



## “I wouldn’t even sit on one.” Relevant attitudes towards tricycles for adults

Carmen Hagemeister <sup>\*</sup>, Julia Krause <sup>1</sup>, Heike Bunte <sup>2</sup>

Technische Universität Dresden, Faculty of Psychology, Assessment and Intervention, 01062 Dresden, Germany



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### ABSTRACT

Tricycles could help to improve the traffic safety of cyclists as they make it easier to deal with bad surfaces. They are an option to ensure independent mobility for persons who cannot ride a bicycle. But on roads tricycles are rare. Compared to bikes, trikes are considered to have substantial disadvantages. In this study, differences between persons who can imagine going on a trial ride with a trike and persons who cannot imagine going on a trial ride are assessed. In effect, practical differences between bikes and trikes are unimportant, as is safety perception. What is important is how far a trike is associated with age and disability, how well it fits to the individual’s lifestyle and whether it is seen as sporty. For the marketing of trikes, safety arguments are irrelevant; references to a “senior” product could be counterproductive.

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### 1. Aim of the study

The number of single bike crashes (crashes without any other road user involved; typically falls or hitting a stationary object) is underestimated in official statistics. Hospital-based studies show that single bike crashes make up the majority of bike crashes which require treatment in an emergency care unit (Schepers et al., 2013; Schepers et al., 2014). Some of these single bike crashes – mainly falls – might have been avoided if the person involved had used a tricycle instead of a bicycle. Offside turns are difficult for cyclists aged 50 or older (Goldenbeld, 1992). Tricycles might also help to avoid collisions with passing cars or bikes when turning left because tricyclists can take enough time to turn round and check for upcoming traffic behind before making an offside turn. They do not have to dismount and mount at a traffic light but can remain sitting. These and other options are especially attractive for cyclists with physical difficulties but could be useful for cyclists of any constitution. Tricycles might therefore improve traffic safety but they are very rarely used in Europe by non-handicapped adults. As tricycles are very rarely used, empirical proof that they really improve road safety is still lacking, but the fact that some persons with disabilities need a tricycle shows that tricycles might also be useful for persons with physical difficulties. Persons who have never tried a tricycle assume that tricycles have many huge disadvantages compared to bicycles and nearly no advantages (Krause, Hagemeister, & Bunte, 2013). This study intends to describe the differences between persons who would give a trike - recumbent or ordinary – a try and persons who would not go on a trial ride.

\* Corresponding author.

E-mail addresses: [Carmen.Hagemeister@tu-dresden.de](mailto:Carmen.Hagemeister@tu-dresden.de) (C. Hagemeister), [krause@ika.rwth-aachen.de](mailto:krause@ika.rwth-aachen.de) (J. Krause), [Heike.Bunte@uba.de](mailto:Heike.Bunte@uba.de) (H. Bunte).

<sup>1</sup> Present address: Institut für Kraftfahrzeuge, RWTH Aachen University KFZ-Systembewertung / User Experience, Steinbachstr. 7, 52074 Aachen, Germany.

<sup>2</sup> Present address: Section I3.1 Environment and transport, German Environment Agency, Wörlitzer Platz 1, 06844 Dessau-Roßlau, Germany.

## 2. Theory

Today, the “normal” bike is a bi-cycle with variations of the diamond frame with different heights of top tubes. Tricycles for the transport are becoming more common again in Europe, though their absolute number is still low. Mainly in the Netherlands and Denmark, tricycles for the transport of children are relatively popular. Nevertheless, tricycles for one person only and no transport purpose are still a relatively rare exception, though there are many types on the market.

For older road users (aged 65 or older), crashes have more severe consequences than for younger road users because older persons are physically more vulnerable than younger persons (Welsh, Morris, Hassan, & Charlton, 2006). This age effect is especially important for non-protected road users, namely pedestrians and cyclists. A second potential problem for older cyclists lies in the fact that physical difficulties make cycling more difficult for many older persons: turning around before an off-side turn, stepping on and off the bike, and keeping balance (Goldenbeld, 1992; Kingma, Duursma, & ten Duis, 1997; Steffens, Pfeiffer, & Schreiber, 2000). Typical causes of single bike crashes are defects in the road surface (potholes), kerbs and insufficient (winter) maintenance of the paths (Nyberg, Björnstig, & Bygren, 1996). Handling these problems might be easier when cyclists with physical problems use a tricycle instead of a bicycle. Tricycles allow enough time to be taken to turn round before an offside turn without being afraid of losing one's balance, a manoeuvre which an insecure cyclist might avoid on a bicycle, resulting in a collision with an upcoming bike or car. For these reasons tricycles might improve the safety of cyclists but they are very rarely used.

In general, the image of tricycles for adults in Germany is negative. Tricycles are seen to have huge disadvantages compared to bikes and no advantage in safety. The main advantage of trikes – that it is much easier to keep one's balance on a trike than a bike – is not related to the perception that trikes are safer or less prone to accidents than bikes (Krause et al., 2013). Tricycles have some advantages compared to bikes: Ordinary and recumbent trikes are seen as more comfortable, cyclists think that it is easier to keep one's balance on them than on a bike. Ordinary trikes are seen as easier to get on and off, more visible to car drivers and safer than a bike. In many aspects, owners of recumbent trikes see recumbent trikes more positively than non-owners (Krause et al., 2013). This difference might be caused by experience (that a recumbent trike is not as impractical in traffic as might seem at first glance), by self-selection (only persons for whom the disadvantageous aspects of tricycles are not so important buy a trike), but also by other processes like cognitive dissonance.

Products are bought only if they meet certain criteria: (1) They must fit to the person's lifestyle. (2) If the product is expensive the potential buyer must have the opportunity to try it out before deciding to buy it. (3) The product must be easy to understand and to use. (4) Only products which are seen are bought. (5) The most important criterion is that the buyer must expect the product to be useful for him or her (Solomon, Bamossy, & Askegaard, 2001). Innovative products are only bought if they have all the positive attributes of the existing product plus additional attributes which the old product does not have (Kuß & Tomczak, 2007). Part of the answer to the question of why (older) adults do use trikes instead of bikes might be the advantages and disadvantages of a tricycle as compared to the existing product, an ordinary bicycle.

Rogers (2003) describes five stages of the innovation-decision process: knowledge, persuasion, decision, implementation, and confirmation. In the knowledge stage, the person knows that an innovation exists. In the persuasion stage more information is searched. For a vehicle, relevant information is not only theoretical. A trial ride is necessary in order to find out how the vehicle is steered, how it feels and – at least if one intends to buy one – what the right size is. For the persuasion stage five characteristics of the innovation are relevant: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. We assumed that persons who are willing to try a trike see trikes more positively than persons who are not willing to go on a trial ride. Which are the relevant aspects? We operationalized the relative advantage by asking persons to compare bike and trike. Do persons who are willing to go on a trial ride see more advantages or fewer disadvantages of trikes than persons who are not willing to go on a trial ride? For a trike, compatibility means that it can be used for the same purposes as a bike, e.g. can be cycled on byways and parked theft-proof at night. How important are these aspects for the persuasion stage? Trialability is operationalized by knowledge of a dealer who sells such trikes, observability by knowing a person who rides a trike or having seen such a person in the neighbourhood. Which role do these aspects play?

Which characteristics of the decision-making unit are important in this stage? Which differences can be found between persons who can imagine acquiring more knowledge about a tricycle by going on a trial ride and persons who cannot imagine it? Are there differences in demographic characteristics or in cycling habits? Are older persons more willing than younger persons to go on a trial ride because they want to know if it is a mobility option for them? Are there gender differences? Are persons who bike more often or do not drive more willing to try a trike because it might become more relevant for them?

In the stage model, prior conditions are mentioned as well, among them norms of the social system. Relevant aspects here might be attitudes towards the fact that old, even very old or physically impaired persons cycle. Do persons who generally accept that these persons cycle or see trikes more positively in general have a more positive attitude towards a trial ride?

Prior personal experience with one trike type might influence the attitude towards trikes. For this reason all analyses in the present study were carried out with persons without personal experience with adult trikes (neither recumbent nor ordinary). We assessed differences between (a) those persons who can imagine going on a trial ride and (b) those who cannot imagine going on a trial ride with a trike.

Comments on trikes in a former project on cycling habits of older cyclists (Hagemeister & Tegen-Klebingat, 2011) and preliminary interviews for this study with older cyclists showed that bi-cyclists aged 80 or older said that they themselves do not need a tricycle but older and physically more impaired cyclists might need one. Age as such does not make tricycles

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