



# An exemplum and its road safety morals



Ezra Hauer

University of Toronto, 35 Merton Street, Apt. 1706, Toronto, ON, M4S 3G4, Canada

## ARTICLE INFO

### Article history:

Received 28 April 2016

Received in revised form 16 May 2016

Accepted 20 May 2016

### Keywords:

Accident  
Causation  
Prevention  
Responsibility  
Professionals  
State

## ABSTRACT

With the design of an existing bike-lane in mind I discuss several general issues: accident causation and its linkage to the formulation of prevention strategies; the myopia afflicting major studies of causation and their misleading 'the-driver-did-it' message; the question of who is responsible for what in the management of road safety; and the difficult position in which the professionals find themselves when the 'State' does not embrace its responsibility to road safety. I think that were the public aware of this state of affairs in North America it might insist on change.

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## 1. The bike-lane exemplum

An 'Exemplum' is a genre in classical, medieval and Renaissance literature, a short tale originally incorporated by a medieval preacher into his sermon to emphasize morals or to illustrate points of doctrine. The exemplum I will use is from near my home (in Toronto, Ontario, Canada) but its morals are general.

The bike lane in Fig. 1 runs between a 40 km/h car lane on the left and parked cars on the right; it ends at the intersection in Fig. 2. It is a fairly new setup for this road.

The supermarket where I shop is just beyond the signal lights. Sometimes I drive there, sometimes I ride my bike. When I ride I do not feel particularly safe and think about the merits of this design. With this exemplum in mind questions can be asked, observation made, beliefs noted, doctrines examined, the bully pulpit mounted, and sermon can commence.

## 2. Two perspectives

One can view this exemplum from two alternate points of view: one faces backward, looking at accidents<sup>1</sup> that occurred; the other is forward-looking and anticipates what accidents might occur in

the future. The views from these two vantage points are very different.

Starting with the backward-looking point of view, imagine that a car-bicycle collision has occurred and is investigated. Viewed from this 'after-the-crash' perspective the investigator tends to ask: Was alcohol involved? Did the driver open the door carelessly? Did the rider veer into the car's path? Was it raining? Did the rider wear a helmet? Did the bicycle have a light? The investigator is not likely to ask, for example, why the bike lane was not placed to the right of parked cars where doors are opened less frequently.

Switching now to the forward-looking perspective and thinking about future accidents, the mind anticipates the circumstances in which these will arise. Thus, e.g., in Fig. 1, noticing in that there is no buffer on either side of the bike lane leads one to think about the risk to the rider of being struck by a fast moving vehicle on the left or being 'doored' by a parked car from the right. In the same vein, noticing that every right-turning car in Fig. 2 has to cross the bike lane, one thinks of blind spots and of the conflicts inherent in this design. Prominent in the forward-looking view of prospective accident causation is the physical arrangement which entails the circumstances in which accidents are likely to occur. These physical arrangements could be made one way or another. Instead of putting

E-mail address: [Ezra.Hauer@utoronto.ca](mailto:Ezra.Hauer@utoronto.ca)

<sup>1</sup> Without compunction I will use 'crash' and 'accident' to mean the same thing. There are those who shun the use of 'accident' thinking that it has connotations of being 'unpreventable'. This is incorrect. The editor of the Canadian Oxford Dictionary (K. Barber, Toronto Star, July 31, 1999) says that: "No dictionary that I know of uses the word 'unpreventable' in any of its definitions of the word 'accident'. Were they to do so, the definition would be inaccurate and not reflect the actual usage of the word.

The defining terms that dominate are 'unexpected', 'unforeseen', 'unintentional', and 'undesirable'. . . . Most people recognize that the things we refer to as 'accidents' do indeed have causes, whether it be an unplanned pregnancy, slipping on a banana peel or the dog peeing on the rug and that accidents are preventable." This is why both terms will be used interchangeably. Shinar (2007) does the same when calling his Chapter 17 "Accident/Crash Causation and Analysis".



Fig. 1. The bike lane.

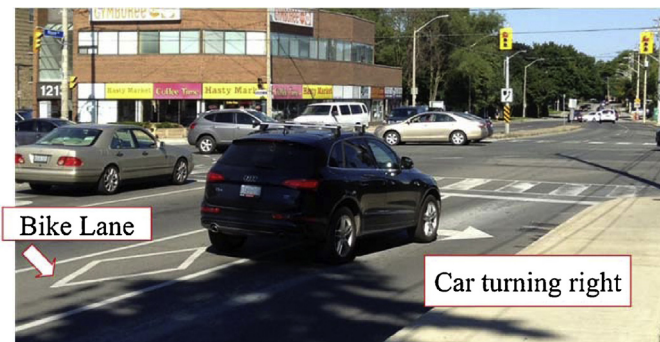


Fig. 2. Car crossing to turn right.

the bike-lane to the left of the parked cars as in Fig. 1 one could put it to their right as in Fig. 3. Rather than using the design in Fig. 2 the design in Fig. 4 could be chosen. Less prominent from the forward-looking perspective are the human frailties of inattention, error, risk taking, etc. After all 'errare humanum est' and the fallibility of road users is the causal background which is present in all design alternatives. The forward-looking perspective goes hand-in-hand with the 'Risk Analysis', 'Risk Management' and the 'Safety Audits' frame of mind: the examination by professionals of what can go wrong with a specific design, how frequently so, how severe will be the consequences, what can be done to mitigate the risk and at what cost.

The situation is depicted schematically in Fig. 5. Accident causes are many and come into existence at various times.<sup>2</sup> Causation, prevention, and ascription of responsibility all look differently from the backward and the forward looking points of view.<sup>4</sup> We have a case of "What you see depends on where you stand".<sup>5</sup>

<sup>2</sup> All causes of a crash materialize before the crash. However, some of the consequences of the crash depend on causes that come into play after the crash. Thus, e.g., whether the person dies of the injuries sustained in the crash will depend on, say, how quickly the ambulance arrives. This is why the beam of the backward-looking flashlight is shown to shine also on causes after the instant of the crash.

<sup>4</sup> The 'forward' and 'backward' looking dichotomy and terminology comes from the realm of philosophy and applied ethics and is set within the 'Responsibility Ascription' context. More specifically it is drawn from a series of papers by Jessica Nihlén-Fahlquist. In summarizing the second paper of her thesis (2007, page 16) Nihlén-Fahlquist says: "There are two main categories of responsibility that capture the essence of the concept. First, we ascribe backward looking responsibility to an agent or institution when we believe he/she/it has done something wrong. . . . Second, we ascribe forward looking responsibility to agents and institutions when we believe that they have it in their power to, and should use that power, influence the future in a certain way." For a comprehensive treatment see Van de Poel and Nihlén-Fahlquist (2012).

<sup>5</sup> The quote has been attributed to Albert Einstein, DL Morrese, and C.S. Lewis (in a somewhat altered form).

### 3. Searching for causes

I was brought up with the stories about John Snow, Louis Pasteur and Robert Koch in which the discovery of a cause was the precondition for the development of effective and often simple treatments. It is possible that stories of this kind foster the common belief that the discovery of some heretofore unknown accident cause holds the promise for success and effectiveness in accident prevention.<sup>6</sup> But the epidemic of traffic accidents is not like that of cholera. There is no single agent in the form of the vibrio cholerae, there is no contaminated pump on London's Broad Street, nor is there a simple and decisive remedy such as removing the handle of that pump. This is why the search for causes may not hold the promise of unexpected discoveries leading to novel, cheap and effective interventions. Still, the quest for causes goes on . . .

The concept of cause has been the subject of debate at least since Aristotle and the dust has not settled yet. However, within the road safety management context the controversy is largely unnecessary. Most agree that for prevention purposes 'cause' is something that were it different the probability of accident outcomes would be different.<sup>7,8</sup> Thus, e.g., if drivers were more attentive in opening the car door, if riders were more inclined to wear a helmet, or had the bike lane been placed to the right of parked cars, the probability of 'dooring' accidents leading to head injury would be different. Of course, in addition to the three 'causes' mentioned in the preceding sentence, many others could be listed. Each accident has many causes. Several observations follow.

First, having defined cause as something that alters probabilities of outcomes makes 'causes' a necessary part of accident prevention and safety management; only by altering causes can one prevent future accidents or ameliorate their consequences.

Second, because our business is prevention, and because prevention requires the alteration of causes, only those causes that can be reasonably altered by a human action are of interest to us. To illustrate, it may have been raining and the raindrops on the car mirror and on the bicyclist's glasses may have been amongst the causes of a dooring accident. But if neither rainfall nor the need to wear glasses can be reasonably affected by some human intervention these are not causes of interest.<sup>9</sup> In contrast it is commonly thought that risk-taking, helmet wearing, and bike-lane design can be affected by human action and are therefore causes of interest.

<sup>6</sup> If I remember correctly, the proponents of the naturalistic driving data collection in SHRP2 promised that understanding what exactly people do before a crash will somehow lead to a 'breakthrough' in road safety management. While such a breakthrough is unlikely, the vast data collected cannot fail but lead to some new insights.

<sup>7</sup> The purposes of road safety management and accident prevention are well served by the 'manipulability theory of causation' according to which causes are handles or devices for manipulating effects. Thus, e.g., Cook and Campbell (1979, page 36) say that: "The paradigmatic assertion in causal relationships is that manipulation of a cause will result in the manipulation of an effect. . . . Causation implies that by varying one factor I can make another vary." Recent book-length expositions are by Woodward (2003) and Pearl (2000).

<sup>8</sup> This definition is similar in spirit to the one used already in 1973 in the landmark Tri-level study (Institute for Research in Public Safety, 1973, page 8 which reads: "Causal Factor-a factor necessary or sufficient for the occurrence of the accident; had the factor not been present in the accident sequence, the accident would not have occurred.") except that instead of being 'necessary and sufficient' I give cause a probabilistic flavour. The same definition is implicit in Sabey and Staughton (1975, page 2) when they say that: ". . .the accident would not have happened, or that it would have been reduced in severity, if the contributory factor had not been present". Even closer is the notion of cause in the Large Truck Causation Study which says that ". . . 'causation' is defined in terms of the factors that are most likely to increase the risk that large trucks will be involved in serious crashes." Federal Motor Carrier Safety Administration, 2007, page 1).

<sup>9</sup> They would be causes of interest if, e.g., one could hope to affect the bicyclists' inclination to ride when it rains, or if there was a reasonable prospect to manufacture non-wetting surfaces for car mirrors or eyeglasses.

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