



# Can older drivers be nudged?

How the public and private  
sectors can influence older  
drivers' self-regulation

Craig Berry  
February 2011



RAC  
Foundation

The Royal Automobile Club Foundation for Motoring Ltd is a charity which explores the economic, mobility, safety and environmental issues relating to roads and responsible road users. Independent and authoritative research, carried out for the public benefit, is central to the Foundation's activities.

RAC Foundation  
89-91 Pall Mall  
London  
SW1Y 5HS

Tel no: 020 7747 3445  
[www.racfoundation.org](http://www.racfoundation.org)

Registered Charity No. 1002705  
February 2011 © Copyright Royal Automobile Club Foundation for Motoring Ltd

This report has been prepared for the RAC Foundation by Dr Craig Berry, of The International Longevity Centre - UK (ILC-UK). The report content is the view of the author and does not necessarily represent the views of the RAC Foundation.

# Can older drivers be nudged?

How the public and private  
sectors can influence older  
drivers' self-regulation

# Acknowledgements

Craig Berry would like to thank Valentina Serra at ILC-UK for research support, and Elizabeth Box at the RAC Foundation for sponsoring the research and providing valuable advice at various stages. David Sinclair and Graham Mulley also made important contributions. The usual disclaimers apply.

# About the Author

Dr Craig Berry joined the ILC-UK in March 2010 as a Senior Researcher. He has a BA in Politics and an MA in Research Methods from the University of Sheffield, and completed his PhD on globalisation and UK trade policy-making in 2009. Before joining ILC-UK he worked as a Policy Advisor on Older People and State Pensions at HM Treasury, and has also worked at the University of Manchester. Craig has particular interests in pensions policy, welfare reform, and employment issues.

# About the International Longevity Centre (ILC-UK)

The International Longevity Centre-UK (ILC-UK) is an independent, non-partisan think-tank dedicated to addressing issues of longevity, ageing and population change. It develops ideas, undertakes research and creates a forum for debate.

# Contents

Foreword	iii
Executive summary	v
Introduction	1
<b>1</b> Nudge and Public Policy	5
<b>2</b> Older People's Decisions on Driving	15
<b>3</b> How to Influence Older Drivers	29
<b>4</b> Conclusion and Recommendations	43
<b>5</b> References	49

# Foreword

At the end of 2010 the Department for Work and Pensions published some astounding figures: more than ten million people in the UK today can expect to live to see their 100th birthday. The challenge of meeting the needs of an ageing population is set to become much, much larger. Key to addressing it is ensuring continued mobility for people long after they retire.

It is well understood that keeping older people active, independent and mobile is central to their mental and physical wellbeing. The use of the private car is fundamental to achieving these aims.



A 2010 report for the RAC Foundation – Maintaining Safe Mobility for the Ageing Population – showed that older drivers tend to be no less safe on average than other categories of road users, partly because there is such a high degree of self-regulation and responsibility amongst this group.

But when older drivers are deciding whether or not to continue using their cars they find there is a marked lack of support and information available to help them make the appropriate decision. This means many drivers will retire from driving at too early a stage while others will go on beyond the point where it is safe to do so.

This is why the RAC Foundation commissioned Dr Craig Berry from the International Longevity Centre UK to provide a view on how the public and private sectors can better influence this crucial decision that all drivers will have to face one day.

He warns against over-regulation. For example age thresholds for holding a licence are not appropriate when so much depends on the health and attitude of an individual not just their birth date.

Drawing extensively on behavioural economics, Dr Berry shows that people are naturally more affected by losses than gains, which is why the very subject of driving retirement is often difficult to broach with those who have reached a stage in their lives where they should at least be considering it. More needs to be done to encourage medical practitioners and family members – whose advice older drivers value – to frame the issue positively and at an early stage.

Without a framework of support ageing drivers are vulnerable to making inappropriate assumptions about their abilities, believing their assessments to be objective when they are in fact subjective. Of course this is a simplification. Older drivers are usually good at spotting and responding to vision and fatigue problems. They are not necessarily so successful at identifying any deterioration in their mental faculties which leads to problems in scenarios where there is a lot of complex information to be processed quickly; typically at road junctions.

A solution could be to provide these drivers with access to well designed and evaluated training courses but without any threat of sanction looming over the heads of those who 'fail' them.

All drivers need to be reminded they do not take to the roads in isolation. Though we might be alone in our vehicles, travelling by car is essentially a social act, surrounded as we are by other road users with whom we must interact on a minute by minute, if not second by second, basis.

Dr Berry recognises strong arguments for establishing a system of self-certification for drivers of all ages. This would see motorists having to positively assert their ability to drive each decade, and more frequently over the age of 70, at the point where they are already required to renew their licenses. Such a scheme would encourage people to face the question of their fitness to drive throughout their driving careers.

Dr Berry also sees merit in developing a system of voluntary restricted licences where older people might receive financial incentives, such as discounted road tax, to limit their motoring in a variety of ways, depending on their individual circumstances.

The RAC Foundation hopes policy makers will respond to this report seriously and positively. The changing demographics of our nation demand that they do.



Professor Stephen Glaister,  
Director RAC Foundation.

# Executive summary

This report considers how interventions, or ‘nudges’, based around insights from behavioural economics and psychology can be used to assist older drivers in coping with the ageing process.

Today’s older people are driving further and more often than previous cohorts. Clearly, cars are vital for mobility. Maintaining mobility in later life helps to delay the physical and mental decline associated with ageing, and is crucial for maintaining access to services, social connectivity, and fulfilling the various routines of daily life. In being available at any hour, and providing door-to-door transport, cars offer benefits that would be impossible for public transport to fully replace. While there is no evidence that older drivers *per se* are less safe behind the wheel, there are questions regarding the road safety of older drivers. Physiological (including visual) and cognitive decline is certainly part of the ageing process, and may therefore impact on driving unless the right support systems are in place.

There is, however, plentiful evidence that older people *do* self-regulate. As such, older drivers reduce, restrict or cease their driving at some point in later life, due to concerns about their declining driving ability and/or increasing vulnerability to serious injury. But the process of self-regulation does not seem to be working as effectively as it could. Some people may not cease driving early enough, whereas some may *over*-regulate and perhaps cease driving too soon. More generally, people may not restrict their driving in the most appropriate ways. Insufficient knowledge and experience of the impact of ageing on driving is probably at the root of these problems, and is one of the reasons that decisions around driving seem to be so traumatic for older people and their families. However, self-regulation must be at the heart of the regulatory system around driving in later life. Diversity in both driving ability and how ageing is experienced among older people means that individuals must maintain ultimate responsibility. In fact, generating a sense of personal responsibility is a key part of the Coalition Government’s nudge agenda. Furthermore, there is no evidence that more restrictive licensing systems lead to safer roads. The fact that many older drivers already demonstrate a willingness to self-regulate is an important foundation upon which policy should be developed; we should allow individuals, as far as possible, to make their own decisions, but seek to support the decision-making process more effectively.

Several behavioural traits seem to act as a barrier to effective self-regulation. ‘Anchoring’ means that people think about mobility in terms of what they already know, that is, driving enables mobility. People only go through ageing once, and therefore have no prior experience of how driving may be affected by the process. A ‘representativeness heuristic’ means that people tend to over-generalise their own experiences, that is, if you have never experienced a serious car accident, you tend to believe that they are very rare, or that

you must be a better driver than most other people. ‘Hyperbolic discounting’ means that people tend to over-value the present, that is, choosing mobility now over road safety in the future. A ‘herd mentality’ or, more broadly, the operation of social norms, also impacts our behaviour: in this case, older people believe they should continue driving because most other people drive. Perhaps the most significant behavioural trait in this regard is ‘loss aversion’: people are reluctant to risk something they already possess or have access to, because they are not fully able to imagine how they will cope without it, even if a better alternative is offered. Fear of losing one’s licence can also inhibit older people from seeking advice from professionals and agencies about the impact of ageing on driving. We need to present older drivers with the ‘good news’ that there are things they can do to prolong their ability to drive, rather than only the ‘bad news’ around age-related decline.

In general, the UK has a liberal system in terms of the regulation of older drivers. There does exist, however, a significant nudge at the heart of the system: older people are required to self-certify at age 70 (and every three years thereafter), on the basis of a medical questionnaire, that they remain fit to drive. The Driver and Vehicle Licensing Agency (DVLA) issues guidelines on the medical aspects of ‘fitness to drive’, but there is no evidence that these are utilised by healthcare professionals in a systematic manner. The burden of intervention often falls on the families of older drivers, but relatives may be as uninformed as individuals themselves about the nature of the impact of ageing on driving, and how problems can be alleviated or overcome. In practice, General Practitioners (GPs) are also involved in interventions, but they have no formal training in fitness to drive, and many are reluctant to take on this function.

Fostering more effective forms of self-regulation requires that we appreciate what older drivers think about driving and how decisions on driving in later life are or should be made. We know that people start to under-estimate age-related decline as they get older (after over-estimating future decline earlier in the life course).



Older people tend to recognise physiological decline far more easily than cognitive decline. As such, even if self-regulation takes place, it usually does not counter all aspects of the impact of ageing on driving. Although the evidence base is not entirely consistent, there appears to be strong support among older drivers for greater involvement by family members and healthcare professionals (especially GPs) in decisions on driving in later life. There are strong preferences against more stringent measures that would put final decisions in the hands of other organisations, and against imposed restrictions that would jeopardise mobility.

On the basis of the evidence on current processes of self-regulation, and being mindful of the need to overcome behavioural barriers to effective self-regulation, the report makes a series of recommendations. All drivers should be asked to self-certify their fitness to drive, so that considering these issues becomes normal throughout the life course, therefore encouraging self-regulation in later life. In self-certifying, older drivers should have to declare they have sought the advice of their GP – this does not hand power to GPs, but rather nudges older people towards seeking advice. Older drivers should also be able to self-select licensing restrictions; this system would help to deliver the message that self-regulation is a means to maintaining your entitlement to drive for longer. Financial incentives could be offered by both insurance companies and licensing authorities to encourage self-regulation, perhaps linked to take-up of self-selected licensing restrictions.

Education and training for older drivers should be more widely available, but the content should include the impact of the ageing process on driving, and feedback on specific driving situations. Education on driving should in fact be available across the life course, perhaps utilising social media and smartphones to reach greater numbers of people in more attractive and cost-effective ways.

The trust enjoyed by GPs among older people must be utilised in any regulatory system around driving in later life – GPs can be a vital conduit between older people and the DVLA. However, they require further training and clearer guidelines on the impact of ageing on driving. More generally, healthcare professionals must be involved in educational schemes, and in providing advice to the families of older drivers. Road safety needs to be seen as a health issue. Given the importance of eyesight to driving, the role of opticians also needs to be clarified and enhanced.

Families will often be the first and main form of support to older drivers. They need more support from the medical profession and other public authorities to perform this role more effectively, not least so that conversations with older drivers can be initiated earlier in the life course – families must support self-regulation, not simply intervene when it fails. Self-assessment tools should be widely distributed among older drivers – both to directly aid self-regulation, but also as important ‘ice-breakers’ so that families can initiate difficult conversations about driving.

There are of course many areas where further research is necessary. For example, we need to understand more fully the impact of driving less on driving skills, to avoid the unintended consequence of self-regulation actually producing worse drivers. We also need to investigate further how the availability of alternatives to driving impacts on self-regulation, and therefore investigate further the relationships between health, road safety, public transport and land use/planning policies.



# Introduction

This report considers how public policy can enable older drivers to regulate their driving habits more effectively as they age by influencing their decision-making processes through techniques associated with the concept of a 'nudge'. The concept is associated with a strand of thinking evident in behavioural economics and psychology which has become influential across the social sciences: that is, that people can be persuaded to make decisions they otherwise would not make by the way choices are presented to them. The science of influencing behaviour has gradually become part of the toolkit of public policy-makers, as it has long been part of the marketer's armoury; it has shaped policy on pensions and savings, for instance, and been given significant impetus by David Cameron and the Coalition Government. A consideration of how, and whether, it can be used to support older drivers is therefore extremely timely.



Today's older people are driving further and more often than previous cohorts. While it may be that the car enjoys a particular allure for certain generations – which is less evident among today's younger people – it is also the case that older people feel significantly reliant upon the car, and see driving as a genuine necessity (Lucas & Jones, 2009).

This chimes with what we know about mobility in later life. Maintaining mobility in later life helps to delay the physical and mental decline associated with ageing. It is vital for maintaining access to services, social connectivity, and fulfilling the various routines of daily life (Box, 2010a). In being available at any hour and providing door-to-door transport – in contrast to most public transport options – 'private transport in the form of self-driven cars can fulfil many [mobility] needs' (Help the Aged, 2008). Of 1,009 older people surveyed by Help the Aged in 2007 on mobility issues, over 80% reported using their car to get 'out and about' more than any other form of transport, and around three-quarters of drivers surveyed reported using their car 'every day or most days'. Older people can feel suddenly isolated and vulnerable when they no longer have access to a car.

Inevitably, there are questions regarding the road safety of older drivers. However, there is no evidence that older drivers *per se* are less safe behind the wheel. Physiological (including visual) and cognitive decline is certainly part of the ageing process, but this does not mean that age itself is an effective indicator of driving performance (Gandolfi, 2010). Older people have proportionately fewer accidents than most other age groups (in fact, young people are the most dangerous road users), but are more likely to be seriously injured or killed if involved in an accident, due to increased frailty (Box, 2010a; Gandolfi, 2010). There is some evidence, however, that the 'oldest old' (that is, drivers aged over 80) are less safe than other age groups (Box, 2010a). We should be concerned, therefore, with helping this group to better self-regulate their driving habits, although it should be noted that most people have already ceased driving by their 80s (Mitchell, 2010). Of course, it could be that some people cease driving too soon, due to exaggerated fears about safety or lack of adequate support.

As this report will demonstrate, there is plentiful evidence that older people *do* self-regulate. As such, older drivers reduce, restrict or cease their driving at some point in later life, due to concerns about their declining driving ability and/or increasing vulnerability to serious injury. Nevertheless, there is room for improvement in the process and outcomes of self-regulation:

- Despite self-regulation, older drivers may not restrict their driving effectively.
- In some cases, older drivers may not cease driving early enough.
- Some older people may be over-regulating their driving. The objective here should be to produce better drivers, not necessarily fewer drivers.
- As evidence from the United States shows, decisions about driving can be extremely distressing for older people (Coughlin et al., 2004; see also BBC, 2010b). A more effective framework for self-regulation should make decisions less stressful.

According to Mitchell (2010), older people retain an intrinsic fitness to drive – their driving ability is only significantly undermined when they begin to drive less. Therefore we must be careful not to introduce well-intentioned measures which have the unintended consequence of producing worse drivers. While this may be over-simplifying the situation, it is clear that there are significant variations in the driving abilities of older people, and that people experience ageing-related decline in diverse and uneven ways. Overly-restrictive policies on older drivers may harm well-being, and age thresholds (on re-testing, for example) overlook the inevitable diversity among older drivers. Given the importance of driving for many older people's well-being, it may not be optimal simply to encourage older people to stop driving at some point, even if there *is* evidence of decline. As such, self-regulation must be the basis of decisions regarding driving in later life. Older people can then retain control and the challenge for policy-makers is to establish a framework in which older people can exercise control while making sensible and appropriate decisions about driving.

This report will first discuss the nudge concept and, more broadly, how and why public policy-makers have already sought to use techniques associated with the concept to produce behavioural change. The second main section assesses in more detail the context in which older people currently make (or fail to make) decisions about driving, including the people and agencies that influence these decisions. The final main section considers various policy options on the basis of insights about behavioural change.



# 1. Nudge and Public Policy

This section introduces 'nudge' and the science of influencing behaviour, and discusses recent policy interest in this area. It begins by defining nudge, and considering its relevance to older drivers. It then looks at the nudges in public policy and the Government's agenda in this regard, and finally contrasts attempts to nudge behaviour with educational schemes.

## **What is a nudge?**

Interest in how certain behavioural traits may prevent people from making rational decisions has been growing for decades, and has long been a concern of policy-makers. Awareness of the role of public policy in nudging people towards better decisions has been augmented by Thaler and Sunstein's book *Nudge: Improving Decisions About Health, Wealth and Happiness* (2008) – as noted below, Thaler is now advising the Coalition Government in this regard. Several other key contributions will also be utilised here, and in the following sub-section. Thaler and Sunstein argue that there are a host of reasons why human beings may make non-rational decisions. They do not criticise people for being irrational; rather, they highlight some limitations of traditional or orthodox economics – and other social science disciplines, albeit to a lesser extent – for assuming that people act rationally to achieve certain objectives, on the basis that they have a full appreciation of their environment, the choices available to them, and the implications of these choices.



In reality, human beings take cognitive short-cuts to make decisions. Thaler and Sunstein point to the following examples.

- *Anchoring*: people decide things in accordance with what they already know or do. For example, if asked to estimate the population size of a city, many people will automatically think of their own town or city, and then determine whether the city in question is larger or smaller. Decisions are often been shaped by what is already known. This is a normal cognitive process, but the short-cut may lead people from different cities to a radically different answers.
- *Availability heuristic*: people over-estimate the importance or extent of things for which they can think of relevant examples. Thaler and Sunstein give the example of comparing the number of murders and suicides: even though there are far more suicides than murders in most countries, people tend to think the opposite, partly because we can all think of numerous murders, but hear about suicides less often.
- *Representativeness heuristic*: people often believe there are patterns to random events, or assume that something they have experienced is more likely to happen again or more significant than it was. For example, demand for earthquake insurance rises sharply following earthquakes.
- *Status quo bias*: people tend to be conservative in their personal decision-making, even where there is little or no evidence that the *status quo* benefits them more than some alternative. Inertia is often caused by having ‘too much choice’ and not having the ability to weigh up all of the options. Inertia is also strongly related to loss *aversion*, meaning that people believe things are twice as valuable if they already own or have access to them, compared to what they would be prepared to pay to acquire or gain access to them.
- *Herd mentality*: people like to be in the majority; they are much more likely to want to do something if they know everybody else is doing it. Various public authorities have sought to mobilise this bias in order to increase contributions to public goods such as recycling and organ donation. More broadly, we can refer to the operation of social ‘norms’.

Thaler and Sunstein's list is far from exhaustive. For instance, in studying the role of behavioural fallacies in retirement planning, Boardman and Blake (2010) add one which may be particularly relevant to older drivers:

- *Hyperbolic discounting*: people tend to over-value the present and under-value the future – they perceive the value of a certain good to be lower when it is only available in the future. This may be relevant to older drivers being asked to sacrifice mobility today in return for avoiding accidents in the future.

It is worth noting that these traits are clearly not exhibited by all people at all times. For instance, Ariely (2008) argues that people make decisions specifically to avoid 'following the herd' – which is probably why it is more sensible to refer more generally to social norms rather than a herd mentality in particular. Furthermore, none of these traits are necessarily new discoveries. Advertising, for instance, depends fundamentally on their existence to convince individuals to buy things, and as such the advertising industry has long recognised the importance of 'framing' consumer choices. The decisions individuals make are fundamentally dependent on the 'choice architecture' within which options are presented. In terms of public policy, Thaler and Sunstein use the example of a doctor informing his or her patient about survival rates. If your doctor tells you that 90% of people with a condition you have been diagnosed with live for at least five years, you are likely to think this is good news, but being told that one in ten people receiving your diagnosis die within five years will probably feel like bad news.

Similarly, Boardman and Blake show that people are more likely to choose inflation-linked pension annuities compared to level annuities (which have a higher starting rate but do not rise over time) if they are shown a graph comparing the two over time, rather than a list of figures which details how payments will compare at various different stages of their life. With a graph, people can imagine the line representing the inflation-linked annuity rising exponentially, but a list of figures requires them to 'do the math' to understand the potential benefit; their choice will be framed by the first figures they will see, which will show much higher payments for level annuities compared to inflation-linked annuities.

Effective 'choice architecture' helps to nudge people towards certain decisions. Of course, changing and influencing people's behaviour is not easy, since behaviour is often habitual and deep-rooted (Halpern et al., 2004). However, simply recognising that outcomes and decisions result from patterns of behaviour allows for a different mode of thinking about policy, and more generally about relationships between the state, society, the economy and individuals. It may be that a 'nudge' involves mobilising existing habits: Scotland's Violence Reduction Unit exploits the 'norm' of gang loyalty to tackle gang-related violence in Glasgow. If a gang member commits a serious crime, rather than simply punishing the individual culprit, law enforcers will target the entire gang on more minor charges, such as drugs, weapons possession,

parole violation, etc. The gang's norm is pushed to its logical extreme, whereby all are members are held responsible for the crimes of individual members (see Dolan et al., 2010a).

It may be, on the one hand, that dilemmas about older drivers do not fit well into the nudge paradigm. Unlike smoking or saving for retirement, for instance, there is no settled view among policy-makers on what the optimal outcomes of public policy might be. It is certainly not a question of simply 'at what age should people stop driving?', because (a) driving involves so many different physical and cognitive functions, (b) driving is such an integral part of daily life which cannot be 'given up lightly', and (c) individuals experience ageing in very diverse ways. In addition, the objective is not to persuade older people to reduce or cease driving, but rather to enable older people to realise that the impact of ageing on driving is an important issue they need to give more consideration to. Perhaps we can be nudged into a decision-making process, but that does not mean the process will produce the right decisions – because what is 'right' regarding older drivers is highly subjective.

On the other hand, we may have no option but to nudge.

Self-regulation is, it seems, the only viable option for producing safer, older drivers without undermining mobility and well-being; if public policy-makers cannot dictate choices to individuals, the only policy lever is to seek to shape the choice architecture surrounding decisions. We *could* compel people to recycle more, for example; this may raise ethical dilemmas, and could be costly, but it would probably be effective. Yet placing draconian measures on older drivers, as evidence presented in the next section shows, would be ineffective. However, it is possible to view this policy constraint positively. Precisely because driving abilities do decline with age in some regard, there is significant evidence that older people already self-regulate their driving. The task of public policy-makers is made easier by the fact that many older people recognise the need to consider their driving habits as they get older.



There are, of course, many different ways to influence behaviour through the nudge paradigm, depending on the circumstances. Some may appear to be fairly superficial, such as the design and wording of an information leaflet, or the placement of healthy foods in a canteen. Thaler and Sunstein (2008) use the example of white lines separating road lanes; they are often placed closer together on dangerous stretches of road, to create the impression of greater speed, therefore encouraging drivers to slow down. Other nudges may be more substantive, and perhaps costly, such as financial (dis)incentives and even punitive measures. Some may simply involve enabling forms of behaviour that were impossible or very difficult before, relying on a dormant tendency to behave in a more socially beneficial way. Some may not look like nudges at all: private companies increasingly seek to build more intimate relationships with their customers (Halpern et al., 2004) – consider the way that Starbucks and Gap (attempt to) engage with their customers on Facebook (Smith, 2010; Stelzner, 2010). By forming the relationship, customers are not committing themselves to certain behaviours, but are enabling an avenue of influence that the company may seek to utilise. Of course, these companies work hard to create a sense of reciprocity, so that customers believe they also benefit from the relationship. As this report will show, it may be that formal and informal relationships with experts and other interested parties are key to nudging older drivers.

There is a significant tension in the nudge agenda regarding the desire for people to make free choices, rather than being told what to do by governments, while being persuaded to do things which the state has determined are in their best interests. However, David Halpern et al., in a 2004 paper published by the Cabinet Office and the Prime Minister's Strategy Unit, in fact celebrate this apparent paradox. Nudges are a compromise between competing public policy objectives: it is important for people to be empowered, but also important that government acts in society's best interests. Nudges allow the latter without unduly impeding the former. Moreover, it is not only central government which acts as a 'choice architect' – other parties such as families, communities, health and care workers, voluntary groups etc. may all have a role in influencing the decisions we make, not least on driving in later life.

### **Influencing behaviour through public policy**

Virtually all public policy is concerned, at least to some extent, with changing people's behaviour. However, only recently have policy-makers sought systematically to consider how to influence the way people behave without significantly reducing individuals' ultimate freedom to decide for themselves.

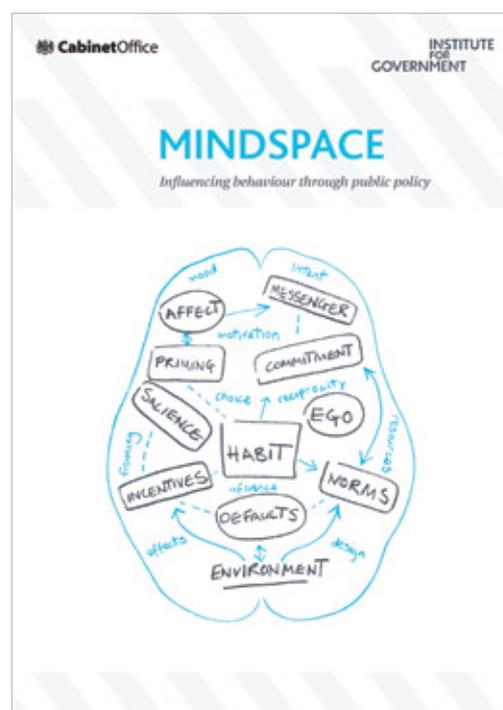
The Coalition Government has taken a keen interest in the nudge paradigm. It has established a Behavioural Insights Team within the Cabinet Office, which is informally referred to by commentators as 'the nudge unit'. The unit is headed by David Halpern; Richard Thaler is an advisor. It also has an impressive

board of advisors, which includes Steve Hilton (David Cameron's Director of Strategy), Gus O'Donnell (Cabinet Secretary), Jeremy Heywood (Permanent Secretary at 10 Downing Street), and Richard Devereux (Permanent Secretary at the Department of Transport) (see Crabtree, 2010; Wintour, 2010). In addition, the House of Lords Science and Technology Committee (2010) have conducted an inquiry into the role of public policy in behaviour change.

The most complete statement of the Government's behavioural agenda is a report published jointly by the Cabinet Office and the Institute for Government titled *MindSpace: Influencing Behaviour Through Public Policy* (see Dolan et al. 2010a; 2010b). The report is intended to provide a practical guide to policy-makers. The term 'mindspace' is actually an acronym for nine key influences on individual behaviour:

- *Messenger*: people are influenced by the way things are communicated to them.
- *Incentives*: people react to incentives in entirely predictable ways; for example, they value avoiding loss. In public policy incentives are generally financial in nature, but this is not necessarily the case.
- *Norms*: people are influenced by perceptions of what other people do.
- *Default*: people tend to 'go with the flow' and support the status quo.
- *Saliency*: people are drawn to things they see as relevant to them.
- *Priming*: people are influenced by sub-conscious cues such as smell, the urge to fill a given empty space etc.
- *Affect*: emotions have an impact on decisions.
- *Commitments*: people seek to be consistent in their public behaviour and to reciprocate the contributions made by others.
- *Ego*: people act in ways that make them feel better about themselves.

This list is inspired by the work of behavioural economists and psychologists in this area, including Richard Thaler and Cass Sunstein. The innovation of *MindSpace*, however, is to detail how public policy-makers should think about these influences in practice (although the *MindSpace* guide is based on a guide developed for DEFRA in 2008 regarding influencing behaviour on saving energy).



*MindSPACE* outlines ‘the four Es’ of public policy nudges:

- **Enable:** start from where people are; that is, consider the structures in their life that lead them to behave in certain ways. If you want X to do Y, first Y must be a viable choice within X’s life.
- **Encourage:** nudging is not only about providing choice. For example, incentives can be used to encourage some choices over others, and decisions can be framed to narrow the choices available. We should also consider the conditions which cause ‘negative’ behaviour (Dolan et al. give the example of more user-friendly hospital designs, which result in less violence towards hospital staff).
- **Engage:** involve target groups in decisions about interventions designed to alter their behaviour. This is a form of influencing behaviour largely absent from Nudge (2008) and the surrounding discourse; Dolan et al. make the case, however, that a deliberative process is more likely to lead to successful outcomes.
- **Exemplify:** the actions of public authorities must be consistent with the behavioural outcomes they hope to produce throughout society.

An important element of influencing behaviour through public policy is that most examples are likely to be far more cost-effective than traditional interventions. While some nudge schemes – such as auto-enrolment into an occupational pension – will prove to be costly to the state, even this will save money in the long-term if pensioner poverty is reduced. Many forms of nudge are in fact relatively low-cost, amounting to little more than doing better the things that government already does. This is a key theme of the 2004 report by Halpern et al. – written before the public finances entered crisis – and *MindSPACE* argues that nudges are ‘especially relevant in an age of fiscal austerity’. The report cites one study, on interventions designed to encourage healthier lifestyles, which showed that simply introducing bicycle and pedestrian trails produced better results than the traditional arsenal of information products, consultations with health/lifestyle professionals, and counselling services – at a much lower cost. It may be that different government departments or layers of public authority need to work more closely on issues like this. Local authorities, for instance, may have the authority to implement nudge-inspired interventions (such as walking trails in public spaces) which help to meet objectives overseen by other parts of the public sector – in this case the Department of Health and the National Health Service (NHS).

Clearly, the nudge agenda does not belong solely to the Coalition Government. The Labour Government pioneered much of the work being built upon by its successor; the common thread is David Halpern, who advised Tony Blair from the Cabinet Office, and now leads the Behavioural Insights Team within the department. Halpern’s involvement also suggests the importance of personal responsibility within the UK Government’s nudge agenda. Halpern is the author of *The Hidden Wealth of Nations* (2009) which argued that the country’s

prosperity is dependent on an expansive version of citizenship, including rights and responsibilities. Personal responsibility is actually a key theme of the 2004 paper by Halpern et al. on influencing behaviour; the authors argue that the first step towards encouraging an individual to change their behaviour is to instil a sense of instrumentality. People need to believe that they have the power to change their own behaviour, as well as an obligation to do so in some circumstances. This helps to explain the role of third E in *Mindspace* (which Halpern co-authored): engage. It also demonstrates the significant overlaps between a broader nudge agenda and David Cameron's 'big society' concept. Arguably, nudges of this type will be much more suited to dilemmas around older drivers, given the objective of helping older drivers to help themselves, rather than necessarily leading to one decision over another.



### Influencing *versus* educating

Research commissioned by the Financial Services Authority (FSA) has considered the relative values of education and ‘nudge’ in relation to influencing financial behaviour, by way of evaluating the National Strategy for Financial Capability (see de Meza et al., 2008). The authors argue that

[f]inancial capability involves knowledge and skills, but attempts to improve these [through education] may not lead to better outcomes. What people choose to know and what they do with their knowledge may primarily depend on their intrinsic psychological attributes...[i]f poor financial capability is mainly a matter of psychology, the information-based approach of the National Strategy for Financial Capability is likely to have only a modest effect in improving outcomes (de Meza et al., 2008: 2).

De Meza et al. point to a number of issues which form barriers against individuals actually benefiting from education, including procrastination, loss aversion, status quo bias, and information overload. They also detail the ‘curse of knowledge’: we can provide people with more information, but this may simply lead them to draw incorrect inferences, focus on unimportant data, or become over-optimistic about their own capacities. The report is short on remedies, although it does offer the fascinating conclusion that education should not focus on providing information, but rather on training in decision-making.

This conclusion is potentially highly relevant to the objective of supporting older drivers’ self-regulation. Box (2010a) has argued that, while education seems to improve the performance of older drivers, and should be part of our toolkit for supporting older drivers, there is little evidence that it results in fewer accidents, and may increase accident incidences for over-75s if confidence is ‘artificially’ increased amongst those participants.

McKenna (2010) has considered road safety education (for all drivers), and found that it is largely ineffective. On the one hand, he argues that education often focuses on the wrong things, that is, schemes are poorly designed and poorly targeted. In addition, schemes are often not extensive enough to have lasting effects, and are rarely evaluated adequately. The financial strain that has been placed on road safety programmes due to local authority budget cuts is also limiting the ability of education to deliver (Box 2010b). There may be potential to improve educational outcomes, with the qualification that education of this type may actually increase exposure to risk. In some cases, knowledge of risky driving may make it seem more attractive. Additionally, improving driving skills and road awareness may increase people’s ability to undertake risky manoeuvres (McKenna, 2010). Interestingly, McKenna also argues that if people are given the impression that, say, speeding is a huge problem, it may help to create a ‘norm’ (or herd mentality) that a large majority of people regularly breach speeding limits, so it is more socially acceptable to

break the law in this way. Yet despite recognising some behavioural aspects of barriers to education, McKenna does not consider the nudge agenda as an alternative to education.

It would clearly be short-sighted to conclude that education has no value for older drivers; education could be done more effectively, with better design, more resources, and a stronger evidence base. It could also be done in conjunction with nudges: firstly, education could be delivered with the nudge paradigm in mind (particularly, more concern with the messenger, attempts to provide incentives as well as information, and avoiding the creation of counter-productive norms). Secondly, education schemes are generally not compulsory – perhaps we should consider how to nudge people into electing to enrol in relevant training courses. Thirdly, as both McKenna (2010) and Box (2010b) recognise, education could play an indirect role in legitimising other forms of public policy interventions. This seems to have been the case regarding smoking; McKenna also uses the example of speeding, hypothesising that education on speeding has helped to legitimise the introduction of a speed camera enforcement programme. Fourthly, influencing versus education should not be seen as an either/or proposition. It may be that education for older drivers should not focus on developing driving skills, but rather on illuminating how ageing may affect driving, and outlining the transport and mobility options that are available to older people.



## 2. Older People's Decisions on Driving

This section considers, firstly, how the currently regulatory system frames older people's decisions on driving. It then discusses evidence of the reality of self-regulation (in the UK and other countries) and how self-regulation could be made more effective.

### **The current system**

The UK has a liberal system in relation to the regulation of older drivers, and indeed drivers through the life course. The driving test has been expanded in recent years – there are now more stages to complete, including hazard perception, theory and practical tests – but once a licence has been awarded to an individual, generally speaking it is for life (although there are some checks and balances around renewal processes).<sup>1</sup> Many licences now have to be renewed every 10 years, but this is mainly a device for ensuring personal information remains up-to-date and the image used for photographic identity is a true representation of the driver.

The system becomes slightly more restrictive once people reach the age of 70. Licences automatically expire at 70, and drivers are required to declare that they remain fit to drive in order to renew their licence, by answering questions related to certain medical conditions. This process is repeated every

---

<sup>1</sup> This is notwithstanding the fact that some people still driving today may have been issued a licence before the introduction of compulsory tests in 1936, or more likely, were issued licences during the Second World War when testing was suspended.



three years. There is no requirement for re-testing, or for certification from a medical profession; as such, the UK's system is characterised by trust. Arguably, however, the renewal procedure serves as a very important 'nudge'. Generally speaking, the liberal licensing system could allow the habit of *not* considering one's fitness to drive to take root. However, the need to renew at least raises the prospect in the individual's mind that driving may be affected by age-related medical conditions, even if they do not suffer from the medical conditions specified in the questionnaire. Furthermore, technically a false declaration would constitute breaking the law – it is not clear whether medical declarations are investigated following instances of unsafe driving, but we can probably think of the law in this regard as a nudge as well as (or rather than) a punitive measure. Even where the threat of prosecution is unlikely, laws nevertheless help to govern what is deemed normal or acceptable behaviour. Of course, this certainly does not apply to all laws, and may not be accurate in this case.

Some European countries have a more liberal system than the UK, in that they issue driving licences of unlimited validity (such as France and Austria; Norway issues licences to drivers up to 100 years old). Most have systems similar in nature to the UK, albeit with more complex renewal procedures. For examples, the length of time covered by licences in Denmark gradually decreases from four years to one year between the ages of 70 and 80; after 80, licences must be renewed each year. Spain reduces the licence validity from ten years to five years at the age of 45, and to two years at age 70. Some countries include formal medical checks. For instance, Ireland allows renewals of 1–3 years after age 70, with the period determined by medical examination, and Finland requires medical checks at the ages of 45, 60, 70 and every five years thereafter. However, as will be explored further below, there is no evidence that different systems of regulating older drivers have significantly different safety records.

The quote below from Parker et al. aptly sums up the situation:

[T]he evidence to date suggests that although the system as it currently stands in the UK appears liberal and permissive, the introduction of tougher screening would not necessarily improve the situation. Moreover, the choice of 70 years old as the point at which license renewal becomes necessary probably means that some older drivers whose abilities have declined rapidly before that age are missed, whereas others who are perfectly able to continue driving may be prevented from doing so. (Parker et al., 2003)

While there is no evidence that the UK's liberal licensing system is less safe than more restrictive systems (Mitchell, 2010), this does not mean that the system works adequately. The renewal nudge may lead to some people ceasing driving too soon, which unduly impacts their mobility, and allow some drivers to continue driving despite becoming unfit. Clearly, we need to consider the wider context of decisions about older driving.

The DVLA issues guidelines on the medical aspects of fitness to drive, which in theory healthcare professionals will utilise in advising their patients. However, there is little evidence that these guidelines are implemented by healthcare professionals in any systematic manner. As Box (2010a) notes, 'healthcare practitioners have indicated that additional training on actual responsibilities and legal implications would be helpful'. A recent study by Hawley (2010) for the Department for Transport (DfT) found that while healthcare professionals are aware of DVLA standards they demonstrate poor knowledge of how they should be applied, and in fact are reluctant in practice to intervene. Moreover, the guidelines are relevant to specific medical conditions, and not necessarily to age-related decline in driving ability.

In reality, it often falls to family members. Again, there is little evidence on how this informal advice is delivered in practice. A study on older drivers in the United States by Coughlin et al. (2004) found that around 45% of older people said their doctor had been involved in intervening in their driving habits. This proportion is far higher than the proportion that expects, hypothetically, their doctor to be involved in such decisions, suggesting health is an important trigger which individuals themselves do not necessarily recognise. This highlights the need for external professional advice in decisions around driving.

Most reported, of course, that family members had led the intervention. Yet Coughlin et al. conclude that the process is traumatic for all involved. At the point of intervention, around half of older drivers were asked to cut back on driving, around a third were asked to cut back on certain types of driving, and 1 in 5 were asked to cease driving entirely. Much lower proportions were asked to see a doctor, change their car, or seek additional training – which could have aided self-regulation with less impact on mobility – suggesting that relatives are not fully equipped to support older drivers. Indeed, family members have

suggested they require more assistance from healthcare professionals in this regard (Box, 2010a). The study by Coughlin et al. also asked older people how they reacted to the intervention; the results are presented in Table 1.

**Table 1: Proportions of older drivers reacting to interventions in various ways**

<i>How did you react to the intervention?</i>	
Felt angry	9.3%
Felt guilty	2.4%
Felt sad	10.8%
Felt depressed	15.9%
Ignored the advice	7.3%
Listened to the advice, but decided it was wrong	16% (Male 21.3%; Female 10%)
Followed the advice	59.6% (Male 55.3%; Female 67.7%)

Source: Coughlin et al., 2004

While most people accepted the advice, it is clear that a significant proportion were negatively affected emotionally; around 30% reported feelings of guilt, sadness or depression. Worryingly, around a third rejected the advice – and they were more likely to be men than women. It is uncertain whether these individuals would have been more amenable to less forceful suggestions, such as seeking medical advice or seeking further training. A recent BBC (2010b) documentary, focusing on a handful of older drivers in the UK, showed older people who portrayed many of these responses, as their relatives sought to encourage them to restrict or cease driving.

It must be noted that while some education and training is provided for older drivers,<sup>2</sup> its availability is extremely patchy across the country (Help the Aged, 2008). Primarily the responsibility of local authorities, provision is in fact likely to be curtailed by the Coalition Government's spending cuts. There are also 17 mobility centres throughout the UK, which offer advice and support to individuals affected by medical conditions and accidents, including older drivers. Again, however, availability is patchy. Moreover, there are very few formal means by which older drivers can be referred to educational schemes. Most mobility schemes, for instance, accept self-referrals. This reinforces the earlier point that older people may need to be nudged into education on driving, rather than a specific decision about their driving.

In the terminology of nudge, we can refer to the current system as a 'choice architecture'. Clearly, there are issues within this framework that could be improved. However, it must not be forgotten that the centrepieces of this

<sup>2</sup> See for example Suffolk Roadsafe's GrandDriver initiative ([http://www.suffolkroadsafe.net/suffolkroadsafe/adult/older\\_drivers.php](http://www.suffolkroadsafe.net/suffolkroadsafe/adult/older_drivers.php)).

architecture are the individuals themselves. There is strong evidence that older drivers do self-regulate (see Gandolfi, 2010). Holland (2001) argues, however, that while self-regulation is largely effective, older drivers cannot fully compensate for decline in some circumstances; moreover, if older drivers avoid certain situations, their skill in mitigating them decreases. Rimmo and Hakamies-Blomqvist's (2002) study of older drivers in Sweden (they surveyed 992 drivers aged between 50 and 92) found that self-regulation is related to some aspects of older driving, but not others. They found that slips or inattention errors – where the driver incorrectly executes the correct action (for example, selecting the accelerator rather than the brake when intending to slow down or stop) – are associated with self-imposed driving restrictions, but mistakes or inexperience errors – where the driver correctly executes the incorrect action (for example, overtaking in the wrong lane on a motorway) – are not. Yet it is not the case that older drivers commit fewer inexperience errors; as they drive less they start to make more mistakes through lack of practice. This is perhaps an inevitable aspect of ageing, and self-regulated driving in later life, but one which could be mitigated with stronger support for self-regulation.

### **Fostering self-regulation**

This sub-section looks more closely at older drivers themselves, in terms of their attitudes to their driving, and to decisions on restricting and ceasing driving. This evidence is crucial for determining how the public and private sectors can support effective self-regulation.

It is important to understand what older drivers themselves think about their declining ability to drive. In a seminal 1996 study, Rabbitt et al. surveyed around 2,000 drivers in the UK aged between 50 and 100. They asked respondents when they thought they would give up driving: drivers in their 50s believed that they would cease driving in their 70s, whereas the age predicted by those in their 70s was their mid-80s. However, among people that had already ceased driving, most had given up sooner than they had anticipated. Younger respondents over-estimate age-related decline, but it is underestimated by older respondents. In terms of how decline manifests, Rabbitt et al. found worrying evidence that older people do not recognise all aspects of age-related decline. For instance, 'scenarios prominent in accident statistics, such as failure to judge gaps in traffic or speed of oncoming traffic, and ability to turn efficiently or pull out into traffic, seemed to pass unnoticed'. A report by the Medical Commission on Accident Prevention (MCAP) and the AA Motoring Trust (2000) also notes that older people tend not to accept they have lost ability to, for instance, negotiate junctions. While more research is probably necessary, the finding that that older people recognise physiological problems (deteriorating vision, fatigue, etc.) but not cognitive problems associated with processing complex information seems plausible.

The findings of Rabbitt et al. (1996) seem to be supported by further research by Rabbitt and Parker, published in 2002. Again, around 2,000 drivers aged 50–100 were surveyed, and followed up by 600 laboratory tests and 200 observed driving sessions. The survey revealed the areas where drivers felt their performance had deteriorated: 26% said 'seeing clearly in low light'; 21% said 'following a route from memory'; 17% said 'reverse parking'; 15% said 'navigating efficiently'; and 15% said 'seeing clearly in bright light'. Clearly, physiological issues around memory and glare dominate these reports. The study also reported the areas which older drivers tend to avoid: 22% avoid the morning rush hour; 15% avoid the early evening rush hour; 15% avoid driving after dark; and 6.2% avoid driving in snow. Supporting these findings, Holland (2001) finds definitively that older people in the UK avoid certain driving situations, but do not recognise cognitive impairment. They tend to believe that experience outweighs age-related decline. However, Holland argues that '[e]xperience contributes significantly to the ability to compensate for deficits at the manoeuvring level, but only up to a certain point at which information-processing related deficits begin to outweigh the experience advantage.'

Two important North American studies have considered in more detail the relationship between self-regulation and perceived driving ability. Blanchard et al. (2010) monitored in depth the driving patterns of 61 older drivers in Canada, using in-vehicle monitoring devices (most similar studies rely on self-reporting or artificially recreated driving scenarios). They found conclusively that perceived poor driving ability was associated with self-imposed driving restrictions (although the study did not test driving ability objectively). Freund et al. (2005) surveyed 152 drivers aged over 65 in the United States. All participants had been previously referred to a driving evaluation class. They were asked to rate their own driving performance, and tested objectively. 38% of participants were deemed to be unsafe drivers objectively. Yet almost 9 in 10 of those found unsafe believed that they were a better driver than their peers (5 in 10 in fact answered 'a lot better') – although we may of course find similar levels of over-confidence among all drivers. No participant admitted being a worse driver than their peers, and 1 in 10 claimed to be on a par. While it must be noted that the participants had already been identified for some incident of unsafe driving, the results suggests a significant proportion of older drivers simply do not recognise decline (see also Holland, 2001) – this is in addition to the evidence presented above that most older drivers fail to recognise some forms of decline.



**Table 2: Proportion of older drivers reporting various barriers to self-regulation**

<i>Barriers to restricting or ceasing driving</i>	
I want to maintain my lifestyle	70%
Unwillingness to ask for help	44%
Unavailability of friends/family as alternative drivers	42%
Other people rely on my driving	35%
Lack of public transport *	25%

Source: Baldock et al., 2006

\*Baldock et al. actually dispute their own figure in this regard, citing other studies which refer to the lack of public transport as a more important barrier.

In a study of drivers aged over 60 in Australia, Baldock et al. (2006) argued the situation is slightly more nuanced. They found that ‘older drivers do appear to self-regulate in a manner consistent with driving ability, but only for a small number of specific situations’ (emphasis in original). Older drivers avoided, most particularly, driving in the dark and poor weather, and parallel parking, but they do not consider more specific hazards such as busy junctions, which are seen as part of the driving experience. The study by Baldock et al. also considered the barriers to self-regulation; the results are presented in Table 2. Mobility and the need/desire for self-reliance clearly figure significantly amongst the results; it may be that the need to keep driving clouds older drivers’ own perceptions of their ability.

This leads us to consider the kind of restrictions on their driving that older people would accept. Marshall et al. (2007) surveyed 86 older drivers in Canada in this regard. Most respondents were happy to accept corrective lenses for eyesight problems, in-vehicle adaptations to make driving easier, regular assessments by the licensing agency (perhaps reflecting the confidence of older drivers in their abilities), and restrictions such as driving only in daylight. Generally, respondents were also content to be forced to avoid major highways and driving during rush hours. These were not considered vital to mobility. However, there were restrictions to which respondents were strongly opposed:

- No left turns (equivalent of right turns in the UK)
- No driving on roads with a speed limit over 60mph
- Only driving within a certain distance of their home
- Only driving when another licensee is in the car

Marshall et al. argue that these are the restrictions that would most affect older people’s day-to-day mobility.

Tuokko et al. (2007) undertook a similar study in the United States, surveying 86 older people that had voluntarily agreed to attend a driving education class. Overwhelmingly, respondents felt confident as a driver. 100% believed they are no more likely to be in an accident than other drivers, and 74% would accept no restriction on their driving. Interestingly, despite voluntarily attending the class, 40% reported an unwillingness to even self-regulate their driving. However, these results were slightly tempered when respondents were asked about health. 98% said there should be medical screening for driving licences, and 84% said there should be driving restrictions based on medical reasons. Indeed, 45% were willing to give healthcare professionals the final decision on when they should cease driving. Tuokko et al. also add that people were more willing to self-regulate if they are aware of alternatives to driving.

Coughlin et al. (2004) undertook a much larger study, again in the United States, involving a survey of around 4,000 drivers aged over 50, and 12 focus groups with drivers aged 58–89. Focus groups revealed that older people prefer their family to lead interventions regarding their driving, reporting that they felt most comfortable talking to their relatives, and that their family would have more knowledge of their driving ability. Evidence from the surveys, however, paints a slightly different picture. Again, family members were preferred over friends, healthcare professionals, and the police, as shown in Table 3.

**Table 3: Older people's preference on who should lead driving-related interventions**

<i>Who would you prefer to talk to about restricting your driving?</i>		
	Married	Live alone
Spouse	50.0%	2.1%
Son/daughter	14.4%	31.2%
Sibling	0.5%	3.1%
Son-/daughter-in-law	0.4%	0.4%
Close friend	1.9%	11.6%
GP	31.0%	41.0%
Other healthcare professional	0.7%	2.1%
Police	5.1%	7.8%

Source: Coughlin et al. 2004

Clearly, however, the family member most preferred is one's spouse. The likelihood of interventions by spouses is, of course, arguable for several reasons – indeed 1 in 5 married respondents said they would definitely not want their spouse to intervene in their driving. The survey by Coughlin et al. in fact shows that GPs enjoy a significant level of trust, certainly among non-married respondents. The score for the police is fairly low (and indeed 1 in 4

said they would definitely not want the police to intervene). The survey did not ask about other government agencies that might, in practice, play a role in interventions in a more systematic ‘choice architecture’.

The survey also asked why the person chosen to lead any intervention was trusted; these results are presented in Table 4. Having knowledge of the driving of the person in question is clearly an important criterion for gaining their trust to offer a judgement. Authority in itself is not valued, but older people are more likely to trust people where they know those intervening are concerned about their interests. Breaking down the results in more detail, Coughlin et al. add that where X is a spouse, seeing them drive regularly becomes a much more significant factor (77.4%); where X is an adult child, having their best interest at heart is more significant (53.8%); and where X is a GP, 92.1% of respondents said they trust their GP because they would know whether they are a safe, capable driver. Interestingly, among respondents that had already experienced an intervention, GPs were even more involved than the (hypothetical) scores in Table 3 suggest they would be, suggesting perhaps that health is an important (and unexpected) trigger for intervention, or that in reality GPs are better placed than family members to offer effective advice on driving to their patients.

**Table 4: Why older people trust certain people to lead driving-related interventions**

<i>Why do you trust X to intervene?</i>		
	Married	Live alone
X knows whether I am a safe, capable driver	61.4%	70.4%
X has my best interests at heart	42.9%	43.7%
X sees me drive regularly	44.4%	20.0%
X is a good driver, I trust their opinion	26.0%	18.1%
X is in a position of authority	10.6%	13.7%

Source: Coughlin et al. 2004

The Age and Cognitive Performance Research Centre (ACPRC) at the University of Manchester has undertaken a study on UK drivers which has produced similar findings (see Rabbitt et al., 2002). Although the data is somewhat dated now, the study in fact involves longitudinal analysis – extremely rare in studies of older drivers. Over two time periods (1994–1995 and 1997–1998), ca. 2,000 older drivers were asked about their attitudes to driving in the context of ageing. The study shows, crucially, that older people do not become more reckless as they get older, and that, in general, they do become more aware of their shortcomings. The survey asked detailed questions about the value of driving, and the acceptability and likely effectiveness of various forms of advice and intervention. Asked about what driving meant to them, a clear story about car dependence emerges

from respondents' answers. In 1994–1995, 90.4% of respondents agreed that driving enabled independence; 92.4% agreed in 1997–1998. When asked whether driving was vital for most people, 76.2% and 82.0% agreed, respectively. Over 90% across both time periods agreed that ceasing driving would have an impact on their mobility, and around 60% across both time periods said it would mean they would be letting down people that rely on their driving. More than half across both time periods agreed that ceasing driving would leave them more vulnerable to violence. These scores are even more significant given that a majority of respondents agreed that giving up driving would mean they saved money (54.9% in 1994–1995 and 57.0% in 1997–1998). Interestingly, however, over 80% across both time periods agreed that poor public transport options made ceasing driving especially problematic.

Table 5, on the next page, shows the survey results on older drivers' attitudes to a wide array of interventions and sanctions. Participants were asked whether they agreed the measure was acceptable, and whether it would be effective. The scores do not necessarily tell a consistent story, but several interesting findings can be inferred. There is fairly strong support for the current regime (i.e. licence renewal every 3 years after age 70, based on self-declarations on health conditions), but also strong support for the acceptability of various additions to the system. For instance, most respondents supported greater provision of advice, and duties on GPs, opticians and themselves to inform the DVLA of any problems with their driving. Interestingly, they also supported more power for the police to demand driving assessments.



**Table 5: Proportion of older drivers in agreement with various forms of interventions**

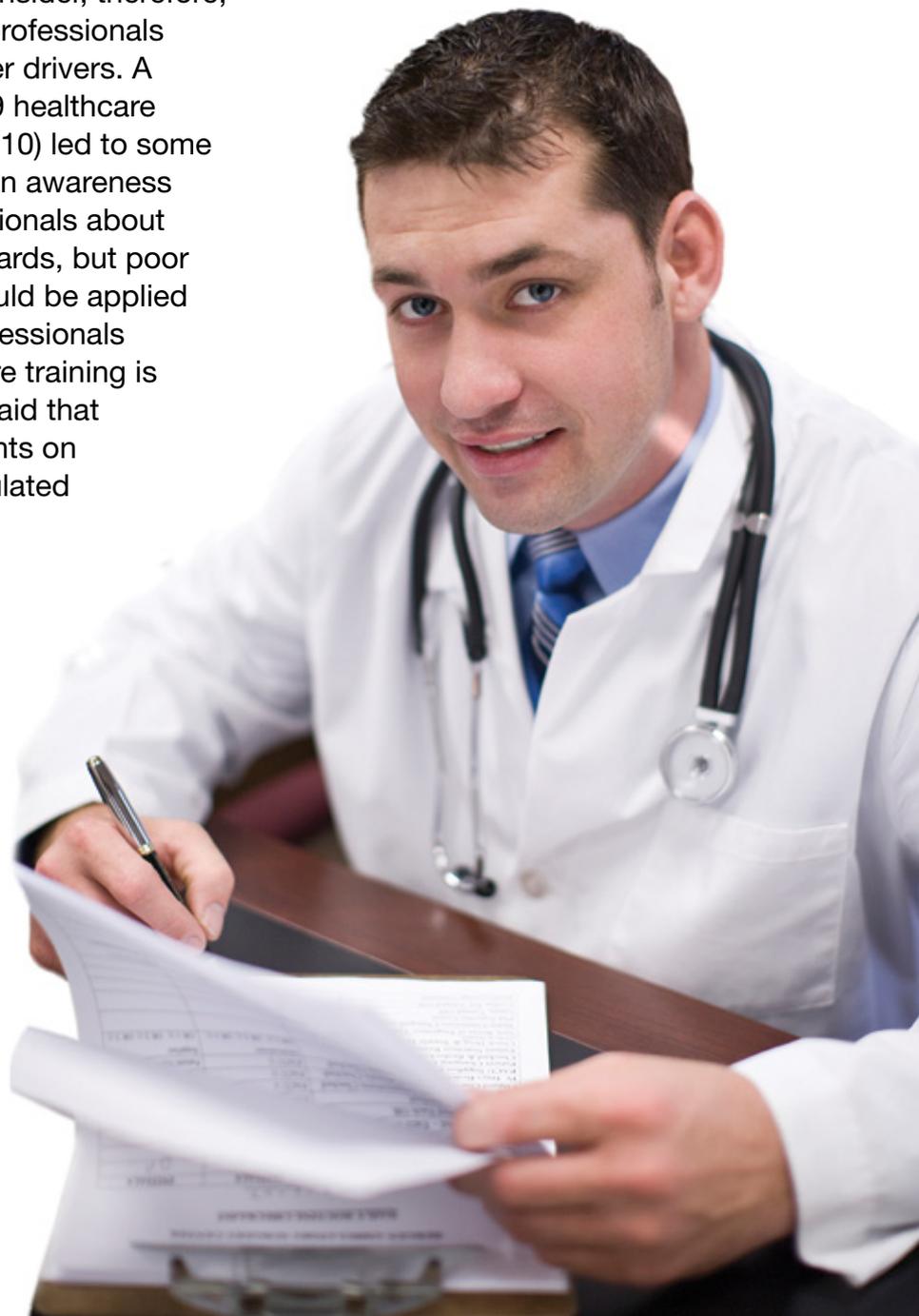
Attitudes to driving-related interventions and sanctions				
	Acceptable? (% in agreement)		Effective? (% in agreement)	
	1994/95	1997/98	1994/95	1997/98
The current regime	69.6	68.6	52.9	49.4
Re-testing every 10 years	36.7	30.4	51.9	52.9
Re-testing every 5 years after age 60	32.4	30.4	50.4	50.4
Re-testing after every accident	32.9	33.9	43.5	47.6
Re-testing after every driving ban	69.6	72.4	73.7	74.9
Re-testing after every conviction	51.4	54.2	54.7	55.4
Driving assessments, but responsibility of individual drivers	54.7	58.7	41.5	35.9
Medical examinations at age 60	48.6	50.4	54.2	57.2
Duty placed on opticians to inform DVLA of potential driving problems	66.8	66.1	72.7	77.2
Duty placed on GPs to inform DVLA of any potential driving problems	67.1	70.1	73.4	78.5
Duty placed on individual driver to inform DVLA of any potential driving problems	75.7	83.3	54.4	68.9
More power for the police to demand re-testing	49.6	47.3	56.7	57.5
More power for the police to demand assessments	64.1	65.9	60.5	66.6
New licensing system with flexible restrictions on medical grounds and driving record	43.8	49.9	43.3	52.4
DIY evaluation kits	44.3	50.1	29.1	30.9
Provision of more advice	70.6	74.9	49.9	52.2

Source: Rabbitt et al., 2002

In general, however, more stringent measures – principally those involving re-testing – were deemed acceptable by fewer people. Perhaps predictably, the more stringent measures were deemed effective in terms of road safety by more respondents, despite low acceptability scores (and despite a lack of evidence of their effectiveness, as the previous section demonstrated). The current regime, greater provision of advice, DIY evaluation scores, and individual responsibility for driving assessments all received much lower scores for effectiveness than they did for acceptability. This suggests that older people recognise there is a problem with self-regulation, even if they remain unconvinced about which organisations should be involved in the decision-making process.

The ACPRC study also asked respondents whose advice they would listen to – in contrast to the formal measures rated above. They gave a mark between 1 (low influence) and 7 (high influence). Remarkably, GPs received a mean rating of 6.56 in 1994–1995 and 6.55 in 1997–1998 (and opticians were rated 6.42 and 6.47, respectively). Family members received mean ratings of 4.15 and 4.33 respectively – lower than ratings for both the police and the DVLA across both time periods. These figures tell us that health is a major determinant of decisions to restrict driving in the UK, perhaps more so than other countries (this was explicitly suggested in Hakamies-Blomqvist & Peters, 2000), but also that people are far more willing to seek advice from GPs than hand over responsibility to them. A later study by Parker et al. (2003) shows that, in the UK, older people accept that healthcare professionals should have more formal power in circumstances where driving may be affected by medical conditions, although this does not necessarily translate into an acceptance that GPs should have responsibility for supervising their elderly patients' driving more generally.

It would be interesting to consider, therefore, the attitudes of healthcare professionals around giving advice to older drivers. A multi-method study of 1,519 healthcare professionals by Hawley (2010) led to some surprising results. There is an awareness amongst healthcare professionals about DVLA fitness-to-drive standards, but poor knowledge of how they should be applied in practice – healthcare professionals themselves believe that more training is necessary. Most surveyed said that they do advise elderly patients on fitness to drive but in a simulated scenario only 1 in 3 gave unprompted driving advice to a patient clearly presenting as potentially unfit to drive. Indeed, 3 in 4 gave incorrect advice on driving to the hypothetical patient.



Hawley found that the main barriers to providing advice on fitness to drive were:

- Not considered relevant in the clinical context
- Forgetting
- Over-complex DVLA guidelines
- Uncertainty over who is responsible for providing advice
- Resistance from patients
- Fear that not driving could adversely impact on their patient
- Concern that giving advice could jeopardise the doctor/patient relationship

Advice is most likely to be given if there is a medical condition with a clear impact on the patient's ability to drive, patients ask for advice, there is a mobility centre available locally, and if healthcare professionals work as part of a team. The study by Coughlin et al. (2004) also finds that healthcare professionals prefer to maintain a focus on medical advice, and are more comfortable in driving-related interventions where family members are also involved. Clearly, there are problems associated with simply giving the medical profession more authority over older people's driving – but this should not prevent doctors providing greater assistance to self-regulation, not least because older people seem more willing to accept the need to self-regulate if framed as a health issue.

Several of the studies cited so far have suggested that women are more willing to self-regulate than men, and in fact that they are more willing to listen to advice from others. Investigating this was one of the main aims of a study by Kostyniuk (2008), which involved interviews with 1,053 drivers aged over 65 in the United States. Kostyniuk found that gender is a more significant determinant of self-regulation than both age and physical functioning. Of course, we also know that older women in the current cohort (especially married women) drive less than older men – which paradoxically makes them less safe when they do drive, due to a lack of practice. Also, we do *not* know whether self-regulation by women is necessarily more effective than self-regulation by men, in terms of increasing safety while maintaining mobility.

The studies presented in this sub-section, although not an exhaustive review, constitute an evidence base regarding the context in which self-regulation among older drivers occurs. There is significant evidence available on: what older people think about their ability to drive, and how it changes as they age; the age-related problems identified by older people – and the ones they tend to overlook; the kind of restrictions older drivers will accept; and who they trust to intervene – and why. While not all of the evidence is consistent (studies have taken many different forms, and there will, of course, be differences between countries), it should be taken into account when considering how to support older drivers' self-regulation.

Clearly, older people need more support in recognising the myriad effects of ageing. Health problems are an important trigger for self-regulation, and older people do seem to recognise ageing-related physiological changes – but there is seemingly little acknowledgement of the decline in information-processing capacity, which may impact significantly on driving. Older people do self-regulate when they recognise decline, but it may not be recognised in full. Even when self-regulation occurs, it does not necessarily occur effectively; there are significant barriers to self-regulation which may cloud judgements or indeed make the process unnecessarily traumatic. In fact, a lack of support for self-regulation may lead to over-regulation, in effect creating worse drivers through lack of practice. There is strong evidence that older drivers will listen to relatives and/or healthcare professionals – but these groups themselves need more support if they are to help foster self-regulation.



# 3. How to Influence Older Drivers

This section, firstly, builds upon the previous two sections by discussing the behavioural traits of older drivers, and the behavioural traits built in (perhaps unintentionally) to the current regulatory regime. It then considers a range of areas in which the public and private sectors may be able to more effectively support older drivers' self-regulation.

## **The behaviour of older drivers**

Given that determining precisely when older people should cease driving, or even determining exactly when their driving should be restricted, is difficult, self-regulation must be at the core of any regulatory system. As such, we could surmise that policy-makers have no choice but to nudge, that is, seek to influence the choices that individuals make, because policy-makers cannot make choices on behalf of older people. However, self-regulation is not only immutable, it is also potentially very positive – so policy-makers should also be thinking about how to nudge people towards self-regulation, or more effective self-regulation. The key for policy-makers is to design an effective choice architecture; older people will make their own decisions, but structures can be established or nurtured (legal, fiscal, commercial, social, etc.) which present choices to them in certain ways, or shape the processes through which choices are made.



Currently, the regulatory system provides few incentives to encourage self-regulation among older drivers. Clearly, most older people have an innate understanding of their declining safety as drivers (because they already self-regulate at least to some extent), which provides an automatic incentive to self-regulate. In general, however, the UK system is liberal – the need to declare one’s own ability to drive every three years after the age of 70 provides a very small ‘stick’. The argument here is not that bigger sticks are required, but that incorporating a few ‘carrots’ would allow the system to remain liberal while upholding road safety as a public good.

There are several behavioural traits which would appear to act as barriers to effective self-regulation among older drivers. ‘Anchoring’, for instance, means that people think about mobility in terms of what they already know; in short, that driving provides mobility. As such, they continue driving in later life. Of course, this does not mean that the anchor is inaccurate – cars are a vital means of maintaining mobility for most older people. More generally, because people only experience growing older once, and because population ageing is a relatively recent trend, not many people have significant experience or knowledge of the impact of ageing on fitness to drive. We should celebrate the achievement of increased longevity – but nevertheless acknowledge some of the challenges it presents. A potentially less accurate factor is exaggerating the importance of one’s own experience: a fallacious ‘representativeness heuristic’ leading older drivers to assume, for instance, that because they have never had a serious accident (or because such incidents are generally quite rare), they are unlikely ever to be involved in a serious accident.

‘Loss aversion’ (or ‘status quo bias’) are clearly significant behavioural barriers. Even where older people recognise difficulties with their driving, potentially leading to reduced safety on the road, they are loath to cease or restrict their car use due to fear of the repercussions in terms of mobility and independence. This probably also inhibits frank discussions with GPs and licensing authorities. This trait is closely related to ‘hyperbolic discounting’ – choosing mobility now over safety in the future.

It is possible that greater levels of education could help to combat these traits. Decisions about ceasing or restricting driving are momentous and complex, and it may be that more information and knowledge is required in order to aid the decision-making process, but what type of education? Should older drivers refresh their driving skills, or learn more generally about the impact of growing older? Should they be made aware of alternatives to driving in order to overcome loss aversion – but what if the alternatives are not viable? Some mix of these may be effective, but we must still think about how to encourage or incentivise older people into participating in educational schemes. It may be that formal educational schemes are unnecessary if information can be delivered more informally, or indeed if older people are encouraged to think more systematically about ageing and driving on their own behalf.

One set of behavioural traits which education will not directly impact is that associated with a ‘herd mentality’, that is, the assumption that I should drive because everybody else does. This mentality gives rise to social norms – and informing people through education about the number of older drivers on the road may in fact reinforce these norms. Again, of course, the norm could be said merely to represent a perfectly legitimate reality: many older people drive because of the centrality of cars to their mobility and independence. The current licensing system represents an attempt to introduce the norm of considering the impacts of ill-health on driving, through a mildly punitive measure. The nudge paradigm upholds the idea that the law can be used to create social norms, as well as directly govern behaviour. It may be that other nudges within the licensing system can encourage greater self-regulation. Driving seems to be predominantly understood in personal or individual terms, when in reality it is a very social phenomenon because we almost always encounter other road users when driving; we depend on them to not create accidents, and are therefore bound in a similar way ourselves. As such, cultural change in terms of our perceptions of cars may be as effective as any legal interventions in encouraging older drivers to consider their collective obligations as road users. The very fact that ‘everybody else is driving’ should be a spur to greater individual responsibility on the roads, not an excuse for parochialism regarding our own conduct as drivers.

The choice architecture for self-regulation depends profoundly, also, upon the ‘messengers’ through which advice and support is delivered. Already, families and GPs are instrumental in older people’s decisions to stop driving but, clearly, this informal process is far from perfect. In most cases, interventions seem to be concerned with the failure of self-regulation, that is, the point at which interested parties (with little guidance) have to intervene to impose driving restrictions. Yet the fact that older drivers largely trust relatives and GPs to lead these interventions mean that this is a resource that could be utilised much earlier in the process of self-regulation. On the basis of the *Mindspace* principle to ‘start from where people are’, people that are already trusted by older drivers should be more systematically involved in decisions. Of course, relationships of trust and authority will differ for each individual. This may mean, for instance, that GPs have a stronger legal duty to support

their patients' self-regulation – a nominally punitive measure for GPs which would encourage them to nudge their patients by non-punitive means. Equally, it could mean that older people themselves have stronger legal duties to report problems to healthcare professionals – a nominally punitive measure for older people designed to make them more receptive to nudges from the medical profession. As well as the messengers, we should perhaps also think about the message itself: in terms of 'framing', it is surely better to deliver the *good news* that self-regulation could help you to drive for longer, rather than the bad news that you are no longer fit to drive.

The next section goes on to consider potential nudges that may form part of an effective choice architecture, including the private sector as well as the public sector and the role of the family. Building on insights from the nudge paradigm, and in order to ensure older people's well-being is central to the regulatory system, it is vital that policy development:

- Supports self-regulation and does not undermine the UK's liberal system
- Does not lead to over-regulation by individuals
- Creates safer drivers
- Maintains older people's mobility and independence as far as possible
- Develops and utilises existing relationships of trust

It is probably also worth reiterating here that part of the appeal of nudges over traditional policy instruments is *cost-effectiveness*. However, while this is an important aspect of policy-making, it should not be one of our immediate concerns here. Clearly, this list is not designed to represent a definitive set of criteria determining policy on older drivers – not least because some of the objectives arising will inevitably conflict in practice – but rather an informative set of principles around which policy should be broadly shaped.



## Policy options

There are various measures which may support effective self-regulation among older drivers: licensing renewal and restrictions, education and advice, the role of healthcare professionals, the role of families and self-assessment, financial incentives, and the alternatives to driving.

### The licensing system

The evidence that more stringent procedures for driving licence renewal in later life (in terms of either re-testing or medical screening) harm mobility while failing to produce safer drivers is fairly conclusive (Mitchell, 2010). For instance, a study which compared the safety records of Sweden and Finland, two very comparable populations representing radically different approaches to licensing for older drivers (Sweden has a liberal system, whereas Finland has one of the most restrictive systems in Europe) found no difference in the rate of accidents caused by older drivers (see Hakamies-Blomqvist and Peters, 2000). A study comparing Australian states Victoria (where there are no age-based renewal requirements) and New South Wales (where people aged over 80 must provide annual medical certificates, and people aged over 85 are re-tested every year) produced the same results (Langford et al., 2008). Indeed, even if they were more effective, such measures would overlook the capacity for older people to improve as drivers, once made aware that their ability has declined for some reason (Eby, 2003). It is worth reiterating here that there is evidence that older people in the UK are tolerant of assessment and even re-testing after accidents or incidences of dangerous driving – in theory this could apply at any age (Parker et al., 2003).

Box (2010a) has argued that age-based restrictions, without just cause on public protection grounds, contravene recent anti-discrimination legislation. Yet it is infeasible to suggest that *all* age cohorts should comply with a more severe licensing system. Furthermore, it may be the case that even the existing system, requiring renewal via self-certification every three years beyond the age of 70, is discriminatory. Certainly, there appear to be no grounds for a threshold of 70 – it was in fact described as ‘somewhat arbitrary’ by the DfT in 2004 (cited in Help the Aged, 2008). As described above, however, the current system is not unduly punitive; in practice, the renewal process may even be an effective nudge in terms of encouraging older drivers to consider the impact of health problems on driving. By this logic, and to eliminate all traces of ageism, drivers of all ages should be periodically required to self-certify that they are fit to drive. This could help to instil a greater level of attentiveness to the impact of ill-health on driving over the life course.

Box’s paper also presents evidence on the efficacy of graduated or restricted licences. In contrast to ‘all or nothing’ driving licences, such systems limit some older drivers to driving in certain circumstances, such as daylight, or only if using aids such as corrective lenses. These systems therefore mimic

the kind of restrictions that many older drivers impose on themselves through self-regulation (moreover, the EU has recently issued regulations permitting restricted licences, although the UK has not yet decided to implement the measure). The evidence, however, is mixed. It seems that the public authority which imposes the restriction (that is, the organisation which determines whether, and which, restrictions should apply) may be a crucial determining factor (Box, 2010a). Graduated or restricted licences do not, of course, represent examples of nudges. But what if older drivers were able to self-select a restricted licence? Older people are already free to self-regulate their driving, but a system of self-selected restricted licences would potentially send a very positive message to older drivers: in short, if you voluntarily agree to certain restrictions, your entitlement to drive remains intact, and crucially, under your control. Of course, such a solution would not be a panacea, not least because it does not in itself enable older people to recognise cognitive decline.

### Education

There are educational schemes available to some older drivers through mobility schemes (based on self-referral) and local authority-run schemes (usually based on GP referral), but their availability is patchy and evidence of success limited. Organisations such as the Institute of Advanced Motoring and the Driving Standards Agency also offer relevant educational materials. Clearly, there is a need for further research into the type and extent of schemes available, and their relative successes. As explored in the first section, education is not nudging – but nor are the two mutually exclusive. In fact, certain behavioural traits may have an impact on the success of education; for instance, education could contribute to a norm that certain bad habits are widespread and therefore acceptable, and training older people in driving skills could increase incidences of risk-taking.



Education could also be used, however, to nudge people in the right direction. We can use the nudge paradigm to consider how education is delivered to older people. Rather than simply providing information or teaching skills useful in certain scenarios, perhaps the emphasis should be on decision-making skills which enable older drivers to avoid certain situations, thereby assisting self-regulation. Framing is also relevant here: education could be presented as a good news story, that is, an opportunity to retain control of one's driving, rather than a punishment for poor driving performance.

While education may ultimately be required to deliver important messages about poor driving – and in this regard is preferable in the first instance to imposed licensing restrictions – successful outcomes would probably depend on a greater availability of educational schemes (assuming they were deemed cost-effective). However, even in these circumstances, we should think about how to nudge people into education and training. If interested parties such as families and healthcare professionals were able to provide more support – for instance, if they had more awareness about the availability of educational schemes – perhaps older people could be nudged into education at an earlier stage. In addition, utilising trust-based relationships could help education be framed as good news.

The nudge agenda should encourage us to consider also the content and recipients of education. Hakamies-Blomqvist and Peters (2000) say educational services should concentrate more on providing feedback on actual driving, rather than skills required in hypothetical situations. It may be that driving simulators could be used to greater effect in this regard. Feedback could be seen as a nudge towards self-regulation, or indeed be a crucial part of the process of self-regulation. Equally, education could focus on ageing itself rather than driving skills, so that older people can consider for themselves how their driving may be affected. Furthermore, it may be that there needs to be greater emphasis on educating drivers throughout the life course, including education about greater numbers of older drivers given population ageing (see Carmel et al., 2008). The Driving Standards Agency's (DSA's) 'Learning to Drive' report, following its recent consultation on improving testing procedures, suggests that the DSA agrees with this, but has not yet offered proposals in this regard; it focuses almost exclusively on procedures for learner drivers (see DSA, 2009). Finally, there may be a case for more joined-up service provision: if driving education or assessment leads automatically, where advisable, to an appointment with a healthcare professional, it may encourage more participants to heed the advice they receive.

### **Healthcare professionals**

One of the dangers of healthcare professionals taking on a greater role in the older drivers' regulatory system is that older people's problems with driving are not necessarily caused by medical conditions. Physical and cognitive decline is a normal part of the ageing process, not a medical condition, and if the

regulatory system is overtly medicalised, it may nudge older people away from taking responsibility for their own driving. However, there is significant evidence that older people do trust healthcare professionals, particularly GPs, perhaps precisely because they recognise that ill-health impacts on their fitness to drive. This may be misguided in some ways, but on the basis that behavioural change is more successful when you 'start from where people are' it is vital that the regulatory system utilises this trust, and indeed the close contact that GPs have with many of their older patients.

There is some evidence that GPs are averse to taking on more responsibility for their patients' driving: it could undermine the doctor/patient relationship, create work pressures, and introduce a duty of care they are not qualified to uphold. However, the fact that older drivers are much more likely to be killed or seriously injured on the road, due to greater frailty, surely means that GPs must have a role in preventative measures for their patients. Indeed, taking advice from one's own GP is preferable to greater use of systematic medical screening, in that it maintains the individual's personal responsibility, which is vital for sustainable behavioural change. Of course, GPs are in need of much greater support if they are to become more responsible in this area, and the additional responsibilities would have to be formally integrated into their incentive structure. Most importantly, the DVLA (in conjunction with medical experts) needs to produce and promote much clearer guidelines on how driving is affected by ageing, beyond a narrow medical paradigm - and this needs to be made more prominent within medical training. In this way, it could simply be the case that GPs act as a conduit between older drivers and the DVLA; nevertheless, some conduit is clearly necessary.

The role of GPs should not be seen in isolation; clearly, healthcare professionals will need to interact with other aspects of the choice architecture. Most obviously, GPs and families should work together in talking to older people about potential problems with driving –healthcare professionals report they are more comfortable intervening when family members are also involved. The medical profession should probably also have a greater role in education and training for older drivers, on the basis that educational schemes should not focus solely on driving skills, but rather on how physical and cognitive decline may impact upon driving. In general, there is a need for earlier inputs by healthcare professionals, so that they can assist self-regulation, rather than simply compensate for its shortcomings.

GPs may also have a role within the licensing system. The existing system of self-certified licence renewal should remain, but this nudge for individual drivers could also serve as a nudge for GPs, if they were encouraged or even obligated to provide advice around the time of renewal. Perhaps this could be achieved by requiring drivers to certify that they have recently sought advice from their GP when renewing their licence – this should certainly be part of any potential move towards graduated or restricted licences.

Various studies into older drivers and self-regulation have suggested that older drivers would be prepared to give greater power to opticians in terms of licence renewals. Indeed, eyesight decline is one of the main ways in which ageing affects driving, and a requirement to wear corrective lenses would be a key aspect of any restricted licensing system, including one based on self-selection. However, older people's willingness to concede responsibility to opticians is perhaps further evidence of the narrow way in which the relationship between ageing and fitness to drive is understood. In practice, despite the seemingly obvious link between eyesight and driving, opticians have no foolproof way of determining whether a person's visual ability is sufficient for the purposes of driving. Of course, even someone with perfect eyesight may fail to see certain hazards, if a decline in cognitive ability means they are not aware quickly enough that they must turn their attention to certain points in the road ahead, or their rear-view mirrors. This is not to say, however, that opticians should not have a role within the choice architecture, perhaps in consultation with GPs. Where significant problems with eyesight exist, opticians must surely have a 'last resort' duty to inform the DVLA so that appropriate measures can be taken.<sup>3</sup> However, care must be taken that this duty does not lead to fewer older people seeking the advice of opticians regarding their eyesight, for fear of losing their driving licence—indeed opticians are likely to oppose any policy which may lead to such an outcome.

### **Families and self-assessment**

Families unquestionably must play a significant role in supporting self-regulation by older drivers. There is strong evidence that families already play this role, and crucially that older people trust their relatives to intervene. Of course, older drivers do not always listen to their relatives, or accept their advice. On the other hand, while the existence of a close relationship means relatives must be part of the regulatory system, they are not necessarily qualified to dispense advice on driving and the ageing process.

For these reasons, the question is not 'what can families do?', but rather 'what can public authorities do to support what families already do?'. Healthcare professionals must be more active in providing advice to families. Government agencies must make more information available so that people can have informed discussions with older drivers within their family. One effect may be that 'intervention' takes place much earlier than it currently does: families would be helping to engender the process of self-regulation, rather than stepping in to pick up the pieces once it falters. This could make interventions more effective, and indeed less traumatic for families and the individuals in question. However, in advocating earlier interventions, this should not obscure the probability that some relatives, lacking information and expertise, encourage older people to cease driving too soon. We need to move away from the notion of an 'intervention' and think more about facilitating conversations that engender self-regulation.

<sup>3</sup> Opticians seemingly do have this duty at the moment, but it is not commonly used, not least because they do not have an appropriate test to use to deduce whether people's eyesight is fit to drive.

Self-assessment may also have an important role in the wider regulatory system. While older people themselves are sceptical that self-assessment would be an effective measure (see Parker et al. 2003), a study by Eby et al. (2003) suggests otherwise. Eby et al. developed a workbook covering issues such as health, driving abilities, and experiences of and attitudes to driving, and distributed it to a sample of older drivers in the United States. The self-assessment was followed up by a questionnaire and an on-road test, to judge its effectiveness. Crucially, responses to the workbook were closely aligned to results from the on-road test, suggesting that older people can be trusted to self-regulate (with one exception: self-assessment of visual acuity was not a good predictor of actual visual acuity in terms of driving).

The behavioural changes resulting from self-assessment are even more interesting. 40% of participants said completing the workbook made them consider further training in driving. Over a third said it convinced them to seek advice from a healthcare professional as a result. A sizeable proportion (14%) reported that the workbook had helped them to discover a deterioration in their driving abilities that they had previously been unaware of.

Incredibly, 100% of participants said the workbook would make conversations with their family about driving easier. As Eby et al. point out, most people agree that families should be a main source of support, but initiating such conversations is often extremely difficult; self-assessments could be an important ice-breaker in this regard, as well as a vital source of highly relevant information. As such, there is a strong rationale for organisations such as the DVLA or the DSA developing a self-assessment workbook, and distributing it (directly or through GPs) to older drivers at a certain age, or perhaps all drivers. However, this could also be done by organisations such as the RAC Foundation, to raise awareness about self-assessment and help to establish an evidence base. Clearly, irrespective of which organisation is responsible for producing resources such as workbooks, it is crucial that the appropriate ‘messenger’ is chosen. A workbook distributed by the DVLA, for instance, may create the impression that results could have a direct impact on licence renewal – even if this is not the intended purpose.

Social media technologies could be used as a way to encourage people to self-assess their driving. For instance, websites or smartphone applications could promote driving-related questionnaires (or driving simulators could be placed in supermarkets, town centres, etc.). In line with the nudge agenda, this idea ‘starts from where people are’: people generally believe they are better drivers than most other people, so offering the opportunity to demonstrate this may utilise our egos in order to help us to learn something (it was noted above that ego represents the ‘E’ in Dolan et al.’s ‘Mindspace’ acronym).



These would serve to raise awareness about how one's fitness to drive changes over the life course, and could even be used to generate more information about individuals' and society's driving skills, therefore aiding research into policy solutions. Commissioning organisations could even award a 'Britain's Best Driver' title to encourage participation.

### **Financial incentives**

Many insurance companies already impose higher standards on older drivers by seeking detailed information about medical conditions (MCAP/AA, 2000). As such, there have been calls for the insurance industry to play a role in providing financial incentives to encourage self-regulation by older drivers (see Box, 2010a). Insurance for older drivers has, in fact, been in the news recently, because of sharp increases in premiums. ConsumerIntelligence.com reports that the average price of car insurance for 50+ drivers rose from £356 in June 2009 to £450 in June 2010 (Webster, 2010; see also Woodman, 2010). Research commissioned by Help the Aged and Age Concern (2007) shows that most older people believe that the insurance industry is discriminatory against older drivers. Of course, this is not necessarily the case – insurance companies would argue that premiums tend to be higher because personal injury claims are more likely (due to increased frailty among older people).

Arguably, higher premiums provide an appropriate financial choice architecture for older drivers: it makes driving more expensive, therefore encouraging older drivers to cease driving sooner. However, while insurance providers may be justified in higher premiums, older drivers are not less safe than younger groups (up to around age 80), it is unfair to penalise older people who need their cars to maintain mobility and independence (perhaps because of this, the ConsumerIntelligence.com and Help the Aged/Age Concern research also shows that older people are less price-sensitive than younger drivers). As such, those who buy car insurance are not necessarily the safest, but those who most need their car, or simply the most affluent. The science of human behaviour tells us that people respond to carrots as well as sticks; therefore, perhaps insurance companies should be allowing those older drivers to demonstrate that they effectively self-regulate to pay lower premiums, rather than penalising all older drivers.

Norwich Union (now Aviva) used to offer a product which could have provided greater incentives for older drivers, to some extent. Their pay-as-you-go insurance allowed drivers to pay premiums based on the amount that they drove, and crucially, premiums were lower in low-risk driving situations (see Brignall, 2006). However, the product in fact had an upper age limit of 65, and has since been withdrawn. There are also specialist insurance providers for older drivers, such as Saga and Age UK enterprises – but these companies are not necessarily less expensive, and they currently hold only 14% of the over-50s market (Webster, 2010). Even if it remains defensible today to charge older drivers higher premiums, it will surely make commercial sense in the future

for insurance companies to offer innovative products along the lines of the Norwich Union scheme. As the population ages, so does the customer base for insurance companies – and tomorrow's generation of older drivers is far more likely to be price-savvy (Webster, 2010).

One further way in which insurance companies could incentivise self-regulation is by rewarding older drivers that undertake education and training. In theory, older drivers are currently obligated to inform their insurer of any feedback they receive through professional assessment of their driving, which could result in higher premiums (MCAP/AA, 2000). This is despite the fact that by undergoing assessment, the feedback is likely to have made them a safer driver in the future. Surely insurance companies should offer lower premiums to drivers that can demonstrate commitment to maintaining and enhancing their driving ability. Of course, any such measure would be dependent on the effectiveness of educational schemes, which is currently not fully established.

It may be that the vehicle taxation system, administered by the DVLA, can also be used to incentivise self-regulation. Restricted insurance coverage would mean that older drivers would pay less if they avoid dangerous situations – should the tax system not reward older drivers in the same way? The prospect of paying less car tax if one commits to self-regulation may encourage people to give more thought to their driving habits; even if they decide not to opt for the cheaper option, the tax system would be nudging people into a decision-making process, and helping to create a 'norm' of self-regulation. Certainly, the tax system should be modified as part of any move towards self-selected restricted licences. It may even be worthwhile considering tax discounts (or perhaps simply free gifts) for drivers of any age that can demonstrate they have considered their fitness to drive, for instance through the education and assessment options explored above, to encourage self-regulation across the life course.

## **Vehicle design**

Technological advancement means that car design and in-vehicle aids may in the future make driving easier for older people (Box 2010a); certainly, many of the driving functions for which Rabbitt et al. (1996) found that older people recognise deterioration, such as reverse parking and navigating, could be assisted by new technology already available. Of course, these aids do not in themselves constitute nudges. However, it may be that choosing an appropriate car and in-vehicle aids will increasingly be seen as a key outcome of self-regulation. Families, GPs, government agencies and insurance companies may concentrate on encouraging older people not to restrict or cease driving, but rather to choose the right type of car.

Clearly, car manufacturers and retailers have a role here too. As Musselwhite (2010) has explained, older people are generally averse to new technology, even where they may be the main beneficiaries. Car companies should

therefore be encouraged to provide more information to older customers on appropriate car choice, or indeed to simply offer a greater range of products (MCAP/AA, 2000). As with insurance companies, the business case for making their products and customer service more amenable to older consumers will become increasingly strong in an ageing society.

McKenna (2010) also makes the interesting point that many in-vehicle devices are not designed primarily to make driving easier. Rather, they can be used to provide feedback on our driving performance. Such devices would therefore play a direct role in aiding self-regulation – and there are clear grounds for insurance companies providing incentives for older people to utilise these devices, not least so that data can be used by the firm in monitoring risk. As McKenna says,

[i]t is now possible to log the speeds that we drive and the acceleration and the deceleration forces that we create. In other words, we now have the opportunity to identify, monitor and change our driving style. The insurance industry might provide the motivational force to change our driving style by the very simple method of relating the premium that we pay to the risks of our driving style. (McKenna, 2010)

The use of technological aids, of whatever type, could be stipulated by restricted licences.

### **Alternatives to driving**

Older people seek to continue driving principally due to its importance to their mobility and independence. Driving is less physically arduous than walking, certainly when the greater distances which can be covered by cars is considered, and the largely door-to-door nature of driving makes driving, in general, more flexible and convenient than public transport. The nudge paradigm upholds the idea that, in order to change people's behaviour, alternatives to current choices must be viable in the context of individuals' real-world circumstances. It is not evident, therefore, that public transport provides a meaningful alternative.



Generally speaking, however, the academic literature on older driving has not considered what role the availability of alternatives to driving plays in self-regulation by older people - this is an area where further research is necessary. The relationships between land use, service planning and the functioning of social networks and their impact on decisions to reduce or cease driving have not been fully explored. Clearly, people's dependency on cars, and their needs and expectations from alternatives to driving, will differ based on whether they live in an urban or rural area; this also needs to be investigated further.

That said, there is some evidence that the availability of public transport encourages safer driving (MCAP/AA, 2000). The study by Tuokko et al. (2007) on older drivers in the United States shows that where public transport is available (and older people are aware of its availability), older drivers are more likely to self-regulate their driving. Help the Aged's (2008) survey on issues around mobility in later life in the UK, however, finds older people generally unwilling to switch from their cars to public transport. A significant minority of older drivers would switch if public transport were more accessible and they were more aware of particular services, but '[t]he only factor that would encourage a majority to switch from driving to public transport use was an improvement in services and/or travel concessions'. The fact that older people already enjoy free bus travel - which could be defined as a significant nudge away from driving and towards public transport - probably underlines the fact that public transport has a long way to go before it can seriously challenge car dependency.

Clearly, alternatives to driving should be part of the choice architecture for older drivers, but if improving services or lowering costs are the only ways to make public transport viable for most older people, it is unclear whether the public sector would be willing to make the required investments in this regard. This certainly applies to more bespoke community transport services - more convenient for older people, but far more costly (an important factor given that they are usually funded by local authorities). Finally, we should be wary of any alternatives to driving which compel older people to drive significantly less. While most of the measures discussed in this section involve some form of self-imposed driving restrictions, they do not discourage older people from driving on a regular basis. Driving regularly is important for maintaining practice - older people often only become unsafe when they drive significantly less. Making greater use of public transport may mean that older people are driving far less regularly but, unless public transport can replace cars altogether for older people, this could make them more dangerous when they do get behind the wheel.

## 4. Conclusion and Recommendations

The nudge agenda has much to offer the formal and informal regulatory system around older drivers. By largely accepting the need to self-regulate driving in later life, most older people already exhibit behavioural traits amenable to nudges. The task of policy-makers, therefore, is to make self-regulation more effective. This means encouraging older drivers to self-regulate at an earlier stage – even if no alterations to driving habits are required, self-regulation must become a normal aspect of the ageing process. It also means that the process of self-regulation itself should be improved, by providing older people with the advice, tools, and incentives to make decisions appropriate to their own circumstances.

**Today's older people are driving further and more often than previous cohorts. To a large extent cars are vital for mobility: maintaining mobility in later life helps to delay the physical and mental decline associated with ageing. Mobility is vital for maintaining access to services, social connectivity, and fulfilling the various routines of daily life; in being available at any hour, and providing door-to-door transport, cars offer benefits that would be impossible for public transport to fully replace.**



Inevitably, however, there are questions regarding the road safety of older drivers. Yet there is no evidence that older drivers *per se* are less safe behind the wheel. Physiological (including visual) and cognitive decline is certainly part of the ageing process, but this does not mean that age itself is an effective indicator of driving performance, and older people have proportionately fewer accidents than most other age groups (in fact young people are the most dangerous road users). That said, there is some evidence that the ‘oldest old’ (that is, drivers aged over 80) are less safe than other age groups. Yet as this report has demonstrated there is plentiful evidence that older people *do* self-regulate. As such, older drivers reduce, restrict or cease their driving at some point in later life, due to concerns about their declining driving ability and/or increasing vulnerability to serious injury. Nevertheless, there is room for improvement in the process and outcomes of self-regulation: some people may cease or reducing driving too late, but equally some may cease or reduce driving too soon – both scenarios demonstrate the current limitations of self-regulation.

Several behavioural traits seem to act as a barrier to effective self-regulation. ‘Anchoring’ means that people think about mobility in terms of what they already know, that is, driving enables mobility. People only go through ageing once, and therefore have no prior experience of how driving may be affected by the process. A ‘representativeness heuristic’ means that people tend to over-generalise their own experiences, that is, if you have never had a serious car accident, you tend to believe that they are very rare, or that you must be a better driver as a consequence. ‘Hyperbolic discounting’ means that people tend to over-value the present, that is, choosing mobility now over road safety in the future. A ‘herd mentality’ or, more broadly, the operation of social norms, also impacts our behaviour: in this case, older people believe they should continue driving because most other people drive. We need to create new norms whereby people recognise driving as a social rather than individual phenomenon, and are encouraged to consider the impact of health on driving over the life course.

Perhaps the most significant behavioural trait in this regard is ‘loss aversion’: people are reluctant to risk something they already possess or have access to, because they are not fully able to imagine how they will cope without it, even if a better alternative is offered. Fear of losing one’s licence can also inhibit older people from seeking advice from professionals and agencies about the impact of ageing on driving. As such, we need to provide far more support for older people in the process of self-regulation, and present them with ‘good news’ that there are things they can do to prolong their ability to drive rather than only ‘bad news’ around age-related decline.

In identifying the existence of behavioural barriers, researchers and policy-makers in a range of areas have considered how people can be ‘nudged’ into better decisions through interventions that seek to remove behavioural barriers rather than simply exhort people to behave differently. This report has considered how older drivers can be nudged towards a more effective form of self-regulation. A significant (if unintentional) nudge already exists at the heart of the regulatory system around driving in later life: the requirement to renew one’s licence at age 70 (and every 3 years thereafter) encourages older drivers to think about how their driving may be affected by certain medical conditions. However, a range of other factors and interested parties are involved in decisions around driving in later life, such as the role of families, advice from healthcare professionals, education and training, insurance, vehicle design, etc. – albeit often in a non-systematic way. This report has considered evidence on older people’s attitudes towards driving, and towards various forms of restrictions on driving, in order to determine how these elements could be marshalled in order to make self-regulation more effective.

On the basis of the evidence reviewed and the insights contained in the nudge agenda, this report offers the following recommendations for the public and private sectors. Clearly, the list does not exhaust the possibilities in terms of nudging older drivers towards self-regulation comprehensive, and any subsequent policy developments would require a larger evidence basis, piloting, and the input of key stakeholders, including older people themselves.

1. The current system of *self-certification at age 70* should be extended to *all age groups*; this would encourage drivers to consider the impact of ill-health on driving across the life course, making self-regulation in later life more ‘normal’. As such, people should be compelled to self-certify at ten-year intervals – at the same time as photocard are renewed. The intervals would be reduced in later life: a three-year interval beyond age 70 probably remains appropriate, although there may be a case for shorter intervals earlier in the life course.
2. A system of *self-selected restricted licences* should be introduced, so that older drivers can voluntarily agree to avoid certain situations or employ certain aids in return for retaining their entitlement to drive. There are of course issues around enforcement, that is, how could we ensure that people did not drive in conditions where voluntary restrictions are

supposed to apply? However, self-selected restricted licences would be a nudge, not a punitive measure. While full enforcement may be impossible it is hoped that the system itself, by utilising existing behavioural traits, will help to achieve behavioural change.

3. *Educational schemes should be used to nudge people towards self-regulation.* Of course, the possibility should be recognised that driving education may help to create negative norms by unintentionally implying that certain bad habits are widespread. As such, *education should teach older people how the ageing process impacts on driving*, so that they can use the information in self-regulating their own driving. In teaching driving skills, feedback on actual performance in certain situations is vital – simulators could be used more to this effect.
4. We also need to consider how to nudge people *into* educational schemes. While this may depend on availability of schemes, in general *families and healthcare professionals need more information about educational schemes* and how they can help older drivers. This will be aided by a greater emphasis on driving education throughout the life course, to assist self-regulation rather than simply compensate for its limitations. *The DVLA and insurance companies should also consider how to reward people that demonstrate commitment to driving education.*
5. GPs must have a role in the regulatory system around driving in later life. However, *GPs require more advice and training, greater financial incentives, and the support of their patients' families* where possible, in order to perform this role. More generally, *road safety should be a concern of public authorities focused on health*, such as the Department of Health and the NHS; this would provide valuable support and insight for policy-making on older driving, but also help GPs to play a more systematic role in older people's self-regulation.



6. In renewing their licence via self-certification, *older drivers should be required to declare that they have sought the advice of their GP* before completing the relevant forms. This would not place undue responsibility on GPs, but instead would act as a trigger for older people to themselves seek out advice and information.
7. Given the particular importance of eyesight to driving, *older drivers should be required to declare they have sought the advice of an optician*, perhaps at a later age than would apply for the GP declaration. Furthermore, *opticians should develop a robust eyesight test for the purposes of driving*. Such a system is already in place for commercial drivers, and would be a useful aid to older drivers' self-regulation.
8. *Healthcare professionals and the DVLA should provide more information and support to the families of older drivers*, to enable earlier, more effective and less traumatic conversations about driving and the ageing process.
9. *Self-assessment workbooks should be distributed to all older drivers* above a certain age, either formally by DVLA and/or the Department for Transport, or by organisations such as the RAC Foundation. These organisations could also seek to promote self-assessment online and through smartphone applications, to all drivers. Self-assessment already exists in some forms, and the evidence seems to suggest that public money should be available for the wider distribution of relevant resources, on the basis of a fuller evaluation.
10. *Insurance companies should provide financial incentives which reward older drivers who self-regulate*; in an ageing society, it is likely to be in their commercial interests to do so. This may be in the form of reductions in premiums for people who voluntarily restrict their licences or undergo education. Alternatively, companies may themselves enable self-regulation by introducing pay-as-you-go schemes which reward older drivers who avoid potentially dangerous driving conditions.
11. *The DVLA should consider options for lower vehicle taxes for older drivers who self-regulate*, ideally in conjunction with self-selected restricted licences. Again, there will be difficulties around implementation, given that taxes are applicable to vehicles, whereas incentives would be applicable instead to individuals. However, tax discounts could take the form of a voucher which can be used for reducing the tax on any vehicle used regularly by the individual in question. Alternatively, DVLA or the Department for Transport could work with retailers and charities such as the RAC Foundation to provide free gifts for those that demonstrate a commitment to self-regulation. Evidence shows that any incentive, however small, impacts on behaviour.
12. *Appropriate choice of car and in-vehicle aids should become a key aspect of self-regulation* and, as such, facilitated by car manufacturers. Insurance companies could also incentivise the adoption of in-vehicle devices which provide feedback on driving performance.

One aspect of influencing behaviour which falls outside of the scope of this report is the media. As such, no specific recommendations for media organisations are considered here. However, social media organisations would probably be important to promoting online and smartphone self-assessment initiatives, and indeed one of the aims of these initiatives (and particularly a ‘Britain’s Best Driver’ prize) would be to generate media interest. More generally, it may be that public service broadcasters could do more to promote self-regulation, or at least present a balanced debate on driving and the ageing process.

Clearly, further research is required before any of the ideas recommended in this report are implemented. There are also several areas where further research could help to generate and refine policy options in relation to older drivers. We need to understand in more depth what kind of restrictions on driving would be acceptable, and how policy messages can be effectively communicated. Furthermore, several of the recommendations here may lead to older people driving less, or at least avoiding certain driving scenarios. We need to more fully understand the impact of driving less on driving skills. Several studies suggest that lack of practice produces worse drivers, and this may need to be considered before introducing any new policies in this area. Perhaps most pertinently, we need to understand how the availability of alternatives to driving impacts on self-regulation, and therefore investigate further the relationships between health, road safety, public transport and land use/planning policies at various levels of governance.

The role of education also needs to be better understood. There is a lack of coherent information on the schemes available, their content and objectives, and how effective they have been. It is also necessary to understand precisely how ageing affects driving – not least in order to make educational interventions more effective. In particular, how and when does information-processing capacity decline, and precisely what difference does the greater experience of most older drivers make? Finally, more research is required into the role that new vehicle designs and technology can play. We need to understand which aids will be most effective without increasing cognitive workload. These aids may be crucial in enabling self-regulation, but increasingly their adoption could become an outcome of self-regulation.

## 5 References

- Ariely, D. (2008). *Predictably Irrational: The Hidden Forces that Shape Our Decisions*, London: HarperCollins.
- Baldock, M. et al. (2006). Self-regulation of driving and its relationship to driving ability among older adults, *Accident Analysis and Prevention*, 38: 1038–1045.
- BBC (2010a). Driving test change introduces “independent” section. BBC website, 4 October. Retrieved 13 January 2011, from <http://www.bbc.co.uk/news/uk-11462155>.
- BBC (2010b). *Taking the Keys Away*. BBC1, first broadcast 2 November 2010.
- Belanger, A. et al. (2010). Capturing the serial nature of older drivers’ responses towards challenging events: a simulator study, *Accident Analysis and Prevention*, 42(3): 809–817.
- Blanchard, R. et al. (2010). Correspondence between self-reported and objective measures of driving exposure and patterns in older drivers, *Accident Analysis and Prevention*, 42: 523–529.
- Boardman, T. & Blake, D. (2010). Spend more today: using behavioural economics to improve retirement expenditure decisions, Discussion Paper PI-1014, Pensions Institute, Cass Business School. Retrieved 13 January 2011, from <http://www.pensions-institute.org/workingpapers/slides1014.pdf>.
- Box, E. (2010a). Older drivers: an RAC Foundation perspective. In E. Box, J. Gandolfi and K. Mitchell, *Maintaining Safe Mobility for the Ageing Population*, London: RAC Foundation.
- Box, E. (2010b). RAC Foundation Response. In F. McKenna, *Education in Road Safety: Are We Getting it Right?*, London: RAC Foundation.
- Brignall, M. (2006). Pay-as-you-go cuts costs for some drivers. *The Guardian*, 14 October. Retrieved 13 January 2011, from <http://www.guardian.co.uk/money/2006/oct/14/motorinsurance.insurance>.
- Carmel, S. et al. (2008). *Driving, Cessation of Driving and Well-being in Old Age*, Tel-Aviv, Israel: ILC-Israel.
- Coughlin, J. et al. (2004). *Who Drives Older Driver Decisions?* AgeLab/The Hartford. Retrieved 13 January 2011, from [http://stuff.mit.edu/afs/athena/dept/agelab/news\\_events/pdfs/AgeLab\\_driver\\_decision.pdf](http://stuff.mit.edu/afs/athena/dept/agelab/news_events/pdfs/AgeLab_driver_decision.pdf).
- Crabtree, J. (2010). Nudge nudge, wonk wonk. *Financial Times*, 9 August. Retrieved 13 January 2011, from <http://www.ft.com/cms/s/0/345e4728-a3ec-11df-9e3a-00144feabdc0.html>.
- Darnton, A. (2008). Overview of behaviour change models and their uses: briefing note for policy makers, Government Social Research. Retrieved 13 January 2011, from [http://www.peecworks.org/PEEC/PEEC\\_Gen/03AC00A6-007EA7AB.2/Darnton%202008%20Policy%20Briefing.pdf](http://www.peecworks.org/PEEC/PEEC_Gen/03AC00A6-007EA7AB.2/Darnton%202008%20Policy%20Briefing.pdf).
- de Meza, D. et al. (2008). *Financial Capability: A Behavioural Economics Perspective*, London: Financial Services Authority.
- Dolan, P. et al. (2010a). *MindSpace: Influencing Behaviour Through Public Policy*, London: Cabinet Office/Institute for Government.
- Dolan, P. et al. (2010b). *MindSpace: Influencing Behaviour Through Public Policy – The Practical Guide*, London: Cabinet Office/Institute for Government.
- DSA (2009). *Learning to Drive: Report on Consultation*, London: DSA.
- Eby, D. et al. (2003). Improving older driver knowledge and self-awareness through self-assessment: the driving decisions workbook, *Journal of Safety Research*, 34: 371–381.

- Eby, D. et al. (2008). *M-CASTL 2008 Synthesis Report, Volume One: Older Adult Mobility*, Transportation Research Institute and Michigan Centre for Advancing Safe Transportation Throughout the Lifespan. Retrieved 13 January 2011, from <http://m-castl.org/files/2010SynthesisReport-Vol1.pdf>.
- Freund, B. et al. (2005). Self-rated driving performance among elderly drivers referred for driving evaluation, *Accident Analysis and Prevention*, 37: 613–618.
- Gandolfi, J. (2010). Infrastructure and older driver risk: a literature review. In E. Box, J. Gandolfi and K. Mitchell, *Maintaining Safe Mobility for the Ageing Population*, London: RAC Foundation.
- Government Social Research (2008). *GSR Behaviour Change Knowledge Review: Practical Guide – an Overview of Behaviour Change Models and Their Uses*, GSR. Retrieved 13 January 2011, from [http://www.civilservice.gov.uk/Assets/Behaviour%20change\\_practical\\_guide\\_tcm6-9696.pdf](http://www.civilservice.gov.uk/Assets/Behaviour%20change_practical_guide_tcm6-9696.pdf).
- Gray, C. & Sullivan, P. (2002). MDs still the key to eliminating unfit drivers, jury decides, *Canadian Medical Association Journal*, 166. Retrieved 13 January 2011, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC102372/>.
- Hakamies-Blomqvist, L. & Peters, B. (2000). Recent European research on older drivers, *Accident Analysis and Prevention*, 32: 601–607.
- Halpern, D. (2009). *The Hidden Wealth of Nations*, Polity.
- Halpern, D. et al. (2004). *Personal Responsibility and Changing Behaviour: the State of Knowledge and Its Implications for Public Policy*, London: Cabinet Office/Prime Minister's Strategy Unit.
- Hawley, C. (2010). *The Attitudes of Health Professionals to Giving Advice on Fitness to Drive*, Road Safety Research Report 91, London: Department for Transport.
- Help the Aged (2008). *Old age – not the end of the road*, London: Help the Aged.
- Help the Aged/Age Concern (2007). *Insurance and Age: Exploring Behaviour, Attitudes and Discrimination*, London: Help the Aged/Age Concern.
- Holland, C. (2001). *Older Drivers: a Review*, London: Department for Transport.
- House of Lords Science and Technology Committee (2010). *Call for Evidence: Behaviour Change*, London: House of Lords.
- IAM (2010). *Older Drivers: Safe or Unsafe?*, Institute of Advanced Motorists. Retrieved 13 January 2011, from <http://www.iam.org.uk/images/stories/reports/IAMOlderdrivers.pdf>.
- Kostyniuk, L. et al. (2008). Self-regulatory driving practices among older adults: health, age and sex effects, *Accident Analysis and Prevention*, 40: 1576–1580.
- Langford, J. et al. (2008). Do age-based mandatory assessments reduce older drivers' risk to other road users?, *Accident Analysis and Prevention*, 40: 1913–1918.
- Lucas, K. & Jones, P. (2009). *The Car in British Society*, London: RAC Foundation.
- Marshall, S. (2007). The acceptability to older drivers of different types of licensing restriction, *Accident Analysis and Prevention*, 39: 776–793.
- Mayhew, D. & Simpson, H. (2002). The safety value of older driver education and training, *Injury Prevention*, 8: ii3–ii8.
- Mitchell, K. (2010). Older drivers: a review. In E. Box, J. Gandolfi and K. Mitchell, *Maintaining Safe Mobility for the Ageing Population*, London: RAC Foundation.
- McKenna, F. (2010). *Education in Road Safety: Are We Getting it Right?*, London: RAC Foundation.

- MCAP/The AA Motoring Trust (2000). *Helping the Older Driver*, Medical Commission on Accident Prevention/The AA Motoring Trust. Retrieved 13 January 2011, from [http://www.theaa.com/public\\_affairs/reports/helping\\_the\\_older\\_driver.pdf](http://www.theaa.com/public_affairs/reports/helping_the_older_driver.pdf).
- Musselwhite, C. (2010). The role of technology in helping to prolong safe driving for older people, paper presented to British Society of Gerontology Annual Conference, Brunel University, 6 July 2010.
- Pankhurst, G. & Shergold, I. (2010). Importance of older people's car access to community connectivity, paper presented to British Society of Gerontology Annual Conference, Brunel University, 6 July 2010.
- Parker, D. et al. (2003). Older drivers and road safety: the acceptability of a range of intervention measures, *Accident Analysis and Prevention*, 35: 805–810.
- Pine, K. (2009). The elderly: a descriptive study of the perceptions of the elderly and their driving abilities, *Social Work Student Papers*, Providence College. Retrieved 13 January 2011, from [http://digitalcommons.providence.edu/cgi/viewcontent.cgi?article=1039&context=socialwrk\\_students](http://digitalcommons.providence.edu/cgi/viewcontent.cgi?article=1039&context=socialwrk_students).
- Rabbitt, P. et al. (1996). *When and why older drivers give up driving*, Manchester: Age and Cognitive Performance Research Centre.
- Rabbitt, P. et al. (2002). *Age, Health and Driving*, Age and Cognitive Performance Research Centre/AA Foundation. Retrieved 13 January 2011, from [http://www.iam.org.uk/images/stories/Policy\\_Research/Historic\\_reports/AA\\_foundation\\_FDN32.pdf](http://www.iam.org.uk/images/stories/Policy_Research/Historic_reports/AA_foundation_FDN32.pdf).
- Rabbitt, P. & Parker D. (2002). *The Ageing Driver: A Programme of Research*, London: Department for Transport.
- Rimmo, P. & Hakamies-Blomqvist, L. (2002). Older drivers' aberrant driving behaviour, impaired activity, and health as reasons for self-imposed driving limitations, *Transportation Research*, 5: 47–62.
- Smith, S. (2010). Mind the Gap? Facebook users certainly do, *The Politics of Marketing*, 11 October. Retrieved 13 January 2011, from <http://stuartsmithsblog.wordpress.com/2010/10/11/gap/>.
- Stelzner, M. (2010). How Starbucks engages millions of Facebook fans, *Social Media Examiner*, 20 May. Retrieved 13 January 2011, from <http://www.socialmediaexaminer.com/how-starbucks-engages-millions-of-facebook-fans/>.
- Thaler, R. & Sunstein, C. (2008). *Nudge: Improving Decisions about Health, Wealth and Happiness*, London: Penguin.
- Tuokko, H. et al. (2007). Perception, attitudes and beliefs, and openness to change: implications for older driver education, *Accident Analysis and Prevention*, 39(4): 812–817.
- Webster, T. (2010). Over-50s to make up 40 percent of drivers by 2035. *Autoblog*. Retrieved 13 January 2011 from <http://uk.autoblog.com/2010/11/08/over-50s-to-make-up-40-percent-of-drivers-by-2035/>.
- Wintour, P. (2010). David Cameron's "nudge unit" aims to improve economic behaviour, *The Guardian*, 9 September. Retrieved 13 January 2011, from <http://www.guardian.co.uk/society/2010/sep/09/cameron-nudge-unit-economic-behaviour>.
- Woodman, P. (2010). Over-50s hit by car insurance hike says survey, *The Independent*, 17 October. Retrieved 13 January 2011, from <http://www.independent.co.uk/money/insurance/over50s-hit-by-car-insurance-hike-says-survey-2109128.html>



The Royal Automobile Club Foundation for Motoring Limited is a charity which explores the economic, mobility, safety and environmental issues relating to roads and responsible road users. Independent and authoritative research, carried out for the public benefit, is central to the Foundation's activities.

RAC Foundation  
89-91 Pall Mall  
London  
SW1Y 5HS

Tel no: 020 7747 3445  
[www.racfoundation.org](http://www.racfoundation.org)

Registered Charity No. 1002705

February 2011 © Copyright Royal Automobile Club Foundation for Motoring Limited

Designed and printed by  
The Javelin Partnership Ltd  
Tel: 01189 303 123

Produced on paper from a managed sustainable source, using pulp that is ECF, also FSC certified as containing 50% recycled waste. Printed using vegetable soya based inks.