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Look: No hands! Driving on the motorway

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ABSTRACT

How drivers hold their steering wheels when they are driving has been studied in restricted ways for many years. Here I describe the advantages (and disadvantages) of a more naturalistic way of studying this phenomenon, and present the results from two studies that observed the hand positions of motorway drivers from an elevated vehicle. In the first study I tape-recorded the data as we passed traffic on the left, and in the second I used paper and pencil to record the data as traffic passed us on the right. In both studies few drivers kept to the recommended 10-2 (or more generous 9-3) position for holding the steering wheel, and approximately one-third of them were driving with one hand on the wheel. Very few of the drivers observed (some 2%) were using mobile phones, but two were driving with no hands on the wheel. The paper concludes with some discussion of the value of this methodology for obtaining realistic data.

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1. Introduction

Early studies of drivers' hand positions have taken place using driving simulators (e.g., [Bianchi Piccinini et al., 2014](#); [de Waard, Van den Bold, & Lewis-Evans, 2010](#)) or in naturalistic situations, with independent observers observing (or photographing) from knolls slightly above the road, or standing on bridges (e.g., [Fourie, Walton, & Thomas, 2011](#); [Jonsson, 2011](#); [Walton & Thomas, 2005](#)). Such methods mean, unfortunately, that only the top-half of the steering wheel can be seen. Other investigators have supplemented such observations with questionnaires asking drivers about how they position their hands on the wheel in a variety of driving conditions (e.g., [de Waard et al., 2010](#); [Thomas & Walton, 2007](#)).

In one – rare – study [Glendon and Bleicher \(2006\)](#) actually filmed the position of 18 drivers' hands whilst they were driving around a set route and, more recently, [Walton, Thomas, Murray, and Fourie \(2015\)](#) have recommended the use of elevated observers (p. 51). However, no-one, as far as I know, has actually used elevated observers, or indeed sought to implement other more extreme methods of detecting the position of the hands on a steering wheel (e.g., using electronic buttons embedded in the wheel: see [Bianchini Piccinini et al., 2004](#); [Evarts et al., 2011](#); [Klausner & Grimm, 2001](#); [Murray, 1980](#); [Steele & Gillespie, 2001](#)).

It seems to me that observing drivers of vehicles from the windows of an elevated passing vehicle might provide the simplest way of observing drivers' hand positions when driving on the motorway.

1.1. The language of clocks

The previous literature – and general discussion – has commonly used the language of clock-faces to describe the position of the hands on the wheel. Originally it was suggested that 10-2 was the safest position for normal driving, and this position

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is advocated in the UK by driving schools and the *Highway Code* (e.g. see [Driver Vehicle Standards Agency \(DVSA\), 2015](#)). Similarly, in France it is 10 min to - 10 min past. More recently this advice has been relaxed – especially in the United States – where 9-3 is now acceptable. This change seems to have followed from the fact that most steering wheels now contain an air safety bag in the middle of the wheel. Studies in New Zealand also usually measure from 9-3 but in China I understand that the suggested hand position is 10-4. [Mackay, Hassan, and Hill \(undated\)](#) grouped hand positions into 12 segments when examining accident data.

1.2. Clocks and wheels

To my surprise, no-one in these studies (to my knowledge) has commented on how the design of the steering wheel can affect where the hands rest most comfortably. In a recent edition of the UK *Auto Express* (No. 1386, 2015) I counted 28 different steering wheels – from one with *one spoke* from the centre to the rim in an ancient Citroen DS – to the almost rectangular shape in a forthcoming Peugeot. Most of these wheels, however, had two or three spokes – either from 9-centre-3, allowing the hands to rest on top, or from 9-centre-3 with an additional vertical spoke to 6. Some wheels, however, did have 4 spokes from 9-centre-3 and from centre-5 and -7, allowing drivers to have both hands at the bottom of the wheel. Perhaps the most well-designed wheels prevented drivers from driving with both hands at 5-7, or worse.

2. Case-study 1

I have long observed that looking through a coach window on the motorway whilst the coach overtakes, or is passed by another vehicle, provides a great deal of information about individual drivers. In this case-study I decided to see if I could record the hand positions of drivers as we passed them (with me, in the UK, sitting higher up on the left-hand side of the coach). Sitting here meant that I could record the hand positions of drivers in the slow lane. (Sitting high up on the right-hand side would mean that I could record the hand positions of drivers in the middle and ‘fast’ lanes – see Study 2.)

I decided to use a tape recorder to record my observations. I was able to observe the nature of the weather, and the nature of the road (e.g., three-lane motorway, two-lane main road, lanes at reduced speed because of road works, etc.).

For this study I recorded the hand positions of drivers for practically every vehicle that we passed in the ‘slow’ left-hand lane on a motorway journey of approximately 50 miles. This included the nature of the vehicle – car, van, lorry – the sex of the driver, the position of their hands on the steering wheel, and whether or not they were (illegally) using mobile phones or i-pads. A typical part of the recording might be as follows:

Van, man, 10-2
 Car, woman, 10-2
 Lorry, man, 8-4
 Lorry, man, -6 (left-hand on knee)
 Lorry, man, 10- (mobile in right hand)

Putting all of this information together it was possible to see what patterns emerged overall, for men and women, for different vehicles, and in some cases (but not here) for different types of road and weather conditions.

[Table 1](#) summarises the results for lorry, tanker, van and car drivers driving in the slow lane over about 50 miles of motorway. Percentages are reported simply to facilitate comparisons.

The data show very clearly that few drivers used the recommended position for their hands, and that many more drove with one hand on the wheel. And, in this study only one van driver was using a mobile. No sex differences were observed.

2.1. Observations on the method

Tape recording like this was not always easy: it was hard to be consistent in recording the items observed. I got side-tracked when I saw a driver using an i-pad or, as once occurred, a lorry driver leaning forward with both his elbows on the wheel as he drove slowly along in a traffic jam... And sometimes I forgot to record the sex of the driver.

Table 1

The percentage of drivers (i) with their hands in the 9-3 position (or better, e.g., 10-2) when driving in the left-hand lane on the motorway ($N = 46$ observations); (ii) using non-recommended hand position; (iii) driving with one-hand at the time of recording; and (iv) using i-phones/mobiles.

	Lorry drivers $N = 14$	Tanker drivers $N = 6$	Van drivers $N = 8$	Car drivers $N = 18$
% 9-3 or better	29%	17%	0%	28%
% non-recommended	71%	83%	100%	72%
% one-hand only	43%	30%	50%	39%
% using i-pads/mobiles	–	–	–	–

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