy measures

For most measures, the respondents' level of support is quite high, particularly given that many of these measures are contentious, and hardly one of them has been implemented in the regions considered. The highest level of support is for HEL, followed by LIC, SCR, and ZER, and the lowest is for 30K and INS. For eight of the ten measures, support is higher for females than for males (Figure 1), which is consistent with other findings (cf. Section 1.2). Men show slightly higher support than women only for PAY and INS, measures with a financial element in it. This also applies to LIC, for which the gender difference is very small. All the gender differences are statistically significant at the 0.01 level, except PAY where it is significant at the 0.05 level.

[Figure 1 here]

As shown in Figure 2, the level of support decreased with age for PAY, LIC, ALC, 30K, SCR, and INS. The decrease is most pronounced for SCR, which is not surprising given that this measure targets older people. For ZER, HEL and RFL, the support increases with age; for ISA, no systematic age gradient can be observed. Such complex age related patterns have also been observed in ESRA [34]. Whatever the pattern, the differences between the youngest and oldest age group are statistically significant at the 0.01 level except for ALC ($p < 0.05$) and ISA (not significant).

[Figure 2 here]

It is important to consider that age related findings discussed in this article are not necessarily linked to age per se, but result from the fact that older people have more experience in traffic, value safety higher and violate traffic rules less than the young. As we will see in the next sections, people with such views and behavior often are more supportive for road safety policy measures than those who are less concerned about traffic safety. In case older people feel they will be more affected by a measure, one can expect the opposition to be higher, as is the case for SCR.

Table 3 lists the average values for support for measures in each region. For each measure, the three highest values are marked in light green, and the three lowest values are in light orange. A general conclusion is that in the low- and middle-income countries in the survey (Argentina, China, and Nigeria), support for the measures is higher than in Europe and the United States; this is consistent with findings from the ESRA survey [27,28]. Within Europe, the highest level of support is often found in Greece and the lowest in Flanders. Across all regions Texas and California were often the regions with the lowest support. The highest variation across countries was for the ISA measure. In all countries, INS had the lowest support; for China, the level of support was fairly high (51.9%).

[Table 3 here]

3.2 Association with views on road safety

The survey included several questions regarding the involvement of crashes. Surprisingly, there was hardly any association between crash involvement and support for measures. However, some weak associations exist with the subjective feeling of safety in traffic. In Table 4 only statistically significant correlations are shown. It can be observed that if people feel unsafe using public transport, they tend to be more supportive of road safety measures. Motorists who feel safe see less of a need for speed-reducing measures such as ISA and 30K. Cyclists who feel safe on the road see less of a need to make wearing a helmet obligatory.

[Table 4 here]

The survey also included questions regarding the perceived causes of crashes. It seems plausible that people who believe a particular phenomenon (e.g., speeding or drunk driving) to be an important cause of road traffic injuries will be more supportive of policy measures meant to reduce this phenomenon. This assumption was confirmed through correlation analysis, except for the RFL measure. Table 5 shows the correlation coefficients between agreement with five statements and support for seven policy measures. Only correlations that are significant at the $p < .01$ level and with an absolute value higher than 0.1 were included. As one can observe, all expected correlations are present; the associations are moderate.

[Table 5 here]

3.3 Association with behavior in traffic

Respondents were asked whether they had engaged in particular behaviors on the road. We hypothesized that someone engaging in risky behavior would be more opposed to measures

restricting that behavior even further. Table 6 shows the correlations between the extent of engagement in particular behavior and the support for measures related to motorists (again, non-significant correlations were left out). The questions on behavior asked whether the respondent had engaged in this behavior over the previous 30 days.

[Table 6 here]

Drivers who self-reported speeding were less supportive of 30K, ISA, ZER and ALC. Drivers who admitted to drunk driving were less supportive of ZER and slightly less supportive of ALC; however, no correlation was evident with ISA and 30K. Thus, drunk drivers are, on average, neutral to speed-related measures, but speeders are also opposed to alcohol-related measures. Further observations include that regular use of cruise control does not lead to support for ISA or ALC, but rather the opposite—perhaps because drivers have experienced limitations on these systems? In addition, the positive association between mobile phone use while driving and SCR is to be noted; this is related to differences between age groups: younger people use more mobile phones and are more in favor of SCR than older people.

We also checked the possible association between not using bike helmets and support for HEL. The association was negative and moderate ($R=-0.286$, $p<0.01$). Cyclists who reported drunk driving were also more opposed to HEL ($R=-0.121$, $p<0.01$) and ZER ($R=-0.141$, $p<0.01$). Pedestrians who reported wearing retroreflective clothing in the dark tended to support RFL ($R=0.136$, $p<0.01$). The strongest negative association was observed between pedestrians ignoring red lights and RFL ($R=-0.185$, $p<0.01$).

3.4 Counterarguments used

Respondents had to indicate whether they agreed with a range of statements in relation to the measures. Each respondent was presented randomly with three of the ten measures. As can be seen in Table 7, the statements were formulated in a negative way, implying that agreeing to them could be seen as a counterargument. For the sake of brevity, we refer to instances of agreement with these statements as “counterarguments.”

Because the counterarguments used are based on the knowledge and perception of the respondents, they are inherently subjective. They may also be used as a protective claim, i.e. people seeking counterarguments if they don't like or want a measure. For instance, when fearing the negative effects of a measure on themselves, people may use the argument “Difficult to implement” because it helps them ‘justifying’ their opposition. We tried to reduce this phenomenon by not labelling the statements as a remark on the measures, rather than as an ‘argument’ to justify their support or opposition.

[Table 7 here]

“Difficult to implement” is seen as the most relevant counterargument; it was used in 39% of cases. Most other arguments were used in about 15 to 20% of the cases; “Reduce enjoyment” was used least (12% of cases). For every policy measure, on average, two counterarguments were used. For each measure, there is a negative and statistically significant ($p<0.01$) correlation between the level of support for that measure and the number of counterarguments. The correlation values varied between -0.391 for HEL and -0.229 for INS.

This systematic negative association is illustrated in Figure 3, which shows for each measure the proportion of counterarguments of those supporting the measure, those opposing the measure, and those who are indecisive. Those opposed to a measure systematically use more counterarguments than those who support the measure. The figure also illustrates how people can be supportive of a measure even if they agree with one or more of the counterarguments.

[Figure 3 here]

The correlations between the level of support for policy measures and the use of particular countermeasures are shown in Table 8. With a few exceptions, all relationships were negative and statistically significant. Where support for measures is concerned, the strongest negative associations are found in the case of “Unjustifiable state intervention”, with correlations ranging from -0.254 (LIC) to -0.435 (ISA). Moderate to strong associations are seen for “Limit reduce injuries” and “Limit freedom or privacy.” The weakest associations are found with “Easy to evade”; most are not statistically significant. This means that these arguments are not an important factor for determining the level of support for the set of measures considered. “Lead to discrimination” is only strongly (negatively) associated with three measures that could be perceived as discriminatory: INS, SCR, and PAY.

[Table 8 here]

When each of the measures is considered, the strongest correlations with the counterarguments listed are found for HEL, ZER, SCR, and ISA. For LIC, the association with arguments is not very strong. This suggests that other types of arguments also need to be considered to explain opposition. One can also observe a rather unique pattern for INS: support for this measure is strongly negatively associated with “Leads to discrimination” (more than with “unjustifiable state intervention”), and a statistically significant positive correlation exists in the case of two arguments: “A lot of public money” and “Difficult to implement.” In other words, even when respondents think that the measure will cost a lot of money or would be difficult to implement, they nevertheless support the measure.

Please note both LIC and PAY were included on purpose in the set of measures because they had other value conflicts than the other measures and transcended beyond road safety. Hence it was to be expected that this would be reflected in different patterns of associations between these measures and the use of the counterarguments.

Figure 4 shows that men use more counterarguments than women, which is consistent with the observation that their level of support is somewhat lower. The biggest gender differences are seen in the cases of ZER, ISA, HEL, ALC, and 30K, measures which are inhibiting risky behavior. There is no difference for PAY, and the male–female difference is small for SCR, LIC, and INS. For all measures (except SCR), the number of counterarguments decreases with age; this is most pronounced in the case of ISA, HEL, ALC, and RFL.

[Figure 4 here]

3.5 Differences in the use of arguments by region

The highest number of counterarguments are used in Austria (22.0%), Nigeria (22.3%), and Wallonia (22.0%), and the lowest number in China (16.2%) and Sweden (16.9%). Figure 5 and Figure 6 show how the use of counterarguments differs between regions.

[Figures 5 and 6 here]

In all regions, the most widely used argument was “Difficult to implement.” Greece had the highest value (51.0%). The lowest prevalence was in Flanders (30.9%); note that this “low” percentage is still higher than the value for any other argument in any region, with the exception of “Not reduce injuries” in Austria. Other interesting observations are the low values for “Limit freedom or privacy”, “Lead to discrimination,” and “Easy to evade” in the case of China. Other relatively exceptional values can be seen for “High costs for people” in Nigeria and “Unjustifiable intervention of the state” in California and Texas.

4 A closer look at three counterarguments

4.1 Counterargument “This policy measure would restrict people’s mobility”

Figure 7 clearly shows that SCR is the measure that is perceived to restrict mobility the most: one-third of respondents used the mobility argument. This percentage is quite stable across gender and age groups: the value of the oldest age group differs by only 6.2% from that of the youngest. For the four other measures, over 15% of the respondents had mobility concerns: 30K, ISA, ALC, and ZER. For all of these, there is a systematic decrease with age, suggesting that older people are less concerned that these measures would affect their mobility; the opposite is the case for SCR. PAY is the measure for which the mobility argument is used the least (6.9%).

[Figure 7 here]

If all measures are taken together, Flanders, Nigeria, and Texas are the regions with the greatest concern for reduced mobility; Sweden, Greece, and China have the lowest. Figure 8 shows the distribution by region for the four measures with the highest perceived restriction of mobility (ISA, ALC, 30K, and SCR). The graph illustrates that the mobility argument for SCR is used most frequently in Belgium, Austria, France, and the United States, but hardly at all in China. For ISA, the strongest concerns are again in the United States and in Flanders. The highest value for ALC was in Texas, the lowest in Sweden. The fear that 30K would reduce mobility is the highest in Austria; it is the lowest in Greater London and western France.

[Figure 8 here]

4.2 Counterargument “This policy measure would lead to discrimination”

Figure 9 illustrates that discrimination is only perceived as an issue for three of the ten measures. The value is very high for INS: about three-quarters of the respondents consider that such a measure would be discriminatory, with little variation across gender and age groups. About a quarter of the

respondents believe that two other measures, SCR and PAY, lead to discrimination. One-third of the oldest age group considers SCR to be discriminatory. It is also interesting to observe that most respondents consider the built-in unequal treatment in PAY to be justifiable.

[Figure 9 here]

When all measures are considered together, respondents from Greece, Nigeria, Belgium, and the United States perceive the most discrimination (about 20%), while the Chinese perceive the measures to be the least discriminatory. Figure 10 shows the distribution by region for the three measures with the highest perceived discrimination (PAY, SCR, INS).

[Figure 10 here]

In all regions except China, INS is seen as discriminatory by 50–85% of the respondents; the percentage is only around 40% for China. Respondents in Austria, Flanders, and Greece were most likely to perceive INS as leading to discrimination. Almost half of the Greek respondents find PAY discriminatory, compared with approximately 10% in Sweden, even lower than the Chinese value.

The low value for Greece (about 10%) for SCR can be explained by the fact that a comparable measure is already implemented in that country. The low Chinese value for SCR may be related to an above-average belief that older drivers are bad drivers. This is supported by data from the survey: 38.6% of the Chinese respondents agreed fully with the statement “Older motorists are often a danger to themselves and other road users in traffic,” while the total sample average was 29.8%.

4.3 Counterargument “This policy measure would be an unjustifiable intervention by the state”

Figure 11 shows that INS is the measure for which about one-third of respondents consider that a state intervention would not be justifiable. In other words, two-thirds consider that insurance companies should not be allowed to differentiate between men and women. Between 15% and 20% of respondents consider that the government should not intervene in relation to ISA, PAY, and 30K. For ISA, almost one in four male respondents use this argument. Across the various measures, males consider the proposed state interventions to be less justifiable than females; for most measures, the rejection of state intervention increases with age.

[Figure 11 here]

Overall, respondents from California, Texas, and Flanders seem to object to state intervention the most; the lowest share of objections are in China, western France, and Argentina. Figure 12 shows the distribution by region for the four measures for which state intervention is seen as least justifiable (ISA, PAY, 30K, and INS).

[Figure 12 here]

For INS, there is a striking difference between China (10%) on the one hand, and all other regions, on the other. The low value for China may be explained by the combination of a generic high acceptance of state intervention and higher gender inequality. For ISA, there is much variation between countries, with high rejection in the United States and low values (10% or lower) in Argentina, China, Greece, Wallonia, and western France. For 30K, California has a relatively high value again, and Greater London has a very low value. In other words, almost all Londoners think that public authorities are justified to impose a speed limit of 30 km/h. For PAY, differences between countries are smaller, with the highest value in Texas.

5 Differences in views between supporters and opponents of three measures

5.1 Compulsory installation of ISA systems in cars (ISA)

Figure 13 shows that the counterarguments for ISA differ considerably between those opposing and those supporting the measure. Almost half of the respondents opposing ISA consider that this would limit their freedom or privacy, while this is only mentioned by about one in eight respondents supporting ISA. One can see similar huge differences with the other perspectives that are considered to be linked to individual human liberties.

However, the differences are much smaller and almost negligible for the more practical and financial considerations: a lot of public money, high costs easy to evade, and difficult to implement. Therefore, these arguments are not very important when it comes to supporting or opposing ISA. This finding is also supported by a correlation analysis showing a strong correlation between the level of support for ISA and “Unjustifiable state intervention” ($R=-0.435^{**}$) and a moderate one with “Limit freedoms or privacy” ($R=-0.347^{**}$) but no significant correlation with “A lot of public money,” “Easy to evade,” and “Difficult to implement.”

[Figure 13 here]

Figure 14 shows how the perceived personal effects differ between supporters and opponents of ISA. The supporters of ISA strongly believe in the effectiveness of the measure; in other words, that it will make them feel safer on the roads, reduce the crash risk, and make driving more comfortable. The opponents, on the other hand, fear ISA as a means of controlling and restricting their behavior. They also think it would make driving less pleasant and even unsafe when overtaking a car. In summary, it is obvious that the expected personal effects of ISA are strongly associated with the willingness to support and accept the measure.

[Figure 14 here]

5.2 The obligation of cyclists to wear a helmet (HEL)

Figure 15 shows how the counterarguments used differ between those opposing and those supporting HEL. Again, the differences between the two groups are often very high. For instance, approximately four out of ten respondents opposing HEL consider that this measure would limit their freedom or privacy (correlation with support for measures: $R=-0.371^{**}$), that it would reduce enjoyment ($R=-0.351^{**}$), and that it would not reduce injuries ($R=-0.221^{**}$), while few respondents

supporting the measure use these arguments. The disbelief in the effectiveness of cycle helmets in reducing injuries and the fear of reduced freedom and joy are clearly very important factors in the opposition to cycle helmets. Furthermore, approximately one-third of the opponents think that HEL would be an unjustifiable state intervention ($R=-0.346^{**}$).

The differences between supporters and opponents of HEL are smaller or negligible for the more “practical” and “financial” considerations: a lot of public money, high costs, and difficult to implement—and there is actually no difference in relation to “easy to evade.” Such arguments are not very important in determining the level of support for HEL.

[Figure 15 here]

Figure 16 shows how the perceived personal effects differ between opponents and supporters of HEL. The supporters think that HEL would have no effect on them and would make them more aware of safety risks on the road. The opponents think that they would cycle less, that cycling would be less enjoyable and more inconvenient, and that they would look foolish or childish. Such arguments are hardly used by the supporters. Interestingly, the expected effectiveness (fewer injuries) is not a strong differentiating factor between opponents and supporters—meaning that even opponents realize that the personal risk of injury is higher without a helmet.

[Figure 16 here]

5.3 Regular screening of older drivers (70+) for driving abilities (SCR)

Figure 17 shows the differences in the counterarguments used between those opposing and supporting SCR. The differences between the two groups were very high for the six arguments. Over half of the opponents considered that SCR would limit freedom or privacy and would lead to discrimination, while less than one-fifth of those in favor used that argument. Other important counterarguments used by opponents of SCR are the restriction of mobility, the unjustifiability of a state intervention, the lack of effectiveness, and the high costs. For none of the other measures did opponents use so many counterarguments.

The strongest negative correlations with support for measures, and hence the best predictors for opposing the measure, are for “Unjustifiable state intervention” ($R=-0.391^{**}$), “Lead to discrimination” ($R=-0.349^{**}$), “Not reduce injuries” ($R=-0.306^{**}$), and “Limit freedom or privacy” ($R=-0.292^{**}$). Interestingly, even respondents who are in favor of the measure recognize its unfair implications: one in five recognizes the limitation of freedom or privacy, and one in four recognizes even the restrictions on mobility that would be caused by the measure.

[Figure 17 here]

Figure 18 shows how the expected personal effects differ between supporters and opponents of SCR. Those supporting SCR believe much more in the effectiveness of the measure and the reduction of road safety risks. They also think that they will walk, cycle, and use public transport more when they are old. Those who oppose the measure think that they are less likely to make more use of these transport modes and fear that their mobility and quality of life would decrease. In other words, the prospect of greater use of transport modes other than driving a car, also feeds the opposition to SCR.

This fear is also illustrated by the fact that almost half of the opponents of SCR think that it would limit their quality of life and reduce their mobility when they are old. Another argument put forward is that they do not want their mobility to depend on a screening that is not foolproof in their eyes.

[Figure 18 here]

6 Conclusion

With this research, previous results on the level of public support have been confirmed, and new insights have been gained. The systematically higher female support for road safety measures is confirmed, but we noticed that this difference can disappear or even be reversed in cases of measures that may not be believed to be effective in improving road safety. We also found that although the support for road safety measures often increases with age, some measures show the opposite pattern. If people feel safe when using a particular transport mode, they are less likely to see the need for additional or stricter measures affecting their transport mode. For example, cyclists who feel safe on the road see less of a need to make helmet wearing obligatory. People who believe that a particular phenomenon (e.g., speeding or drunk driving) is an important cause of road traffic injuries are more supportive of policy measures meant to reduce this phenomenon. These results suggest that “educating” the population about the causes of accidents can contribute to their willingness to support policy measures that aim to reduce the prevalence of these causes.

Motorists who self-report risky behavior are more opposed to further measures restricting or penalizing that behavior. Motorists who have been speeding are more opposed to speed-limiting measures but also oppose more alcohol-related measures; however, motorists who have driven drunk are against alcohol-related measures but are, on average, neutral to speed-related measures.

We analyzed the extent to which the agreement with ten generic counterarguments was related to the level of support for the measures. Although the associations varied across measures and countries, overall, the perceived restriction of human liberties, fear of discrimination, and resistance against state interventions fuel opposition to measures. Moreover, people from different countries vary in what they consider fair and unfair, which is linked to the national culture and organization of society. For instance, many more Americans than non-Americans consider the policy measures to be an unjustifiable state intervention; the opposite was the case in China. In China, the respondents often considered the proposed interventions to be less restrictive of freedom, privacy, and mobility than in the other countries considered. Another finding was that even if a measure was perceived to be unfair from a certain perspective (e.g., discrimination), some respondents supported the measure. This illustrates that other considerations were more decisive in their minds.

Other interesting associations were found with personal consequences for individuals. Not surprisingly, if the perceived effects are negative, people are more inclined to oppose the measure, even if they consider the measure to be fair. Very large differences exist in the expected personal effects between the opponents and supporters of a measure, suggesting that such different expectations are decisive for the willingness to support policy. We also found that only a small fraction of the respondents agree with certain arguments that are often used against certain measures—for instance, that mandating wearing helmets for cyclists would reduce cycling.

In conclusion, policymakers are notoriously reluctant to issue new regulations for improving road safety when public support is low. Low public support may be shaped by particular stakeholders and lobby groups that influence policymakers, especially by stressing particular counterarguments. Our research shows that even people who recognize that a measure would be effective might oppose the measure because they think it is not justified from at least one perspective, for instance, an excessive

restriction of freedom—even if in practice, this argument is far less widely used and support increases once the measure has been implemented and its beneficial effects have been recognized.

Another consideration is that people may have a very biased or incorrect view of what consequences they might face. Correcting these perspectives through information, education, and awareness activities will help to increase public support for the policy measures envisaged. It is also important to inform the public of the relevance of the measure and the anticipated benefits, while recognizing the potential for negative side effects such as some limitations of freedom or additional costs.

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- the people assisting in the translations of the survey into different languages, and the numerous people who checked the draft, online, and translated versions of the survey.

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Tables

Table 1. Acronym and full formulation of the policy measures in the survey

Acronym	Formulation of policy measures in the dilemma survey
ZER	Zero tolerance for driving under the influence of alcohol (0.0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...)
ISA	All cars should be equipped with an Intelligent Speed Assistance (ISA) system that automatically limits the speed of the car to the maximum speed limit and that cannot be turned off by the driver.
PAY	Fines that people have to pay after they have committed a traffic offence should be proportional to their income.
HEL	All cyclists should wear a helmet.
LIC	The education and training needed for a car driving licence should be free of charge and integrated in the school curriculum.
ALC	All cars should be equipped with an alcohol ignition interlock system (which prevents starting and driving the car if the driver's alcohol concentration is above the legal BAC limit).
30K	In all urban areas and villages the speed limit should be 30 km/h for all vehicles.
SCR	All people aged 70 or more should be screened every 3 years, in order to let a medical expert decide whether they are still allowed to drive a car or not.
RFL	Pedestrians should wear retroreflective clothing, shoes or bags when walking or running in the dark on public streets and roads.
INS	Insurance companies should be allowed to differentiate the price for the car insurance premiums between men and women.

Table 2. Administrative survey sample characteristics after data cleaning

Region	Language	Sample size	Median LOI (minutes)	Female sample			Male sample		
				[18–25]	[36–47]	[58–69]	[18–25]	[36–47]	[58–69]
Argentina	Spanish	507	20	83	86	86	76	87	89
Austria	German	472	16	80	79	85	68	72	82
California	English	390	15	65	62	79	38	49	81
China	Mandarin	492	16	66	68	59	73	70	76
Flanders	Dutch	466	15	78	79	85	65	67	82
London	English	388	13	53	71	76	35	58	72
Greece	Greek	475	17	85	81	67	79	81	81
Nigeria	English	616	24	144	51		159	150	9
Sweden	Swedish	429	15	68	77	82	47	68	84
Texas	English	433	15	60	67	89	61	59	84
Wallonia	French	461	15	80	72	89	69	69	82
W. France	French	458	15	80	66	86	54	66	92
Total		5,587	16	942	859	883	824	896	914

Table 3. Level of support for measures by region

	ZER	ISA	PAY	HFI	LIC	ALC	30K	SCR	RFL	INS
Argentina	86.1	71.5	63.4	89.2	88.0	82.2	63.5	85.1	67.0	24.1
Austria	67.3	49.3	65.7	73.4	58.7	68.6	28.3	69.8	72.1	18.5
California	63.1	39.4	42.4	82.5	77.7	56.1	41.3	66.9	66.2	26.4
China	81.5	75.0	63.8	65.9	75.9	81.3	59.3	80.9	70.6	51.9
Flanders	63.1	58.4	53.3	57.2	71.8	64.5	38.7	61.1	66.5	11.6
G. London	72.5	59.7	56.7	86.6	65.0	71.8	56.1	73.5	58.9	36.7
Greece	75.9	65.0	56.2	88.9	81.6	75.4	56.0	84.3	67.2	23.5
Nigeria	84.4	82.6	63.8	93.2	87.8	83.9	68.8	88.4	70.3	46.5
Sweden	75.3	50.2	63.2	71.6	60.5	72.2	55.7	69.8	74.8	24.6
Texas	68.1	44.5	49.6	83.8	79.3	52.9	39.4	67.6	79.6	31.9
Wallonia	65.6	60.9	57.5	82.4	78.8	67.2	43.1	64.8	73.1	18.0
W. France	66.9	61.4	50.8	81.6	76.5	72.8	44.2	73.0	75.0	25.8

Table 4. Correlation between level of support and subjective safety of road users.

	Walking	Cycling	Riding a motorcycle	Driving a car	Passenger in a car	Using public transport
ZER						-.070**
ISA				-.106**	-.045*	-.052**
HEL	-.086**	-.109**				-.127**
LIC					-.041*	-.074**
30K				-.050**		-.061**
SCR	.038*					-.057**
INS	.076**	.144**	.124**		.039*	

** p<0.01 *p<0.05

Table 5. Correlation between beliefs in causes of crashes and support for measures

	ZER	ISA	HEL	ALC	30K	SCR
<i>“Cyclists are at high risk of sustaining a head injury.”</i>			.215**			
<i>“Driving after drinking alcohol is a major cause of accidents.”</i>	.225**		.110**	.155**	.113**	.127**
<i>“Speeding is a major cause of accidents.”</i>	.223**	.270**	.151**	.194**	.268**	.153**
<i>“Older car drivers are often a danger to themselves and other road users in traffic.”</i>						.304**

** p<0.01 *p<0.05

Table 6. Correlation between support for measures and car drivers engaging in particular behavior

	ZER	ISA	PAY	LIC	ALC	30K	SCR	INS
Drunk driving	-.121*			.048**	-.061**			
Speeding in built-up areas	.095**	-.114**			-.079**	-.142**		
Speeding in rural areas	-.096**	-.149**		-.043**	-.084**	-.159**		-.034*
Speeding on motorways	-.120**	-.231**	-.043**		-.103**	-.152**		-.037*
Using mobile phone				.066**			.140**	.066**
Sleepy driving				.036*			.040*	.056**
Not seeing pedestrians			.038*		.034*		.041*	
Using cruise control	-.079**	-.067**		-.035*	-.053**	-.100**		

** p<0.01 *p<0.05

Table 7. Formulation of the question on counterarguments used in the survey

Please consider the policy measure: *[Here the full statement on the policy measure was included]*. Please indicate if you agree with the following statements about it (tick the boxes for

all the statements with which you agree).

This policy measure would ...

- not reduce road traffic injuries
- limit people's individual freedom or privacy
- reduce people's enjoyment in life
- restrict people's mobility
- lead to discrimination
- require a lot of public money
- imply high costs for the people concerned
- be easy to evade
- be difficult to implement correctly
- be an unjustifiable intervention by the state

Table 8. Correlation between support for measures and agreement with the counterarguments.

	ZER	ISA	PAY	HEL	LIC	AFC	30K	SCR	RFL	INS
Not reduce injuries	-.250**	-.253**	-.210**	-.221**	-.241**	.160**	-.303**	-.306**	-.166**	-.190**
Limit freedom or privacy	-.352**	-.347**	-.148**	-.371**	-.061*	.275**	-.193**	-.292**	-.308**	-.214**
Reduce enjoyment	-.282**	-.193**	-.088**	-.351**	-.071**	-.196**	-.198**	-.258**	-.236**	-.096**
Restrict mobility	-.280**	-.248**	-.056*	-.209*		-.170**	-.241**	-.188**	-.176**	-.057*
Lead to discrimination	-.188**	-.143**	-.344**	.029**	-.072**	-.168**	-.126**	-.349**	-.123**	-.379**
A lot of public money	-.122**		-.040*	-.108**	-.184**	-.058*	-.070**		-.068**	.123**
High costs for people		-.076**		-.115**		-.113**	-.061*	-.145**	-.133**	
Easy to evade			.050*			-.082**				
Difficult to implement	-.093**		.072**	-.091**	-.089**	-.065**	-.059*		-.121**	.112**
Unjustifiable state intervention	-.304**	-.435**	-.329**	-.346**	-.254**	-.369**	-.358**	-.391**	-.302**	-.291**

** p<0.01 *p<0.05

Figures

Figure 1. Distribution of the level of support by gender

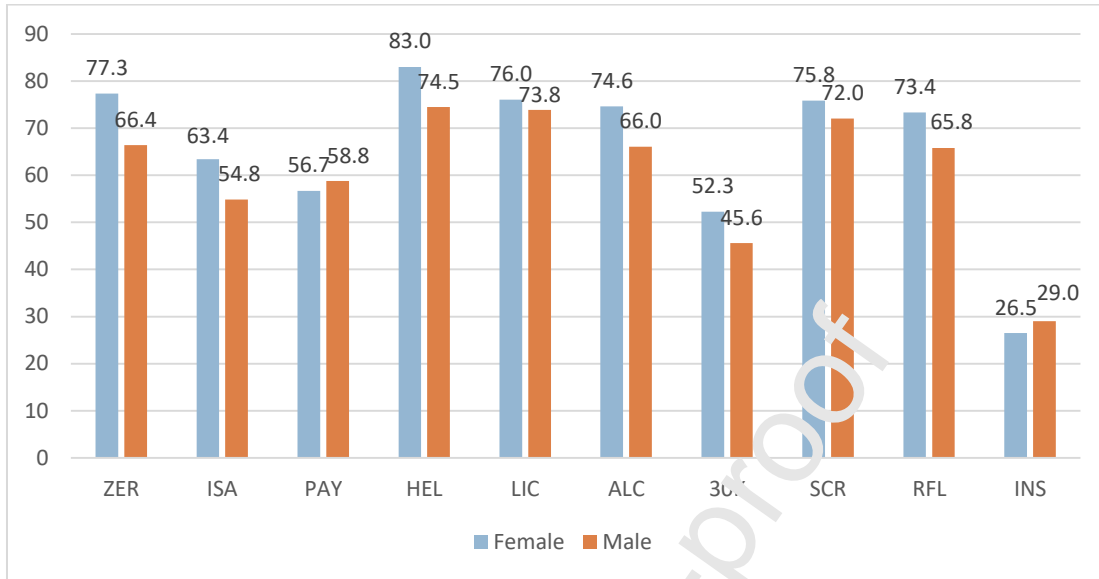


Figure 2. Distribution of level of support by age group

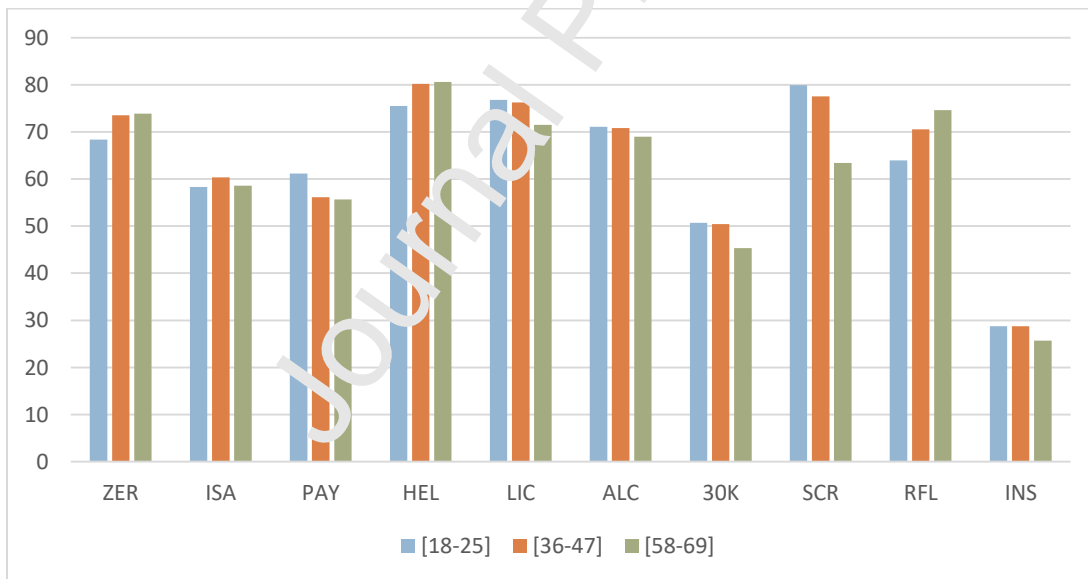


Figure 3: Number of counterarguments used by nature of support

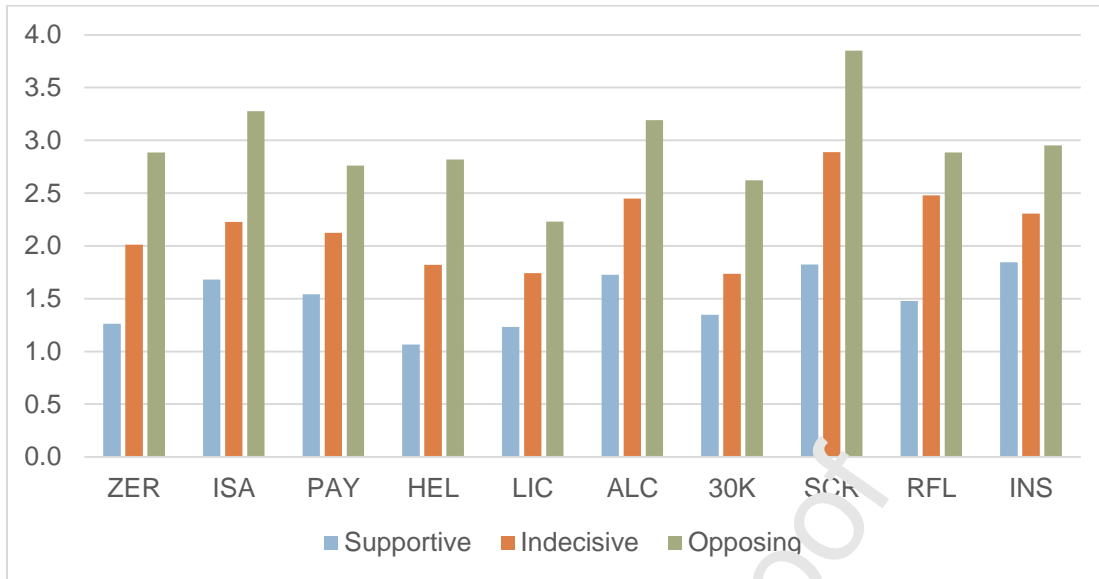


Figure 4: Number of counterarguments used by gender and age group

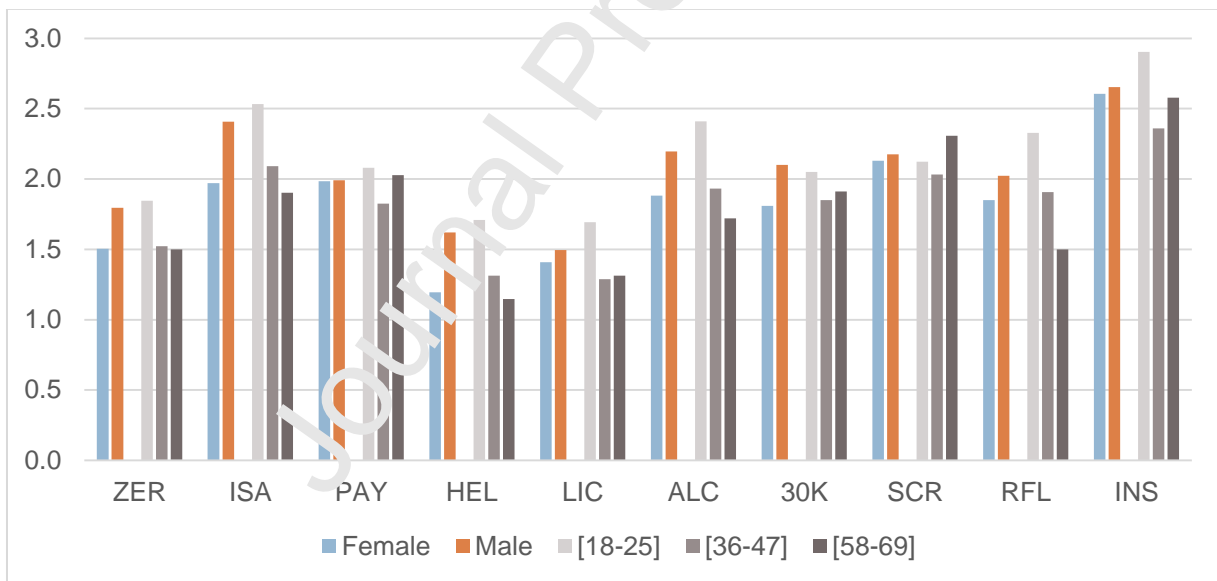


Figure 5. Frequency of counterarguments used, by region (1)

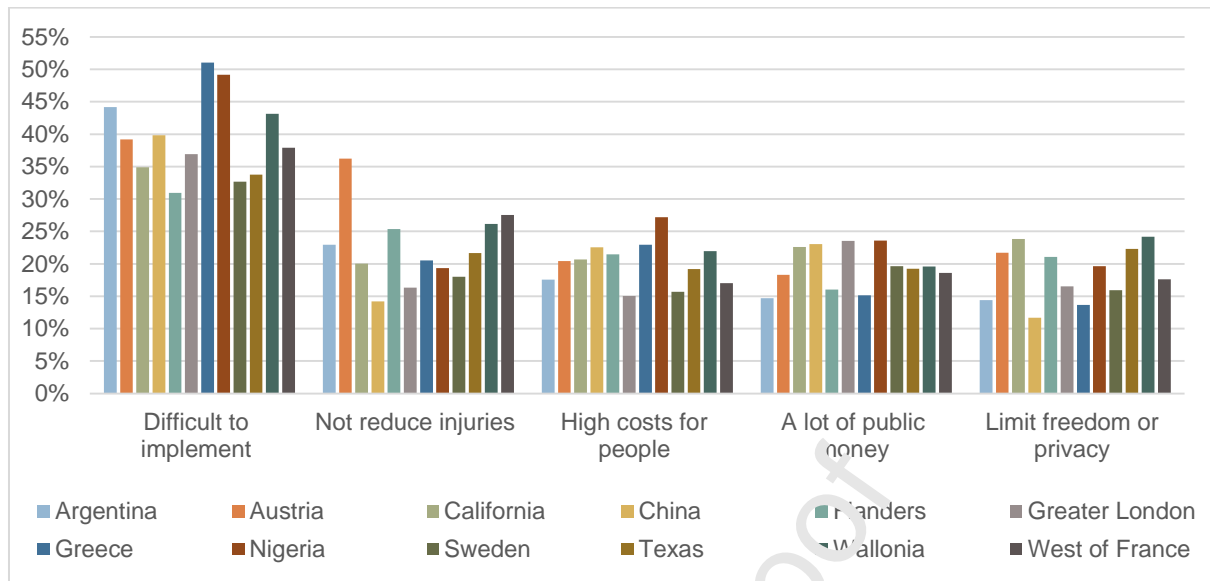


Figure 6. Frequency of counterarguments used, by region (2)

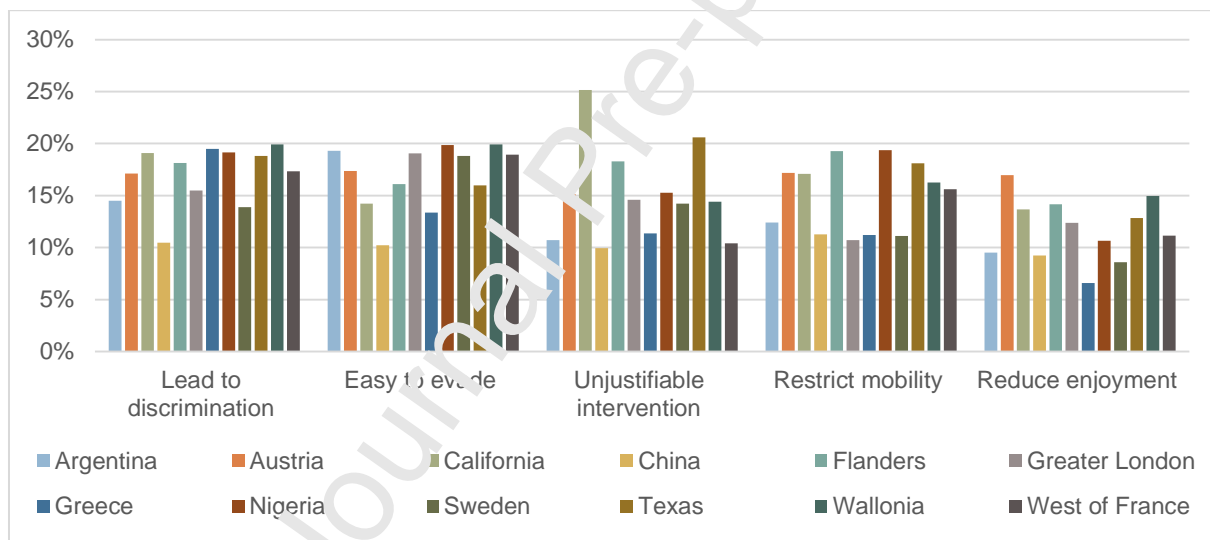


Figure 7. Perceived restriction of mobility by the measures, by gender and age group

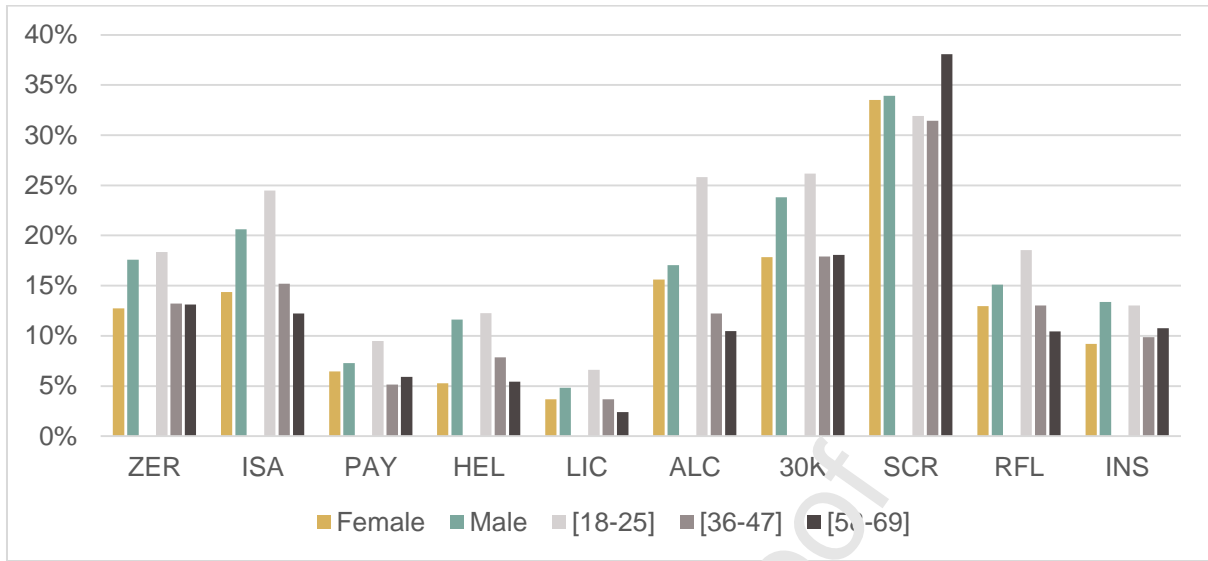


Figure 8. Perceived restriction of mobility for four measures, by region

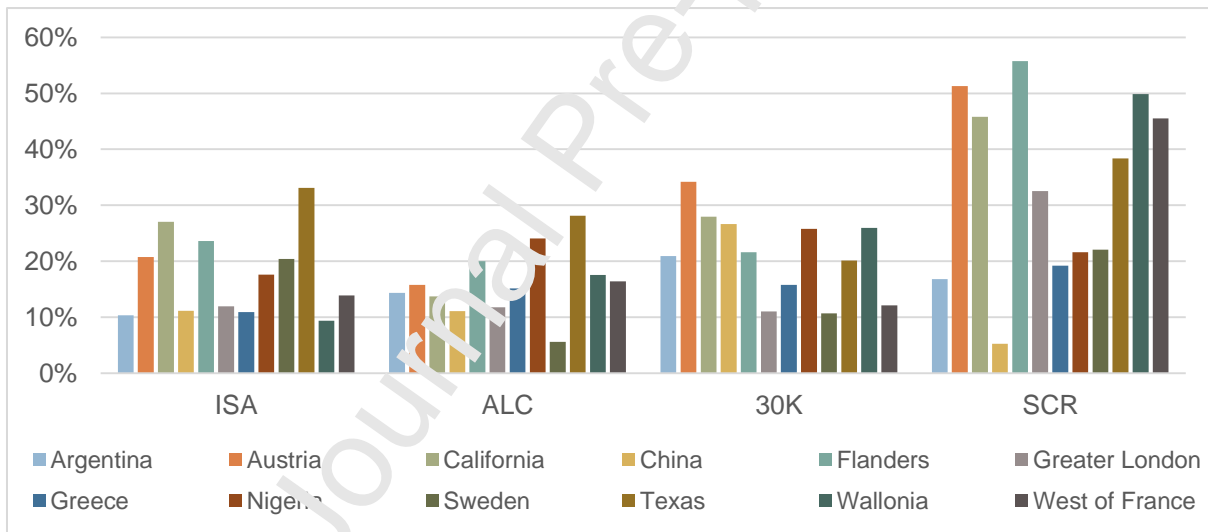


Figure 9. Perceived discrimination of the measures, by gender and age group

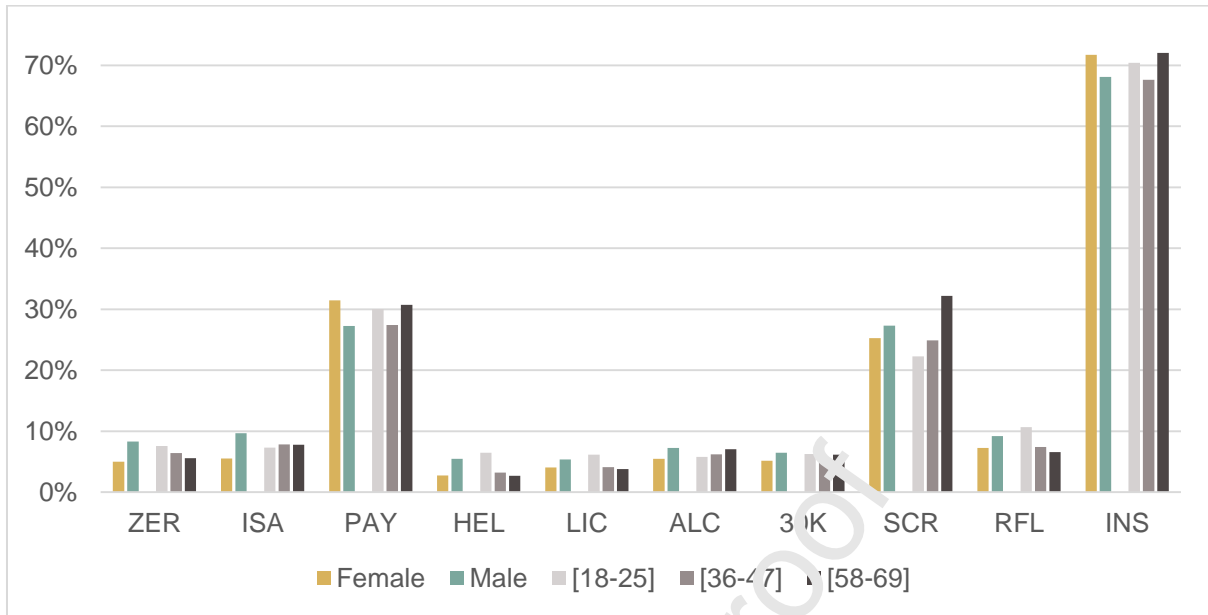


Figure 10. Perceived discrimination for three measures, by region

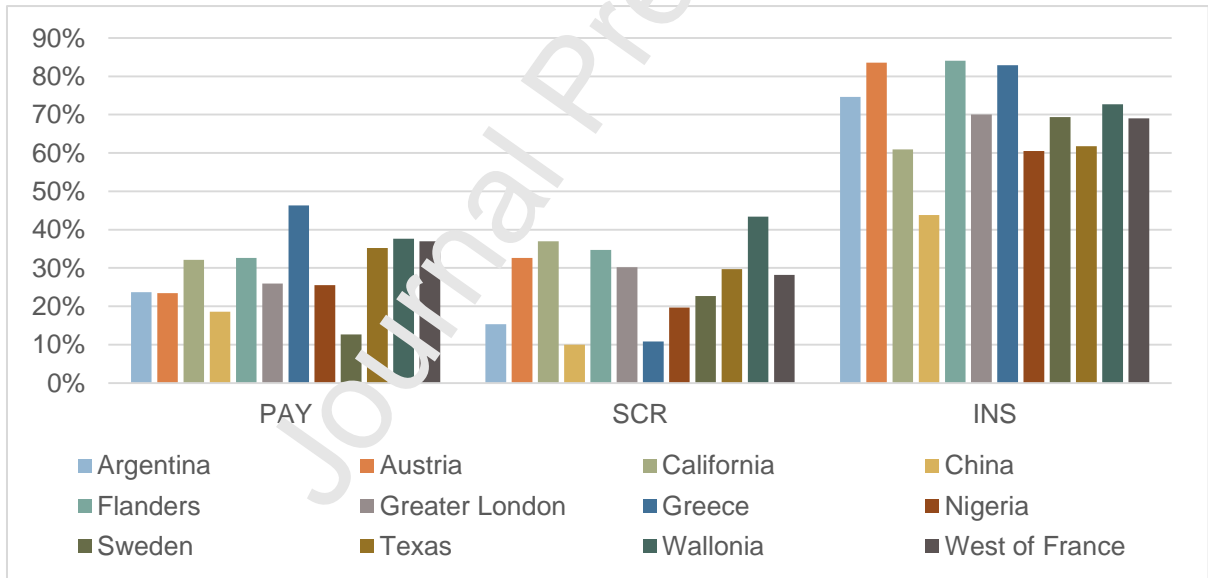


Figure 11. Perceived unjustifiability of state intervention, by gender and age group

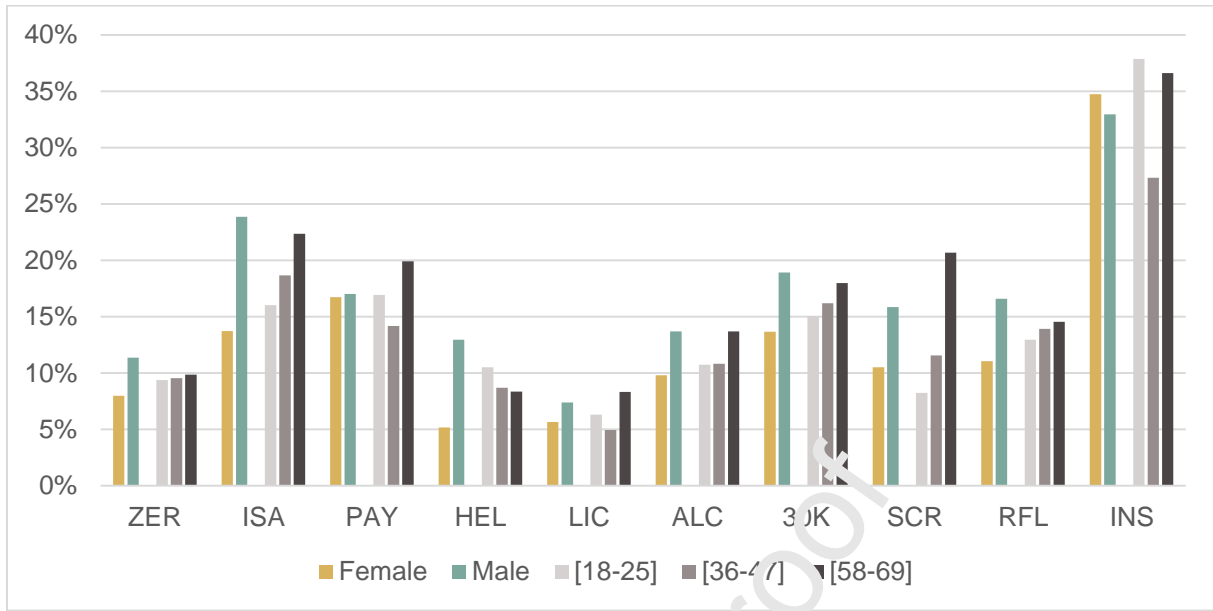


Figure 12. Perception of unjustifiability of state intervention for health measures, by region

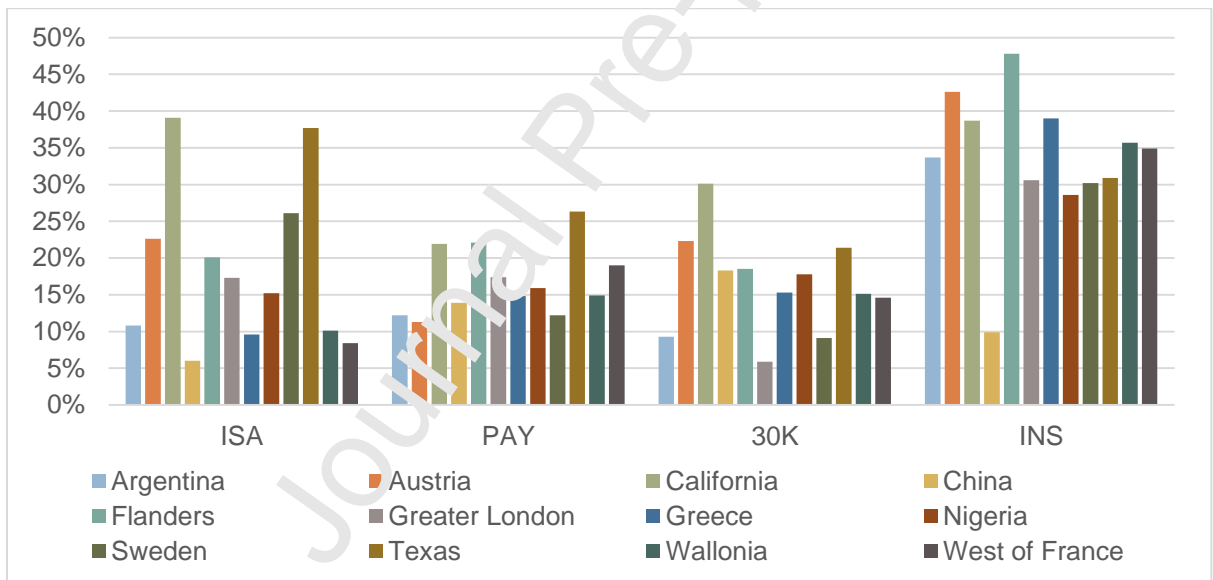


Figure 13. Differences in use of unfairness arguments between those supporting and those opposing ISA

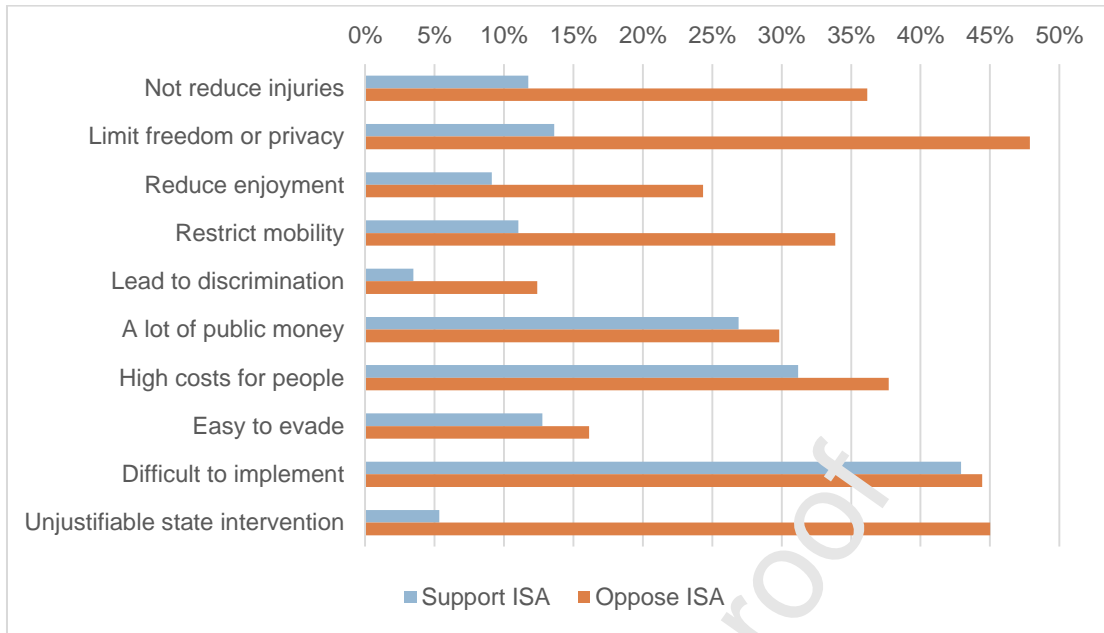


Figure 14: Expected personal effects by supporters and opponents of ISA

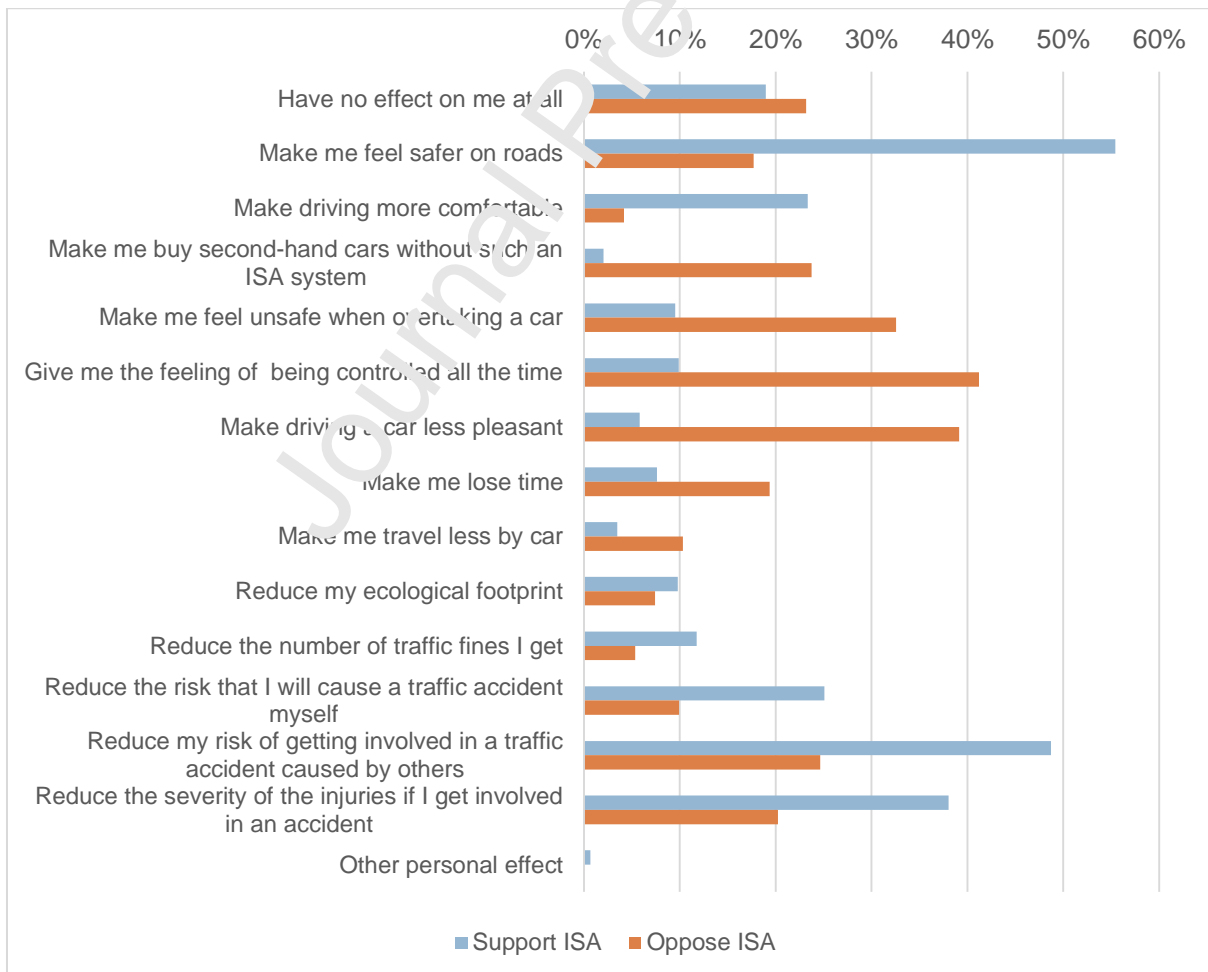


Figure 15. Differences in use of unfairness arguments between those supporting and those opposing HEL

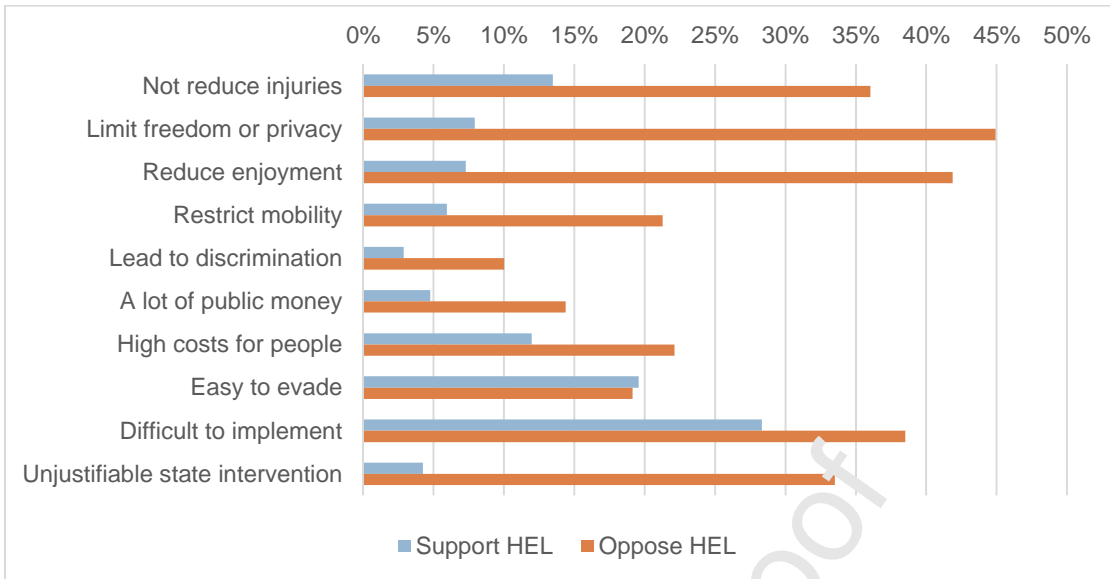


Figure 16: Expected personal effects by supporters and opponents of HEL

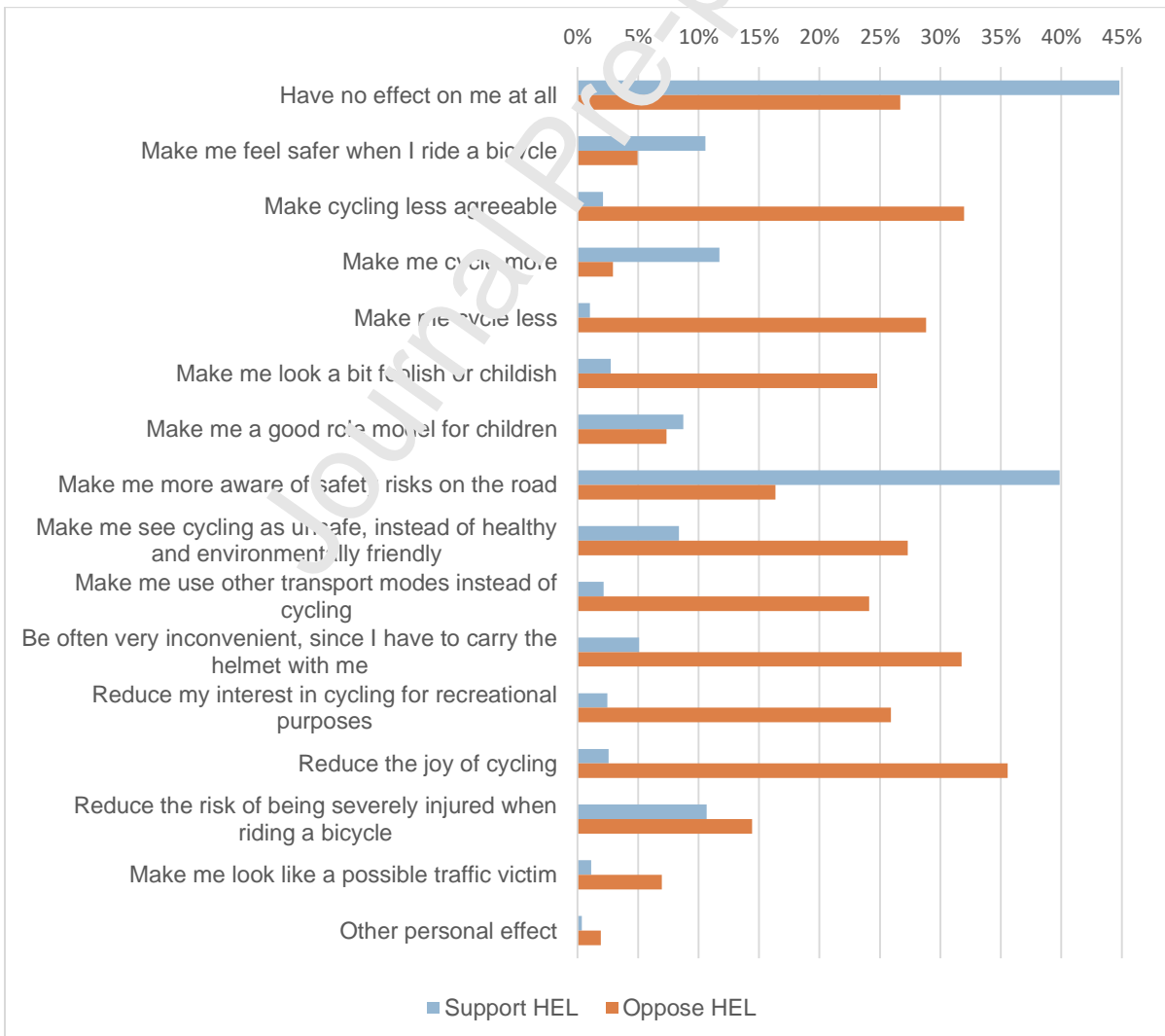


Figure 17. Differences in use of unfairness arguments between those supporting and those opposing SCR

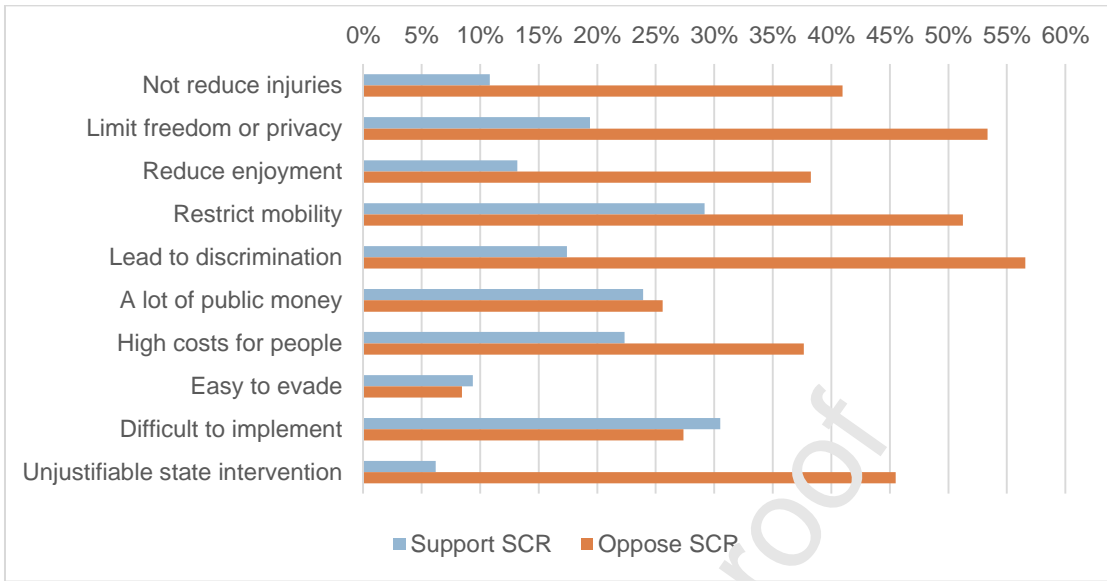
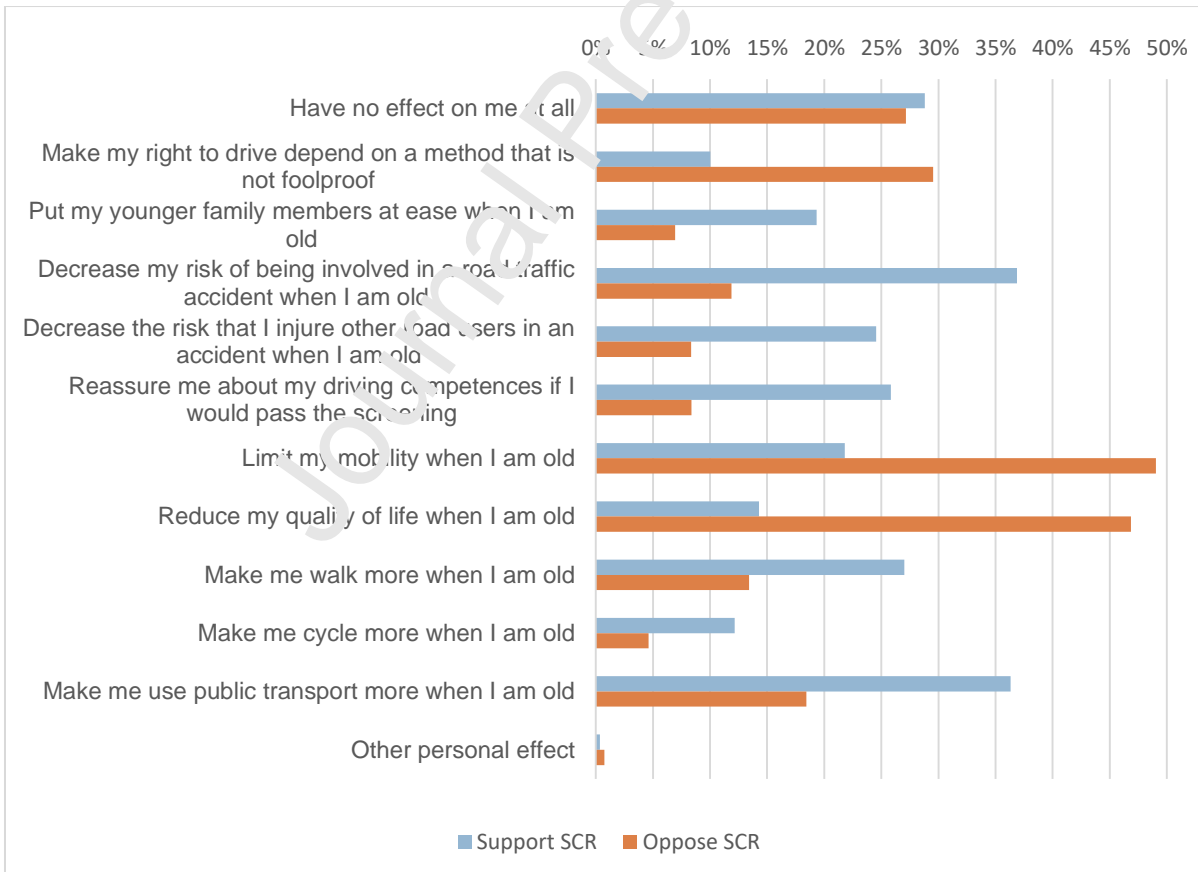


Figure 18: Expected personal effects by supporters and opponents of SCR



Highlights

- Women are more supportive of road safety measures than men.
- People who feel safe when using a particular transport mode are less supportive of additional measures affecting that mode.
- Perceived restriction of freedom, fear of discrimination, and resistance to state intervention fuel opposition to measures.
- “Difficult to implement” is seen as the most relevant counterargument, followed by “Will not reduce injuries.”
- People from different countries vary in what they consider to be fair and unfair.

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