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Cycling under the influence of alcohol in Germany

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ABSTRACT

Cyclists have a relatively high risk of being injured in traffic accidents. In Germany, statistics have shown that cyclists injured in police-reported traffic accidents are often found to have cycled with high blood alcohol levels. Relevant research has discussed the ability of the Theory of Planned Behavior (TPB; Ajzen, 1991), deterrence factors, and habitual behavior to predict unsafe and rule-violating behavior in traffic. To promote safer cycling, the relative contributions of these predictors must be determined to design efficient countermeasures. In an online survey, N = 353 participants reported cycling and drinking behaviors for 1 week and answered questions on the TPB, deterrence, and additional predictors. Perceived social norms were quite permissive and perceived behavioral control when cycling under the influence (CUI) of alcohol was quite high. Furthermore, a third of the cyclists reported CUI. Participants with experience of CUI reported having consumed large amounts of alcohol before cycling. High levels of cycling, a permissive attitude, and greater alcohol consumption per drinking episode predicted the number of CUI trips. The amount of alcohol consumed before one CUI trip was predicted by high perceived behavioral control when CUI, a high level of need for stimulation, and higher habitual alcohol consumption per drinking episode. Deterrence factors were found to have no influence on reported CUI. Overall, the findings suggested that Germans who habitually drink a large amount of alcohol are not deterred from CUI in the same manner that they would be from driving under the influence (DUI). The generally permissive perceived social norms did not differentiate between CUI and non-CUI cyclists, which indicated that a societal effort is required to balance the mismatch between CUI and DUI. In addition, changing the general drinking behaviors of highly educated Germans who cycle, would be beneficial for their health.

1. Introduction

1.1. Cycling under the influence of alcohol

In Germany, it is forbidden to steer any vehicle in traffic when under the influence of alcohol (§315c StGB, §316 StGB). Similar to drivers of motor vehicles, cyclists are found to be at fault and can be fined for cycling under the influence (CUI) of alcohol in crashes if their blood alcohol concentration (BAC) is higher than 0.03%. However, the obligation to remain sober is only legally enforced for cyclists when crashes occur and when the so-called "absolutely unfit for participating in traffic" BAC legal limit is breached, which for cyclists is 0.16% (Bundesgerichtshof, 1990). A recent initiative to reduce cyclists' legally

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acceptable BAC for being deemed "absolutely unfit to participate in traffic" failed; this was because a scientific test indicated that some cyclists' skill levels were similar to those of sober cyclists even with a BAC of 0.16% (Daldrup et al., 2014).

Unfortunately, cyclists have a rather high risk of being injured in crashes compared with car drivers, internationally (Chaurand & Delhomme, 2013) as well as in Germany (Schreck, 2016). However, direct evidence for a higher crash risk when CUI is sparse. In a case-crossover study by Asbridge et al. (2014), a four-fold increase in crash risk was found within a New York City sample. Experimental data has shown that CUI with a BAC of at least 0.8 g/kg increases gross motor disturbances compared with cycling sober; furthermore, at a BAC of 1.4 g/kg, test subjects were found to be unable to surpass their sober results in cycling skills (e.g. Hartung, Mindiashvili, et al., 2015; Hartung, Ritz-Timme, Schwender, Mindiashvili, & Daldrup, 2015).

The risk of injury for cyclists increases non-linearly with increasing alcohol consumption (Taylor et al., 2010). Intoxicated cyclists' crashes differ in type and severity from those of sober cyclists: if committed to a hospital, alcohol-consuming cyclists are found to be more severely injured and have higher mortality rates than sober cyclists (Sethi et al., 2016). Alcohol-consuming injured cyclists are more likely to be male (Orsi, Ferraro, Montomoli, Otte, & Morandi, 2014), to have fallen from their bike (Andersson & Bunketorp, 2002; Orsi et al., 2014; Sethi et al., 2016), and are less likely to have been injured in a collision with a motor vehicle (Sethi et al., 2016). Their crashes are more likely to have happened on dry roads (Orsi et al., 2014), at night, on weekends, and on route from parties, pubs, and restaurants (Andersson & Bunketorp, 2002). Alcohol-consuming injured cyclists are more often found to be at least partially responsible for a crash than sober cyclists are (Orsi et al., 2014). This is because if the police detect that a road user has drunk alcohol (with a BAC of at least 0.03%), this road user is declared at least partially responsible, which follows the logic of: "If this road user were sober, he or she would have been able to avoid this crash." Li, Shahpar, Soderstrom, and Baker (2000) found cyclists with positive BAC at admission to a trauma center to be more likely to have a record of DUI and license suspensions than sober cyclists.

German crash statistics also show that cyclists' risky behaviors contribute to their crashes. In German two-party urban crashes, 45% of cyclists are found to be at least partially at fault; the most commonly coded errors in crashes where the cyclist is at fault are (1) "cycling on the wrong path" in 17.1% of cases; (2) "cycling too fast for conditions" in 7.5%; (3) "errors when entering fluent traffic" in 6.9%; and (4) "alcohol" in 6.7% (calculations based on Statistisches Bundesamt, 2016). In police recorded urban single-bike crashes, the leading causes are (1) "cycling too fast for conditions" in 17% of cases; (2) "alcohol" in 15.9%; and (3) "cycling on the wrong path" in 4.6% (calculations based on Bundesanstalt für Straßenwesen, 2015).[1] Of those cyclists who were tested for alcohol after being in a crash with at least one injured person, only 5.2% were below the German legal limit for car drivers at a BAC of 0.05%; 49.3% were tested between this and the legal limit for taking part in traffic at all at a BAC of 0.16%, and as much as 44% of cyclists were found to be at levels of intoxication above a BAC of 0.16% (calculations based on Statistisches Bundesamt & Fachserie 8, 2016).

How large the problem of CUI is and how many cyclists are guilty of the practice are questions that researchers have attempted to answer. de Waard, Houwing, Lewis-Evans, Twisk, and Brookhuis (2016) collected the BAC levels of 687 cyclists in two Dutch cities at night, and found that the percentage of those cyclists CUI of alcohol rose throughout the night. Specifically, it rose from 7.7% at 6 p.m. to 89% at 1 a.m. for all participants who tested with any BAC above 0.0 g/l, and from 0.0% at 6 p.m. to 84.6% at 8 a.m. the next morning for all participants who tested with an illegal BAC above 0.5 g/l. Furthermore, the BAC levels rose throughout the night. The average BAC was 0.79 g/l, and 68% of cyclists at 1 a.m. were found to have a BAC above 0.5 g/l.

In a representative survey of German cyclists (N = 2158), most reported never (60.3%) or seldom (31.1%) CUI (Von Below, 2016). However, in the same survey, 6.5% of cyclists reported being fined by the police within the previous 2–3 years for CUI. Hagemeister and Kronmaier (2017) compared attitudes toward using cars versus bikes after drinking alcohol in a survey on 267 Germans who cycle, drive a motor vehicle, and drink alcohol at least sometimes. They found that the amount of vehicle type usage as well as drinking more to be positively associated with CUI and DUI of alcohol. In their sample, CUI was predicted by frequent bike use, frequent drinking, seeing friends use their bike after drinking, and needing a bike to travel to work. A belief that CUI endangers others as well as an attitude that a bike must be left parked after drinking were negatively associated with CUI.

1.2. Theoretical framework

In traffic research, scientists often use seemingly different constructs to explain the behavior of road users; for example, demographics such as age and sex, behavioral variables such as past behavior, past crash exposure or psychological constructs such as risk perception or self-efficacy, and even personality traits such as sensation seeking. Some of these factors are found in behavioral theories from various backgrounds.

One of the most prominent models of deliberate behavior in psychological science is the Theory of Planned Behavior (TPB; Ajzen, 1991). Central to the TPB is the idea that any behavior is determined by behavioral intentions, which are functions of three constructs: attitude, subjective norm, and perceived behavioral control (PBC). Attitude refers to the evaluative reactions of a person toward engaging in a target behavior; subjective norm reflects individuals' perceived expectation that significant others approve or disapprove of the behavior; and PBC relates to the extent to which a person perceives personal capacities and constraints regarding the target behavior.

[1] *However, it should be stated that single bike accidents are estimated to be underreported by 89% (Von Below, 2016) in Germany. Nevertheless, it appears that most single bike accidents with severe injuries are recorded and the majority of the accidents that are missing in the statistics seem to be ones with no or only minor injuries.*