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## New Environmental Zones for Passenger Cars

### Attitudes, Norms and Legal Compliance

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# New Environmental Zones for Passenger Cars

Attitudes, Norms and Legal Compliance

*Måns Svensson & Oscar Björkenfeldt*

Research Report in Sociology of Law 2019:2





*Måns Svensson & Oscar Björkenfeldt*

# New Environmental Zones for Passenger Cars

Attitudes, Norms and Legal Compliance

SOCIOLOGY OF LAW  
LUND UNIVERSITY

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# Preface

The Swedish Transport Agency has been commissioned to study different methods to ensure compliance with environmental zone regulations, to be introduced in accordance with applicable and coming regulations. The results of the Swedish Transport Agency's report shall be submitted to the Government Offices (Ministry of Environment and Energy) no later than April 1, 2019. The Transport Agency has entered into agreement with the Sociology of Law Department, Lund University, to provide commissioned research (TSA 2018-470). Within this framework, Lund University has been assigned to study the premises for public compliance with environmental zone regulations based in theories on attitudes and norms.

The assignment's mission statement lays out that the Sociology of Law Department at Lund University shall conduct two sub-studies: a literature review and a survey study. The purpose of the study is to compare formal and informal social control in relation to traffic rules, and analyse how successful different strategies are likely to be at achieving compliance with environmental zone rules that enter into force on January 1, 2020.

The present background report was carried out by associate professor Måns Svensson (project manager) and PhD-student Oscar Björkenfeldt on behalf of Lund University.





# 1. Introduction

We know that new laws and amendments to already existing laws do not automatically generate desired changes in behaviour, not least in the area of traffic safety. It would be overstating things to claim that research has all the answers, and, even more importantly, research on how to achieve optimal compliance with regulations is scarce. But, collectively, the body of knowledge in the area is fairly substantial, in particular, multidisciplinary approaches that allow different disciplines to contribute their own jigsaw pieces when studying the potential capacity of various strategies to influence behaviours toward increased legal compliance.

The fact that the regulations of relevance here have not yet been tried and tested in practice does not make the task any less challenging. In Sweden's case, the new environmental zone regulations that enter into force on January 1 2020 will consist precisely of unproven regulations. The present study does not provide a detailed account of what these regulations entail, or their exact legal contents; partly, because that lies beyond the scope of the study as commissioned by the Transport Agency, and partly because it is not necessary when drawing conclusions from the relationships between legal compliance, attitudes and norms.

For the present study, it suffices to know that environmental zones are a method for improving quality of air in selected areas. Municipalities are already allowed to prohibit some heavy traffic (lorries and buses) in particularly environmentally vulnerable urban areas by designating selected areas as environmental zones. Starting in 2020, other vehicle classes, such as passenger cars, light trucks and minibuses may also be banned in these zones, depending on the municipalities' decisions.

Starting on July 1, 2022, diesel cars will face more stringent standards and many vehicles in use in traffic today will be banned, particularly in areas that the municipalities designate as Class 2 environmental zones. But the new rules will also allow municipalities to designate certain areas as Class 3 environmental zones, which will have even stricter standards. Only electric, fuel-cell and LPG gas vehicles are allowed in Class 3 zones. The above explanation is, however, a somewhat simplified account; in actual fact, the new rules contain a number of exemptions, clarifications, and other factors. For our purposes, however, suffice to say that the municipalities

will be able to decide to impose far more stringent requirements on all vehicles in these areas/zones. Some specific questions that the Principal, i.e. the Transport Agency, would like to know more about are:

- How well does informal social control of traffic rules work in general?
- Are some traffic rules more acceptable to break than others, and if so, why?
- Do road users feel that some traffic rules are unmotivated, and if so, why?
- What norms and attitudes do road users seem to have toward the new environmental traffic rules and how does informal social control work in this context? Follow-up questions on the road users' responses.

## 2. Theoretical points of departure

The fundamental premise for the present report is to examine the degree to which it is possible to predict compliance with future rules. In other words, is it possible to predict whether people will or will not obey a law or regulation before it is implemented? The answer to this question is that although it is not possible to make definite predictions, it is possible to make reasonable assessments of the likelihood of legal compliance. The analytical model presented here is based in the position that legal compliance is manifest at two levels. Firstly, a legal and social level that is concerned with functions and processes that result in general compliance with laws and regulations; secondly, an individual and group level that deals with how (and why) people decide whether or not to obey specific laws and rules. Theoretically, this dual problem entails by necessity a multi-disciplinary approach which incorporates the following two perspectives: (a) a socio-legal theory of why some laws are received with a high degree of compliance while others are broken more frequently; (b) socio-psychological theory of how people's intentions are based in social/cognitive understandings and perceptions, and these intentions lead to actions in various situations. Put simply, one could say that questions concerning compliance with future regulations are best answered through systematic socio-legal and social psychological analyses. The matter is further complicated by the fact that both sociology of law and social psychology are, in themselves, multidisciplinary disciplines that, apart from sharing an interest in sociology, also use both legal scientific and psychological findings. Therefore, research on legal compliance requires a multidisciplinary approach that includes, at the least, judicial, sociological and psychological perspectives.

## 2.1. Different perspectives of why people comply with legal rules

The main research focus of conventional criminology has been to understand why people develop criminal behaviours, with the underlying assumption that if we can discover the causes of crime, we will be able to develop preventive strategies (Hopkins, 1975). Their main focus, in other words, has been on why some people break the law. This perspective is better suited for behavioural analyses that fall under what could be called criminal behaviours, but is less suited for minor, everyday transgressions.

Within sociology and sociology of law, the main research focus, rather, is directed at understanding why people obey laws and rules in society to such a high degree to begin with. By increasing our understanding of this subject, we are able to draw some conclusions on why some laws are received with a high degree of compliance while other laws are violated more frequently (Svensson, 2017). At a macro-level, this involves seeing legal rules in relation to behavioural patterns, while at a micro-level it involves understanding why some individuals choose to obey the law. Two scientific approaches to explaining legal compliance are: (a) the instrumental perspective, and (b) the normative perspective (Tyler, 2006). The instrumental perspective dominates the body of so-called deterrence literature.

One of the challenges when studying legal compliance is that violations cannot generally be categorised as a uniform phenomenon. Different categories of violations, linked to specific rules (or levels of rules), require different kinds of analytical models. One way of distinguishing between categories of violations is to observe them from an outside perspective, so to speak, regardless of how socially unacceptable they may be. This helps to establish a rough division between violations that are socially unacceptable, partially acceptable or generally socially acceptable. Put simply, one could say that criminology focuses mainly on gaining knowledge of socially unacceptable violations; that is to say, actions that violate both legal as well as other social norms. Other kinds of legal violations, i.e., socially acceptable or at least partly acceptable violations consist almost solely of crimes that the legal system also considers minor – so-called misdemeanours. Misdemeanours are crimes that carry a relatively low punishment, and often, do not lead to prosecution but, rather, consist of an order payment or fine. Some examples of relatively socially acceptable, everyday violations that carry minor penalties are minor violations of speed limits on motorways, cycling on pavements or neighbours exchanging minor services that they do not declare in their tax returns. There are also violations that the legal system takes more seriously, but which continue to be relatively socially acceptable,

regardless. Online copyright infringements (file sharing) are one such example (Svensson and Larsson, 2012).

Furthermore, people are differently inclined both with regards to everyday transgressions and more serious crimes. Simply put, people can be placed in three categories: people that are generally not inclined toward committing crimes, people that are somewhat inclined toward committing crimes, and people that are inclined to committing crimes (Korsell, 2003). These categories should be understood as ideal types and applied generally in discussions on legal compliance.

The threat of punishment is negligible for people that are (a) not inclined to commit crimes. The reason for this is that the threat of punishment is not the only form of deterrent. There are also other forms of control underlying why people obey rules. With regards to this group, alternative (and social) sanctions are more than the formal sanctions at the government's disposal. These people are not inclined toward a criminal lifestyle but are, rather, completely focused on behaving conventionally. People with strong social attachments stand to lose a lot if they are caught breaking the law. When the opinions of family members, friends, neighbours and work colleagues are of importance to the individual, factors that threaten these relationships have a deterrent effect. This group sees themselves as responsible citizens, and any situation that conflicts with their self-image gives rise to feelings of guilt and lack of self-esteem. In situations where a law does not correspond with social norms, or where the social norms may even conflict with the legal rules, the threat of punishment also becomes important for people who are not inclined to commit crimes. This group's inclination to obey the law "at any cost" should not be underestimated. This group sees law as having inherent value, and do not believe that every single rule needs justifying. One obeys the law simply because it is the law. However, people that are (b) moderately inclined to break rules are swayed by the threat of punishment. Even small differences in the level of threat has an impact. The literature uses the phrase "tipping point" to describe the point at which an individual decides that a crime would be too costly in terms of risks. When the risk level is no longer at zero, e.g. as a result of increased control, the deterrent effect grows decidedly stronger. This group consists of people that do not have any particular emotional predisposition with regards to obeying rules. They tend to act rationally and weigh advantages and disadvantages against each other. Therefore, the threat of punishment has a deterrent effect on them. In this context, it should be noted that people can have different degrees of respect for different aspects of the legal system; i.e., a person can have strong opinions on theft, which is related to the threat of external social sanctions and internal psychological sanctions (i.e., remorse and guilty conscience), while simultaneously not having second thoughts about breaking safety belt rules (which would lead to the threat of punishment). The threat

of punishment has limited deterrence value for people that are (c) inclined to commit crimes. These are people that have adopted a criminal lifestyle, either permanently or temporarily (e.g. in their youth, or as a result of substance abuse). They tend rather to see the opportunity to commit a crime as a desirable outcome. This category tends to ignore the threat of punishment, and has adopted a lifestyle that has decided that crime pays and that it is worth the risk of getting caught. For them, there is value in fooling the system of rules, and they may also take some pride in their accomplishment. In common with group (a), their emotional predisposition prevents them from making rational considerations. Sometimes the threat of being caught can be a source of excitement and encourage the inclination to break rules. Criminology, as a scientific discipline, tends to study this group, and when drawing conclusions on whether surveillance and punishment as a general preventative effect, their knowledge is generally based on this category.

## 2.2. The instrumental perspective

Research on legal compliance and compliance control in the field of economics is traditionally based on an instrumental perspective of criminality. This view continues to dominate within economics and is based on the “expected utility” model, initially developed by ground-breaking economics researcher Gary Becker (Cf. 1968). This model presumes that violations of rules and criminality are the result of conscious decisions made by rational individuals. The total sum of violations of a given rule are, according to this perspective, inversely proportional to societal investments in police (and other forms of) surveillance and various kinds of systems of sanctions (Chalfin and McCrary, 2017). The theory, here, is, in other words, that increased surveillance and harsher punishment lead to fewer violations and increased legal compliance. This argument is based in the notion that society, by way of the legal system, increases the costs of any criminal activities such that they exceed any potential benefits. This means that in the long run, breaking the law will cost the individual more than it’s worth, and they will therefore abstain from breaking the rule. Theories that take their point of departure in general, deterrent effects of punishment are based in three fundamental assumptions: risk of discovery, severity, and immediacy. That is to say, the risk of discovery while breaking a rule, the severity of any potential sanction, and the length of time between the violation and the sanction, are all important factors (Chalfin and McCrary, 2017). Over the years, a large body of empirical studies that test these theories in various ways have been published. A recently conducted knowledge review of this field of research concluded that there is strong support for the theory that the level of surveillance

(risk of discovery) has an impact on legal compliance, as does immediacy; i.e., the time that passes between the discovery of violation and the implementation of a reaction/sanction (Chalfin and McCrary, 2017). When it comes to the severity of the sanction, the results are more ambiguous. It should be noted that criminologists, unlike researchers in the field of economics, often question the relevance of punishment in relation to the degree of criminality. The difference between the conclusions drawn by economists and criminologists, in this area, may be related to the fact that the disciplines focus on different categories of legal violations. Criminologists are more interested in legal violations that are socially unacceptable, while economists tend to be more interested in violations that are either wholly or partly socially acceptable.

## 2.3. The normative perspective

One of the more substantive contributions to what we might call the normative approach to answering why people obey the law has been developed by Tom R. Tyler, professor of law and professor of psychology at Yale Law School. His book 'Why People Obey the Law' (2006) rapidly became a contemporary classic in areas that emphasises the importance of acceptance and legitimacy in relation to legal compliance. What is of crucial importance is whether people perceive the law as justified and legitimate. This perspective focuses on the fact that when people act on personal preferences and subjective understandings, attitudes, and moral positions when obeying a law, they thereby voluntarily decide to obey the law. This occurs regardless of the risk of discovery and potential sanctions. This approach provides one explanation for why people, based in their own evaluations of laws, might decide that it is justifiable to violate copyright laws by downloading movies and music from illegal websites, but would never steal a physical CD or DVD from a shop. Furthermore, it can be concluded that people who perceive the legal system as being legitimate and fair in general are less inclined to break any laws whatsoever – regardless of risk of discovery and potential punishment. Analyses based in the normative perspective focus, among other things, on people's attitudes to law and legal compliance at a general level. In Sweden, sociology of law has long emphasised the normative perspective (cf. e.g.: Baier et al., 2018; Baier and Svensson, 2018; Dahlstrand and Svensson, 2017; De Kaminski et al., 2013; Svensson, 2013, 2008; Svensson and Dahlstrand, 2014; Svensson and Larsson, 2012; Urinboyev and Svensson, 2017, 2013). Socio-legal research in Sweden focuses on social norms from an empirical perspective, both quantitatively, i.e., by carrying out surveys, and qualitatively, i.e., by conducting ethnographic studies. Often, the purpose of such



research is to empirically establish that legal regulations must be supported by social norms and informal social control in order to be met with compliance.

## 2.4. The expressive perspective

Both the instrumental and normative perspectives provide fertile ground for a rich flora of theories and explanatory model. Additionally, we have gradually come to understand that the instrumental and the normative perspectives, even when combined, provide insufficient explanations for why people obey the law. Research, mainly in the USA, emphasises the need to incorporate the pedagogical dimensions of law when examining why people obey laws. Along the same lines, Richard H. McAdams book "The Expressive Powers of Law" (2017) has garnered the most attention. Of relevance in this context is the *expressive perspective* which sees legal compliance as the result of law fulfilling two key pedagogical functions.

Firstly, in creating a structure that enables people to avoid risks and unintended consequences, law provides a coordinative function. A good example of this is the introduction of right-hand traffic on 3 September 1967, which entered into force despite the fact that 80% of Swedes had voted against such a change eight years previously. Despite strong, negative public opinion, legal compliance was, for obvious reasons, never a problem. People accepted the law's coordinating function since it informed road users of how to drive to avoid accidents.

The second, key pedagogical function that the expressive perspective emphasises is law's potential to change people's convictions by signalling other people's perceptions. This function is partly linked to the normative perspective, which shows us that people tend to obey the law when it is recognised as justifiable and legitimate. By having the potential to signal conventional public perceptions of an issue, law creates an illustration of the workings of informal social control in the particular situation. If this illustration gains credibility, it becomes an incentive for others to change their minds. This is because people have a strong tendency to want to conform to convention and think the same way as everyone else. In this context, there is reason to consider the strong social norms that arose in connection with safety belts after being made obligatory in 1975 (backseat safety belts became obligatory in 1986). Probably, the law has contributed to this development.

## 2.5 The need to combine perspectives

Finally, it can be concluded that law's capacity to have an influence on society and behaviours is largely dependent on how well citizens and organisations are likely to receive the new laws and legal reforms. The instrumental perspective informs us that one way of increasing the likelihood of legal compliance is to monitor compliance and punish violators. To some extent, it is also possible to predict an ideal, in terms of legal compliance, mix of surveillance and punishment. At the same time, it is clear that the legal system's resources are far from sufficient for such repressive strategies to succeed in promoting compliance. The normative perspective informs us that legal reforms are most likely to succeed if they already enjoy strong support in existing social structures. The literature shows that it is very difficult to successfully implement laws that are not supported by social norms and informal social control (i.e., how we punish people that violate social norms in everyday matters). Additionally, by applying the expressive perspective, we now know that law is endowed with an inherent power to bring about change regardless of repressive strategies and existing social norms. This is partly a result of law being accepted as a sort of coordinating support system when avoiding risks and undesirable consequences, and partly because laws signal how one "ought" to act in certain situations. Such signals have proven to have the capacity, over time, to change people's perceptions to the extent that they change their behaviour.

When attempting to predict legal compliance in relation to a specific body of rules, one should also consider including different kinds of perspectives of the reasons behind legal compliance. The instrumental perspective informs us, among other things, that sanctions have an effect on some groups and violations of rules (mainly people that are somewhat inclined to commit crimes and violations that are socially acceptable or partially acceptable). In these cases, there is reason to consider the probability, severity and immediacy aspects of the punishments. A normative perspective focuses on the importance of understanding how strongly people perceive rules as being justified and legitimate, and how much support they have in social norms and informal social control. Finally, from an expressive perspective, it can be concluded that the law sometimes clears a trail for changing norms and behaviours. This aspect has to do with law's pedagogical dimension and its coordinating characteristics, as well as law's signal value. The difficult part is trying to understand how the three perspectives' functions influence each other. Research is still in its infancy here, and due to a lack of knowledge, different empirical studies appear to lead to conflicting conclusions (please see the knowledge review below).



# 3. Methodology

It follows from the design of the present assignment that this report will consist of two sub- studies: a survey study and a literature review. We have chosen a quantitative approach that incorporates distinct qualitative aspects. Today, combining quantitative and qualitative methods is uncontroversial, and it is particularly recommended in cases that focus on more complex social processes (Creswell and Creswell, 2018; Johnson et al., 2007). This project combines the main quantitative survey study (Sub-study 1) with a semi-systematic literature review that is first and foremost based in a qualitative, thematic analysis (Sub-study 2).

## 3.1 Survey study based in Theory of Planned Behavior (Sub-study 1)

A description of the survey study, which is mainly based in Icek Ajzen's Theory of Planned Behaviour (TPB) (2005, 1991), follows below, and consists of a sociopsychological model that can be used to predict behaviour and develop strategies for changing people's behaviours. This theory focuses on behaviours that are preceded by cognitive processes which, in turn, lead to intentions that result in the individual taking action. This theory classifies that kind of action as a planned action, unlike actions that are the result of instinctive or impulsive control. There are three crucial factors at play when people decide how they intend to behave/act in various situations, namely (a) their attitude toward the behaviour; (b) the subjective norm, i.e., the individual's perception of her social peers' expectations of her behaviour; (c) perceived behavioural control, i.e., the individual's perception of how likely it is that they will be able to carry out the action in question (Ajzen, 1991, p. 182). Icek Ajzen has described in detail how to operationalise these three factors in survey studies of planned behaviour (2013, 2006). However, it is important to point out that we regard the third factor (perceived behaviour control) as an unknown variable, in the present study. Therefore, for this study, we have not based any questions on perceived behaviour control in Theory of Planned Behaviour methodology. Instead, we use the two first factors (a) attitude, and (b) the subjective



In all, there are four such binary questions that collectively measure the attitude's capacity to influence behaviour. In total, this makes eight questions that focus on attitudes toward environmental zones.

For a detailed description of how these values are evaluated mathematically to calculate the attitude's overall capacity to influence behavior, see Ajzen (2005, p. 124)

### **3.1.2. Studying norms in relation to legal compliance in environmental zones**

The concept of norms, much like the concept of attitudes, has become a key concept within social psychology. The concept of norms is also considered very important in sociology of law, which often uses a triple-pronged definition (Svensson, 2013) consisting of three essential attributes that all norms share in common. According to this definition, norms are:

1. imperative
2. socially reproduced
3. conditions on which people base their perceptions of their peer group's expectations of them.

Social psychology and Ajzen's Theory of Planned Behaviour focus on the third essential attribute. In this case it suffices to establish the individual's perception of her peer group's expectations of her behaviour. Since it is the individuals' individual perceptions that are of interest, Ajzen elects to call this attribute "subjective norms". Subjective norms, according to Ajzen, can also be measured using surveys by combining two kinds of questions: (a) how the respondents think people in their social sphere would react if they acted in a certain way; and (b) how much the respondents think they would be influenced by those people's opinions of their actions. These two questions relate to other people in the respondents' peer group. In the present study, we have elected to include questions about the following people in the respondents' peer group: mother, father, other close relatives, partners, friends, other road users, their boss, work colleagues/classmates, neighbours, casual acquaintances. In line with the above, an example of a survey question from the present study:

- (a) How do you think your mother would react if you broke the coming environmental zone rules by driving a diesel car in a prohibited zone?

She wouldn't care :\_:\_:\_:\_:\_: She would be very upset

- (b) How much do you think you would care about your mother's opinion on whether you obey the new environmental zone rules (e.g., banning diesel cars in some areas)?

I don't care about her opinions :\_:~:~:~:~:~:~: I care a lot about her opinions

In all, there are 10 such binary questions that collectively measure the norm's capacity to influence behaviour. In total, this makes twenty questions used to study social norms in relation to environmental zones.

For a detailed explanation of how these values are mathematically calculated to produce the attitude's total influence on behaviour, please see Ajzen (2005, p. 125)

### **3.1.3. Studying perceived behaviour control in relation to environmental zones**

The research scope of the present study is to gain an understanding of the kinds of measures required to ensure legal compliance with the new environmental zone rules. Therefore, we will view perceived behaviour control, both with regards to the risk of discovery as well as the severity of the sanction, as unknown variables.

Theory of Planned Behaviour measures perceived control in relation to a specific behaviour in the same way that it measures attitudes and subjective norms, i.e., by combining two kinds of questions: (a) How likely is it that a factor that either supports or deters the desirable behaviour will arise? And (b) how strongly will these factors be activated in either direction (i.e., whether in support of or to deter the behaviour)?

We concluded from the pilot study that the respondents did not appear to recognise any actual conditions (factors) that might deter them from obeying the new environmental zone rules. Therefore, we decided to include three statements tested beforehand on a 7-point Likert scale using the same method as in the attitudes study (please see above):

Statement 1: Public transport is so good in Sweden that not being able to drive a banned car in some environmental zones is not a problem.

Statement 2: People who really need to drive in environmental zones can choose to use a car that meets the environmental standards.

Statement 3: It won't be long before all new cars meet environmental standards and, therefore, the fact that some car owners might not be able to drive everywhere will not be a major issue.

The responses are presented in the results chapter. These results remain uncontested, and none of the tested statements were perceived as particularly problematic in the context of legal compliance. This means that in our discussions

on what is required to change perceived behavioural control, we can turn our full attention to understanding how sanctions and surveillance can be useful factors when promoting increased legal compliance.

In addition to the aforementioned questions, the survey study also included questions that directly address legal compliance, appropriate sanctions in the event of transgressions, and surveillance methods. Here, too, we used a matrix consisting of seven statements. The following is an example of a legal compliance variable excerpted from the survey study:

If I knew that there was a low risk of discovery and punishment, I might conceivably break the new environmental zone rules (e.g., driving a banned diesel cars in some areas).

Finally, we asked a direct question concerning appropriate surveillance methods which allowed four alternative responses, and a question concerning appropriate fine amounts for transgressions, which also allowed four alternative responses. The final question of the survey study invited respondents to describe in their own words how they felt about the environmental zone rules.

Prior to launching the survey study, a qualitative pilot study was carried out on a sample group from Lund University that is well acquainted with survey studies. The main purpose of the pilot study was to map underlying, conscious and potential behavioural outcomes, as well as other control factors (Ajzen, 2006). Furthermore, the pilot study also included direct attitudinal measurements of behaviour, perceived social norms and perceived behavioural control. Data retrieved from the pilot study was used to select reliable and valid questions for the final survey study. In this context, it is important to assess each variable's relevance in relation to the study's theoretical framework and purpose. In other words, some questions were rejected and replaced, or reformulated. Finally, the pilot study included measurements of background factors that were deemed relevant for the study. For example demographic questions concerning gender, highest level of education, and what kind of car the respondents usually drives. Based on the results of the pilot study, it was possible to evaluate the relevance of the following demographic variables: Do the background questions correlate with intention or previous behaviour? If not, should they be removed from the final survey study? (Ajzen, 2006).

In order to further ensure that the survey study could feasibly be carried out, we conducted a so-called Soft Launch consisting of 100 respondents before submitting the survey to the entire sample group. This was done to reduce the possibility of any misunderstandings concerning the design of the study and the questions.

The survey study was conducted in collaboration with online survey company QuestBack who, in turn, administered the survey via EasyResearch. The survey was



sent out by email to all recipients in early December 2018, and upon closing the survey, on December 15, the number of respondents amounted to 1,147. The target was to exceed 1,000 respondents. The respondents represent a national cross-section of citizens of 18–65 years-of-age and above, in terms of gender and place of residence (urban/rural). The reason the respondent group was confined to the above-mentioned age group was that this sample included all possible driving licence holders. Since this study is concerned with driving licence owners, the survey study began with a screening question: “Do you have a driving licence?”, in order to filter out respondents that did not have a driving licence. The sample was drawn randomly, with the exception of the above-mentioned criteria, from CINT CPX (Cint Panel eXchange) which consists of 500,000 individuals in Sweden that represent a cross-section of the population. Respondents registered with CINT CPX have given their approval to participate in online survey studies in advance and received a small compensation for participating in the study.

## 3.2 Semi-systematic literature review

### (Sub-study 2)

We have elected to describe the method used for the literature review as semi-systematic (cf. Løkke et al., 2015; Vargas and Mantilla, 2014). We decided not to conduct a full systematic study since this is a multidisciplinary area of research that uses different terminologies and conceptual apparatuses, which means that search strings by necessity become specific to each discipline. This is a vast number of search strings, and the systematic aspect becomes somewhat neglected. However, the three basic elements of the systematic method have been applied in this study (Tranfield et al., 2003; Urinboyev and Leo, 2016). This means that the study has been conducted in three phases: (I) searches, (II) screening, and (III) analysis.

#### 3.2.1 Phase I: Searches

The first step is to choose what databases to use when searching for scientific publications. Given the research scope of the present study, it would be inadequate to search single, discipline-specific databases. We chose to use EBSCO Research Platform which compiles studies and journals from myriad scientific disciplines. The database indexes roughly 23,000 scientific journals. With regards to search strings, we have worked on a number of different combinations and variations of keywords (key phrases), such as:

Theory of planned behavior; Attitudes; Norms; Behaviour; Perceptions; Opinions; Beliefs; Traffic violations; Traffic offences; Law enforcement; Surveillance; Policing; Traffic police; Punishment; Enforcement strategies; Environmental concern; Pollution; Eco-driving; Green zones; Environmental zones; Transport; Commuting; Road traffic;

There are a few limitations that apply to all searches. Firstly, we have only included materials published between 2010-2018. Additionally, when searching the EBSCO databases, we have only included research that has been peer-reviewed, i.e., each published article has been reviewed for scientific rigour by at least one scientific expert. Furthermore, we have only included materials published in English and made available in their entirety through EBSCO host Research Platform. These limitations, however, do not apply to searches for Swedish publications or publications that we have found in appended reference lists. When it comes to Swedish reports and reports by European organisations, we have used some sources that are not strictly scientific sources.

### **3.2.2 Phase II: Screening**

Following review of our semi-systematic searches of the EBSCO host Research Platform databases, we initially assessed that we had 354 full scientific articles that were of relevance given the study's research scope. All of these publications were uploaded to the research assistant tool Zotero which was then used to screen them.

The first screening process consisted of reviewing all abstracts and assessing each article's relevance for the study. Many discarded studies dealt with traffic behaviour in developing countries with very different traffic and norm systems. The first screening produced 90 articles that were deemed to be of relevance.

The second screening resulted in 90 remaining articles which were then read in their entirety, with particular focus on the reference lists appended to each article in order to identify and include other relevant publications that had not been captured during the first general search. Additionally, a somewhat rudimentary search for Swedish publications resulted in three hits (reports). The process finally resulted in 58 publications on which the present analysis is based.

### **3.2.3. Phase III Analysis**

When analysing publications, it is sometimes useful to distinguish between content analysis and thematic analysis. This is particularly true when measuring the frequency of different kinds of categories and themes, in which case, content analysis is preferable (Vaismoradi et al., 2013). In actual fact, both methods overlap to such

a degree that in practice they are often used as synonyms. The present study employs a thematic analysis approach, although it is also based in content analysis principles. In practice, it consists of identifying and reading relevant research publications and identifying and describing prominent themes in contemporary research. The results are presented in the knowledge review.

# 4. Knowledge Review

The knowledge review is intended to provide an account of the current body of research of relevance for the overarching purpose of this study. That is to say, to analyse different strategies and their potential capacity to bring about compliance with the new regulations that gain force on 1 January 2020, based in a comparative analysis of formal and informal social control in relation to traffic regulations. The overarching purpose of the study is broad, and there is a vast body of research that could potentially be of interest. The publications we have selected to review are consistent with the study's research scope and theoretical point of departure (more in-depth in Ch. 2) which is that attitudes, norms and perceived behaviour control combined with a knowledge of strategies are important factors for achieving legal compliance, particularly in the context of environmental zones and similar regulations. As stated in Chapter 3, with regards to methodology, a strictly systematic literature review is not the most suitable method for this kind of study. It should also be pointed out that the body of research in the area is too extensive to be covered given the scope of this review. The following overarching themes have been identified:

- General legal compliance in road traffic situations
- Collective behavioural changes toward reduced environmental impact
- Previous research on traffic-reducing measures
- Social acceptance for environmental zones in Europe
- Difficulties of reducing car usage

This does not mean that the above-mentioned themes are the only possible ways of gaining an optimal understanding of the issues of interest for the present study. Neither does it mean that they present an objective account of the aspect that research in the area tends to gather around certain subjects. Rather, the six, above-mentioned themes represent our combined ambition to highlight the specific issues of focus here; and how research *de facto* tends to focus on various subjects.

## 4.1. General legal compliance in road traffic

Traffic studies have produced a large body of research on legal compliance and the influence that different kinds of sanctions have on behaviour. One often suggested reason for this, aside from its obvious relevance, is that large amounts of data and possibilities of comparative studies of cities/countries are readily available, particularly before/after studies (Killias et al., 2016). Thus, in recent decades, many studies have focused on the effects of raising fines, increasing severity of sentences, other forms of increased traffic surveillance, and so on.

With regards to surveillance and the influence that different kinds of sanctions have on legal compliance, speed limits and violations thereof tend to be the most commonly studied cases. Despite this, the conclusions drawn from this research are ambiguous. Although several studies clearly show that stricter surveillance and severer sanctions influence behaviour toward a reduction in speed limit violations, the literature generally assumes that such measures to change behaviours are seldom sufficient in themselves (Lawpoolsri et al., 2007).

Given the theoretical and methodological starting points of the present study, it is of particular interest to study the extent to which social psychology and TPB methodology has been employed in research on traffic behaviour and legal compliance. It is apparent that a number of researchers have employed this methodology in their research (Conner et al., 2007; Elliott et al., 2003; Elliott and Thomson, 2010; Forward, 2009; Letirand and Delhomme, 2005; Newnam et al., 2004; Paris and Broucke, 2008; Wallén Warner and Åberg, 2008). What they all share in common is that they demonstrate how the driver's attitudes and their peer group's norms are important components with regards to compliance with traffic rules. The drivers' attitudes and their peer group's norms, for example, play a big part in how inclined the driver is to obey speed limits, as well as their inclination to obey mobile phone rules in traffic (cf. Riquelme et al., 2010). In other words, TPB-based studies in the area of traffic research consistently show that the instrumental perspective and Rational Choice, based in the preventative effect of sanctions, do not provide adequate explanations for how legal compliance actually functions. It is clear that in order to predict level of legal compliance, at least in connection with traffic situations, the traditional model needs to be complemented with data on psychological and social conditions. A clear and obvious example of the influence that peer groups have on legal compliance is the fact that car-owners tend to be better at obeying traffic rules in areas where they feel a sense of belonging (Bradford et al., 2015).

The traditional model tends to reduce people to rational individuals that consider violating traffic rules when they think there is something to be gained from the

transgression, e.g., when they are in a hurry. This potential inclination to break rules is reduced when society increases the potential risks and costs through increased surveillance and sanctions. This is a common argument for implementing speed cameras, automatic number-plate recognition methods, preventative marketing campaigns and increased severity of sentences (Bradford et al., 2015).

However, while research shows that the conventional model, based in the assumption that the individual is a rational actor, provides inadequate explanations for what causes legal compliance, the application of traditional strategies does reinforce people's perception that there is a likelihood of being punished if they break the traffic rules – at least in some countries, and in some cases (Nagin, 2013).

The conclusions drawn from research on police control and sanctions are more ambiguous and sometimes contradictory (Killias et al., 2016; Walter et al., 2011). Some studies, for example, have shown a drop in speed limit violations where speed cameras are employed, (Elvik and Christensen, 2007) although the drop is limited. With regards to stricter punishments for not using safety belts, the conclusions drawn from the literature are less ambiguous. Studies in Germany and Finland show that harsher punishments introduced several years after safety belts had become compulsory contributed to almost doubling safety belt usage (Heinrich, 1991; Valtonen, 1991). Similar results were shown in Saudi Arabia, where the use of safety belts increased significantly after being made compulsory (Bendak, 2005). One common denominator, with regards to having a visible influence on legal compliance, is that the new rules were preceded by information campaigns and met with strong public acceptance (cf. Stanojević et al., 2013). Thus, it is difficult to discern whether harsher punishments or other factors are the cause of increased legal compliance.

With regards to drink-driving and legal compliance, a large number of studies have attempted to establish the effects of surveillance and punishment. A well-known study by Tavares (2008) was unable to confirm that various adjustments in surveillance measures and severity of sentences made any significant difference. Another study by (Lee, 2012) showed that a dramatic increase in the number of traffic fines did not reduce traffic accidents. However, a comprehensive evaluation of a legislative package (introduced in 2005) conducted in Switzerland that included more frequent drink-driving checks, severer sentences and lower alcohol level limit did show a reduction in the number of drink-driving violations, traffic accidents and self-reported cases of drink-driving (Vaucher and Fink, 2014). The design of the study included survey studies (conducted every other year between 2001 – 2012) of attitudes toward drink-driving, police checks, and self-reported cases of drink-driving. Self-reported cases of drink-driving went down immediately upon implementation of the legislative package, from 36.1% (2003) to 23.5% (2005), and

continued to drop each successive year thereafter. The conclusions of the study indicate that the legislative package received strong public support, which, in combination with harsher punishments, explains the success of the legal reform.

In accordance with the above, when it comes to whether harsher punishments and increased surveillance have a significant effect, it can be concluded that the current body of research is ambiguous. On the other hand, based on the findings, this theory cannot be dismissed, either. Possibly, the contradictory results indicate that much research conducted in the area is based on overly simplistic models of how legal compliance arises and the roles that factors such as surveillance and punishment play. Additionally, we can conclude that laws that become socially accepted generally enjoy a high degree of compliance (Stanojević et al., 2013). The following section focuses on research that may help us understand public opinion on behavioural changes aimed at reducing our environmental impact.

## 4.2. Collective behavioural changes toward reducing environmental impact

In recent years, public discourse in environmental discussions has largely focused on changing collective behaviours in order to reduce our impact on the environment (Gifford and Nilsson, 2014). Environmental issues are becoming an increasingly frequent topic of public discussion, which combined with government measures has increased the public awareness for necessary behavioral changes. (Gifford and Nilsson, 2014).

Research has singled out some factors that have varying levels of influence on people's perceptions on environmental issues, sustainable consumption and generally environmentally friendly behavioural patterns. Paradoxically, a significant portion of the body of contemporary research also shows that people's environmental concerns and raised awareness do not necessarily lead to environmentally friendlier behaviour, or may only affect some behaviours (Gifford and Nilsson, 2014). Social-psychology theorists, *inter alia*, have studied how strongly individual and social factors influence people's environmental concerns and their subsequent inclination to act in an environmentally friendly manner. In the case of changing consumption patterns in order to protect the environment, it has been shown that social control and the peer group's norms are of great importance (Jansson et al., 2017). One example shows effects as a result of city neighbourhoods in the USA publishing reports on average and desirable energy consumption levels (Schultz et al., 2007). The purpose of publicising the statistics was to reduce energy consumption in areas

with the highest consumption. Subsequent measurements, however, showed that although high-consumption households reduced their use of electricity, low-consumption households, instead, increased their use. Thus, there was a tendency among all households, at a statistical level, to strive toward “normalcy”, regardless of the environmental consequences (Schultz et al., 2007).

The general public’s understanding of environmentally friendly behaviour also indicates some problems; knowledge of environmental issues tends to be skewed toward environmentally friendly behaviours that are often based in concrete everyday activities, while more systemic knowledge of environmental issues is less common. For example, a review of 15 environmental knowledge surveys in the USA showed that the respondents were knowledgeable in areas such as recycling, renewable resources, and food-waste disposal, but less knowledgeable in areas such as climate change, energy production and quality of water (Robelia and Murphy, 2012). According to the literature, there is also a gap between knowledge and attitudes towards environmental issues. A study by (Mobley et al., 2010) shows that the influence of knowledge on behaviour greatly depends on contemporary attitudes toward environmental issues. These attitudes are often linked to people’s general political opinions (McCright and Dunlap, 2013). There is also an extensive body of research that indicates that people ignore our impact on the environment at a local level and tend to think that there are bigger environmental issues elsewhere – which coincides well with Robelia and Murphy’s (2012) conclusions that there is a knowledge gap in relation to the more overreaching aspects and effects of environmental issues. For example, a study of 18 countries shows precisely that; i.e., people are less concerned with environmental threats in their own countries and they perceive that other countries have a greater and more serious impact on the environment (Gifford et al., 2009). In the following section, we shall discuss the conclusions of the literature with regards to traffic reduction measures in sensitive areas.

### 4.3. Previous research on traffic reduction methods

Research shows that traffic rules in combination with infrastructure modifications and other political measures are of great importance for infrastructure and residential areas to develop in an environmentally sound and healthy manner (Gardner and Abraham, 2010). But while it is clear that this type of intervention can influence behaviour in the desired direction, often, its importance is exaggerated. When it



comes to successfully introducing reforms that are intended to influence people's behaviour, social context is very important (cf. Sfendonis et al., 2017).

There is relatively little research on norms and attitudes in the context of environmental zones. This is probably due to such zones being a relatively new innovation, and because decisions on environmental zones are often made at a municipal level. There are a few, not particularly extensive, studies that focus on acceptance of and attitudes toward environmental zones. A study of driving licences owners' opinions of the potential introduction of environmental zones was conducted in Thessaloniki, Greece (Sfendonis et al., 2017). The results showed that the respondents were generally favourably inclined toward environmental zones, in particular women, who had a more favourable disposition toward the rules than man. Despite this, 45% of respondents were not willing to pay a fee (camera surveillance) to monitor traffic regulation violations. Only 15% reported that they would continue to use their car in the city centre after the introduction of environmental zones. The respondents were also willing, to some extent, to consider replacing their conventional car with a hybrid or electric car (Sfendonis et al., 2017). This suggests that the introduction of environmental zones would result in more people switching from a petrol or diesel car to a hybrid or electric car. The impact of environmental zones on the vehicle fleet is to a degree confirmed by previous research. The effects recorded in London were, for the first few years, of a temporary nature, then the effects grew to a standstill and reached roughly the same levels as prior to the implementation of the reform (Ellison et al., 2013). However, developments in the German vehicle fleet toward changing to hybrid and electric cars has continued unabated for a number of years (Holman et al., 2015). Whether this can be linked to the introduction of environmental zones is unknown.

Since 2009, municipalities in Sweden are allowed to legislate in local traffic matters and ban vehicles with studded tyres on certain roads or stretches. It is also possible, since 2011, to ban vehicles with studded tyres in certain areas. Prohibiting vehicles with studded tyres is one way of reducing the amount of airborne particles in some areas. Although only a few stretches in a few cities in Sweden fall under such prohibitions, there is nothing to stop municipalities from expanding such provisions to larger areas (Elo, 2017). The ban on studded tyres is similar, in this sense, to the new environmental zone regulations. It is therefore of interest to examine how the public received the ban on studded tyres and how well the public complied with the rule. In common with contemporary research on environmental zones, academic studies of studded tyres are largely limited to measuring their impact on quality of air. However, a few reports and evaluations of the ban on studded tyres have been published. A report conducted by the Environment & Health Protection Administration shows, among other things, that one of the most important reasons

for improved air quality in Stockholm is that the use of studded tyres dropped, from approximately 70% to approximately 30% on Hornsgatan, and to approximately 40 – 50% in the rest of the city centre (Eneroth, 2016). The same report also shows that the drop in studded tyres began before the ban was introduced on Hornsgatan in 2010 as part of an information campaign about the damaging health effects of studded tyres. The ban on studded tyres has led to a decrease in their usage, but has remained relatively stable in recent years (Eneroth, 2016). Yet another report, commissioned by the Swedish Transport Administration in Stockholm, focused on the effects of the ban on studded tyres on Hornsgatan in Stockholm. The report addressed a number of private car owners who regularly drove on Hornsgatan in 2009 and included two survey questions concerning the rule. Among other things, the report showed that compliance with the ban on studded tyres was weak. Only 40% of car owners using studded tyres stopped driving on Hornsgatan completely, and several car owners who broke the rule did so repeatedly. The majority of the 60% of car owners who disobeyed the ban on studded tyres reported doing so because they didn't care about the ban (Trafikkontoret Stockholm Stad, 2010). However, the reported reduction in vehicles with studded tyres and the improvement in air quality could be seen as an indication that the ban on studded tyres was received with a relatively high degree of compliance. This also applies to the majority of European cities that have introduced environmental zones where improved quality of air could, in itself, be seen as an indication of legal compliance.

How legal compliance in environmental zones is enforced varies in European countries, and in some cases, in different cities in the same country. One common method of control is to mark cars with environmental classification stickers (as in Athens, Berlin, Lisbon, Madrid and Paris). This is usually carried out by local police patrols (Georgiev, 2018).

Other cities, such as Brussels, London and Milan register license plates via camera surveillance systems that automatically send a fine to the car owner's home in the event of a traffic rule violation. However, these kinds of systems are very expensive and require extensive investments as well as having ongoing maintenance costs. It was estimated in 2003 that installing such a system in London would cost €2.8 million, while manual surveillance of the system would cost €4 million a year. The corresponding cost of an automatic surveillance system was estimated at €6-10 million for the installation and €5-7 million to operate. According to the European Environment Agency (EEA), automatic supervision contributes to a higher degree of legal compliance and increases the rules' environmental and economic advantages. In Oslo, Norway, a similar system has been implemented, (AutoPASS), where license plate information is transmitted to special monitoring stations via radio frequencies (Georgiev, 2018).

Similarly, fines for transgressing environmental zone rules vary, from 68 EUR in Paris to 200 EUR in Athens, and 300 EUR in Brussels. In other cities, the final amount varies according to season (e.g. Milan), while other cities raise the fine in the event of late payment (e.g. Paris). The opposite method is used in London, where the fine sum is reduced if it is paid within two weeks. In Brussels, in order to accustom residents to the new rules, only warnings are issued for the first nine months. Additionally, in Brussels, only one fine may be issued every three months, and foreign-registered vehicles are fined to the amount of €150, rather than €300. This differentiation between foreign and domestic vehicles also occurs in cities like Milan, and several German cities (Georgiev, 2018).

#### 4.4. The difficulties of reducing car usage

As a result of the implementation of environmental zone rules, the majority of the present Swedish vehicle fleet will be subject to prohibitions in some areas (Elo, 2017). Therefore, changes in behaviour, e.g., reduced car usage and increased use of alternative transportation methods, are highly relevant. As mentioned previously, TPB has been applied across a broad spectrum of research to explain different kinds of behaviours and has also been applied in research on environmental psychology and transportation (Bamberg and Schmidt, 2003; Gardner and Abraham, 2008; Heath and Gifford, 2002). For example, Heath and Gifford (2002) show that university students' attitudes, subjective norm (what their social peers think) and the perceived degree of behavioural control has significant (positive) influence in relation to intentions to travel by bus. The university students' intentions to travel by bus were, in turn, significant (positive) in relation to the reported level of bus usage.

When it comes to studies of people's preferred choice of transportation, researchers tend to focus on personally beneficial outcomes related to perceived financial expenses, travel times and flexibility (Bamberg and Schmidt, 1999), as well as environmental concerns (Vugt et al., 1995). There are studies that show that environmental issues influence our preferred transportation methods (for an overview, please see: Gardner and Abraham, 2008) and several instances of environmental cognition have been measured; awareness of environmental issues; (Steg, 2005); concerns about our impact on the environment (Polk, 2003); how serious one feels that our impact on the environment is (Tanner, 1999); how serious one feels that the impact is on individuals, society and the biosphere (Collins and Chambers, 2005; de Groot and Steg, 2007; Tanner, 1999); perceived responsibility and feelings of guilt in relation to negative environmental impact (Bamberg et al., 2007); and how much one feels that one's method of transportation has any impact

on the environment (Tanner, 1999; Steg and Sievers, 2000). A study by (Klöckner and Matthies, 2004), in which TPB was applied, showed that environmental awareness contributes to a sense of moral obligation to carry out certain actions and consequently arrive at assessments that are in line with one's moral norms. This, in turn, leads to greater flexibility in terms of methods of transport (Harland et al., 1999; Klöckner and Matthies, 2004). A significant majority of studies that apply TPB conclude that environmental concerns ought to lead to reduced driving and increased use of alternative methods of transport (de Groot and Steg, 2007; Gardner and Abraham, 2008). However, it appears that such behavioural changes are more complicated in practice. An example of this is Gardner and Abraham's (2008) study of thought patterns in connection with driving, alternative methods of transport, and environmental issues. In their study, they employed TPB methodology to study patterns of motivations behind car usage in a town in England that offers very good alternative methods of transportation. The results showed that respondents that had a positive attitude toward alternative methods of transportation also shared a greater concern for environmental issues than respondents that had a negative disposition toward alternative methods of transport. Additionally, there is a correlation between positive attitudes to alternative methods of transport and environmental concerns. However, environmental concerns and a positive attitude towards alternative methods of transport did not influence their choice to drive a car, in practice. This is also confirmed by an extensive body of earlier research that indicates that environmental concerns often do not, in themselves, have an impact on car usage (Gardner and Abraham, 2007; Klöckner and Matthies, 2004; Steg, 2005).

The main reason for why respondents continued to use cars, despite a generally favourable attitude toward alternative methods of transport, was that they viewed public transport as cumbersome. Based on this, the authors argue that the use of cars also involves a moral dimension that is not based in utility-based patterns of thought (Gardner & Abraham, 2008). Thus, there is a discrepancy between people's perceived tolerance for reduced car traffic, on the one hand, and changes in behavioural patterns, on the other. This is emphasised by the fact that research has shown that people tend to stick to their preferred methods of transport, and it is hard to influence that preference (ibid).

This tells us that environmental awareness and concerns do have some effect on our choice of transport method. However, there is often a discrepancy between accepting alternative methods of transport and actual changing one's behaviour. The results of the research are ambiguous, and the actual impact on car driving is often unclear. This underlines the fact that more research is required to establish how other factors in combination with TPB ought to be included when understanding how people choose methods of transport. It is possible that the implementation of

environmental zones may lead to reduced car traffic as a result of reduced access to central parts of towns. Environmental zone rules may also lead to new developments and improvements in public traffic (Elo, 2017). If the environmental zones are supported by social attitudes and norms, the chances of the public changing their behaviour with regards to method of transport are good. A similar argument has been made by Gardner and Abraham (2010) who argue that it takes more than good quality public services to change people's driving habits, and that efforts should be combined with traffic-reducing regulations, to have as great an impact as possible, (cf. Sfendonis et al., 2017).

## 4.5. Social acceptance for environmental zones in Europe

Contemporary research on attitudes and norms in relation to environmental zones, as well as other traffic reducing regulations, is, as mentioned previously, somewhat scarce. However, some overarching reports have been conducted that compare the implementation of different environmental zones around Europe. According to a report by the European Environment Agency (EEA), the level of social acceptance for environmental zones varies among different countries and different kinds of social actors (Georgiev, 2018). Unsurprisingly, EEA argues that the rules often face broad resistance from motoring organizations and representatives of the retail sector. Criticism levelled by retailers at reducing traffic measures are founded in concerns that such measures may have a negative impact on business operations – however, this fear has been disproved in cases where traffic reduction measures have been introduced, according to EEA. Motoring organisations have presented similar arguments, i.e., that traffic limits will have a negative impact on their business operations. However, the same report also states that the main reason for not introducing more environmental zones is that it is considered to be a politically unpopular decision. The report is ambiguous about whether this conclusion can be backed up empirically.

Another aspect that has complicated the introduction of environmental zones is the exception for Euro 6 diesel cars. This is a result of the diesel pollution scandal which revealed that emission levels from diesel vehicles belonging to environmental class Euro 5 and 6 were markedly higher in reality than test results claimed. EEA estimates that there are roughly 37 million severely polluting vehicles manufactured between 2011–2016, in Europe. This has made it harder to switch to an environmentally friendly vehicle fleet. (Georgiev, 2018)

Easily accessible alternative methods of transport are crucial for a successful introduction of environmental zones. The case in London provides a good example of how to distribute information regarding alternative transportation methods, where public opinion was first reviewed in connection with the introduction of additional, more stringent, environmental zones (Ultra Low-Emission Zones). The results of the study were then used as documentation on which the new rules were based. In some cases, referendums have been called to achieve greater reach and legitimacy among the public. Similar factors can be seen in the implementation of congestion charges in Stockholm, which was also preceded by a referendum prior to implementation. A study comparing public opinion on congestion charges before and after implementation in Stockholm showed that the level of acceptance had risen after the trial period. (Schuitema et al., 2010)

The explanation for the positive reception among Stockholmers who initially were critical of the project was that visible effects such as reduced traffic jams, parking problems and pollution were more tangible than expected. Furthermore, during the trial period residents enjoyed reduced travel costs which was perceived to be a direct result of the congestion charges (Schuitema et al., 2010). Similar examples can be found in Antwerp in Belgium, where a citizen science project led to increased awareness and discussions on environmental zones. This had a positive effect on public opinion (PETI, 2018). Additionally, a number of measures to reduce traffic in cities around Europe have been received positively, following implementation (European Commission, 2017).



# 5. Presentation of results

## 5.1. Background data

The study was evenly distributed between men (59.9%) and women (49.9%). The respondents were divided into six age categories: 18–25; 26–35; 36–46; 46–55, 56–65, and over 65 years-of-age. The age categories 18–25 and 56–65 are somewhat under-represented in comparison with the other age categories. With regards to highest level of education, the responses are distributed as follows: 43.9% university or college education; 43.1% high school education; 10.5% elementary or primary education, secondary school or similar, and 2.4% had not completed any full education. The geographic spread of the respondents was representatively divided according to population spread. In response to the question: *What municipality do you live in?* the following alternatives were offered: Gothenburg, Malmö, Stockholm, and “other municipality, state which:”. With regards to the last alternative, all other municipalities were collected in the same category, i.e., “other municipality”. The study also included a question on the type of car the respondent usually drives and offered the following response alternative: Petrol (62,8 %), Diesel (26,3 %), Hybrid (6,0 %), Electricity or LPG gas (1,4 %) and None of the above alternatives (3,5 %). Finally, how knowledgeable the respondents assessed they were with regards to the new environmental zone rules was also measured. 4.8 % stated that they were very knowledgeable, 12.6 % that they have never heard of it before, 25.1 % that they were reasonably knowledgeable, and 57.4 % that they had heard about it, but did not know much about it.

## 5.2. Theory of Planned Behaviour

### 5.2.1. Attitudes

In line with the present study’s research purpose, which is to measure attitudes in society that support compliance with these rules, the datasheet below is intended to depict the respondents’ reactions in relation to a number of (attitudinal) objects. To



operationalise this, we use four binary questions: Indicators A, B, C and D, which together measure the attitude's capacity to influence behaviour. In all, we composed eight questions to study attitudes toward environmental zones; binary question for all indicators are presented below:

#### Indicator A

1. I think it's good for the environment and for people's health to put limits on some vehicles in cities.
2. It's important that people are confident that the quality of air in our cities meets official standards.

#### Indicator B

1. Tougher environmental car standards are good for the environment and people's health.
2. Access to clean air and good health is so important that banning cars that do not meet tough environmental standards is justified.

#### Indicator C

1. The new traffic rules for environmental zones (e.g. bans on diesel cars in some areas) will lead to environmental and health benefits.
2. Fixing polluted air in our municipalities is of crucial importance.

#### Indicator D

1. Most people will be inclined to obey the new environmental zone rules (e.g. bans on diesel cars in some areas), and therefore, they will work as planned.
2. Society's efforts to protect the environment are an important component of our shared responsibility to future generations.

Based in this statement, the following datasheet should be interpreted in terms of how strongly respondents believe that a certain behaviour or action will lead to a specific consequence (a), and how concerned they are about the said consequence (b). This is expressed in terms of strength of attitude (a), outcome (b), and each indicator is then weighted and summarized (the norm's ability to influence behaviour) – all values are displayed on a scale from 1–7. Table 1 shows the total capacity of attitudes to influence behaviour (bottom of datasheet): 3.75 – which is the total value of all respondent values for all indicators, and summarised to a total value between 1–7.

**Table 1.**

The respondents' attitudes toward the rules, shown as strength of attitude and outcome, and weighted and presented as the attitude impact strength.

Attitudes	Consequence	Evaluation	Impact strength
(a) Indicator A	5.21	5.37	4.00
(b) Indicator B	5.31	5.20	3.98
(c) Indicator C	4.86	5.35	3.72
(d) Indicator D	4.10	5.63	3.30
<b>Mean value</b>	4,88	5.39	3,75

**Table 2.**

The respondents' attitudes toward the rules.

Coef.	(a)	(b)	(c)	(d)
1	45	38	58	90
2	46	28	59	101
3	64	59	88	160
4	151	154	200	257
5	226	204	215	209
6	182	217	164	108
7	316	328	243	104

**Table 3.**

The respondents' perceived outcome of the rules.

Coef.	(e)	(f)	(g)	(h)
1	29	39	30	26
2	32	52	36	27
3	64	69	54	50
4	142	156	162	132
5	223	197	216	159
6	209	213	197	196
7	329	303	331	438

The capacity of attitudes (on a scale of 1–7) to influence individual car owners' behaviour toward compliance with the rules: **3.75**

The column on the right containing values for Table 1 shows the indicator that has the greatest effect on behaviour. We can see that “Indicator A” has the strongest impact strength, at 4.00, while “Indicator D” has the weakest impact strength, at 3.30. This shows that the strongest impact becomes visible (Indicator A) where environmental and health issues benefit from the use of certain kinds of vehicles in cities (attitudinal strength) and if it is deemed important that air quality meets official standards (outcome). The results for “Indicator D” show that strength of attitude (4.10) is weakest among the four indicators, while outcome has the highest

value (5.63). In other words, the respondents feel that society's efforts to protect the environment (outcome) are important, but whether the environment zones rules will help (attitudinal strength) has a lower value. Furthermore, "Indicator B" has the highest attitudinal strength value (5.31), i.e., a high value for stricter environmental car standards that contribute to environmental and health benefits. The same indicator also has a high outcome (5.20), meaning that access to clean air and good health are considered important enough to motivate bans on cars that do not meet strict environmental standards. As mentioned, values that describe the general capacity of attitudes to influence car owners' behaviour with regards to legal compliance can be found at the bottom of the page. The present study puts the influence of attitudes on behaviour at 3.75.

### 5.2.3. Some examples of respondent opinions – attitudes

The following quotes are excerpts from a concluding, open question where survey respondents were asked to freely express their opinions on the new environmental zone regulations

"Joint decisions that benefit the environment is very good. I also think there are other ways to have an influence. To ensure a smooth transition, private persons should be encouraged to buy environmentally friendly cars. They should be cheaper."

"Air quality in big cities like Malmo, Copenhagen, Stockholm and Gothenburg is not very good. There are a lot of lorries, delivery trucks, and cars spewing out diesel particles. I've just moved to the centre of Malmo, and after 17 years in the countryside, I can tell that the air here is much worse. I get a blocked nose and there's a bad smell in the air. That's why it is important to encourage the use of electric cars, hybrids and electric buses and trains in cities. Cities are nicer when people travel by bike and on foot, lots of trees and green areas".

"Just ban all the traffic in town like they do in city centres, except for commercial traffic - problem solved! That is to say, the police, fire engines, deliveries and public transport should be allowed to drive there, but no one else... Build car parks outside of those areas so that you can only get into town by public transport! Why should rich people be allowed to drive around town and not poor people?"

"I think it's a great way of improving the environment – a really important issue! Don't think you should be entitled to drive everywhere at all unless you meet environmental standards, it's up to you to either fix it or find a different method of transportation."

“Environmental zones are a good first step toward pedestrian-only streets, for future generations, and for setting a good example for other countries.”

#### 5.2.4. Norms

In addition to the present study’s research purpose, i.e., to discern attitudes toward the rules, it is also intended to study the respondents’ perception of their peer groups’ expectations of their behaviour, how strong these expectations are and who exerts informal social control. The model for operationalising norms was also compiled by combining two kinds of questions: (a) “How do you think your peer group would react if you broke the coming environmental zone rules and drove a diesel car in a forbidden zone?”, and (b) “How much do you think you would care about the following people’s opinions of whether you obey the new environmental zone rules or not?” These two questions were asked in relation to different members of the respondent’s peer group – in all, there were ten binary questions, i.e., twenty single questions, intended to study social norms in the context of environmental zones. Simply put, the model is based on an ambition to understand how much pressure their social peers exert on the respondents, and how much value the respondents assign to this pressure. This is expressed in terms normative strength (perception of social peers), receptibility, (evaluation of social peers’ perceptions) and a weighting (impact strength) of each peer representative. All values are displayed on a scale from 1–7.

**Table 4.**

The respondents’ perception of their social peers shown as strength of norm and receptibility, weighted and presented as the norm impact strength.

<b>Social peers</b>	<b>Norm strength</b>	<b>Receptibility</b>	<b>Impact strength</b>
(a) Mother	3.80	4.18	2.27
(b) Father	3.69	4.13	2.18
(c) Other close relatives	3.97	3.93	2.23
(d) Partner	4.17	4.70	2.80
(e) Friends	4.18	4.38	2.61
(f) Other road users	4.68	4.03	2.70
(g) Chef	3.70	3.60	1.90
(h) Colleagues/Classmates	3.88	3.75	2.08
(i) Neighbours	4.00	3.75	2.14
(j) Superficial acquaintances	3.71	3.32	1.76
<b>Mean value</b>	3.98	3.98	

**Table 5.**

The respondents' perception of their social peers' attitude to whether the respondent should obey the rules.

Coef.	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1	186	210	141	146	116	74	199	152	146	184
2	71	69	85	81	87	40	69	78	82	94
3	102	106	138	97	116	97	97	114	116	136
4	174	144	226	190	213	232	184	202	262	243
5	153	148	208	169	246	222	135	168	171	160
6	92	92	110	146	136	186	95	107	128	101
7	97	94	93	136	102	168	84	79	100	77

**Table 6.**

How much the respondents value their social peers' opinions.

Coef.	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1	161	178	182	116	111	163	220	173	205	269
2	55	52	70	41	64	66	64	77	88	108
3	72	73	125	80	94	119	83	105	114	136
4	167	133	209	159	233	240	185	205	234	209
5	132	133	173	162	227	187	125	163	170	128
6	113	116	124	178	147	124	96	96	103	82
7	154	154	110	223	141	114	74	68	93	65

The norm's capacity (on a scale of 1–7) to influence individual car owners' behaviour toward legal compliance: **2.3**

The final value, *The norm's capacity (on a scale of 1–7) to influence the behaviour of individual car owners toward legal compliance*, (at the bottom of the data-sheet), which is a weighted value in which the values of the various social peers for all respondents are summarised into one value, gives us a brief summary of the norm's capacity to influence behaviour. Which social peers exert the most influence on behaviour is shown in the column on the right with values for Table 4. This column shows that the "Partner" peer has the strongest ability to influence behaviour with a value of 2.80, while the "casual acquaintance" representative has the lowest strength of influence, at 1.79. This means that the respondents report that their partners have the most influence on their behaviour with regards to legal compliance, while casual acquaintances have decidedly less influence. Strength of norms and receptibility show that the norm is strongest for (4.68) for "Other road users" representatives, but since receptibility for "Other road users" is only 4.03, compared to 4.70 for "Partner", "Other road users" thus has less strength of influence than "Other road users."

### **5.2.5. Some examples of respondent opinions – social norms**

The following quotes are excerpts from a concluding, open question where survey respondents were asked to freely express their opinions on the new environmental zone regulations

“Sounds great! Naturally, a society where everyone can choose anything they want would be great, but that’s just a utopian dream. You have to have rules. The goals justify the means. If you have to ban some forms of car transportation in some places in order to promote environmental efforts, that’s fair to me. If we want to keep our standard of living, we all need to make “sacrifices” at the individual level that might cost us more money, but costs less for the environment.”

“I think it’s good, but am not sure that other people will obey the rules. We need to change for the sake of future generations.”

“You can’t just ban something without FIRST making sure that the ban will work. If I have to drive my car to get to town I must be able to count on there always being car park spaces by the railway station outside of town, and that public transport runs often and on time. Otherwise I’ll be forced to drive into town, and it won’t be my fault.”

“It sounds reasonable, although I would rather see a full-on ban on cars on lots of streets in cities.”

“It is extremely important to legislate against environmentally harmful activities, I think it’s necessary in order to awaken opinion.”

“Good, studded tyres are already banned in some places in Stockholm – no problem. Think it’s reasonable that all car owners contribute.”

### **5.2.6. Perceived behaviour control**

As mentioned in the methodology section of the present report, we concluded that the respondents did not report any particular conditions (factors) that would stop them from obeying the new environmental zone rules. However, we decided to keep the three statements used in the pilot study to see whether it would be possible to measure similar results from a representative sample.

**Table 7.**

Respondents indicated how much they agree with the following statements on a scale between 1–7 (1=Disagree completely, 7=Agree completely). The mean value of the respondents' responses, where 7 is the highest possible value and 1 is the lowest value, is shown below.

	Mean value	Respondents
Public transport works so well in Sweden that not being able to drive a banned car in some environmental zones is not a problem.	3,8	1024
People who really need to drive in environmental zones can choose to use a car that meets the environmental standards.	4,5	1022
It won't be long before all new cars meet environmental standards and, therefore, the fact that some car owners might not be able to drive everywhere will not be a major problem.	4,3	1024

The results of the table above confirm the pilot study's indications that conditions are good for the rules to be received positively – with the exception of the statement referring to public traffic, where the value is somewhat lower (3.8) than for the other statements.

### 5.2.7. Some examples of respondent opinions - preceived behavioural control

The following quotes are excerpts from a concluding, open question where survey respondents were asked to freely express their opinions on the new environmental zone regulations

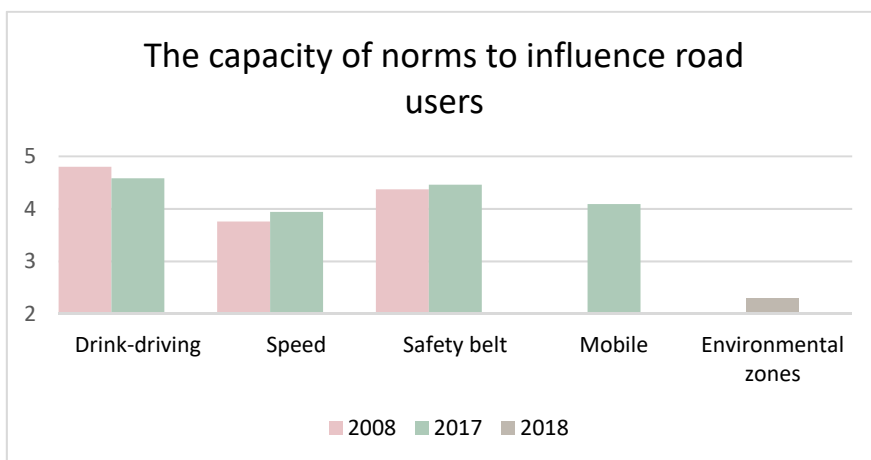
"It's necessary, not very difficult in cities with efficient public transport. A good way of reducing car traffic in general, and in cities in particular."

"I'm convinced that the problem will solve itself, old cars will disappear in the near future. Implementing environmental zones and making sure that people obey them will just cost lots of money. Invest that money in efficient public traffic, instead."

"It's important, and good for the environment and people's health, but you can't just assume that people that need/depend on cars can afford to change/buy a new car. Environmental zones in some streets is all right, but shutting out people from the town centre isn't. Also, to make public transport an attractive alternative, it should be really cheap. As things are now, it's usually cheaper to drive than to use public transport. It's crazy."

### 5.2.8. Intention to comply with the rules

The present study measured the capacity of norms to influence car owners' behaviour in relation to environmental zone rules. To establish comparative points of reference, we measured the social norms' capacity to influence behaviour with regards to drink-driving laws, speed limits, safety belts, and mobile phones. The comparative data was collected using the same method between 2008-2017.



**Diagram 1:**

The norm's capacity (on a scale of 1–7) to influence individual car-owners' behaviour in environmental zones toward legal compliance, year 2018; compared to the norm's capacity to influence car-owners' behaviour in relation to drink-driving laws, speed limits, safety belts, and mobile phones, year 2008 and 2017.

The results here show, first and foremost, that the capacity of norms to influence behaviour with regards to compliance with traffic rules is generally strong. Although there are some differences in values between rules for drink-driving, speed limits, safety belts and mobile phones, they all have relatively high values. However, the capacity of norms to have an influence on compliance with environmental zone rules is decidedly lower than for other traffic rules.



### 5.3. The respondents' opinions

In addition to the survey questions on attitudes, norms and perceived behavioural control, there were also questions directly linked to legal compliance, appropriate sanctions in the event of transgressions, and surveillance methods. The purpose of this was to establish the respondents' personal opinions on the rules.

The results of Table 8 show that the respondents' answers can be interpreted to mean that opinions on strict environmental standards for streets in city centres with heavy traffic (5.1) receive high mean values. In answer to the question on whether respondents might conceivably break the rules if there is a low risk of discovery and punishment, the mean value is 3.4, while 30% of respondents responded between 5–7. A somewhat lower value was derived when the risk of discovery and punishment was elevated (2.9) – i.e., a smaller share than those who responded between 5–7 (23.5%).

**Table 8.**

Respondents indicated how much they agree with the following statements on a scale between 1–7 (1=Disagree completely, 7=Agree completely). The mean value of the respondents' responses, where 7 is the highest possible value and 1 is the lowest, is shown below.

	Mean v.	Respondents
I think that tough environmental standards for cars in urban areas with heavy traffic is justified.	5.1	1022
If I knew that there was a low risk of discovery and punishment, I might conceivably break the new environmental zone rules (e.g. bans on diesel cars in some areas).	3.4	1025
Even if I knew that there was a high risk of discovery and punishment, I might conceivably break the new environmental zone rules (e.g. bans on diesel cars in some areas).	2.9	1022
If environmental zones are implemented in the municipality where I live or work (e.g., a ban on diesel cars) it will have an effect on my next choice of car.	5.0	1022
I think it is important that everybody obeys the environmental zone rules (e.g. bans on diesel cars in some areas), once they have been introduced.	5.2	1024
I think all cars should be clearly marked according to environmental classification, e.g. on the licence plate, so that it is easy to see if people obey the rules.	4.6	1024

The mean value for the statement that cars should be clearly marked according to environmental classification in order to make it easier to ascertain whether people obey the rules registers at 4.6. This can be seen as an indication of a kind of social surveillance: social pressure that favours legal compliance. Yet another interesting result relates to the respondents' statements regarding whether environmental zones (if implemented in the municipality they live or work in) will have an impact on their next choice of car. The mean value for this statement registers at 5.0, but as

many as 20% of respondents responded with a 7, and 63.8% responded between 5–7.

With regards to methods of surveillance and control that the respondents perceive as appropriate when ensuring legal compliance, a majority of the respondents (37.7%) stated that they felt that camera surveillance would be the most reasonable alternative, followed by 22.8% who felt that traffic police should be in charge of compliance with the rules (see Table 9).

**Table 9**

Surveillance methods and control methods the respondents perceive as appropriate for ensuring compliance with the rules after gaining force. The table below shows the percentage of respondents that have responded with the various alternatives.

	All respondents
In my opinion, camera surveillance is most appropriate	37.7
In my opinion, the traffic police should ensure legal compliance	22.8
In my opinion, municipal employees should ensure legal compliance	13.3
In my opinion, there shouldn't be any surveillance at all	17.2
None of the above	8.9
Respondents	1028

**Table 10.**

The fine sum that the respondents deem reasonable in the event of violation. The table below shows the percentage of respondents that have responded with the various alternatives.

	All respondents
SEK 0	13.5
SEK 500	41.2
SEK 2,500	35.5
SEK 5,000	10.1
Respondents	1018

The table above shows that the respondents believe that the most reasonable fine in the event of violation is between SEK 500 and 2,500.

### 5.3.1. Some examples of respondent opinions – respondents' reflections

The following quotes are excerpts from a concluding, open question where survey respondents were asked to freely express their opinions on the new environmental zone regulations

“Different kinds of stimuli/penal measurements are problematic. In my opinion, diesel is a good alternative at the moment due to lower fuel costs, relatively many miles/year. Live in the countryside where air particles aren’t a problem. Visiting cities is a bigger problem if you risk getting fined there. Electric cars also pollute the environment by way of mines, new production, etc. There might be benefits to driving fully functioning and fuel-efficient fossil fuel vehicles for a few more years rather than scrapping them as a result of increasing costs.”

“Good idea, introducing environmental zones around the town. If you can ban smoking on restaurant patios, then I think cars are much worse polluters. Also, the fines should be quite severe so that people obey the law.”

“Good that things are moving in the right direction. People who break the rules need to be punished hard, you can’t mess around with them. Rules are made to be obeyed and must be made stronger, otherwise, if people don’t care about the consequences, they’ll break the rules. One big problem in Sweden is that no one cares any more, this has to change by punishing people who don’t follow society’s rules \*harder\*.”

“I think we need them! Some days, the air in Stockholm really isn’t very good. AT THE SAME TIME, I think that we citizens ought to be able to demand a bit more foresight from our politicians!

I know several people (e.g., my mum, my brother, etc.) who bought an expensive “environmentally friendly diesel car” just a few years ago. The argument used to sell these cars was that they were more environmentally friendly, would give tax breaks, etc. And now, with these environmental zones, a lot of people feel like they’ve been had. The second-hand value has gone down a lot, and the cars are banned in some places. It’s a big problem and leads to weaker trust in society and politicians. Politicians and people in charge of laws and rules must punish people who act wrongly (e.g., car manufacturers) and first and foremost protect the interests of private persons. In Sweden, none of the politicians have mentioned car manufacturers cheating when it comes to emissions. Instead, they heap all the responsibility and costs on regular people. A huge betrayal.”

### **5.3.2. The respondents’ opinions**

When studying the respondents’ personal opinions on legal compliance, appropriate sentences for violations, and surveillance measures in relation to the underlying variables of the present study, i.e., gender, age, highest level of education, residential municipality, what kind of car they own, and knowledge of regulations, some interesting results emerged.

Of the respondents, men report that they are inclined to break rules, regardless of whether the risk of discovery and punishment is low or high, to a higher degree than women. In line with this, women state that it is more important to obey rules than do men. A similar pattern can be discerned in relation to the respondents' level of education, where respondents that lack completed education were more inclined to break rules, regardless of whether the risk of discovery and punishment was low or high. Furthermore, women also state that environmental zones will have an impact on their choice of car, if/when they buy a new one, and they think that cars should be clearly marked according to environmental classification to a greater degree than at present.

When comparing respondents according to the car they own, it is notable that the opinions remained roughly the same across the categories. For example, the difference in mean value regarding whether environmental zones will have an impact on choice of car is around 5.0% of all respondents, for all car categories. However, with regards to how important it is to obey the rules, the mean value is lower (4.7) among respondents that most often drive diesel cars – however, this is still a relatively high value. The same pattern emerges in response to the question on whether it is fair to introduce tough environmental standards in urban areas with heavy traffic. Here, respondents have a less favourable opinion, but once again the results produce a relatively high mean value (4.6). Similarly, electric and LPG gas car owners are more favourably inclined toward tougher environmental standards, and ensuring that everyone obeys the rules. Additional results show that respondents with a university degree are more favourably inclined (5.3) toward tougher, urban environmental car standards than respondents with a shorter, completed education.

With regards to the differences between Gothenburg, Malmö, Stockholm and other municipalities, some interesting results can be discerned. The mean value for legal compliance is equally distributed across the country, with the exception of the question regarding high risks of discovery and punishment, since respondents residing in “other municipalities” are less inclined to break rules. However, respondents in Malmö were less positively inclined toward tougher environmental standards, the impact environmental zones will have on their next choice of car, and how important they think it is to obey the rules, compared to respondents in Gothenburg, Stockholm and other municipalities. Furthermore, there were no significant differences between the different age categories. A discernible difference is that elderly citizens over the age of 65 are more positively inclined toward tougher environmental standards in urban areas with heavy traffic, and they feel that it is more important to obey the rules than the other age categories. With regards to legal compliance, it is apparent that the category of 18–25 years-of-age registers relatively low values compared to the 26–35 years-of-age and 36–45 years-of-age categories, which is somewhat surprising since this age category is usually overrepresented in regulation violations.



## 6. Analysis and conclusions

Theoretically, the present study takes its starting point in a selection of different scientific disciplines and their particular perspectives. The instrumental perspective is primarily based in economic studies and has a strong tendency to view humans as economically rational creatures. Undoubtedly, this field of research, often based in theories developed by Gary Becker, (1968) has had great impact on the production of knowledge of relationships between surveillance and sanctions and increased legal compliance.

One important aspect of the present study is that it is a counterweight to criminologists', sometimes flippant, dismissals of the deterrent and preventative effects of punishment. The instrumental perspective shows that for sanctions to be effective, there must be a likelihood that they will be effectuated; i.e., there needs to be a sufficient risk of discovery; a sufficient level of severity; and finally, they should be issued immediately, as far as possible. Studies have shown that the likelihood of discovery and immediacy are more important factors than level of severity. I.e., compliance control is most effective when there is a real chance of being discovered and receiving immediate sanctions. How severe the punishment is, within reason, is of less importance.

The survey respondents would seem to agree with this conclusion. 38% of respondents felt that camera surveillance is the best method for achieving compliance, compared to 23% who would prefer that traffic rules were enforced by traffic police. It is also apparent that the respondents were largely positive toward clearly marking cars according to environmental classification (4.6 on a scale of 1–7, where 7 means that they agree completely). With regards to the severity of the punishment, respondents felt that sentences do not need to be particularly strict (54.7% believe that fines should amount to between SEK 0– 500).

The normative perspective, here, primarily based in the theories of Tom R. Tyler (2006), includes a number of components which collectively drive increases in legal

compliance. The most important condition is that the rules are perceived as justified - this seems to be an indisputable conclusion of the survey. Every single question related to the respondents' opinions on the new rules points in this direction; for example, they strongly agree with the statement, "I think that tough environmental standards for cars in urban areas with heavy traffic is justified" (5.1 on a scale of 1–7, where 7 means that they agree completely).

When it comes to the legitimacy of the new rules, and whether they have been designed fairly and reasonably, things begin to look different. To be fair, none of the survey questions specifically address this aspect. But, in response to the final question, a significant number of respondents expressed frustration at feeling tricked into buying diesel cars based on environmental considerations, only to now be told that their cars will be banned in some areas due to their unacceptable levels of pollution.

Aside from the fact that the normative perspective focuses on whether the rules are justified and legitimate, it also emphasises that support from other normative social structures is necessary in order for people to obey laws. Icek Ajzen (2005, 1991) has developed a model and theory – Theory of Planned Behavior – to study behaviour and influences on behaviour. This model stipulates that there are three crucial factors at play when people decide how to act in a given situation: attitude, subjective norm and perceived behavioural control. The first two aspects, attitude and subjective norm, can be understood from a normative perspective. This study measures both factors in accordance with Ajzen's methodology. Social norms in relation to the coming environmental zone regulations are extremely weak compared to other traffic rules (2.3 on a scale of 1–7; compared to, e.g., the use of safety belts, which registered at 4.5 in 2017). One might conclude that it is not surprising that the social norm for environmental zones is so weak, given that the regulations have not yet gained force. But, a study on social norms in relation to a ban on mobile telephones while driving conducted before the ban gained force showed that the norm registered at 4.1. We should probably expect that the social norms surrounding environmental zones will be very weak, which means, in turn, that informal social control will also be very weak, initially. Interestingly, both men and women, in this case, perceive the social norms as being roughly equally weak. Normally, women tend to perceive social norms as being stronger than men.

With regards to attitude, the second of the three factors that can predict behaviour according to Ajzen (1991), things look somewhat brighter. In this context, attitudes can be understood as cognitive, emotional rules of thumb that provide behavioural guidelines. In other words, they represent an internal compass that is based on one's personal perceptions and opinions. Attitudes toward obeying the upcoming

environmental zone regulations are stronger than the norms, and have some potential to influence behaviour (3.75 on a scale of 1-7).

The results on what motivates people to obey laws, from a normative perspective, are somewhat ambiguous. People feel that the new rules are justified, but do not believe that they have been created in a wholly fair manner. With regards to informal social control, we should not expect that it will contribute to legal compliance due to weak norms; at least not initially. In other words, people will likely not monitor each other to make sure that they obey the rules. However, things look better when it comes to attitudes towards environmental zone rules. People's personal, internal moral compasses will have some degree of influence on their legal compliance.

Finally, when it comes to interpreting the results from an expressive perspective, we need to establish to what degree the law, in this case, has the potential to act as a pedagogical social force, (McAdams, 2017), whether by being perceived as a coordinating function or by strongly signalling that it has value, thereby strengthening social norms in the area. It is unlikely that the new environmental zone regulations will be recognized as a coordinating force to such an extent that people will immediately obey them automatically, as was the case in 1967 when Sweden changed from left-hand to right-hand traffic; at least, the present study has not discovered any indications otherwise. It is more likely that law represents values that are so powerful that the value of the signal can have an influence on social norms in the long term. This is a reasonable assumption given that, according to the present study's findings, people generally agree that the rules are justified. Additionally, they are relatively strongly supported by people's attitudes.

Based on the above-mentioned results, and Theory of Planned Behaviour, we conclude that even when combined, attitudes and subjective norms are not strong enough to bring about legal compliance. What remains, then, to discuss is the third behavioural predictor, namely, perceived behavioural control. So far, we have concluded that people do not feel that there is anything to prevent them from acting in accordance with the coming rules. In that sense, they feel that they are in control of their own behaviour. The decision to obey the law or not is theirs to make. The question is, to what extent they feel that they are responsible for their own behaviour if they should decide to break the coming rules. Roughly 30% of the respondents state that they would break a rule if the risk of discovery and the potential fines were low. Our conclusion is that there are strong arguments for actively promoting legal compliance from the onset. In the absence of such a control system, the rules clearly risk being broken on a frequent basis. In line with this statement, it is more important to ensure that the risk of discovery is sufficiently high and that the reaction/sanction is effectuated immediately than imposing a severe sentence. Our study shows that public acceptance of automatic surveillance systems is relatively



high and that people do not object to cars being clearly marked according to environmental classification. If active efforts are made in the area of perceived behavioural control by creating obstacles (compliance control) the law's signal value is strengthened, and in time, it is likely that social norms in the area will also grow stronger.

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# New Environmental Zones for Passenger Cars

This studie was performed in December and January 2018-2019 on behalf of The Swedish Transport Agency to study the premises for public compliance with environmental zone regulations based on theories about attitudes and norms. Along with indicators of attitudes and norms, the study maps out relevant questions regarding traffic behavior, legal compliance towards traffic rules in general and environmental zone regulations in particular. The empirical data consists of a survey study and a semi-systematic literature review.

Svensson and Björkenfeldt portray informal- and formal social control on the one hand and legal compliance on the other, and the overreaching question of the report, therefore, address the correlation of these two. The study shows that attitudes and subjective norms towards the upcoming environmental zone regulations are not strong enough to bring about legal compliance. However, with active efforts of creating obstacles in breaking the regulations, the law's single value is strengthened, and in time, it is likely that social norms will also grow stronger.



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