

# The moral case for intelligent speed adaptation

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## The moral case for Intelligent Speed Adaptation

**Keywords:** ethics of driving risk, prevention of harm to others, Intelligent Speed Adaptation, techno-regulation

### Abstract

Speeding is a major problem in road safety. Intelligent Speed Adaptation (ISA) is a potential solution, but the moral acceptability of ISA has been called into question both in the popular media and in academic discussions. In this paper, a moral case is made for making warning and limiting versions of ISA obligatory in all cars. The practice of car driving involves frequent speeding, which imposes unacceptable risks of harm on other road users. In this paper, I argue that ISA can therefore be justified on the basis of the harm it prevents, as is the current criminalisation of speeding. I defend obligatory ISA against three objections. First, ISA is likely to introduce some additional risk for drivers. However, drivers should accept these risks to reduce the risks from driving for other parties to an acceptable level. Second, although limiting ISA reduces drivers' options for moral agency and exercising self-restraint to some extent, this consequence is defensible. Third, accepting ISA does not commit us to accepting an entire range of other behaviour-regulating technologies.

### I Introduction

In this paper, I will argue that there is a moral case for setting mandatory speed alerts and speed limiters in all cars. These technologies are fairly intrusive. Nevertheless, my claim is that we should accept these measures in our cars to solve a major problem in road safety: speeding. In 2010, in Europe, more than 30,000 people were killed and 1.4 million were injured in road traffic, with speeding as a major cause. Current enforcement measures work to some extent but are clearly not sufficient. Intelligent Speed Adaptation (ISA) systems are highly effective additional measures to counter speeding. Advisory ISA warns drivers if they transgress the speed limits. Limiting ISA makes speeding impossible, and consequently this technology can prevent up to 50 % of fatal accidents.<sup>1</sup>

Intelligent Speed Adaptation is indispensable for reducing the risks of car driving to a more acceptable level. Many philosophers uncritically refer to driving as an example of acceptable risk imposition.<sup>2</sup> The benefits of car driving are considered to justify the risks involved, which are perceived as being relatively low. Car driving is regarded as a morally acceptable practice from which we all benefit. However, as I will argue below, this view is problematic even with regard to lawful car driving. Moreover, in appealing to car driving as an example of acceptable risk imposition, one fails to appreciate the fact that the practice involves massive transgressions of the rules. Pedestrians, cyclists, and lawful drivers have good reason to reject the risks involved in our *actual* car driving practice. No tacit consent to the risks of driving can be inferred from individuals' choice to walk, cycle, and drive.<sup>3</sup>

Speeding thus imposes excess risk of harm to life and limb. Speeding involves transgressions of democratically accepted rules for traffic risk regulation, which ideally represent a fair weighing of driving risks and benefits. Thus, the resulting harm would be wrongdoing. Therefore, it appears that, as in the criminalisation of speeding, ISA is justified by the prevention of wrongful harm to others. Insofar as ISA is an effective criminal enforcement method, there appears to be a straightforward moral case for ISA.

However, several objections to ISA are raised. In particular limiting ISA, which makes speeding technically impossible, meets strong resistance from many drivers.<sup>4</sup> In the popular press, readers raise the concern that ISA introduces new safety risks that they are unwilling to accept.<sup>5</sup> Additionally, they claim that ISA is an intolerable interference with drivers' liberty. Legal scholars have argued that the enforcement of the law by means of technologies such as ISA goes beyond the law itself, because this type of enforcement makes civil disobedience impossible and leaves no room for interpretation of the law. People obey the law because they are unable to do otherwise and not as an exercise of moral agency. Consequently, ISA-like technologies might endanger the development of the moral capacities of citizens and reduce their human dignity.<sup>6</sup> Even worse, arguments similar to those that justify ISA appear to justify an entire range of other behaviour-regulating technologies.

In addition to its direct practical relevance, then, ISA is an interesting example of a broader trend in regulation, namely so-called 'techno-regulation', or 'design-based regulation'. Techno-regulation refers to regulating and channelling conduct "by relying on [...] integrated technology or design".<sup>7</sup> Techno-regulation that tries to influence people while leaving them free choice can be classified as a so-called persuasive technology.<sup>8</sup> Advisory ISA, which warns drivers if they transgress the speed limits, falls within this category. Techno-regulation that makes undesirable behaviour impossible or a desired behaviour the only option could be called a limiting or forcing technology. Limiting ISA, which makes speeding impossible, is a clear example of such a technology.<sup>9</sup>

This paper is organised as follows. In the next section, I will argue that car driving poses morally problematic risks. In section III, I will explain how ISA can reduce the risks of driving by reducing the incidence of speeding. In section IV, I will argue that harm prevention justifies ISA in much the same way as the criminalisation of speeding. In section V, I argue that drivers are morally required to accept the additional safety risks introduced by ISA to make driving safer for others. In section VI, I will extensively evaluate the concern that ISA erodes the moral agency and responsibility of drivers. In section VII, I argue that the reasons for implementing ISA do not commit us to 'designing out' all forms of undesirable behaviour. ISA is not a first step to the virtual disappearance of citizens' liberty. Finally, I conclude that there is a moral case for all of the different versions of ISA. Amongst these versions, limiting ISA with a highly restricted option to override the system appears to be the most favourable.

## **II Driving risks are morally problematic**

Although many of us drive, closer inspection shows that current car driving is morally problematic. Driving risks may *appear* to be acceptable because these risks are the result of a (democratic) agreement about risks and benefits that is viewed as working for the benefit of all. However, this impression is false. Pedestrians, cyclists, and some drivers, especially lawful drivers, have at least three reasons to reject the driving risks that are imposed on them.<sup>10</sup> First, the risks are, in fact, substantial *and* higher than necessary to receive benefits. This is most clearly problematic from a consequentialist perspective. In addition, drivers impose highly non-reciprocal risks on pedestrians, cyclists, and some other drivers. The distribution of benefits and burdens is unfair. Finally, precautionary measures, such as airbags, are distributed unevenly amongst different road users. These latter two reasons have to do with considerations of fairness that are central to a deontological perspective.

ISA is relevant to each of these three problematic characteristics of car driving practices as follows. Speeding contributes strongly to unnecessarily high risk levels. Furthermore, speeding

severely aggravates the consequences of both the non-reciprocal character of driving risks and the absence of due precaution. I will elaborate on each characteristic in turn.

First, the statistics make clear that driving risks are indeed substantial: road traffic is a major cause of death and injury all over the world. Although the risks imposed by a single car trip may appear to be low, it should be noted that driving is not an isolated action. Driving is a regular practice for which the *cumulative risks* imposed on road users are the most appropriate subject for moral evaluation.<sup>11</sup> In 2010, approximately 30,400 European Union citizens were killed in road traffic accidents, of which approximately 19 % were pedestrians and 7 % were cyclists.<sup>12</sup> In addition, approximately 1.4 million people were reported as injured.<sup>13</sup> In 2011, an estimated 250,000 people were seriously injured, of which a significant number became permanently disabled.<sup>14</sup> The estimated economic cost of these accidents is 2 % of the European yearly GDP.<sup>15</sup> Husak, writing on this problem in the context of the US, where it is worse than in Europe, rightly remarks that "...driving is the riskiest activity in which the vast majority of Americans routinely engage. It is safe to predict that if the typical reader of these pages (directly) kills or seriously injures another person, his weapon is likely to be a motor vehicle".<sup>16</sup> A quick glance at the data provided by the World Health Organization shows that the figures in the rest of the world are even worse than in the US.<sup>17</sup> Driving poses significant risks to human health and life.<sup>18</sup>

The massive transgression of traffic rules is one of the causes of these unnecessarily high risk levels. In most countries, between 20 and 40 % of cars exceed the speed limit, depending on the road type. Speeding is even more common in other countries. Speeding is an *avoidable* major contributing cause of accidents.<sup>19</sup>

Philosophers who present car driving as an example of acceptable risk imposition may respond to my argument so far by emphasizing that they are referring to lawful driving. Suppose that lawful car driving does indeed involve a level of risk that is morally acceptable. Then, their reply merely serves to accentuate the need to bring actual driving practice much closer to lawful driving. In fact, the huge allowance for unlawful driving constitutes the highest risk of car driving and is a good reason to reject current driving practices.

The second reason to reject driving risks applies to both unlawful and lawful driving: the risks are highly non-reciprocal. Risks and benefits are not distributed fairly among different road users. This is most obviously the case for risks imposed by drivers on pedestrians and cyclists. However, the risks of crashes can be distributed highly unevenly also among drivers because different cars have different masses and can thus be 'crash-incompatible'.<sup>20</sup>

This non-reciprocal character of driving risks cannot be justified by the distribution of benefits. On the contrary, the resulting benefits of driving are primarily derived by the parties with the lowest risk, the drivers. The numerous pedestrians who do not drive receive no benefits from a significant part of all trips made by car, not even indirect benefits. Drivers of heavy cars receive safety benefits at the expense of drivers of lighter cars. Crucially, these risk impositions need not be as non-reciprocal as they currently are for car driving to deliver its benefits. For, cars need not be heavy to travel from A to B. And, much more can be done to protect vulnerable road users. In the EU, pedestrian and cyclist safety have only recently become important design considerations for car manufacturers, spurred by 2007 EU legislation that has (finally) addressed the problem of vulnerable road users. Therefore, drivers impose many partly avoidable risks on other road users, while receiving the lion's share of the benefits.

The third reason not to accept car driving risks relates to the above discussion of the non-reciprocity of driving risk and regards the uneven distribution of precautionary measures amongst

road users. Precaution is a crucial condition for acceptable risk imposition: have those imposing the risk taken due precautions directed towards *each* of the affected persons?<sup>21</sup> Unfortunately, the safety measures with which cars are equipped are one-sided in being designed for drivers and passengers. For example, although airbags for drivers have been more or less standard for approximately two decades, there are virtually no cars with airbags for pedestrians. Car driving is, at least in Europe, changing for the better but, in its current form, it falls short of taking reasonable precaution for other road users. Drivers cannot make the argument that they are not responsible for car design. Manufacturers are highly sensitive to consumer wishes that these are willing to pay for. If enough drivers were genuinely worried about pedestrian safety, car manufacturers would respond.

To conclude, although it is certainly morally significant whether or not drivers obey the law, even lawful driving is morally problematic. Pedestrians, cyclists, and some car-drivers have more than sufficient reason to reject current driving risks.<sup>22</sup> As already noted, the mere fact that they use the road cannot be taken as (implicit) consent to these risks. Often they have no alternative. Furthermore, they may be largely unaware of several of the facts of driving risks as discussed in this section.

The aforementioned risks reinforce each other. Although speeding is risky in itself, crash incompatibility and a lack of precautionary equipment increase the risks of speeding enormously. This mutual reinforcement amplifies the moral urgency of reducing the incidence of speeding, thus strengthening the case for ISA. In the next section, I will explain how ISA can reduce driving risks significantly.

### III Significant risk reduction through Intelligent Speed Adaptation

ISA leads to a major reduction of driving risk by reducing the incidence of speeding. The effectiveness of ISA can be explained in terms of the strong and empirically well-established relationship between speed and accident risk. Higher speed increases the risk of accidents by increasing the stopping distance and decreasing manoeuvrability and the available reaction time. In addition, higher speed always increases the severity of accidents, thus increasing the likelihood that an accident will result in injury or fatality. Consequently, a tiny reduction of the mean speed from 120 km/h to 119 km/h already results in 3.8 % less fatalities. In addition to a higher mean speed, also a higher variance in the speed of different cars increases accident risks.<sup>23</sup>

There are several variants of the ISA. All of these variants employ technology, most often global positioning technology, that locates a vehicle. The location of the vehicle is coupled to a database that provides the corresponding speed limit, which enables feedback to be provided to the driver. Advisory variants of ISA display the speed limit and warn the driver if he exceeds the limit. Supportive ISA limits the speed (e.g., via the engine management system or a gas pedal that exerts upward pressure) but can be overridden at any time. Limiting versions operate in comparable ways but go beyond supportive ISA by limiting the driving speed *without* allowing the driver to override the system. Interestingly, ISA technologies enable governments to go beyond the system of fixed speed limits, and to work with dynamic speed limits. Dynamic speed limits can vary with the time of the day, the weather, traffic load, and other conditions.

Extensive research predicts sizable absolute risk reductions upon implementing ISA. Numerous driving simulator experiments and field tests with ISA have consistently shown the following effects: a decrease in the mean speed, a decrease in the speed differences among cars, and a decrease in transgressions of the speed limit.<sup>24</sup> It is predicted that the use of advisory, supportive, and limiting ISA in all cars would prevent 2.7, 12.0, and 28.9 %, respectively, of injury accidents in the

UK in which a car is involved.<sup>25</sup> This 28.9 % accident reduction for limiting ISA can be extrapolated to a 50 % reduction in fatal accidents.<sup>26</sup> An Australian trial with an advisory ISA predicted a reduction of 5.9 % for injuries and 8.4 % for fatal accidents.<sup>27</sup> Calculations that were based on data from a Dutch trial with limiting ISA predicted a 25-30 % reduction of fatal accidents.<sup>28</sup> These estimates are calculated on the basis of real-world speed data from ISA field-trials, empirical quantitative models of the relations between speed and accidents (as referred to above), and accident statistics for the respective countries.<sup>29</sup> In a traffic system with dynamic speed limits the reductions will most likely be even larger.<sup>30</sup> Data giving predicted absolute numbers of lives saved are absent, but some rough estimations can be made. Given the approximately 30.000 yearly road traffic fatalities in Europe, limiting ISA will save thousands of lives. For individual countries this will typically be a few hundreds.

To appreciate the precise scope of my claims, it is important to note that the speed at which ISA systems intervene, either by warning or limiting speed, is a matter of choice. This speed could be the legal maximum speed or a higher speed.<sup>31</sup> In most ISA trials, the intervention speed was the legal speed limit, sometimes with a very small margin. In this paper, all my arguments apply to ISA that intervenes at the legal speed limit because this is the strongest and thus most interesting case for which to argue. In addition, this version of ISA matches the current practices of speed limit enforcement in several countries. Legal speed limits have a particular significance regarding a democratically accepted level of risk. Nonetheless, readers who are ultimately unconvinced by my arguments are invited to consider how their ethical evaluation of ISA would change for an increased speed level at which ISA intervenes.

#### **IV Harm prevention justifies ISA**

Obligatory ISA is justified by the aim of preventing harm in much the same way as the current criminalisation of speeding. In many countries, laws have been passed that set speed limits and criminalise the transgression of these limits. The justification of these laws follows relatively straightforwardly from the fact that they prevent severe harm. According to Feinberg's well-known formulation of this idea that the prevention of harm to others supports criminalisation, "it is always a good reason in support of penal legislation that it would probably be effective in preventing (eliminating, reducing) harm to persons other than the actor (the one prohibited from acting) *and* there is probably no other means that is equally effective at no greater cost to other values".<sup>32</sup> This rationale for criminalisation includes the aim of preventing significant *risk* of harm, since many harms are the result of accidental events. Harm prevention is only *a* reason in support of criminalisation, and not a sufficient or even a necessary reason, for we do not criminalise all behaviours that causes harm or risk of harm to others.

Speed limits that are rightly set play an import role in determining which driving behaviour involve such risks of harm to other road users that it ought to be criminalised. Driving below the speed limit creates the very same risk of accidents as speeding, only of a lesser magnitude. Nevertheless, we do not prohibit all driving, because flexible and time-efficient mobility has high value. Setting the speed limits, then, involves a judgment based on the social benefits of driving at a certain speed and the distribution of these benefits, and the safety risks and their distribution among different road users. Thus, we weigh driving risks against the benefits and also consider whether risks and benefits are distributed in a sufficiently fair way.

Given morally justified speed limits, exceeding them *wrongfully* imposes *excess* risk of accidents. Again, these excess risk are substantial: consider, for example, that an increase in the mean speed at highways from 63 to 70 mph leads to 62 % more fatalities,<sup>33</sup> together with the high

incidence of speeding, between 20 % and 40 % for most countries.<sup>34</sup> These substantial additional risks cannot be justified, because the additional benefits no longer outweigh them, and also the distribution of risks and benefits becomes too problematic. Our right not to be harmed bodily or killed is (one of) the most widely acknowledged and most important of our rights. The interest of bodily integrity, protected by this right, is a profoundly basic interest that all humans share and on which nearly all of their other interests crucially depend. Therefore, the interest of traffic safety for all participants easily outweighs the drivers' interests that are associated with speeding, such as saving travel time or the enjoyment of driving fast. Thus, speeding is a serious wrong. It imposes unjustified substantial risk of grave harm to others,<sup>35</sup> which is sufficient reason to criminalise speeding. At the very least, the justification of the relevant road traffic laws that many countries have adopted can be understood along the lines sketched here.

It might be objected that some instances of speeding are not of a nature that they should be considered as serious wrongs. For example, "am I really imposing a substantially increased risk of harm to others when I drive a few mph over the speed limit for 20 miles along a deserted highway under excellent driving conditions?"<sup>36</sup> The following responses are possible. First, as I argued above driving at the legal speed limits *already* involves substantial risk, which however, according to our collective judgment, is justified by the mobility benefits. Therefore, the *increase* of this risk need not be substantial for speeding to be wrong. Second, even if it were conceded that some incidences of speeding do not constitute a serious wrong, or a wrong at all, speed limits are still justified by the prevention of harm to others on the level of the driving practice as a whole. No proof that every single case of speeding is morally wrong is needed to justify uniform speed limits, and the same is the case for the justification of ISA. Third, ISA enables dynamic speed limits that could be set higher under the conditions mentioned in the objection.

At this point, it is useful to distinguish between a weaker and a stronger claim defended in this paper. The weaker, conditional, claim is that, *if* current levels of the speed limits are justified (representing a just weighing of risks and benefits), then obligatory ISA is justified by the harm it prevents.<sup>37</sup> The stronger claim is that obligatory ISA is in fact justified in this way. The reason is that, by and large, current speed limits are too high, rather than too low, such that if the limits are exceeded, this clearly creates a risk of harm that ought to be prevented. As discussed in section II above, driving risks are substantial, the protection of vulnerable road users is far less than reasonable and feasible, while the benefits of driving go one-sidedly to drivers who create the risks. Many cost-effective road safety measures have been identified that still wait for implementation.<sup>38</sup> As long as these problematic aspects of current driving risks are not satisfactorily addressed, our speed limits are most likely not too low. A discussion as to how the speed limits should be set exactly is, however, far beyond the scope of this paper. This would have to include an extensive weighing of cost and benefits, as well as a determination of the relative importance of fairness considerations. For present purposes, this discussion of the justification of speed limits should suffice.

It is reasonable to hold that harm prevention does not only support criminalisation, but techno-regulation, such as ISA, as well. This is in the spirit of the broader Millian liberal core idea that the only legitimate reason for which the state may interfere with the liberty of its citizens is to prevent harm to others.<sup>39</sup> Techno-regulation is another way in which the state can interfere with the liberty of citizens to prevent harm to others. Like criminalisation, techno-regulation can often constitute a strong restriction of citizens' liberty, which, in principle, should only be imposed by the state.

However, some may doubt that preventing harm to other road users justifies a policy of making ISA mandatory in all cars. It could be argued that because physical limitations of liberty extend beyond legal limitations, a stronger justification is needed for the former. This view is hard to defend as a general claim, because there are many intentionally designed physical limitations on how we can act that are completely non-problematic. In particular our built environment contains many such limitations. For example, elevated pavements exclude drivers from space dedicated to pedestrians, and iron fences strongly inhibit unauthorized climbing of pylons.<sup>40</sup>

Nevertheless, I will address three respects in which ISA could be thought to require more justification than criminalising speeding. First, the outcome of balancing the interests of different road users is not fundamentally altered by implementing ISA in addition to the criminalisation of speeding. Road traffic law enforcement is a heavy burden on the criminal justice system. Imprisoning offenders incurs serious public costs, such as the stigmatisation of wrongdoers and financial costs,<sup>41</sup> that would be reduced by the implementation of ISA. However, driving will become less pleasurable for a significant portion of drivers who may experience the warning signals from advisory ISA as annoying and intrusive or because of the impossibility of speeding with limiting ISA. These drivers may consider the reduction in their enjoyment of the driving experience as a significant loss, and any government that aims to successfully implement ISA should address this consideration. At the same time, research has shown considerable variation in drivers' attitudes towards ISA.<sup>42</sup> A different group of drivers may feel supported by this system and find driving much more pleasurable knowing that all cars have limiting ISA.

It is of crucial importance to appreciate that ISA does not affect the central interests of drivers. Drivers can still travel to their destination in a flexible, time-efficient, and private manner, which enhances personal autonomy.<sup>43</sup> ISA systems do not interfere with this opportunity; they only make it safer for all of the parties involved. Drivers who experience a significant loss of freedom and pleasure from the use of ISA could merely be individuals who never took the legal limits seriously in the first place. Feinberg's analysis of the 'fecundity' of liberties applies here.<sup>44</sup> Mobility as such is an option that leads to many other valuable options, whereas speeding primarily leads to enjoyment and small travel-time savings.

However, speeding may save lives in cases of emergency. Given that in most cases calling ambulance services is the best option, the number of lives saved by limiting ISA will significantly outweigh the number of lives saved by emergency speeding. Furthermore, it is not at all clear that a need to speed in cases of emergency would trump others' right to protection against speeding risks. Still, limiting ISA would rule out some rare cases in which speeding, within certain plausible limits, appears to be justified. To conclude, in case of both the criminalisation of speeding and ISA, the safety interests of all road users outweigh the interests of the drivers in speeding.

The second point of comparison between the justification of criminalisation and ISA regards their effectiveness. As noted above, criminalisation can only be justified if it is effective in preventing harm. This implies that greater effectiveness in preventing harm to others provides stronger support for limiting liberty. Limiting ISA could prevent up to 30-50 % of fatal accidents (section II), enough of which are not the victim's own fault and thus qualify as harm to others. At least in the particular case of ISA, stronger support for liberty limitation can plausibly also be interpreted as support for greater liberty limitation. This interpretation seems plausible because even though a physical speed limit goes indeed beyond a legal limit, the liberty to speed is of minor fecundity.

Finally, ISA may come with "greater cost to other values" (Feinberg)<sup>45</sup> than mere criminalisation of speeding. In particular, ISA may threaten legislative values. One concern regarding



techno-regulation in general is that such regulation could negatively affect the ideal of ‘legality’. Legality refers to the concept that “law should be viewed as the product of an interplay of purposive orientations between the citizen and his government [and not] as a one-way projection of authority, originating with government and imposing itself upon the citizen”.<sup>46</sup>

Legality poses a potential problem for ISA because it is often assumed, including by politicians,<sup>47</sup> that ISA lacks societal support. If this assumption is correct, the policy of making ISA mandatory for all drivers would fall short of the moral ideal that citizens express their autonomy via democratic lawmaking. However, advisory ISA is supported by a majority of drivers, whereas a significant minority supports stronger (i.e., supportive and limiting) versions of ISA.<sup>48</sup> Moreover, what counts is the view of *all* citizens, not only the view of drivers. It seems not unlikely that the overall societal support for limiting ISA is greater than that by drivers alone, though I know of no data here.

Other important legislative values, such as ‘transparency’ and ‘accountability’,<sup>49</sup> can also be safeguarded. The decision to make any version of ISA mandatory should involve democratic procedures in the same way as the underlying traffic laws and legal speed limits.

To conclude, ISA can be justified on the basis of preventing harm to other road users, similar to the criminalisation of speeding. As each of the objections to ISA that were mentioned in the introduction hinges on certain “cost to other values” arising from ISA, I will now discuss these objections in turn.

## **V      Objection I: ISA introduces new safety risks**

One objection against ISA that is frequently voiced in the popular press is that this technology will introduce new safety risks from sources such as technological malfunctioning, negative adaptation of driving behaviour to ISA (e.g., tailgating, higher degrees of frustration), and increased time needed for overtaking.<sup>50</sup> One could imagine what might happen if, for example, the localisation technology of limiting ISA were to erroneously locate a car along a stretch of a road with a speed limit of 50 km/h, when the driver is in fact driving on an adjacent, parallel highway. The objection grants drivers the right not to accept such additional and partially involuntary risks and thus to reject ISA. This objection is, however, not valid.

The safety risks that accompany ISA are real, although their magnitude is uncertain, and depends on several factors. The extent of behavioural adaptation, for example, depends on the scale of implementation: is the driver one of a few driving with ISA or is ISA the standard? Overtaking may become more dangerous with ISA, but drivers are fully in control of deciding whether to overtake. If ISA leads to less overtaking, safety may, in fact, increase. No sound estimates of magnitudes are currently available for many of these risks; however, in general, the level of uncertainty, as judged by experts, is higher for limiting ISA than advisory ISA.<sup>51</sup> Two ways of gaining more knowledge and addressing these risks are to do more research and begin monitored implementation, most likely with advisory versions of ISA.<sup>52</sup>

Despite the uncertainty in the aforementioned risks, the numerous trials that have been conducted since the 1990s do not provide any evidence that the magnitude of these safety risks would be considerable. It is therefore highly plausible to assume that the large gains in safety that result from decreased speeding will significantly outweigh any losses from ISA safety risks. Although it is important to validate this claim during ISA implementation, in the remainder of this section I will assume that it holds.

Accordingly, from a consequentialist perspective on the ethics of risk, drivers cannot refuse to accept safety risks that arise from ISA on moral grounds, because ISA can be expected to produce a significant overall increase in safety. Furthermore, this expectation also applies to drivers individually. Thus, drivers cannot protest that their well-being is sacrificed for the sake of the well-being of other road users. Nevertheless, they could maintain that they prefer the higher risks that arise from others' speeding above the risk of, for example, malfunctioning ISA technology. These drivers may strongly dislike the fact that they cannot control that risk. As Teuber argues, we are not merely concerned with the level of the risks we bear, but, as autonomous persons, we also value control over these risks.<sup>53</sup> Therefore, from a deontological perspective, it is crucial that people consent to the risks imposed on them (be it perhaps only hypothetically).

However, from this perspective it also follows that a driver cannot reasonably refuse to accept additional safety risks that arise from ISA. In section II, we saw that drivers impose substantial, avoidable, and non-reciprocal risks on vulnerable road users without taking reasonable precautionary measures. Again, reasonable precaution is an important condition for acceptable risk imposition. ISA is such a precautionary measure that is highly effective. In fact, ISA is indispensable for reducing the risks of driving practices down to a level that is acceptable to all road users. Therefore, drivers should accept the imposition of some (likely small) risks on *themselves* to reduce the substantial risk they impose on *others*.

Nonetheless, a lawful driver might object to this line of reasoning by arguing that she never speeds or that advisory ISA would be sufficient to prevent her from speeding. She is certainly right, but the relevant question is whether her reasons to reject ISA are stronger than the reasons for which an individual pedestrian or cyclist could reject the alternative, i.e., cars not equipped with ISA. From my discussions of driving risks (section II) and ISA risks, it should be clear that the vulnerable road users have the strongest case. The only way for the lawful driver to have the practice of driving, is to accept measures that prevent fellow drivers from speeding. To conclude, the safety risk objection to ISA does not hold.

## **VI Objection II: ISA erodes the moral agency and responsibility of drivers**

Roger Brownsword is an eloquent spokesman for the concern that techno-regulation, such as ISA, makes disobedience impossible and thus reduces and erodes citizens' moral agency and responsibility. Brownsword discusses the example of a fully automatic car and concludes that its implementation would mean a reduction of opportunities "for choosing agents to respect the vulnerability of others". He argues that such a car is the first step towards the "corrosion of the moral community". This moral community essentially presupposes that people are vulnerable rights-holders whose legitimate interests can be harmed. However, these people are also duty-bearers who "have at least some opportunity to inflict harm on right-holders".<sup>54</sup> I will label these opportunities for inflicting harm 'opportunities for moral agency' because what we value positively is that agents understand and act on the basis of moral reasons. These opportunities for moral agency presuppose that agents can act otherwise and cause harm.

How should ISA be evaluated in light of this concern? I will show that although ISA does take moral agency and responsibility away from drivers, this is justified by the safety benefits ISA provides. Karen Yeung analyses the effect of hypothetical automatic braking technology, which is activated by red traffic lights, on drivers' moral agency and responsibility.<sup>55</sup> I will draw from her example to analyse ISA systems. Let us consider a version of advisory ISA that emits a clear warning signal for 5 seconds for every transgression of the speed limit. How does this ISA affect the moral

agency of the following three different stylised types of drivers: the vicious driver who only acts on prudential reasons, the ordinary driver who typically acts on a mix of prudential and moral reasons, and the virtuous driver who always acts on moral reasons?<sup>56</sup>

Advisory ISA will elicit whichever reasons for not speeding are most important and accessible for a certain driver. The vicious and ordinary drivers are reminded of their self-interested reasons for not speeding, such as not getting fined and not getting hurt in an accident. The ordinary and the virtuous driver are, in situations in which they are not sufficiently attentive, reminded of their moral reasons for not speeding: having regard for the safety and well-being of others. As long as advisory ISA is not equipped with a detection function, the technology will not emphasise prudential reasons at the cost of moral reasons.<sup>57</sup> In addition, ISA would prevent each driver from speeding unintentionally, thus benefitting each.<sup>58</sup> We see that the opportunity for exercising moral agency is not reduced for any of these three drivers but that the driver is in fact supported in acting morally. Somewhat surprisingly, advisory ISA is a piece of techno-regulation that *promotes* rather than erodes the flourishing of the moral community.

The picture is different for limiting ISA. The decision to speed or not to speed is displaced from the moral agency of drivers to that of legislators who decide to implement ISA. In this case, each of the three drivers loses the specific option to exercise one's capacities for self-control in respecting the traffic laws, be it for prudential or moral reasons. Limiting ISA not only rules out the opportunity for drivers to show consideration for the safety of others by not speeding, it also rules out the option for these drivers to engage in deliberation about the moral reasons for speeding in emergency cases. Yeung discusses the case of a driver who sees a collapsing elderly pedestrian who urgently needs medical assistance.<sup>59</sup> Limiting ISA prevents speeding and makes it futile for the driver to make his own judgement as to whether morality requires the transgression of the legal speed limits to rescue the elderly person.

The interpretation of the law by the driver, who is the subject of the law, has become otiose, and the situation in which this driver would have to defend himself for speeding never arises. In the present system, however, if the driver were caught speeding, the legal system would provide several opportunities to account for his behaviour, such as arguing that prosecution was not appropriate or pleading in court that his behaviour was justified or excusable.<sup>60</sup> Nonetheless, the driver in the car with limiting ISA can still deliberate about other options to rescue the wounded pedestrian, such as calling emergency services.

Interestingly, this picture is completely changed by a relatively narrow option to override the limiting ISA system that is restricted in terms of both duration and excess speed. Drivers can exercise their capacities for moral agency by not using the override option; they can decide in emergency situations to speed while being willing to account for their actions, and it is once more reasonable to praise or blame their choice of driving speed.<sup>61</sup> The same applies to a larger extent to supportive ISA (which limits the speed but can be overridden at *any* time).

This more fine-grained analysis of how the different versions of ISA affect our opportunities for moral agency shows that this effect can be justified by the road safety benefits. The upshot of the analysis is that advisory ISA supports drivers in their exercise of moral agency. However, limiting ISA, on the contrary, does reduce drivers' moral agency by making speeding impossible. At the same time, drivers still have plenty of *other* opportunities to harm fellow road users. Drivers can fail to stay in their lane, engage in tailgating, or simply be inattentive. Thus, even limiting ISA does not significantly corrode our moral community and to the small extent that it does, this can be plausibly justified in terms of the avoidance of harm to others.<sup>62</sup> It is informative to compare the use of ISA to

that of speed bumps and elevated pavement. The two latter measures also reduce opportunities for moral agency, but seem not to elicit any concerns from any of the involved parties. In these cases as well, the huge safety benefits have a larger moral weight than considerations of moral agency. To conclude, the objection that ISA is detrimental to driver's moral agency and responsibility is unconvincing.

### **VII Objection III: Accepting ISA leads to a *Brave New World* society**

However, there is a related concern that is more pressing: if we accept ISA to gain safety, we seem to commit ourselves to accepting even more techno-regulation for similar reasons, ultimately leading to erosion of moral agency and responsibility. Brownsword rightly points to the fact that the effectiveness of techno-regulation is a strong incentive for regulators to apply such regulation in many domains.<sup>63</sup> Citizens would then perceive that their moral responsibility was being displaced to the system, and their capacities for moral agency would become superfluous in many situations and weakened as a result. Ultimately, this situation would lead to a society such as that in *Brave New World* in which the government extensively uses technology to 'design out' all socially undesirable behaviour.

It is not inevitable or even likely that accepting (limiting) ISA would lead to such a dreadful society. Yeung develops key insights into why this is unlikely.<sup>64</sup> Most importantly, society should maintain *sufficient* opportunities for the right type of moral agency to sustain the moral community. Yeung argues that we should only accept techno-regulation to an extent that is compatible with maintaining a healthy moral community. Crucially, new technologies always introduce new options for moral agency and therefore always affect the health of the moral community. This effect depends on the extent and types of these opportunities that come into existence with new technologies and disappear with displaced old technologies.

If we agree that what matters is having sufficient opportunities for moral agency, we can see that maximising these opportunities will often come at too high a cost. For example, faster cars increase our opportunity to exercise moral restraint and respect fellow humans. However, the other side of the coin is an increased opportunity to harm these humans. In current practice, faster cars increase the number of people killed, thereby removing members of the very same moral community. Several trade-offs can be identified in this respect. Maximising *opportunities* for moral agency does not maximise the development of our *capacities* for moral agency. Developing these capacities is difficult in a Hobbesian state of nature because acting on moral reasons, in principle, is most likely to occur in circumstances under which mutual trust exists among members of a society. This trust can only be established in a state that secures a minimum amount of safety to life and limb to which techno-regulation may be well suited. A second trade-off occurs between the opportunities for moral agency of different agents. If, for example, cars become faster and consequently drivers can do more harm with their cars, others may feel that it is no longer a responsible choice to walk or cycle.<sup>65</sup>

Once we accept this perspective on techno-regulation, we need to find a principled way to determine which instances we will allow and not allow. Our aim should be to maintain a sufficient opportunity for moral agency to sustain the moral community. Because techno-regulation is a relatively new phenomenon, legal scholars have just started to develop frameworks for assessing techno-regulation that could serve this purpose. Yeung provides some considerations that a fully worked out framework would be likely to incorporate.<sup>66</sup> I will apply these considerations to ISA technology to estimate whether ISA will be one of the pieces of techno-regulation that societies are

likely to accept. First, the regulatory purpose must be legitimate, and the social benefits of the measure must be substantial. Regarding ISA, the regulatory purpose of reducing injury and lethal accidents is clearly legitimate, and the expected social benefits are enormous, both in terms of lives saved, which are ultimately valuable, and prevented economic and social losses.

Second, the effect on the moral community of reducing the number of options for moral agency must be justified by these social benefits. In the previous section, I showed that ISA has a minor effect in this respect that is clearly outweighed by the social benefits. To see this more clearly, compare ISA with, for example, devices that ensure that only paying passengers can use public transport. These devices take away a significant opportunity to act honestly, and the long-term social costs of reinforcing a 'pay only if you are forced to pay' attitude may be high. However, the benefits of such devices are only financial and do not involve preventing the loss of life and limb.

Third, the technological measures must not be harmful to the regulatees or be otherwise illegitimate. This partly depends on the ethical and democratic standards of the society. ISA also satisfies this third criterion. ISA differs from many other measures that would do equally well qua trading moral agency options for large social benefits. ISA targets what people can do with a technological artefact, whereas other measures target persons themselves and may compromise their rights. For example,<sup>67</sup> tagging or chipping former criminals who have completed their sentences to prevent recidivism would, given substantial recidivism, result in significant social benefits. However, such measures go against the maxim that former criminals are citizens whose rights have been fully reinstated and can seriously harm these former criminals. Being trusted and having privacy is a crucial condition for a former criminal to resume his life as a citizen. ISA does not violate any drivers' rights or otherwise treat them illegitimately.

Although even an established and well-functioning framework for deciding on techno-regulation may give rise to considerable debate and judgements concerning degrees, Yeung's three considerations give reason to think that limiting ISA will lie on the justified side of the spectrum. I expect that satisfactory frameworks for techno-regulation can be developed, just like our society has developed principled ways to decide which behaviours to criminalise. Accepting ISA will not commit us to a world replete with techno-regulation.

## **VIII Concluding remarks**

I have argued that obligatory ISA is justified on the basis of its considerable potential to prevent harm to other road users caused by speeding. Exceeding the speed limits imposes significant excess risks as compared to lawful driving. These risks cannot be justified, because the interests of other road users in the safety of life and limb outweigh the interests of drivers in further time saving and driving pleasure. My argument that even lawful driving involves morally problematic risks confers additional justification to ISA. It is worth mentioning here that ISA also leads to saving a few percent of fuel, depending on circumstances.<sup>68</sup> Three specific objections against ISA have been extensively evaluated and shown to be ultimately unconvincing.

Although all versions of ISA are justified by the harm they prevent and survive the objections, it is still the question for which the strongest moral case can be made. The answer depends on weighing the various considerations discussed above. First, the effectiveness of advisory ISA, although sufficient to lead to a positive cost-benefit analysis,<sup>69</sup> is low compared to supportive ISA and particularly so to limiting ISA. Limiting ISA is approximately three to ten times more effective in reducing accidents than advisory ISA (section II), depending on which studies are used to perform the comparison. Safety benefits are crucial to all of the aforementioned arguments; thus, the higher

effectiveness of limiting ISA over that of advisory ISA is a major advantage. However, advisory ISA performs better for all other criteria: advisory ISA does not reduce but supports drivers' moral agency, introduces fewer additional safety risks to drivers, and, by virtue of its larger acceptance by society, adheres more strongly to the ideal that lawmaking and law enforcement are a cooperative enterprise of citizens and government (legality). Nonetheless, if we view the effort to increase road safety as a task for all citizens, it is unfair that drivers who comply with advisory (and supportive) ISA must bear the risks imposed by non-compliant drivers. That is, limiting ISA reduces the unfairness of the present mutual imposition of risks between lawful and non-lawful drivers more significantly than advisory ISA.

I take the impressive effectiveness of limiting ISA as being decisive for considering its moral case to be the strongest. Nonetheless, sufficient public support for ISA is essential. A strictly limited override will facilitate this objective and has also been shown to improve the performance of limiting ISA on driver safety and the preservation of moral agency.

However, making a final judgement of this type at this point in time is only of academic value. Governments that decide to implement ISA should consider an implementation trajectory, such as that proposed by Carsten and Tate.<sup>70</sup> This trajectory starts with self-chosen advisory ISA and proceeds via several steps to eventual obligatory limiting ISA in all cars. These steps may include starting with subclasses of drivers, such as young adults or repeat offenders. In the course of such a trajectory, societal acceptance and democratic support will most likely grow, while manufacturers will gain more knowledge about the risks associated with ISA, which will help improve the technology and lead to a more informed implementation process. The technology needed for advisory ISA is already widely available in the form of navigation devices and smart phones.<sup>71</sup> Governments have ample moral reasons to start implementing advisory ISA today.<sup>72</sup>

## NOTES

<sup>1</sup> See section (II) for references.

<sup>2</sup> e.g., David McCarthy, 'Rights, Explanation, and Risks', *Ethics* 107, 2 (1997): 205–25; Sven Ove Hansson, 'Ethical Criteria of Risk Acceptance', *Erkenntnis* 59, 3 (2003): 291–309; Madeleine Hayenhjelm and Jonathan Wolff, 'The Moral Problem of Risk Impositions: A Survey of the Literature', *European Journal of Philosophy* 20 (2012): E26–51.

<sup>3</sup> Cf. J. J. Thompson, 'Imposing Risks' in Mary Gibson (ed.) *To Breathe Freely* (Totowa, N.J.: Rowman and Allanheld, 1985).

<sup>4</sup> S. Vlassenroot et al., 'Potential for in-Car Speed Assistance Systems: Results of a Large-Scale Survey in Belgium and the Netherlands', *IET Intelligent Transport Systems* 5, 1 (2011): 80–89.

<sup>5</sup> See, for example, reader responses to the following article. <http://www.dailymail.co.uk/news/article-2408012/Britain-fights-EUs-Big-Brother-bid-fit-car-speed-limiter.html> (in fact there was no such EU plan to oppose; Last accessed 11-12-2014)

<sup>6</sup> Roger Brownsword, 'Code, Control, and Choice: Why East Is East and West Is West', *Legal Studies* 25, 1 (2005): 1–21; Karen Yeung, 'Can We Employ Design-Based Regulation While Avoiding Brave New World?', *Law, Innovation and Technology* 3, 1 (2011): 1–29.

<sup>7</sup> Brownsword op. cit., p2.

<sup>8</sup> B Fogg, *Persuasive Technology : Using Computers to Change What We Think and Do* (Amsterdam; Boston: Morgan Kaufmann Publishers, 2003), pp. 15–16.

<sup>9</sup> In the literature one can also find other terms for these versions of ISA, e.g. 'mandatory ISA' instead of limiting ISA, and 'voluntary ISA' instead of advisory ISA.

<sup>10</sup> Here I focus on safety risks, and leave out environmental and health risks, which concern other stakeholders as well.

<sup>11</sup> Cf. Douglas Husak, 'Vehicles and Crashes: Why Is This Moral Issue Overlooked?', *Social Theory and Practice* 30, 3 (2004): 351–70.

<sup>12</sup> European Road Safety Observatory, 'Traffic Safety Basic Facts 2012: Main Figure', (European Commission, DG Mobility & Transport, 2012a).

<sup>13</sup> European Road Safety Observatory, 'Annual Statistical Report 2012', (European Commission, DG Mobility & Transport, 2012b).

<sup>14</sup> [http://ec.europa.eu/transport/road\\_safety/topics/serious\\_injuries/index\\_en.htm](http://ec.europa.eu/transport/road_safety/topics/serious_injuries/index_en.htm) (Last accessed 11-12-2014). Real figures of (serious) injuries may be different and are most likely larger, because different reporting criteria and different definitions of serious injury are used across the EU. So, *estimates*, based on the European Injury Database, indicate that "more than four million people are injured annually in road traffic accidents in Europe, one million of whom have to be admitted to hospital". European Road Safety Observatory, op. cit. 2012b.

<sup>15</sup> Ibid.

<sup>16</sup> Husak, op. cit. p. 355.

<sup>17</sup> See <http://www.who.int/mediacentre/factsheets/fs358/en/index.html> (Last accessed 11-12-2014).

<sup>18</sup> *Contra* McCarthy, who writes, without providing arguments, that "Driving by someone and thereby imposing, say, a one in ten million risk of death on her seems to be an action of little moral significance" McCarthy op. cit. p. 211. As said, we should not focus on a single drive, but on the practice as a whole. In 2010, 0.64 % of EU deaths were traffic deaths European Road Safety Observatory, op. cit. 2012b. Thus, in 2010, the chance to die in traffic extrapolated to the lifetime of a EU citizen was 1 in 156. I suspect that many people would not accept this risk if they were aware of its magnitude.

<sup>19</sup> OECD and European Conference of Ministers of Transport, *Speed Management* (OECD Publishing, 2006), p. 55.

<sup>20</sup> If the mass difference increases, the lethal risk for the driver of the lighter car increases, while the risk for the driver of the heavier car decreases proportionally. A driver of a car that weighs 1079 kg, crashing with a 2100 kg car, has 21 times more chance of dying than the driver of the 2100 kg ca. In addition to the distribution problem, the cumulative risks increase as well. For the Netherlands, it is estimated that 25 % of all deaths resulting from crashes between passenger vehicles are caused by mass differences. E.M. Berends, 'De invloed van automassa op het letsel risico bij botsingen tussen twee personenauto's: een kwantitatieve analyse. [The effect of car-mass on injury risk from crashes between two person vehicles: a quantitative analysis]' (SWOV:Leidschendam, 2009).

<sup>21</sup> For an elaboration, see Thomas Scanlon, *What We Owe to Each Other* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1998). pp. 208–9; James Lenman, 'Contractualism and Risk Imposition,' *Politics, Philosophy & Economics* 7, 1 (2008): 99–122.

<sup>22</sup> See also Husak, op. cit., who argues, that considerable part of our driving practice, even where in accordance to the law, should be regarded as morally wrong. He argues from the facts that many trips are 'frivolous', i.e. are not necessary, and are taken in highly crash-incompatible vehicles such as SUVs. (Husak could have added that all cars are crash-incompatible with cyclists and pedestrians). In addition, he explains why his claim may appear so counterintuitive to many of us. People underestimate risks they believe to control, "people downplay the risks of conduct they hold to be beneficial", and "people tend to regard risky conduct permissible if they engage in it themselves" (p. 368). It seems that philosophers referring to car-driving as an example of acceptable risk impositions felt prey to some of these biases.

<sup>23</sup> Letty Aarts and Ingrid van Schagen, 'Driving Speed and the Risk of Road Crashes: A Review,' *Accident Analysis & Prevention* 38, 2 (2006): 215–24; Elvik, R. 'The Power Model of the relationship between speed and road safety. Update and new analyses.' (TOI Report 1034, 2009)

<sup>24</sup> Sven Vlassenroot et al., 'Driving with Intelligent Speed Adaptation: Final Results of the Belgian ISA-Trial,' *Transportation Research Part A: Policy and Practice* 41, 3 (2007): 267–79; Frank Lai, Oliver Carsten, and Fergus Tate, 'How Much Benefit Does Intelligent Speed Adaptation Deliver: An Analysis of Its Potential Contribution to Safety and Environment', *Accident Analysis & Prevention* 48 (2012): 63–72.

<sup>25</sup> Lai, Carsten, and Tate, op. cit.

<sup>26</sup> Oliver Carsten, 'Is Intelligent Speed Adaptation Ready for Deployment?', *Accident Analysis & Prevention* 48 (2012): 1–3. Comparable extrapolations will apply to the other versions, but are not provided by Carsten.

<sup>27</sup> NSW Centre for Road Safety, 'Results of the NSW Intelligent Speed Adaptation Trial Effects on Road Safety Attitudes, Behaviours and Speeding' (NSW Centre for Road Safety, 2010), p. 98.

<sup>28</sup> H. Oei and P.H. Polak, 'Intelligent Speed Adaptation (ISA) and Road Safety', *Journal of the International Association of Traffic and Safety Sciences (IATSS Research)* 26, 2 (2002): 41–51.

<sup>29</sup>It should be noted that different studies use slightly different though comparable ISA systems, and somewhat different methodologies, and apply to different countries, for which the magnitude and characteristics of the speeding problem may differ. Still, the results of those studies constitute a reliable indication of the effectiveness of the different versions of ISA. Unfortunately, there is no study that has both injury and fatal accident savings based on field trial data for all three versions of ISA.

<sup>30</sup> Oliver Carsten and Fergus Tate, 'Intelligent Speed Adaptation: Accident Savings and Cost-benefit Analysis' *Accident Analysis & Prevention* 37, 3 (2005): 407–16.

<sup>31</sup> I thank Philip Nickel for emphasizing this point.

<sup>32</sup> Joel Feinberg, *The Moral Limits of the Criminal Law Vol. 1, Vol. 1*, (New York; Oxford: Oxford University Press, 1987), p. 26 (emphasis original).

<sup>33</sup> Calculated on the basis of Elvik, op. cit.

<sup>34</sup> OECD and European Conference of Ministers of Transport, op. cit.

<sup>35</sup> Of course, not all the fatalities and injuries mentioned in section II qualify as harm to others. Exact data appear absent here. Approximately one third of all fatalities in the EU during the period 2001-2010 were caused by "single vehicle accidents". See: European Road Safety Observatory, 'Traffic Safety Basic Facts 2012: Single Vehicle Accidents', (European Commission, DG Mobility & Transport, 2012c). For the remaining accidents, part of the casualties and injuries regard drivers who caused the accident, and thus harm themselves. Note however that passenger harm classifies as harm to others in case it results from speeding or other non-lawful driving. In countries where cycling is common, the category 'injured' involves a significant number of accidents in which no car driver is involved, but a cyclist. Still the number of fatalities and injuries that qualify as "harm to others" will be large enough to justify my argument for ISA on the basis of the prevention of harm to others alone. If we are willing to also accept the prevention of "harm to self" as a justifying ground for ISA, then of course all fatalities and injuries count. Although in this paper I will not argue for ISA on paternalistic grounds, I do think that this would be plausible in the case of children, and young adults, which are involved in a disproportionately large part of all accidents.

<sup>36</sup> This is how an anonymous reviewer put it. I thank the reviewer for pressing this objection to me.

<sup>37</sup> I thank two anonymous reviewers for emphasizing the central importance of correct speed limits for the justification of ISA.

<sup>38</sup> SafetyNet 'Cost-benefit analysis' (2009), available at [http://ec.europa.eu/transport/road\\_safety/specialist/knowledge/pdf/cost\\_benefit\\_analysis.pdf](http://ec.europa.eu/transport/road_safety/specialist/knowledge/pdf/cost_benefit_analysis.pdf)

<sup>39</sup> John Stuart Mill, *On Liberty* (London: Penguin Books, [1859] 1985), p. 68

<sup>40</sup> The need for justification of legal and technological (physical) limits to driving speed arises merely because these constrain an option that is *perceived* as significant by many people. But one could still raise the question as to whether that perception might be misguided, or highly contingent. Imagine that we were to design cars from scratch and that no one had prior experience with car-driving. If these cars *by design* could not exceed the speed limit, I doubt whether that would be perceived as a serious liberty limitation.

<sup>41</sup> See e.g. Jessica Nihlén Fahlquist, 'Saving Lives in Road Traffic—ethical Aspects', *Journal of Public Health* 17, 6 (2009): 385–94.

<sup>42</sup> Vlassenroot et al. op. cit.

<sup>43</sup> Cf. Loren E. Lomasky, 'Autonomy and Automobility,' *The Independent Review* 2, 1 (1997): 5–28.

<sup>44</sup> Feinberg, op. cit., pp. 206-214

<sup>45</sup> Feinberg, op. cit., p. 26

<sup>46</sup> Lon Fuller, *The Morality of Law*, cited in: Roger Brownsword and Morag Goodwin, *Law and the Technologies of the Twenty-First Century: Text and Materials* (Cambridge, UK; New York: Cambridge University Press, 2012), p. 451.

<sup>47</sup> Carsten op. cit.

<sup>48</sup> Vlassenroot et al. op. cit., 2011; NSW Centre for Road Safety op. cit.

<sup>49</sup> Brownsword and Goodwin op. cit.

<sup>50</sup> J. W. G. M. van der Pas et al., 'ISA Implementation and Uncertainty: A Literature Review and Expert Elicitation Study', *Accident Analysis & Prevention* 48 (2012): 83–96; Samantha Jamson, Kathryn Chorlton, and Oliver Carsten, 'Could Intelligent Speed Adaptation Make Overtaking Unsafe?', *Accident Analysis & Prevention* 48 (2012): 29–36.

<sup>51</sup> Van der Pas et al. op. cit.

<sup>52</sup> Ibid.

<sup>53</sup> Andreas Teuber, 'Justifying Risk', *Daedalus* 119, 4 (1990): 235–54.

<sup>54</sup> Brownsword, op. cit., all citations at p. 19



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<sup>55</sup> Karen Yeung op. cit.

<sup>56</sup> Adapted from Yeung (op. cit., pp. 11-15) by application of the fourfold typology of agents in Brownsword and Goodwin (op. cit. pp. 437–438), leaving out the fourth.

<sup>57</sup> On this worry, cf. Brownsword and Goodwin, op. cit., pp 436-439

<sup>58</sup> Cf. Yeung op. cit., p. 14

<sup>59</sup> Yeung op. cit., p. 13

<sup>60</sup> Cf. Yeung op. cit., p. 13

<sup>61</sup> The reason to think that overridable limiting ISA system will still be considerably more effective than advisory and supportive ISA is that it forces that group of drivers that ignores advisory ISA and persistently overrides supportive ISA to give up nearly all of their former habit of speeding. An anonymous reviewer suggested a way to severely restrict the override function: allow “the driver [only to] speed after sending a signal to some authority that they are going to speed.” A nice feature of an override is also that it will reduce some of the ISA-generated risks discussed in the previous section. See also Yeung, op. cit. and Brownsword, op. cit. for some thoughts about an override.

<sup>62</sup> But perhaps from the subjective point of view of some drivers, it *feels* as if these technologies take away precisely a very important opportunity for moral agency. One they find important and which they enjoy during considerable amounts of time. Limiting ISA denies them the status of responsible and capable agents in a domain they highly value and which in our car culture may be part of their authenticity. I leave it an open question whether the subjective experience of a specific opportunity for moral agency as being important *makes* it a greater contribution to the flourishing of the moral community. However, given the massive occurrence of speeding, many of these drivers just misattribute to themselves this status of responsible driver. Their resistance to limiting ISA is most plausibly interpreted as resistance against lacking the option to speed, and not as resistance against lacking the option to show respect to fellow road users. This interpretation is supported by research that shows that drivers who confess to enjoy speeding also are most likely to override ISA systems. See Samantha Jamson, ‘Would Those Who Need ISA, Use It? Investigating the Relationship between Drivers’ Speed Choice and Their Use of a Voluntary ISA System’, *Transportation Research Part F: Traffic Psychology and Behaviour* 9, 3 (2006): 195–206.

<sup>63</sup> Brownsword op. cit., p. 19

<sup>64</sup> Yeung, op. cit.

<sup>65</sup> I thank Auke Pols for this point.

<sup>66</sup> Yeung, op. cit. pp. 23-7.

<sup>67</sup> Cf. Brownsword & Goodin op. cit.

<sup>68</sup> Carsten and Tate op. cit.

<sup>69</sup> Carsten and Tate op. cit.

<sup>70</sup> Ibid.

<sup>71</sup> Carsten, op. cit.

<sup>72</sup> I am grateful to Jan-Willem van der Pas, Oliver Carsten, and Niels Bos for help with the technical details of ISA, to Philip Nickel, Andreas Spahn, Anthonie Meijers, and Jan-Willem van der Pas for helpful comments on earlier versions, and finally to my audiences at the 1st Annual OZSW Conference in Philosophy in Rotterdam, the Eindhoven Philosophy and Ethics Workshop, and the Fourth International Conference Responsible Innovation in The Hague, where I presented earlier versions of this paper, for valuable discussion.