A survey of police officers encounters with sober, alcohol- and drug-intoxicated suspects in Sweden

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ABSTRACT

Alcohol-related crimes are very common globally, including in Scandinavia. Despite this, no survey to date has examined the prevalence of alcohol- and drug-intoxicated suspects in Sweden specifically, or which procedures police use when interacting with this suspect group. Given the current lack of (inter)national policy guidelines on how to interrogate intoxicated persons, it is important to examine law enforcement’s contact with this potentially vulnerable group in different contexts. This was the aim of the present study. Data were collected via an online survey sent out to Swedish police investigators and 133 officers responded in total. A large majority (87%) of responses indicated that it was common or very common to encounter intoxicated suspects, but findings also suggest that police departments differ in their procedures for when and how to conduct investigations and interviews involving drunk suspects. Our findings support the need for (inter)national guidelines on how to interview intoxicated suspects and the need for more scientific studies on how alcohol affects suspect’s memory and decision making.

The present study surveyed Swedish police employees and aimed to investigate their perceptions of, and experience with intoxicated suspects, as well as their procedures when interacting with intoxicated suspects. The survey addressed both alcohol- and drug intoxication among suspects, although most questions concerned alcohol. Alcohol consumption in many western countries is very high, according to the World Health Organization (WHO). A recent WHO global report shows that the annual alcohol consumption in Sweden during 2016 was equal to 9.2 litres of pure alcohol per person aged 15 years and older (WHO, 2018). Similar population consumption rates were found in other Scandinavian countries such as Norway (7.5 litres), Denmark (10.4 litres), and Iceland (9.1 litres). Other European countries had similarly high alcohol consumption, including Spain (10.0 litres), U.K. (11.4 litres), France (12.6 litres), and Germany (13.4 litres). The U.S. had a rate of 9.8 litres of annual consumption.

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Interestingly, a well-debated article among alcohol and drug researchers published in the Lancet showed that experts in the U.K. rated alcohol as the most harmful drug when considering the combined harm to the individual, society and environment (overall harm score of 72/100 points), above heroin (55 points) and crack-cocaine (54 points) (Nutt et al., 2010). One reason why alcohol, a legal drug, was ranked higher than illegal drugs is because alcohol causes a lot of harm to the individuals consuming it, but even more importantly, alcohol causes a lot of harm to others. This harm can take the form of physical and psychological injury, as well as social harms such as economic costs, family adversities, and crime (Nutt et al., 2010). International statistics lend support to a strong association between alcohol and crime. For example, a Swedish report showed that, out of 317,000 cases of physical assault during one year, 57% involved victims, witnesses and/or suspects who were alcohol-intoxicated (IOGT-NTO, The Swedish Society for Medicine, and CERA, 2017) and in the U.K., it is estimated that nearly half of all violent crimes were committed by intoxicated perpetrators (Kershaw et al., 2008). With such a high prevalence of intoxicated suspects/perpetrators it becomes highly relevant to explore how police officers perceive and interact with these individuals. Alcohol-intoxication can have a negative impact on important brain functions necessary for impulse control, inhibiting responses, and considering future consequences (see Abernathy et al., 2010, for a review). As such, intoxication may increase the risk of self-incrimination and also a suspect’s susceptibility to suggestive interrogation approaches.

Police officers surveyed in the U.S. estimated that around 50% of violent crime perpetrators are drunk at the time of the incident (Evans et al., 2009). Over 80% of police officers reported that contact with intoxicated suspects was ‘common’ or ‘very common,’ and that intoxicated suspects were most common in crimes such as fights and assaults, domestic disputes, and sexual violence. These U.S. police officers reported that intoxicated suspects typically have a breath alcohol concentration (BrAC) above 0.10%, however, this is just an estimate, as most police officers did not objectively measure suspects’ intoxication level. High prevalence rates were also reported in another U.S. study, which found that half of a community sample of suspects stated that they had consumed alcohol, or drugs before being interrogated (Redlich et al., 2004). Moreover, a U.K. observational study showed that illicit (non-prescribed) substance use prior to being incarcerated was a strong predictor of suspects giving a confession (Pearse et al., 1998). Further, almost 40% of a U.S. sample of juvenile offenders indicated that they had been intoxicated at the time of their interrogation (Malloy et al., 2014).

Also telling, alcohol and drug use among prisoners, as well as imprisonment for alcohol- and drug-related offences is common. A report by the U.S. National Center on Addiction and Substance Abuse (2010) revealed that as many as 1.5 million out of 2.3 million inmates in U.S. prisons met the medical criteria for substance abuse. Furthermore, another 458,000 inmates had a history of substance abuse; were incarcerated for alcohol or drug violations; were intoxicated while committing their crime; or committed their crime to get money for drugs. In total, these groups comprised 85% of the American prison population. In Sweden, where the present study was conducted, as many as 60% of inmates suffer from some form of substance abuse, with drug abuse being the most common followed by alcohol and mixed abuse (Swedish Prison and Probation Service, 2019).

Despite the potential risks of involuntary self-incrimination and suspect rights violations while interrogating intoxicated suspects, police generally do not seem to take any
special precautions during such interrogations, at least not in the U.S. (Palmer et al., 2013). In fact, research shows that sober and intoxicated individuals are often interrogated in a similar manner, with almost 65% of surveyed U.S. police officers reporting that their department’s standard procedures concerning intoxicated suspects were the same as with sober suspects (Evans et al., 2009). To date, there are no national policy guidelines on how to interrogate intoxicated suspects in the U.S. Similarly, the U.K. has no guidelines on how to interrogate drunk suspects, although they do provide guidelines for first responders on dealing with intoxicated witnesses and victims (College of Policing, 2019). In Sweden, approximately 1500–3700 investigative interviews with suspect, witnesses, and victims take place every day, with around 950,000 occurring each year. Despite this, there are currently no national policy guidelines on investigative interviews in Sweden. However, the Swedish police are developing guidelines for investigative interviews with sober witnesses, victims and suspects (Swedish Police Authority, 2019). Beyond this, a collaboration has also started between a team within the police organization and researchers from academia to develop policy guidelines for interviews with intoxicated witnesses (Hagsand et al., 2020). Given a large number of investigations overall, and the high alcohol-consumption rates and the many alcohol-related crimes (i.e. leading to the potential likelihood of many investigations with drunk suspects), there is also a need for a coherent national policy on interrogations with intoxicated suspects in Sweden. However, before such a policy is developed, further research regarding how alcohol affects suspects’ cognition and memory should be conducted.

While research on the impact of alcohol on suspect cognition is quite sparse, the effects that alcohol can have on memory have been explored for intoxicated eyewitnesses. Although the general perception of intoxicated eyewitnesses has been one of reduced credibility (Evans & Schreiber Compo, 2010; Kassin et al., 2001), a decade of research has demonstrated that intoxicated eyewitnesses may perform better than their reputation, at least under certain circumstances (e.g. Hagsand, Hjelmsäter, et al., 2013; Hagsand, Roos af Hjelmsäter, et al. 2013; Hagsand et al., 2017; Schreiber Compo et al., 2012). Overall, intoxication in the low to mid-range (BrAC < 0.10%) has shown no detrimental effects on eyewitness memory, at least not on accuracy. Alcohol has sometimes been found to decrease the number of recalled details, although the effect sizes usually are rather small (see Altman et al., 2019; Jores et al., 2019, for reviews and meta-analysis). On the other hand, higher intoxication levels (>0.10%) have been found to impair both the quantity and quality of eyewitness memory (see Altman et al., 2019; Jores et al., 2019). Also, of practical importance for the police, studies have shown that it often is best to interview intoxicated witnesses as soon as possible after the to-be-remembered event instead of delaying the interview (Hagsand et al., 2017; Hildebrand Karlén et al., 2017; La Rooy et al., 2013; Yuille & Tollestrup, 1990).

However, it is not clear to what extent research on eyewitnesses translates to suspects, as there are several important factors that may distinguish witnesses and suspects. For example, suspects engage in a crime as a participant with limited incentives to accurately recall the event in a later interview, as opposed to a witness who is only an observer and arguably more motivated to accurately encode and recall the event in a subsequent interview. One study (Read et al., 1992, exp 1) with intoxicated mock suspects, found higher recall accuracy rates for ‘own action’ details than for object and person details, suggesting a possible difference in recall between seeing and doing consistent with the levels of
processing model (Craik & Lockhart, 1972). Furthermore, witnesses are also likely to be more motivated to cooperate with the police during an interview and thus to exhaust their recall. This is especially true for the majority of witnesses, so-called independent witnesses (i.e. bystanders with no personal connection to the suspect, victim or the criminal event itself). In contrast to most witnesses, suspects likely have different goals during the interview process, including impression management and deception to outsmart police officers and the legal system (Gehl & Plecas, 2017).

Unfortunately, there has been little research on interrogations of intoxicated suspects. Of particular concern is alcohol’s impact on suspects’ memory, suggestibility, and likelihood of making self-incriminating statements. Alcohol can affect all stages of memory (encoding, storage, retrieval), but the encoding stage is usually the stage that is most impaired (White, 2003). One can therefore hypothesize that it might be difficult for intoxicated suspects (especially those who are highly intoxicated), to have a complete and correct memory of a criminal event experienced while intoxicated. Therefore, intoxicated suspects might be particularly vulnerable to suggestive and leading questions/information during the investigation. Only a few studies have examined how alcohol affects suggestibility, with mixed findings. The aims of these studies varied. Some studies focused on eyewitnesses’ suggestibility (Evans et al., 2019; Flowe et al., 2019; Gawrylowicz et al., 2017; Schreiber Compo et al., 2012). Others had participants read and/or listen to a story (Santtila et al., 1998; Santtila, Ekholm, et al., 1999; Van Oorsouw et al., 2019; Mindthoff et al., 2021, blinded for peer-review) and measured suggestibility with the use of the Gudjonsson Suggestibility Scale; GSS (Gudjonsson, 1987) or a variant of the GSS scale (see Van Oorsouw et al., 2019). Another study involved a case study of two intoxicated persons with withdrawal symptoms falsely confessing to a crime (Santtila, Alkiora, et al., 1999). Only one study was a mock-suspect study with participants who were instructed to commit a ‘crime’ (Van Oorsouw et al., 2015). This field study, conducted in three local bars, included participants with both low, medium and severe intoxication levels. Mock suspects with high intoxication levels (an average of 0.16%) were more likely to go along with suggestive details compared to participants with lower intoxication levels.

As described, there is some evidence that alcohol might increase suggestibility. Also relevant to criminal suspects is whether alcohol may affect the risk of oversharing sensitive information, including self-incriminating information. It is well known that alcohol can impair brain activity in areas important for self-regulation (e.g. frontal lobe) which can cause impulsive behavior and reduce the capacity to think about future consequences (see Abernathy et al., 2010, for a review). Hence, there seems to be some scientific support behind anecdotal expressions such as ‘alcohol loosens the tongue’ (one says too much while intoxicated) or ‘in vino veritas’ (the truth comes out when intoxicated; see Suchotzki et al., 2015). Not much work has been done on how alcohol affects the risk of oversharing information, but one experimental lab study addressed whether alcohol increased social drinkers’ risk of disclosing transgressions carried out by someone else or oneself (Mindthoff et al., 2019). Alcohol did not increase the risk of disclosing transgressions, at least not at the low-to-moderate dose of alcohol (below BrAC of 0.10%) used in the study. However, it should be noted that in this study participants were merely asked to voluntarily report an unethical or illegal transgression; they were not ‘suspects.’
Another important question is how alcohol affects suspects' memory. The aforementioned field study found that intoxicated participants who committed a 'crime' demonstrated increased suggestibility and impaired memory both during an immediate interrogation and after a delay (Van Oorsouw et al., 2015). Another field study carried out in bars, with participants viewing a crime from a perpetrator perspective, found that increasing intoxication levels were associated with fewer correctly recalled details of the event (Van Oorsouw & Merckelbach, 2012). Further, a study involving mock suspects carrying out a simulated robbery in a university office found that alcohol reduced the accuracy of mock suspects' recall of the event and of their own actions (Read et al., 1992). (Note, none of these studies examined disclosures or true or/and false confessions.)

It is also of relevance to examine the perceptions and beliefs law enforcement have about intoxicated suspects. In jurisdictions with a common-law system, such as the United States, if a suspect does not take a plea, guilt can be determined in a court of law, either by a judge or by lay people sitting on a jury. A survey of U.S. law enforcement reported that respondents estimated that intoxicated suspects were slightly more likely to waive Miranda rights and incriminate themselves than sober suspects (Evans et al., 2009). Similarly, potential jurors rated being under the influence of alcohol, illegal drugs or prescribed drugs was rated as a strong predictor of false confession (Mindthoff et al., 2018). Consistent with this, an experiment by Mindthoff et al. (2020) found that potential jurors relied less on a confession from an intoxicated suspect than one from a sober suspect. The researchers thus argue that it may be more difficult to achieve a conviction based on a confession from an intoxicated suspect, and that it might be advisable not to interrogate suspects under the influence of alcohol or drugs. However, more research is needed before any specific recommendations can be made for interrogations with intoxicated suspects given the scarcity of current knowledge.

The present study

The aim of the present study was to explore the prevalence of sober, alcohol- and illicit drug-intoxicated suspects and Swedish police officers’ experiences with these groups. A similar survey was conducted in the U.S. (see Evans et al., 2009), but the present research constitutes the first such investigation in Sweden. Collecting information on police officers’ experiences with intoxicated suspects provides a stepping-stone towards an understanding of the situation in Sweden, and a more evidence-based approach for interrogations with suspects.

Method

Participants recruitment

Via their respective online contact forms, we reached out to each of Sweden’s seven police districts (Stockholm, West, South, North, East, Middle, and Bergslagen). In Sweden, there are almost 32,000 employees at the Swedish Police Authority. Of those, there are around 20,400 police officers, spread out over all seven districts, with the most officers being employed in the three major urban districts (Stockholm, West, South) belonging to the largest cities; Stockholm, Gothenburg, and Malmö (Swedish
Police Authority, 2020). The survey informed participants that the aim of the study was to examine how employees within the police organization perceive and handle intoxicated persons (suspects, witnesses, and victims) in criminal investigations, and the prevalence rates of intoxicated persons involved in crimes. The study did not list any exclusion criteria, and asked the participants to disclose information about their role/rank and years of experience within the police, and in particular their experience in handling suspects, witnesses and victims. From the study information page, it was clear that we were interested in recruiting police officers with experience handling intoxicated persons.

Data collection took place over the course of 10 months and follow-up solicitations were sent four times over the 10-month period. The solicitation included a link to the online survey and encouraged recipients to send the link to their police officers and investigators. In addition, the first author reached out via e-mail to her network within the Swedish Police Authority. The response rate is impossible to determine because the solicitation e-mail invited the recipients to forward the link to an unknown number of others to increase participation.

Materials

The survey instrument was developed by the research team and based closely on the Evans et al. (2009) U.S. police survey. All questions were translated from English to Swedish and some modifications were made to the questions to fit the legal context in Sweden. The survey included questions about the prevalence of sober, and alcohol- and drug- intoxicated suspects in Sweden, types of crimes committed, most commonly consumed drugs, suspect credibility, intoxication measurements, practical procedural issues, and other experiential questions. The survey was administered via Sunet software and comprised in total of 97 questions of various types (i.e. open-ended answers, multiple answer questions, and Likert scale questions), including questions regarding suspects, victims, and witnesses.

Procedure

The survey took roughly 30–40 min to complete. Clicking on the link in the solicitation took potential participants to an informed consent agreement. Participants who consented moved on to a demographics questionnaire and then read general instructions regarding the survey, including that alcohol-intoxication could mean any breath alcohol concentration (BrAC) and those respondents should decide for themselves the point at which someone should be considered intoxicated. Note, in Sweden the 'drunk driving' cut-off is BrAC >=0.02% (this is in contrast to other nations, e.g. in the U.S. the limit is 0.08%). Definitions were provided for key terms; for example, interrogation was defined as police interactions with suspects and suspects were defined as individuals suspected of committing crimes.

The first section of the survey asked respondents about the prevalence of sober and intoxicated witnesses/victims, and the second section contained similar questions about suspects. Sections three, four, and five included questions about witnesses/victims. The final section asked in-depth questions about police procedures when dealing with suspects. Given the length of the survey and to avoid redundancy, specifics regarding the questions are not presented here and are instead presented in the results section along with the relevant findings.
Participants could skip questions and ‘I do not know’ (IDK) response options were available for all questions. This resulted in varying numbers of responses across questions. When questions requested respondents to make an estimate (frequency or percentage), the response options were intervals of 10. In other words, rather than input a specific number or a slider with values, questions were phrased in a multiple answer question format for frequency estimates (e.g. 0, 1–10, 11–20, etc.) and for percentage estimates (e.g. 0%, 1–10%, 11–20%, etc.). For some questions, respondents were asked to estimate percentages and these should ideally have added up to 100%; however, it was not required that they do so and sometimes the percentages adds up to more than 100%. For all multiple answer questions, respondents could make more than one selection. Please note that the number of responses (not respondents) is generally reported when multiple answers were possible, given the possibility of making multiple selections to these questions.

Results

The solicitation link was clicked on 473 times. Not all potential participants chose to consent and participate (or did not choose to do so at that time; potential participants may have read the consent form and decided to participate at a later time). Our final sample includes 133 police officers and investigators, of whom 130 answered the last section of the survey that addressed suspects, which indicated a high retention rate.

Participant characteristics

Sample characteristics reported here are based on 133 respondents if not otherwise stated. The sample consisted of 61% male and 39% female participants and the average age was 39 years ($SD = 11$). Of the respondents who indicated their national origin ($n = 124$), most (94%) reported that they were born or grew up in Sweden. Respondents’ reported title/rank varied between police constable (less than 4 years of experience) or senior police constable with more than 4 years of experience ($n = 81$), sergeant ($n = 31$), inspector, i.e. police who is team leader for other police officers ($n = 13$), and chief inspector ($n = 1$). Among the respondents, there were also a few civilian investigators ($n = 5$), meaning these individuals are employed by the Swedish Police Authority and conduct investigations and interrogations, but instead of a police degree they have at least a 3-year degree from a university/college with a major in psychology, behavioral science, criminology or similar areas. In addition, two respondents in the survey did not report their rank.

On average, participants had 7 ($SD = 7$) years of experience with their current job tasks and 12 ($SD = 11$) years of experience in total at the Swedish Police Authority, ranging from 1 to 46 years. The participants reported an average of 11 ($SD = 10$) years of experience with interviewing criminal suspects, with a range of 1–46 years, indicating that all respondents had experience handling suspects. The respondents’ answers varied with regard to which shift they most often worked; day shift (42%), night shift (2%), both day and night shifts (56%). Participants represented a broad range of geographic regions within Sweden, with 54% of officers working in the three major districts (Stockholm, $n = 18$; West, $n = 25$; South, $n = 29$) connected to the large urban cities of Stockholm, Gothenburg, and Malmö.
Sober and intoxicated suspects

Number of police interrogations with all suspects (regardless of intoxication level)
Sixty-nine percent of 131 responses reported that they interrogate between 1 and 10 suspects in a typical month (including both sober and intoxicated suspects), and 21% reported interrogating 11–20 suspects per month. Almost all (94%) of the 130 responses indicated that they questioned between 1 and 10 suspects a typical week. See Table 1 for a detailed summary.

Characteristics of intoxicated suspects
Out of 129 responses, 95% indicated that intoxicated suspects are typically men, with only 2% indicating they are typically women (5% IDK). The majority of responses (67% out of 180) indicated that most intoxicated suspects are between the ages of 21 and 30 years; the next most common response category (32% of responses) was 31–40 years old. Furthermore, investigators indicated the percentage of suspects that are under the influence of: alcohol only, marijuana only, other illegal substance only, multiple substances, and other. As can be seen in Table 2, results varied considerably. Thirty nine percent of responses (49 out of 127) indicated that at least half of intoxicated suspects were under the influence of alcohol only (17% IDK). For estimates on other substances, the frequency ratings were much lower. Furthermore, while 46% of responses (out of 130) indicated that <51% of intoxicated suspects suffer from alcohol abuse problems, 39% of responses indicated that the majority of intoxicated suspects have such problems (15% IDK).

Prevalence of intoxicated suspects
For the question ‘How common is it, according to you, to encounter a suspect to a crime who is intoxicated?’ the 131 responses were almost evenly split between stating that it was common (45%) or very common (42%). Very few responses suggested that it was not common (12%) or very unusual (1%), with 1% indicating IDK/NA.

Respondents answered detailed questions regarding when they question suspects, in terms of the timing of the suspect’s intoxication: (a) sober at both crime and interrogation, (b) intoxicated at crime but sober at interrogation, (c) sober at crime but intoxicated at interrogation, and (d) intoxicated at both crime and interrogation. See Table 3 for a complete overview. Almost all (95% of 131 responses) stated that they indeed had questioned a suspect who was sober both at the time of the crime and at the time of the

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Table 1. Frequencies of responses indicating how many suspects (0, 1–10, 11–20 etc.) police respondents interrogated in a given timeframe.

| Number of suspects | Typical month ($N = 131$) | Typical week ($N = 130$) | Last month ($N = 130$) | Last week ($N = 130$) |
|--------------------|---------------------------|--------------------------|------------------------|-----------------------|
| 0                  | 4                         | 6                        | 7                      | 26                    |
| 1–10               | 90                        | 122                      | 90                     | 104                   |
| 11–20              | 27                        | 1                        | 26                     | 1                     |
| 21–30              | 10                        | 1                        | 6                      | 0                     |
| 31–40              | 0                         | 0                        | 1                      | 0                     |
| 41–50              | 0                         | 0                        | 0                      | 0                     |
| 50+                | 0                         | 0                        | 0                      | 0                     |
| IDK                | 0                         | 0                        | 0                      | 0                     |
| Total no. of responses | 131                       | 130                      | 130                    | 131                   |

Note: Boldfaced is the most selected category (mode) for a given timeframe. Multiple answers were possible for each question. IDK = I don’t know.
interrogation, and 76% (of 126 responses) reported having interrogated 1–10 of these sober suspects in the past month. Additionally, 88% (out of 130 responses) reported having ever questioned a suspect who was sober during the interrogation but had been intoxicated when the crime took place, and more than half (56% out of 118 responses) indicated having done so with 1–10 suspects the past month. It was also very common (76% of 129 responses) to have interrogated a suspect who was intoxicated both at the time of the crime and at the questioning, and a majority (52% out of 106 responses) indicated having conducted 1–10 of these interrogations in the past month. In contrast, only 22% (out of 131 responses) reported ever having interrogated a suspect who was intoxicated at the time of questioning, but sober during the crime. In sum, questioning sober suspects was the most common, but a large majority of police officers also reported encounters with suspects who either had been intoxicated at the time of the crime, or were intoxicated both during the crime and during the interrogation.

**Type of crimes**

Police officers were asked about the type of crimes that intoxicated suspects tended to engage in most often. Based on free narrative responses from 126 police officers, it is

**Table 2.** Frequencies of responses indicating what percent (e.g., 1–10%, 11–20% etc.) of intoxicated individuals were under the influence of various substances/substance categories.

| % of intoxicated | Alcohol only (N = 127) | Marijuana only (N = 122) | Other illegal substance (N = 121) | Multiple substances (N = 127) | Other substances (N = 94) |
|------------------|------------------------|--------------------------|----------------------------------|-------------------------------|--------------------------|
| 0%               | 0                      | 1                        | 0                                | 0                              | 0                        |
| 1–10%            | 6                      | **30**                   | 31                               | 14                             | 7                        |
| 11–20%           | 8                      | 20                       | 19                               | 11                             | 3                        |
| 21–30%           | 14                     | 10                       | 14                               | **17**                        | 3                        |
| 31–40%           | 16                     | 9                        | 6                                | 11                             | 0                        |
| 41–50%           | 12                     | 7                        | 6                                | 12                             | 2                        |
| 51–60%           | 8                      | 2                        | 2                                | 7                              | 1                        |
| 61–70%           | 12                     | 0                        | 0                                | 11                             | 0                        |
| 71–80%           | **18**                 | 3                        | 5                                | 9                              | 2                        |
| 81–90%           | 11                     | 2                        | 1                                | 4                              | 0                        |
| 91–100%          | 0                      | 0                        | 0                                | 1                              | 0                        |
| IDK              | 22                     | 38                       | 37                               | 30                             | 77                       |
| Total no. of responses | 127               | 122                      | 121                              | 127                            | 95                       |

Note: Boldfaced show the most selected category (mode). Multiple answers were possible for each question. IDK = I don’t know.

**Table 3.** Frequency of contact with suspects intoxicated and/or sober at the time of the crime and interrogation.

| Intoxication status of suspects | Officers who had ever questioned a suspect given intoxication status | Estimates of how many suspects questioned in the past month that were intoxicated/sober at the time of the crime and/or interview. |
|--------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------|
|                                | No. of responses | % of responses | No. of responses | 0 | 1–10 | 11–20 | 21–30 | 31–40 | 41–50 | 50 | + | IDK |
| Sober                          | 131             | 95%            | 126              | 16 | **96** | 10 | 0 | 0 | 0 | 0 | 4 |
| Drunk                          | 130             | 88%            | 118              | 43 | **66** | 5 | 0 | 0 | 0 | 0 | 4 |
| Sober                          | 131             | 22%            | 42               | **32** | 8 | 1 | 0 | 0 | 0 | 0 | 1 |
| Drunk                          | 129             | 76%            | 106              | 43 | **55** | 3 | 2 | 0 | 0 | 0 | 3 |

Note: Boldfaced show the most selected category (mode). Multiple answers were possible for each question. IDK = I don’t know.
common to encounter alcohol- or drug-intoxicated suspects in violent crimes. Many of the officers reported several types of crimes. They reported encounters with intoxicated suspects in cases of physical assault (73 responses; many of these responses noted that these tend to happen in or outside of bars), followed by general acts of violence (45 responses), driving under the influence (38 responses), domestic disputes (31 responses; many of these responses specified men hitting women), thefts (10 responses), narcotic crimes (10 responses), sexual violence including rape (8 responses), illegal threats/assaults (8 responses), damaging of property (5 responses), mugging (2 responses), other types of crimes (2 responses), illegally wearing a knife (1 response), break-ins (1 response) and attempted murder (1 response).

Also, officers were specifically asked how many of all persons suspected of sexual crimes are intoxicated at the time of the crime. Out of 127 responses, about a third indicated that <51% of suspects in sexual crimes were intoxicated, another third indicated that this was the case for the majority (51–100%) of suspects, while 32% indicated that they did not know. A clearer pattern emerged when officers reported how many persons suspected of violent crimes (not involving sexual violence) were intoxicated at the time of the crime. The majority (66% out of 128 responses) estimated that over half of suspects of violent crimes are intoxicated, and only 20% of responses indicated that this was the case for <51% of these suspects (14% IDK/NA).

**Measuring intoxication**

Police officers were asked whether they used a portable breathalyzer, and whether they used a stationary benchtop breath alcohol measurement instrument to measure the breath alcohol concentration for those suspects they thought could be under the influence (yes, no, IDK answer options). The majority (77% out of 128 responses) indicated not using a portable breathalyzer, with only 22% indicating doing so (1% IDK/NA). Further, while most responses (57% out of 127) indicated not using a benchtop instrument to assess suspects’ intoxication levels, a relatively large proportion (43%) indicated doing so.

When police officers were asked whether they used some other method to assess intoxication level, a majority 68% (out of 122 responses) indicated they did. In their free narrative responses explaining the methods they use, police officers indicated that they may start a conversation with the suspect to subjectively assess intoxication level, ask the suspect to self-report their drinking, use standard field sobriety tests (e.g. can suspect stand up straight, walk in a straight line?) or behavioral cues (e.g. does suspect look or smell drunk?), and/or make an overall assessment of the person and situation. To quote one police officer’s own written response; ‘it is not rocket science to determine how drunk someone is.’ However, another officer noted the impossible task of subjectively assessing intoxication levels among suspects who have alcohol abuse problems, because such individuals can have extremely high BrAC levels and still function quite normally (due to their high tolerance). Officers were also asked to estimate the BrAC level intoxicated suspects typically have, and the most common theme in the free narrative answers was that it varies a lot and it is impossible to answer. The estimates provided varied between BrAC levels of 0.05% up to 0.30%, but many officers reported levels around 0.10% or above. This uncertainty among officers was also shown in a large number of IDK responses (21% out of 130 responses) when asked to rate intoxicated
suspects on a Likert scale from 1 (not at all intoxicated) to 10 (extremely intoxicated). Of the 104 responses, the mean intoxication level was estimated to be 5 (Mdn = 5, SD = 2).

**Police practices with intoxicated suspects**

Respondents were asked if they used the same or different interrogation procedures when interrogating the intoxicated as when interrogating the sober. Around 60% (out of 129 responses) indicated using different interrogation procedures, while 36% of responses indicated using the same procedures for both sober and intoxicated suspects. When asked about the efficiency of the interviewing procedures used with intoxicated suspects (regardless of whether the same or different procedures were used), the mean on a Likert scale from 1 (not at all effective) to 10 (extremely effective) across the 126 responses was 7 (Mdn = 7, SD = 2), with 26% of responses indicating ‘IDK.’

Police officers who reported using different interrogation procedures for sober and intoxicated suspects explained in free-report format that it is not a regular practice at their department to interrogate a person who is intoxicated, or that it is up to the individual police officer to make a subjective decision in each case. Based on these free-report answers, it appears common to let intoxicated suspects sober up in the detention room and/or sleep before any questioning can proceed. One officer elaborated on this, saying that it is not legally appropriate to interrogate intoxicated suspects because suspects need to be aware of what is happening during the questioning, otherwise the defense can make the case in court that the interrogation was not valid and that information obtained from it should not be counted as evidence. Police officers expressed that it may be acceptable to have a short conversation with the intoxicated suspect to obtain some central details and then conduct the real interrogation at a later point in time.

Respondents were asked to select if they typically let intoxicated suspects sober up before interrogating them, interrogate them while intoxicated, or if it depends on the situation. About half (49% out of 132 responses) stated that they usually let intoxicated suspects sober up, 45% said it depends on the situation, and only 5% reported interrogating while suspects are intoxicated (1% IDK/NA).

All police officers were also asked about the amount of information (regardless of accuracy) reported by suspects during repeated interrogations as a function of time of questioning and intoxication state. Most commonly reported (36% responses out of 133 responses) was that the officers believed suspects reported the most information directly after the crime while still under the influence, followed by 22% of responses indicating that they would obtain more details from suspects as soon as they are sober, later on during the same day. Some responses (7%) indicated that it was more productive to wait until the next day when suspects are completely sober, and a few responses (5%) claimed they would obtain the most information at a later point in time when suspects were intoxicated again (37% IDK/NA).

**Vulnerabilities of intoxicated suspects**

Police officers were asked to rate the likelihood of suspects incriminating themselves during interrogation on a Likert scale from 1 (not at all likely) to 10 (extremely likely), depending on the time of intoxication (see Table 4 for details). The police thought the highest risk for self-incrimination was when the suspect was intoxicated both at the
time of the crime and the interrogation, followed by cases where the suspect was intoxicated only during the interrogation or during the crime only. Not surprisingly, officers estimated that suspects were at least risk for self-incrimination in cases where they were sober at both the time of the crime and the interrogation.

Police officers were also asked how likely it is for suspects under the influence to testify in their own defense compared to sober suspects (i.e. more likely, just as likely, or less likely). The most common response (44% out of 126 responses) was IDK, followed by 25% stating that intoxicated suspects are more likely to testify in their own defense, while 21% thought intoxicated and sober suspects were just as likely to testify in their own defense, and only 10% thought the intoxicated were less likely to testify compared to sober ones.

**Discussion**

The present study is the first to examine the prevalence of sober, alcohol- and drug-intoxicated suspects in Sweden, and the first to explore the procedures used in this context. One central finding suggests that alcohol-intoxication is very common among suspects in Sweden – similar to other countries, including the U.S. (Evans et al., 2009). In line with Evans and colleagues, the present study also suggests that the majority of police officers use different procedures when interrogating intoxicated suspects compared to sober ones. Similarly, individual police officers often use their own subjective judgement when deciding which procedures to use when handling intoxicated suspects. Thus, the present survey revealed both subjective assessment issues and inconsistent procedures among police respondents who interact with potentially intoxicated suspects, which is consistent with the lack of national guidelines. This could in turn impose threats to the rule of law in Sweden given that intoxicated suspects may not receive the same treatment as sober suspects, because each encounter is dependent on the individual police officer’s judgement. Below, we discuss these findings in more depth.

When surveying the Swedish police force, almost all officers reported that they interrogate between one and ten suspects (regardless of intoxication level) in a typical week. Eighty seven percent of officers said it was common or very common to encounter alcohol-intoxicated suspects in Sweden. This is very similar to international statistics. For example, a U.S. police survey (Evans et al., 2009) found that more than 80% of police officers reported that it was common or very common to encounter intoxicated suspects. When shifting focus from suspects to perpetrators, U.K. data suggest that intoxicated perpetrators were responsible for around half of all violent crimes (Kershaw et al.,

| Time of intoxication                  | Likelihood of self-incrimination | N  | No. of responses | M       | Mdn | SD | % IDK |
|---------------------------------------|---------------------------------|----|-----------------|---------|-----|----|-------|
| Crime only                            |                                 | 126| 126             | 4.8     | 5.0 | 2.0| 34    |
| Interrogation only                    |                                 | 125| 125             | 5.0     | 5.0 | 2.0| 53    |
| Crime and interrogation               |                                 | 126| 127             | 5.3     | 5.0 | 2.0| 39    |
| Sober at both times                   |                                 | 125| 125             | 3.7     | 4.0 | 1.8| 31    |

Note: Multiple answers were possible for each question. IDK = I don’t know. Estimation were rated on a scale from 1 (not at all likely) to 10 (extremely likely).
Alcohol has been rated as the most harmful drug, in part because of its detrimental effects on society (e.g. via its role in crimes) (Nutt et al., 2010). As such, a high prevalence of intoxicated suspects and perpetrators is not unexpected, especially given the high alcohol-consumption rate in Sweden (WHO, 2018) and the previously established strong link between alcohol consumption and crime (IOGT-NTO, The Swedish Society for Medicine, and CERA, 2017). Also, 95% of the responses in our police survey showcased that most alcohol-intoxicated suspects in Sweden are male. This finding reflects the alcohol-consumption rates in a WHO report (2018), stating that males in Sweden consumed around 14.6 litres and females around 3.8 litres of pure alcohol. Given the large gender difference in consumption rates, it is no surprise that the Swedish police encounter more intoxicated male suspects than female suspects.

When law enforcement in the present study estimated which substance intoxicated suspects in Sweden were under the influence of, most (39% of responses) indicated that >50% of intoxicated suspects were under the influence of alcohol only. This is similar to the findings from Evans et al. (2009); police officers estimated that around half of intoxicated suspects are under the influence of alcohol only. Because alcohol is a legal drug and the general consumption rate is high in many western societies (WHO, 2018), it is to be expected that illicit drug intoxication among suspects is less common than alcohol-intoxication. Further, although the majority of police officers in the present study thought that intoxicated suspects in Sweden are not usually alcohol-dependent, around 40% of the responses indicated that the majority of suspects have substance abuse and dependence problems. In the U.S. police survey, the officers indicated that around half of all intoxicated suspects had substance abuse problems (Evans et al., 2009). When compared to international statistics on substance abuse problems among inmates in prisons, estimates in the present study are a fair bit lower. In America, 1.5 million inmates (65%) suffer from substance abuse in prisons (National Center on Addiction and Substance Abuse, 2010). Parallel statistics from Sweden reported that as many as 60% of inmates suffer from substance abuse (Swedish Prison and Probation Service, 2019). The cause for this discrepancy between police estimates (on suspects, not necessarily inmates) and prison statistics warrants further research.

Furthermore, the police officers in the present study reported a high proportion of intoxicated suspects to be involved in violent crimes. This makes sense given that alcohol has a negative impact on important brain functions necessary for impulse control, inhibiting responses, and considering future consequences (see Abernathy et al., 2010, for a review). Our Swedish police officers more frequently reported that intoxicated suspects are involved in physical assaults, other general violence acts, driving under the influence, and domestic disputes. These types of crimes are similar to what U.S. police officers reported (Evans et al., 2009). Regarding sexual crimes, around one-third of our Swedish police officers reported that the majority of suspects are intoxicated during the act.

When it comes to measuring intoxication levels, the overwhelming majority in the present study indicated not using a portable breathalyzer. A substantial number of respondents (43%) also indicated using a benchtop instrument to assess suspects’ intoxication levels. This is in contrast to our findings regarding Swedish police’s interactions with witnesses during which police reported that they were very unlikely to measure intoxication level at all (Hagsand et al., 2021, blinded for peer review). The reason for
this contrast is probably that in Sweden it is legal to measure suspects’ BrAC (at least in cases of suspected DUI or in violent crimes, in which intoxication level is needed as evidence), whereas it is usually not legal to measure witnesses’ and victims’ BrAC levels as it can be regarded as a body inspection. In the U.S. police survey, around 54% of officers reported not using an instrument to objectively measure intoxication level among suspects (Evans et al., 2009). In our sample, almost 70% reported using other methods (instead of instruments) to assess intoxication among suspects, similar to the rate (72%) reported in the Evans et al. (2009) survey. Just as in the U.S. police survey, our Swedish police sample reported using standard field sobriety tests, behavioral cues or an overall assessment of the person and situation to estimate levels of intoxication among suspects. Given research on alcohol tolerance and individual differences in reactions to it, it is concerning that many police officers casually reported that intoxication level is something that can be easily determined without instrumental measurement. Specifically, this approach is problematic for several reasons. First, if police officers ask suspects how much they have been drinking, it is likely that these self-report measures are not correct because individual estimates may be subjective and misremembered (Barnett et al., 2009). Also, the police should not use ‘rule of thumb’ guidelines, as two individuals consuming the same amount of alcohol can reach different intoxication levels, based on their differences in weight, gender, tolerance, consumption rate, and alcohol content in drinks, and so on (Lee et al., 2009; Paton, 2005). Even if the same amount of alcohol is consumed, individuals may exhibit different behavioral changes, and also may differ with respect to the subjective experience of alcohol-intoxication (Holdstock & de Wit, 1998). This renders it difficult to subjectively assess someone’s intoxication level. It is of course possible that police officers, who have many years of experience and training in interacting with the intoxicated, are better than the general population or participants in studies at assessing intoxication using subjective measurements. However, until this is proven to be the case, caution should be taken by police officers when employing subjective measurements of intoxication among suspects as erroneous estimates can have serious consequences and impact the criminal investigation and the rule of law in a negative manner. The common use of subjective measurement, instead of objectively measuring intoxication using an instrument, can indirectly be seen in the Swedish police officers’ uncertain answers when asked to estimate the typical intoxication level among suspects. Participants’ estimates ranged from BrAC levels between 0.05% up to 0.30%, with many ‘I do not know’ responses. Hence, using a portable breathalyzer or a benchtop instrument to objectively measure BrAC would be beneficial for many reasons, when there is legal support for the police to do so.

It is also of relevance to look at which police practices are used with intoxicated suspects given the potential risk of self-incrimination and suspect rights violations while interrogating intoxicated suspects. The present survey found that Swedish police often employ different interrogation methods with intoxicated suspects than with sober. Only about 36% of respondents indicated using the same procedures as with sober suspects. Such precautionary measures have not been found among U.S. law enforcement (Palmer et al., 2013). In fact, U.S. research shows that sober and intoxicated individuals are often interrogated in a similar manner. Almost 65% of surveyed U.S. police officers reported that their department’s standard procedures concerning intoxicated suspects were the same as with sober suspects (Evans et al., 2009). Among those Swedish
participants who reported using different procedures for sober and intoxicated suspects, some reported that they may delay an interrogation with an intoxicated suspect because of their department’s practice to not question drunk individuals. Others reported that it is up to each officer to make a subjective judgement on when and how to interrogate an intoxicated suspect. Just over half indicated that they usually let intoxicated suspects sober up before interrogating them – in stark contrast to U.S. law enforcement’s self-reported behavior, where only around 7% of officers let suspects sober up before interrogation (Evans et al., 2009). One reason why many Swedish police officers may wait until the suspect has sobered up before questioning may be found in a free-report response noting that the defense can question the validity of the suspect’s statement in court if the suspect was interrogated by police while drunk. The practice of waiting to interrogate may also be reflected in the finding that 88% of the Swedish officers reported questioning a suspect who was sober during the interrogation but had been drunk during the crime. Despite this, as many as 76% reported that they had interrogated suspects who were intoxicated both at the time of the crime and the questioning. Nevertheless, over a third of police officers reported thinking that suspects report the most details directly after the crime while still under the influence. Taken together, our findings highlight the need to have science-based (inter)national policy guidelines on when and how to interrogate intoxicated suspects. Although the eyewitness and memory literature have started to find compelling evidence for the benefits of an immediate interview over a delayed interview, at least when witnesses have only low-to-moderate levels of intoxication (e.g. Hagsand et al., 2017; Hildebrand Karlén et al., 2017; La Rooy et al., 2013; Yuille & Tollestrup, 1990), there are still too few alcohol and suspect memory studies to conclude that this body of work can be used to extrapolate from in the context of intoxicated suspects. The scientific base for policy guidelines concerning suspect interrogations must improve with more studies on the topic, as several factors already described potentially differ when it comes to suspects’ and witnesses’ memory and their goals when interacting with law enforcement (e.g. first person vs. bystander perspective, deceptive intent, motivation to collaborate with the police) (Gehl & Plecas, 2017).

Further, it is important to highlight potential vulnerabilities of intoxicated suspects. In the present survey, the risk of self-incrimination was estimated to be highest when suspects were intoxicated both at the time of the crime and during the interrogation. Similarly, sober suspects were deemed less likely to self-incriminate. These perceptions are hardly surprising given the amount of basic memory research demonstrating detrimental effects of alcohol in general on cognitive processes (e.g. White, 2003). In order to assess the veracity of these perceptions, future research should collect empirical data on how common self-incrimination is among intoxicated suspects. It is possible that alcohol reduces suspects’ ability to correctly judge the consequences of their actions during an interrogation. Indeed, in the U.S. survey, around 25% of the police respondents estimated that intoxicated suspects were more likely than sober suspects to waive their Miranda rights (Evans et al., 2009). This perception of intoxicated suspects as less cognizant decision makers is not confined to police officers’ perceptions. For example, potential jurors rated suspect intoxication as a strong predictor of false confessions, and confessions from intoxicated suspects were rated as less credible compared to those from sober suspects (Mindthoff et al., 2018; Mindthoff et al., 2020). Memory impairment, whether alcohol-induced or not, has long been thought to contribute to the susceptibility to suggestions made by an interrogating police
officer (Schooler & Loftus, 1986). This potential vulnerability to suggestibility has been minimally investigated, with some indications that intoxicated suspects may be more susceptible to suggestive cues during interrogation (Van Oorsouw et al., 2015; Van Oorsouw et al., 2019), possibly due to memory impairments. However, research on this is very limited and the best recommendation may still be to use interrogation methods designed to avoid suggestive questioning. Most likely, further research will find that interrogations with intoxicated suspects will benefit from adopting productive and ethically sound interrogation methods. Given the large body of research on the benefits of an information-gathering approach over an accusatorial approach during interrogations with sober suspects (see Hartwig et al., 2005; Meissner et al., 2014, for a review and meta-analysis), our expectation is that interrogations with intoxicated suspects, who might be particularly vulnerable, will benefit from these methods as well.

A related perception is a likelihood that a suspect will testify in their own defense. In our sample, there was a roughly even split between officers who thought intoxication did not matter and those who thought intoxicated suspects were more likely than sober ones to testify in their own defense. In contrast, a U.S. study found that about 25% of police respondents estimated that intoxicated suspects were less likely to testify in their own defense, and only a small portion (5%) of their sample thought intoxication increased the likelihood to testify (Evans et al., 2009).

**Limitations**

The present study surveyed law enforcement via a self-report format, a methodology that has strengths and limitations. Police officers are probably the most appropriate group to ask about the prevalence of intoxicated suspects, the interrogation procedures employed, and their perceptions of these suspects. However, officers’ memory, years as an officer, and individual experience (e.g. working in either urban or rural areas) will of course impact their estimates and responses. Survey responses (as with all memory recall), can therefore not be seen as entirely accurate reflections of objectives numbers and procedures, but rather as a good estimate provided by individuals who interact with this suspect group first hand. Indeed, the majority of our respondents were junior or senior police constables (and not inspectors or chief inspectors), meaning they probably spend their time out on the streets (as opposed to in the office), giving them the opportunity to regularly encounter intoxicated persons. While social desirability could also be a factor, the anonymous nature of the survey hopefully reduced any such effects. Further, the number of police respondents (N = 133) in this survey is a small sample in relation to the approximately 20,400 police officers employed in Sweden (Swedish Police Authority, 2020). As such, their responses may not reflect the experiences of the entire Swedish police force. However, similar international survey studies have equal or lower representativeness. For example, the U.S. police survey by Evans and colleagues (2009) had 119 respondents, a small sample considering that the U.S. is a much larger country compared to Sweden.

**Future research**

Police regularly question alcohol-intoxicated suspects in Sweden, yet police officers’ practices with this group are inconsistent. As such, there is a need for national policy
guidelines that go beyond the guidelines for interrogations that the Swedish Police Authority currently is developing which only address sober persons (e.g. suspects), and intoxicated witnesses (Hagsand et al., 2020). Other countries, such as the U.S. and the U.K., are also lacking policy guidelines on how to handle intoxicated suspects (e.g. Evans et al., 2009). For example, in the U.K., there are no guidelines in place on how to interrogate drunk suspects, although short guidelines for first responders do exist on how to deal with intoxicated witnesses and victims (College of Policing, 2019). However, before policy development can take place concerning intoxicated suspects, there is a clear need to increase the scientific knowledge base on how alcohol affects suspects’ cognition, memory, suggestibility, and likelihood of self-incrimination (including true and false confession rates). The scientific knowledge regarding intoxicated witnesses has increased exponentially during the last decade (e.g. Altman et al., 2019; Jores et al., 2019, for reviews), making it possible to develop policy guidelines on this particular witness group (Hagsand et al., 2020). However, research on witnesses/victims may not directly translate to suspects (Gehl & Plecas, 2017), as previously noted. Therefore, the same scientific progress is needed on intoxicated suspects during the coming decade, although there are ethical and scientific challenges with examining how alcohol affects cognition among intoxicated mock suspects and real suspects.

**Final remarks**

Findings from this police survey suggest that Sweden is similar to other nations in its high prevalence rate of intoxicated suspects. The lack of national policy guidelines concerning interrogations of intoxicated suspects was clear, as many police officers reported using their own subjective judgements on how and when to interrogate intoxicated suspects, and how to determine if a suspect is intoxicated. We would argue this might lead to different treatment of intoxicated suspects depending on which police officer is on scene and where in Sweden the encounter takes place. The rule of law in Sweden should ensure fair and equal treatment of all criminal suspects. When subjective judgements and unfounded assessments replace standard, evidence-based guidelines and objective instrument-based measures, the rule of law is jeopardized. In some sense, all legal judgements are subjective but national guidelines and technology can reduce variability in the treatment of intoxicated suspects. We therefore urge researchers to continue this important research on alcohol and cognition, with a focus on studies examining mock suspects and real suspects and/or perpetrators. This will provide a solid scientific base for developing national policy guidelines in the coming years.

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**Notes**

1. The current manuscript describes findings relating to intoxicated suspects. The data were obtained as part of a data collection effort that surveyed experiences with intoxicated suspects, witnesses and victims. The manuscript (Hagsand et al., 2021 – blinded for peer-
review) describing the findings regarding witnesses and victims is under review elsewhere. As such, the methods described here are very similar as those described in that manuscript.

2. To obtain a copy of the Swedish survey instrument used in the present study, please download a PDF copy of the survey (in Swedish) from the Open Science Framework (OSF) website. Note: The material on OSF is made anonymous for blind peer review purposes. https://osf.io/sa9zm/?view_only=6263439fd6fa4cf5a36d717e4c7f095d

3. As previously noted, the questions and data on witnesses/victims will be reported elsewhere due to the length of the survey.

4. A benchtop/stationary breathalyzer uses a more advanced technique (infrared spectrometry) than a handheld/portable device, which uses fuel cell technology to assess the level of breath alcohol concentration. Handheld breathalysers are used by the police as a first screening instrument (often used roadside in cases of suspected driving under the influence) and are typically not admissible as evidence for example in Swedish or U.S. courts. It is the outcome of the more sophisticated benchtop instrument, that can be easily calibrated to ensure accurate readings and is often located at police stations, that is used as evidence in court (Jones, 2016). The Swedish police also adhere to these rules (Swedish National Forensic Centre, 2020).

5. Depending on the manufacturer and model, even handheld breathalysers can be valid and reliable instruments to use in situations needing a quick assessment of intoxication level (Sorbello et al., 2018). For example, the Swedish National Forensic Centrum (2020), which is part of the Swedish Police Authority, stated that the reason why portable breathalysers are not used as evidentiary instruments is not because they are inaccurate per se, but because they may give an misleading result if used in close proximity to someone’s last drink when they still have residual alcohol in their mouth. Scientific studies have found that the breath alcohol concentration usually is higher than the blood alcohol concentration during the first minutes after someone has consumed alcohol (Holt et al., 1980). Therefore, administration of water to rinse the mouth before using a portable breathalyzer is advisable, as is performing a re-test some minutes later (see this procedure used in the experiments by Hagsand et al., 2017).

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