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ABSTRACT

Victims, witnesses, and suspects of crime are frequently intoxicated by Alcohol or Other Drugs (AOD) during the event. How intoxication is perceived by investigating officers, and the manner in which this is handled during interview procedures, can affect the quality of information obtained and therefore investigative outcomes. Various factors are likely to contribute to how intoxication is handled during the investigation of a crime, including standard procedures, familiarity with the effects of different substances, and cultural attitudes. While findings with respect to the effect of different substances on memory are still emerging, it is important to investigate whether police beliefs are consistent with available evidence. In this study, Australian and Indonesian police officers were surveyed about their perceptions of memory accuracy and credibility of victims and witnesses intoxicated with various substances (e.g. alcohol, cannabis, amphetamines, and opioids). A higher proportion of Australian police identified larger negative memory effects associated with alcohol intoxication. At the same time, Indonesian police were found to be more likely to report that intoxication with alcohol would make a victim or witness less credible. With regard to timing, across multiple substances, larger proportions of Australian police reported believing that information obtained from witnesses that were still intoxicated would be more accurate than if interviewed after they became sober. It is concluded that, in order to rectify misconceptions about the impact of AOD intoxication on memory and improve investigative practices, both Australian and Indonesian police would benefit from additional training on the effects of intoxication.

Witness and victim testimony often play a crucial role in the proceedings of a criminal investigation. For example, testimonies frequently are the sole evidence available in violent crimes such as rape, physical assault, and domestic violence (Flowe et al., 2011). However, witnesses and victims are frequently intoxicated by Alcohol or Other Drugs (AOD) when crimes occur. For example, in some countries 50% of recorded assaults involve alcohol consumption (see Jores et al., 2019, for a review). It is therefore imperative to know how intoxicated individuals are perceived by legal

professionals for a number of reasons. First, if their testimony is not perceived as credible despite it being accurate, this could increase the risk of a failed investigation or prosecution. Alternatively, if intoxicated witnesses are perceived as credible but their testimony contains inaccuracies (i.e. errors of either commission or omission), this could potentially obscure the investigative process and even result in a false conviction. These outcomes pose a risk to society, as the perpetrator remains free to commit further crimes.

Intoxication with AOD may affect a witness's capacity to remember details of an event. However, the nature of these effects is complex and varies according to the substance of intoxication. For example, a recent meta-analysis (including primarily laboratory studies) found that alcohol-intoxication is associated with a reduction in the quantity but not accuracy of information recalled (Jores et al., 2019). This is contrary to common perceptions among laypeople (Benton et al., 2006), undergraduate students (Monds et al., 2021), and even experts (Kassin et al., 2001). The effect on quantity was moderated by intoxication level, retention interval, and recall format, with less complete accounts given by more intoxicated individuals, when questioned immediately, and when cued recall questions were asked (Jores et al., 2019). However, a survey, and field study specifically focused on suggestibility suggest that to avoid increases in inaccuracy or suggestibility, immediate questioning while individuals are moderately intoxicated is preferable to delayed questioning (Evans et al., 2019), and that at high levels, alcohol might increase suggestibility during intoxication but also at a later sober interview (Van Oorsouw & Merckelbach, 2012), respectively. While research into effects involving other substances is limited, emerging evidence form laboratory studies has identified potential adverse effects on memory, including higher rates of false memories among those acutely or recently intoxicated with cannabis (Kloft et al., 2019, 2020a).

At the same time, recent evidence from a laboratory study suggests that intoxication with 3,4-Methylenedioxymethamphetamine (MDMA; the main psychoactive ingredient of ecstasy) is not associated with increased suggestibility to misinformation (Kloft et al., 2020b). There is minimal research regarding other substance effects on memory outside of basic memory tasks (e.g. word lists). A recent review (Kloft et al., 2021) has therefore concluded that the effects of substances on memory in an applied forensic context are highly nuanced and strongly depend on factors such as the type of drug used, the dose, the state during encoding and retrieval, and the timing of an interview. These discrepant findings highlight the importance of further research into the effects of different substances on memory, and a more sophisticated treatment within forensic and judicial settings.

At the same time, this need for further experimental research brings to light a complex challenge faced in the field; legal practitioners are required to make decisions based on knowledge not yet fully established within laboratory research. Specifically, although further research is needed to understand how substances aside from alcohol and cannabis affect memory, police are regularly required to evaluate intoxication to make decisions on when and how best to interview suspects, witnesses and victims (see Monds et al., 2019b, for a review). Their perception regarding levels of intoxication and associated impairment will therefore affect the approach taken to conducting interviews and the reliability of witness testimony (e.g. as a result of decisions regarding when to conduct the interview). Given that scientific knowledge is still in the process of being established, so far differences in the approach police officers take in conducting interviews with intoxicated witnesses/victims may result mostly from differences in law enforcement guidelines. While some guidelines provide specific recommendations with regard to the timing of interviews, suggesting for example, that they should be delayed until witnesses are sober (New South Wales Police Legal Services Training Section, 2004), others emphasise officers' discretion in determining an approach based on the physical and/or mental state of victims and witnesses (Indonesian National Police, 2019). When guidelines for conducting interviews with intoxicated persons are discretionary or absent, an individual officer's perceptions, experience and training on intoxication may have

particular bearing on the outcome of investigations. It is therefore of vital importance to examine police perceptions regarding the memory and credibility effects of intoxication with alcohol and other drugs.

To date, these issues have been addressed in two survey studies. US investigating officers (*N*= 119; Evans et al., 2009) and police officers from England (*N*= 198; Crossland et al., 2018) were surveyed about the prevalence of intoxicated witnesses and respective law enforcement procedures. According to most respondents in both surveys (73% and 82% respectively), interacting with intoxicated witnesses was a common or very common occurrence. In addition, results from both studies indicated that standard procedures were lacking in how to deal with intoxicated individuals, for example, about when to question them or how to determine their intoxicated state. Investigators deemed statements made by intoxicated witnesses to be less accurate compared to sober witnesses (Crossland et al., 2018), and believed that jurors would find intoxicated witnesses and victims less credible (Evans et al., 2009). Consequently, investigators reported believing that cases involving intoxicated witnesses were less likely to proceed to court (Crossland et al., 2018) and that intoxicated witnesses were less likely to testify than sober witnesses (Evans et al., 2009).

While the abovementioned studies were valuable in understanding police procedures and perceptions on this topic, several critical unaddressed issues remain. First, past research using police samples has predominantly focused on perceptions of alcohol intoxication. However, the effects of other (illicit and/or prescribed) substances on memory have become a rising issue of concern in the legal field. In Evans et al. (2009), of those witnesses thought to be under the influence of any substance, officers estimated that 59% had consumed alcohol only, 18% had used cannabis only, 12% had used another illegal substance, and 24% had used multiple substances. These results demonstrate that a variety of substances are frequently encountered by officers in the course of their investigation. However, previous research has not explored police perceptions regarding the effects of intoxication with substances other than alcohol. The current study therefore aimed to address this limitation by asking police about a range of different substances.

Another limitation of prior research is the generalizability of findings to jurisdictions outside of the USA and UK. It is important that perceptions of intoxicated witnesses/victims are investigated in different countries, in order to understand social and cultural influences, as well as those associated with different levels of experience on interviewing intoxicated witnesses. A 'one size fits all' approach to future police training initiatives may not be appropriate if there are considerable differences across police cohorts (e.g. training may need to be tailored to differing experience levels). It is especially important to consider collecting data outside of Western, Educated, Industrialized, Rich, and Democratic (WEIRD) populations (Henrich et al., 2010), since previous work has been exclusively confined to Western samples. Cultural differences on how drug consumption is viewed and prosecuted might drive different perceptions in various countries. Therefore, another novel element of the present study was to examine a cross-cultural comparison between two countries (one 'WEIRD' and one not, respectively): Australia and Indonesia.

Although Australia and Indonesia are geographical neighbours, law enforcement practices relating to drug and alcohol use differ considerably. While some Australian jurisdictions have become increasingly lenient, including decriminalizing possession of small quantities of cannabis under the *Drugs of Dependence Act 1989* (Australian Capital Territory, 2020) and the *Controlled Substances Act 1984* (South Australia, 2020), Indonesia continues to enforce some of the strictest drug laws in the world. For example, according to the Indonesian Law on Drugs (Republic of Indonesia, 2009), possession of modest quantities of illegal drugs can lead to a maximum of 20 years imprisonment. Moreover, any person found to have illegally produced, imported, exported, or otherwise distributed narcotics exceeding 5 grams may be subject to life imprisonment or even the death penalty. Differences in the penalties associated with substance use and distribution may reflect social factors, including religiosity, with a large majority of Indonesians identifying as Muslim (Hackett et al., 2012) and features of the legal system reflecting these values (Crouch, 2011).

A substantial proportion (around 95%, see Pribadi, 2017) of the Indonesian population does not consume alcohol for religious reasons, and lower levels of per capita alcohol consumption are reported across the wider population, even relative to other South East Asian countries (Sornpaisarn et al., 2020). In contrast, Australian alcohol and other drug consumption rates are amongst the highest in the world (Winstock et al., 2019). Australia also had the highest rate of policing of people who use drugs according to the 2019 Global Drug Survey (Winstock et al., 2019), with 51.1% of those who had consumed drugs in the last 12 months reporting they had encountered police in relation to this. Despite relatively low rates of illicit substance use (Devaney et al., 2007), drug-related offences are more highly represented among inmates in prisons across Indonesia than in Australia, with the majority of prisoners convicted of such crimes (Budi, 2019). In contrast, only 15% of prisoners in Australia were imprisoned for illicit drug offences in 2018–19 (Australian Bureau of Statistics, 2019). It is therefore likely that police from the two countries have different frequencies of interaction, levels of experience and attitudes to people intoxicated with alcohol and other drugs. This, in turn, may translate to different perceptions regarding the impact of intoxication on memory, and how best to interact with intoxicated witnesses and victims of crime.

In the current study, we examined Australian and Indonesian Police perceptions regarding the impact of substance intoxication (i.e. with alcohol, amphetamines, cannabis, cocaine, ecstasy, GHB, hallucinogens, opioids and sedatives) on memory and eyewitness credibility. Responses across the two countries were compared. It was anticipated that, given the differences between the countries, experiences and perceptions would also differ. However, given the current dearth of evidence regarding perceptions of the impact of different substances on memory, no directional hypotheses were made.

Method

Participants

Australian police

One-hundred and sixty-nine Australian Federal Police (AFP) officers voluntarily participated in this study by responding to a study advertisement on the AFP staff intranet. The AFP is responsible for enforcement of Commonwealth criminal law, serving to address organized, serious, and transnational crime across Australian jurisdictions and overseas. Roles within the AFP are varied, and include work within community policing, national security, and counterterrorism. Only AFP officers who completed beyond the demographics questionnaire were included in the final sample (*n*= 151).

Indonesian Police

One-hundred and thirty-one Indonesian police officers voluntarily participated in the survey as part of a Police Science course at the National Police Science College (STIK-PTIK). All participants had graduated from the National Police Academy (AKPOL), the training institution for leadership roles within the Indonesian National Police (INP). Before they attended the STIK – PTIK, participants were required to have had sufficient work experience over a period of two to three years at different units, including criminal investigation, traffic and drugs enforcement. Only officers who completed beyond the demographic questionnaires were included (*n*= 128).

Materials and procedure

All procedures were approved by the Human Research Ethics Committee at the University of Sydney, Australia (Protocol Number: 2016/999). Recruitment for both AFP and Indonesian Police via STIK-PTIK was covered under this ethics protocol; for Indonesian Police, the head of STIK-PTIK granted approval based on the original Australian ethics protocol. The survey used in the

current study was adapted from that of Evans et al. (2009) on US police officers' perceptions of alcohol intoxication. The survey was expanded to include similar questions for eight other substances in addition to alcohol (i.e. amphetamines, cannabis, cocaine, ecstasy, GHB, hallucinogens, opioids and sedatives).

Translation

The original survey was translated from English into Indonesian (Bahasa) by author NS, who is a native Indonesian speaker. Subsequently, a back-translation from Bahasa to English was made by a different Indonesian native speaker with sufficient English language proficiency (M.Sc.). NS then checked the discrepancies between the original and the back-translated English version with two other authors, LK and HO.

Demographics

Officers provided their gender, age range (18–24, 25–34, 35–44, 45–54, 55–64 years), work jurisdiction, job category, and the number of years in which they have worked within their specific role.

Substance intoxication

Police officers were asked to state how often they interacted with people who are intoxicated by legal and illegal substances (daily, more than weekly but less than daily, weekly, monthly, less than monthly, or other). They were asked about their confidence in recognizing the signs of intoxication (from 1 to 7, where 1 = 'not at all confident' and 7 = 'extremely confident'). They were asked to rate on a 7-point scale (from 'strongly disagree' to 'strongly agree') the extent to which they believed a) identifying intoxication is part of their role, b) identifying intoxication is important for civilian safety, c) intoxication (if not detected) presents a risk to the intoxicated individual, d) intoxication (if not detected) presents a risk to law enforcement professionals, and e) talking to suspects/witnesses about intoxication may place them at risk. Finally, they were asked to select the substances that they believed were of specific concern for civilian or staff safety.

Intoxication training

Officers were asked open-ended questions to describe the strategies they would employ to determine whether someone was intoxicated, and the training they received in determining whether someone was intoxicated. Officers then rated the adequacy of their intoxication training (from 1 to 5, where 1 = 'completely inadequate' and 5 = 'completely adequate'). Officers were asked whether they would be interested in further training in intoxication detection (yes/no), and if they had any other concerns regarding intoxication detection that they would like to share.[1]

Substance specific questions

For this section, officers only answered questions based on the substances they selected they were concerned about for safety; except for alcohol and cannabis, which all officers were required to answer, regardless of whether they reported a concern for safety. This decision was made due to alcohol and cannabis being two of the most widely used recreational substances worldwide and also frequently implicated in crime across several countries (Evans et al., 2009; Palmer et al., 2013; Reksodiputro, 1991; Winstock et al., 2019). In addition, this decision was made on the basis that a longer survey of compulsory items was more likely to result in high rates of attrition due to busy police schedules.

Intoxication detection.[1]

Participants were asked to rate the difficulty they experience in determining whether someone is intoxicated by the substance (from 1 to 5, where 1 = 'extremely difficult' and 5 = 'extremely easy'). They were then asked to list up to three visual and three verbal cues that they would use in order to determine whether someone is intoxicated by the specific substance, alongside their beliefs about the reliability of that cue in determining intoxication by that substance (from 1 to 5, where 1 = 'not at all reliable' and 5 = 'extremely reliable'). Participants were also able to opt out of answering the question by selecting 'prefer not to answer'.

Effects of substance on memory and credibility

Participants were asked to rate the degree to which they believed intoxication by that substance had a negative impact on an individual's memory of events (from 1 to 5, where 1 = 'not at all' and 5 = 'extremely'), and a reason for their response. Participants were also asked when they believed a witness intoxicated by that substance would be most accurate (i.e. 'soon after while still intoxicated', 'as soon as they are sober', 'after a delay when intoxicated again' or 'after a delay when sober again'). Similarly, they were asked when they believed a victim intoxicated by each substance would be most accurate. Participants were asked to justify their answers. In separate questions, participants were asked whether they believed a victim or witness intoxicated by the substance would be 'more credible', 'less credible', or 'just as credible' as a sober victim/witness. Participants were again asked to justify their response.[2] For all memory and credibility questions, participants were able to respond, 'prefer not to answer' or 'I don't know'.

Results

Demographics

Both AFP and INP officers were predominantly male. Chi-square analysis revealed that there was a significantly higher proportion of females among AFP participants (27.8%) compared to the INP sample (15.9%), χ^2 (1, N= 277) = 5.64, p = .02, Cramer's V (φ_c) = 0.14. The age distribution of INP participants was found to be significantly different to that of AFP participants, χ^2(4, N= 277) = 84.57, p< .001, φ_c = 0.54. Post-hoc comparison revealed a significantly higher proportion of INP in the 25–34 years age bracket (82.5% vs 29.8%), and a significantly lower proportion of INP in older age brackets, including 35–44 years (16.7% vs 39.7%), 45–54 years (0.0% vs 22.5% and 55–64 years bracket (0.0% vs 6.0%). INP participants also had significantly fewer years of experience in policing (M= 5.26, SD = 2.48, range 2–9 years) compared to those from the AFP (M= 12.31, SD = 8.49, range 1–40 years), t(259) = 8.43, p< .001, 95% CI [5.40, 8.69], $Cohen's\ d$= 1.06.

Frequency of interaction and concerns regarding intoxication

Officers were asked how frequently they interacted with individuals who were intoxicated by any substance. A chi-square analysis revealed that frequency of interaction with intoxicated individuals varied across the sample, χ^2(5, N= 252) = 88.31, p< .001, φ_c = 0.60; with post-hoc comparisons revealing that a significantly greater proportion of AFP interacted with intoxicated people on a daily or more than weekly (but less than daily) basis than INP (59.6% vs 23.7%). INP were significantly more likely than AFP to report dealing with intoxicated individuals on a less than monthly basis (47.2% vs 9.6%) or say 'other' (18.5% vs 5.5%). Most 'other' responses included some variation of 'very rarely' or 'never' when asked to explain their response.

    Regarding which substances police were concerned about for the safety of civilians and officers, more than 50% of AFP officers were concerned about the use of amphetamines (98.6%), alcohol (92.0%), hallucinogens (65.9%) GHB (63.0%), ecstasy (56.5%), opioids (55.8%), and cocaine (51.4%). However, INP officers appeared most concerned about the use of alcohol (78.8%), with

Table 1. Safety concerns for each substance per police sample.

Substance	AFP (N= 138)		INP (N= 99)	
	n	%	N	%
Alcohol	127	92.0	78	78.8
Amphetamines	136	98.6	34	34.3
Cannabis	50	36.2	33	33.3
Cocaine	71	51.4	28	28.3
Ecstasy	78	56.5	27	27.3
GHB	87	63.0	23	23.2
Hallucinogens	91	65.9	19	19.7
Opioids	77	55.8	28	28.3
Sedatives	59	42.8	16	16.2

no other substance reported as a concern by more than 50% of the sample (the second highest rated substance of concern was amphetamines at 34.3%). See Table 1 for the proportion of respondents per sample that believed each substance was concern for safety.

For the analyses reported below, it is important to note that officers only answered these questions for the substances they indicated they were concerned about for safety, with the exception of alcohol and cannabis, which all officers were required to answer irrespective of whether they reported a concern for safety.

Memory and credibility of intoxicated witnesses and victims

Officers were asked to rate the extent to which they believed intoxication by each substance negatively impacted upon an individual's memory for events. Fisher's exact tests with a Bonferroni correction ($p< .0056$) were used to assess differences between the reported beliefs of AFP and INP respondents as to whether substances negatively impact upon memory (see Table 2). Statistically significant differences were observed with regard to alcohol and cocaine. Post-hoc analysis with Bonferroni correction ($p< .007$) revealed that a significantly higher proportion of INP than AFP officers reported believing that memory is 'moderately' impacted by alcohol (55.7% vs 30.6%), whereas a higher proportion of AFP officers reported believing that memory is 'extremely' impacted by alcohol (17.4% vs 0%). Differences were also observed between AFP and INP respondents with respect to perceptions regarding negative impacts of cocaine intoxication on memory. Post hoc analysis with Bonferroni correction ($p< .007$) revealed that a significantly larger proportion of INP respondents identified that cocaine intoxication was associated with a 'moderate' negative impact on memory compared with AFP respondents (44.4% vs 10.3%). At the same time, AFP respondents were significantly more likely to report that they do not know the degree to which cocaine negatively impacts on memory (48.3% vs 11.1%,). Significant differences between AFP and INP participants were not observed on questions relating to negative memory effects of other substances (however, cannabis, ecstasy and sedatives were significant at the $p< .05$ level).

Officers were also asked to state whether they believed a witness and victim intoxicated by each substance would be more credible, less credible, or just as credible as a sober witness/victim in the same scenario. As the pattern of results was highly similar across questions focused on witnesses and victims, results were interpreted only with respect to witness intoxication (see Appendix Table A1 for detailed results relating to the perception of intoxicated victims). Fisher's exact tests with a Bonferroni correction ($p< .0056$) revealed a statistically significant difference in the reported beliefs of AFP and INP respondents as to how alcohol intoxication affects witness credibility (see Table 3). Post-hoc analysis with Bonferroni correction ($p< .01$) revealed that a significantly higher proportion of INP officers reported that alcohol intoxication makes a witness 'less credible' (85.6% vs AFP 68.6%), whereas a significantly higher proportion of AFP rated alcohol-intoxicated witnesses 'just as credible' (19.8% vs INP 3.3%). Similarly, a Fisher's exact test with Bonferroni correction identified statistically

Table 2. Perceptions of degree to which intoxication with substance negatively affects memory.

Substance	Country	n	Not at all	Slightly	Moderately	Very much	Extremely	I don't know	Prefer not to answer	FET, p, Cramer's V
Alcohol*	AFP	121	-	5.8%	30.6%	43.8%	17.4%	2.5%	-	FET = 34.32,
	INP	88	-	5.7%	55.7%	29.5%	-	8.0%	1.1%	p< .001, φ_c = .38
Amphetamines	AFP	70	2.9%	5.7%	21.4%	20%	15.7%	28.6%	5.7%	FET = 10.11,
	INP	25	8.0%	4%	52%	8.0%	8.0%	20.0%	-	p= .086, φ_c = .35
Cannabis	AFP	93	2.2%	18.3%	29%	20.4%	3.2%	25.8%	1.1%	FET = 13.94,
	INP	81	6.2%	7.4%	44.4%	23.5%	2.5%	12.3%	3.7%	p= .022, φ_c = .28
Cocaine*	AFP	29	-	17.2%	10.3%	10.3%	3.4%	48.3%	10.3%	FET = 20.88,
	INP	18	16.7%	-	44.4%	27.8%	-	11.1%	-	p< .001, φ_c = .69
Ecstasy	AFP	27	-	14.8%	22.2%	7.4%	3.7%	44.4%	7.4%	FET = 12.74,
	INP	19	10.5%	-	26.3%	36.8%	5.3%	21.1%	-	p= .018, φ_c = .55
GHB	AFP	28	-	7.1%	14.3%	10.7%	10.7%	39.3%	17.9%	FET = 3.88,
	INP	14	7.1%	7.1%	21.4%	14.3%	-	35.7%	14.3%	p= .797, φ_c = .31
Hallucinogens	AFP	29	3.4%	-	10.3%	17.2%	31.0%	20.7%	17.2%	FET = 8.13,
	INP	13	15.4%	-	30.8%	23.1%	7.7%	23.1%	-	p= .124, φ_c = .45
Opioids	AFP	23	-	4.3%	17.4%	21.7%	26.1%	17.4%	13.0%	FET = 8.32,
	INP	18	5.6%	5.6%	44.4%	22.2%	5.6%	16.7%	-	p= .177, φ_c = .46
Sedatives	AFP	17	-	11.8%	5.9%	29.4%	11.8%	23.5%	17.6%	FET = 11.17,
	INP	14	14.3	7.1%	35.7%	1	7.1%	-	35.7%	p= .043, φ_c = .64

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Note. *p≤ .0056. Differences between the number of respondents indicating safety concerns relating to each substance (see Table 1) and the number of responses to survey items reflect instances in which a respondent discontinued before completing the survey.

significant differences in the reported beliefs of AFP and INP officers with respect to how cannabis intoxication affects the credibility of witnesses. Post-hoc analyses revealed that, compared with AFP officers, a significantly smaller proportion of INP officers reported believing that witnesses intoxicated with cannabis are 'just as credible' as a sober witness (18.5% and 3.7%, respectively). Reported beliefs regarding the effect of intoxication with cocaine on credibility of witnesses also differed significantly between AFP and INP officers. Post-hoc analyses identified that, compared with AFP respondents, a higher proportion of INP officers reported believing that witnesses intoxicated with cocaine are 'less credible' than sober witnesses (27.6% and 72.2%, respectively).

Officers were asked to indicate the point in time at which they believe a witness and victim intoxicated by each substance would be the most accurate. Fisher's exact tests with a Bonferroni correction (p< .0056) revealed significant differences in the reported beliefs of AFP and INP respondents with regard to the best timing for witness recall across each substance (all p≤ .0056) except hallucinogens (p= .012). Similarly, differences in reported beliefs by AFP and INP respondents regarding timing for the best recall by victims were found to be statistically significant for each substance (all p≤ .0056) except hallucinogens and sedatives (both ps < .05). The breakdown of responses across AFP and INP officers is displayed with respect to perception of witnesses in Table 4, while results relating to perception of victims are available in the Appendix (Table A2). For most substances, a significantly higher proportion of AFP than INP indicated a preference to interview while the person is still intoxicated, generally equal proportions say to interview as soon as the person is sober, while a higher proportion of INP than AFP say to interview after a delay once the person is sober. For cannabis specifically, a significantly higher proportion of AFP reported they 'don't know' when is best to interview a cannabis-intoxicated witness.

Table 3. Perceptions regarding credibility of intoxicated witnesses compared with sober witnesses.

Substance	Country	n	More credible	Just as credible	Less credible	I don't know	Prefer not to answer	FET, p, Cramer's V
Alcohol*	AFP	121	0.8%	19.8%	68.6%	9.9%	0.8%	$FET = 15.53$, $p = .001$,
	INP	88	1.1%	3.4%	86.4%	6.8%	2.3%	$\varphi_c = .26$
Amphetamines	AFP	70	1.4%	5.7%	62.9%	24.3%	5.7%	$FET = 1.79$, $p = .861$, φ_c
	INP	25	-	8.0%	68.0%	24.0%	-	$= .15$
Cannabis*	AFP	92	-	18.5%	56.5%	21.7%	3.3%	$FET = 15.86$, $p = .002$,
	INP	81	1.2%	3.7%	74.1%	12.3%	8.6%	$\varphi_c = .30$
Cocaine*	AFP	29	-	10.3%	27.6%	48.3%	13.8%	$FET = 14.02$, $p = .002$,
	INP	18	11.1%	-	72.2%	16.7%	-	$\varphi_c = .58$
Ecstasy	AFP	27	3.7%	3.7%	44.4%	37.0%	11.1%	$FET = 5.36$, $p = .237$, φ_c
	INP	19	10.5%	-	68.4%	21.1%	-	$= .35$
GHB	AFP	28	-	-	46.4%	35.7%	17.9%	$FET = 0.31$, $p = .913$, φ_c
	INP	14	-	-	42.9%	42.9%	14.3%	$= .07$
Hallucinogens	AFP	29	-	24.1%	62.1%	-	13.8%	$FET = 1.68$, $p = .472$, φ_c
	INP	13	-	30.8%	69.2%	-	-	$= .22$
Opioids	AFP	23	-	-	60.9%	26.1%	13.0%	$FET = 3.45$, $p = .316$, φ_c
	INP	18	5.6%	-	72.2%	22.2%	-	$= .31$
Sedatives	AFP	17	-	11.8%	41.2%	29.4%	17.6%	$FET = 4.28$, $p = .249$, φ_c
	INP	14	-	-	64.3%	35.7%	-	$= .40$

Note. *$p \leq .0056$. Differences between the number of respondents indicating safety concerns relating to each substance (see Table 1) and the number of responses to survey items reflect instances in which a respondent discontinued before completing the survey.

Discussion

This study sought to examine perceptions of Australian and Indonesian Police regarding the impact of different substances (i.e. alcohol, amphetamines, cannabis, cocaine, ecstasy, GHB, hallucinogens, opioids and sedatives) on the memory and credibility of victims and witnesses. Several differences were observed between the perceptions of police officers in the two countries, including with respect to the credibility of intoxicated victims and witnesses, as well as the best time to obtain accurate information from them. These differences potentially reflect the influence of cultural factors, as well as experience relating to intoxication with alcohol and other drugs. Perceptions reported by AFP and INP officers are informative for understanding how attitudes to intoxication may influence investigative outcomes, highlighting discrepancies in practice and the need for standardised evidence-based training.

A novel aspect of the current study was the focus on other drugs alongside alcohol. Results showed that the main substances of concern for the civilian and staff safety across both police samples were alcohol and amphetamines. These perceptions are in line with research linking alcohol and amphetamine use with increased risk for aggression and incidence of crime (e.g. Hoaken & Stewart, 2003; Miczek & Tidey, 1989). However, a majority of Australian police officers (66%) were also concerned about hallucinogen use and 36% about cannabis use (Indonesian sample: 19% and 33%). There is no empirical support that such substances make an individual dangerous (e.g. Krebs et al., 2013; Miczek & Tidey, 1989). On the contrary, despite potential risk of chronic abuse, acute cannabis intoxication has been associated with a reduced likelihood of violence (Hoaken & Stewart, 2003). With regard to risk to consumers, hallucinogenic substances have low potential for abuse and overdose (Nichols & Barker, 2016). Indeed, hallucinogens such as psilocybin have received much public and empirical interest in recent years due to findings indicating potential therapeutic applications (for a review see Johnson et al., 2018). Discrepancies between research evidence and police practices highlight potential misconceptions about these substances, particularly among Australian police, which could be targeted through training to improve the identification of intoxication and its consideration in interview procedures.

Table 4. Perceptions of best time for interviewing a witness intoxicated by different substances.

Substance	Country	n	Soon after the crime, still intoxicated	As soon as they are sober	After a delay, when intoxicated again	After a delay, when sober	I don't know	Prefer not to answer	FET, p, Cramer's V
Alcohol*	AFP	117	42.7%	20.5%	0.9%	11.1%	23.1%	1.7%	FET = 73.44,
	INP	88	1.1%	29.5%	1.1%	43.2%	18.2%	6.8%	p< . 001,
									$\varphi_c = 0.55$
Amphetamines*	AFP	69	24.6%	21.7%	-	10.1%	39.1%	4.3%	FET = 15.29,
	INP	25	4.0%	28.0%	-	40.0%	28.0%	-	p= .003,
									$\varphi_c = 0.42$
Cannabis*	AFP	89	33.7%	19.1%	-	6.7%	38.2%	2.2%	FET = 56.36,
	INP	80	2.5%	25.0%	5.0%	36.3%	22.5%	8.8%	p< .001,
									$\varphi_c = 0.55$
Cocaine*	AFP	29	20.7%	10.3%	-	3.4%	48.3%	17.2%	FET = 21.19,
	INP	18	-	27.8%	-	50.0%	22.2%	-	p< .001,
									$\varphi_c = 0.69$
Ecstasy*	AFP	26	19.2%	23.1%	-	-	50.0%	7.7%	FET = 18.66,
	INP	19	-	26.3%	5.3%	42.1%	26.3%	-	p< .001,
									$\varphi_c = 0.65$
GHB*	AFP	28	21.4%	17.9%	-	-	42.9%	17.9%	FET = 14.35,
	INP	14	-	14.3%	7.1%	35.7%	35.7%	7.1%	p= .004,
									$\varphi_c = 0.62$
Hallucinogens	AFP	29	6.9%	17.2%	3.4%	3.4%	51.7%	17.2%	FET = 11.83,
	INP	13	-	7.7%	-	46.2%	46.2%	-	p= .012,
									$\varphi_c = 0.58$
Opioids*	AFP	22	36.4%	18.2%	-	-	31.8%	13.6%	FET = 22.70,
	INP	17	-	17.6%	-	58.8%	23.5%	-	p< .001,
									$\varphi_c = 0.75$
Sedatives	AFP	17	11.8%	35.3%	-	-	35.3%	17.6%	FET = 12.56,
	INP	14	-	7.1%	-	35.7%	57.1%	-	p= .005,
									$\varphi_c = 0.67$

Note. *$p \leq$ .0056. Differences between the number of respondents indicating safety concerns relating to each substance (see Table 1) and the number of responses to survey items reflect instances in which a respondent discontinued before completing the survey.

When it comes to witness and victim accuracy and credibility, most police officers from both countries believed witness accuracy is at least moderately influenced by alcohol and viewed alcohol-intoxicated witnesses as less credible. The results of the effects of alcohol on credibility were similar to those found by Crossland et al. (2018) and Evans et al. (2009). In both studies, there were significantly higher ratings of accuracy and believability for sober compared to intoxicated witnesses. One interesting finding relates to the fact that although a higher proportion of AFP than INP reported their belief that alcohol impacts memory 'very much' or 'extremely' (61.2% vs 30.0%), a higher proportion of AFP rated alcohol-intoxicated witnesses as 'just as credible' (19.8% vs 3.3%). This result may reflect a view that memory impairment does not necessarily mean that a witness should be considered less credible. Such a belief may accurately reflect evidence that alcohol intoxication may be associated with a reduction in the quantity of information that is recalled without affecting its accuracy (Jores et al., 2019). Alternatively, dissociation of perspectives regarding witness memory and credibility may reflect an evaluation of the personal qualities of an intoxicated witness (e.g. honesty) rather than their ability to accurately recall information. The finding that AFP respondents were more likely to report believing that intoxicated witnesses were 'just as credible' might therefore indicate less stigma regarding alcohol-intoxicated witnesses and victims of crime. Future research may be needed to distinguish perceived credibility with respect to the reliability of a witness's memory from assessment of believability based on their personal qualities.

Our findings also suggest that AFP and INP officers vary significantly in their perceptions of how various drugs impact on memory over the time course of intoxication. While Indonesian police more frequently reported that information obtained from witnesses would be most accurate after

they had become sober, higher proportions of AFP officers reported believing that information would be most accurate if witnesses are interviewed while still intoxicated or shortly thereafter. The beliefs expressed by AFP participants, almost half of whom reported witnesses and victims would be most accurate while still intoxicated soon after the crime, is consistent with views previously expressed by US police officers (Evans et al., 2009). However, it is currently unclear at exactly what time Australian police officers are expected to interview intoxicated witnesses and victims, as police forces only provide limited information publicly regarding how witness evidence should be collected by officers (Cullen et al., 2021). Additionally, AFP specifically do not have any publicly available documentation relating to police procedure (Cullen et al., 2021).

In addition to revealing differences between the attitudes of Australian and Indonesian police officers, participants' perspectives varied with respect to how well these aligned with current evidence regarding the impact of different substances on memory. With regard to alcohol, AFP participants tended to rate the credibility of intoxicated witnesses more highly than that of INP participants. This position may better reflect recent evidence that the accuracy of memory is not affected by alcohol intoxication, despite a reduction in the completeness of information recalled (Altman et al., 2018; Crossland et al., 2018; Flowe et al., 2016; Jores et al., 2019; Van Oorsouw & Merckelbach, 2012). Similarly, the tendency for AFP members to endorse interviewing alcohol-intoxicated witnesses soon after a crime is more consistent with evidence suggesting that intoxication during encoding may result in increased suggestibility when combined with a delay before the first retrieval attempt (Evans et al., 2019). It is worth noting that interviewing soon after a crime is also supported by research demonstrating that intoxication at time of retrieval is not related to memory performance (Schreiber Compo et al., 2017).

With regard to amphetamines, both AFP and INP participants tended to suggest that intoxication was associated with reduced witness credibility. While acknowledging the limitation on conclusions within the present study due to potential dose-related effects, this finding was generally not consistent with evidence suggesting that amphetamine intoxication at time of encoding may in some cases be associated with improved memory performance (Ballard et al., 2012). Similarly, AFP and INP participants were both inclined to rate the credibility of cannabis-intoxicated witnesses poorly; evidence suggests an increase in false alarms when such witnesses are intoxicated during retrieval but not encoding (Ballard et al., 2012; Doss et al., 2018; Kloft et al., 2019). The tendency for INP participants to endorse interviewing cannabis-intoxicated witnesses once they have become sober may better reflect these research findings than the perspectives expressed by their AFP counterparts. Finally, the tendency of INP police officers to report larger perceived memory effects of ecstasy intoxication than AFP respondents appears to be more consistent with significant impairment identified at both encoding and retrieval (Doss et al., 2018; Kuypers & Ramaekers, 2005). Because increased false memory susceptibility has been associated with effects on retrieval during MDMA intoxication (Kloft et al., 2020b), the tendency of INP officers to support interviewing after witnesses have become sober may also be more supported than the views expressed by AFP participants.

Discrepancies between the perspectives of police officers in each jurisdiction and evidence regarding the memory effects of each substance highlights the need for additional training. While research is still teasing apart the various intricacies of intoxication, memory and interviewing, officers should be taught general evidence-based facts of the influence of intoxication on memory. It is important that this knowledge is updated regularly, as new evidence comes to light. Generic guidelines can be used, but equipping officers with knowledge provides them with the opportunity to use informed discretion when dealing with intoxicated witnesses/victims/suspects. As such, they should be able to back up their decisions in specific cases, with scientific evidence which will resist scrutiny in court.

While the current research supports an improved understanding of Indonesian and Australian police officers' perception of the impacts of substance intoxication on credibility and accuracy of eyewitness recall, several limitations should be acknowledged. First, while every participant was

required to answer all survey questions on alcohol and cannabis, they only answered other questions in relation to drugs they were concerned about. This means that there is a potential confounding effect of concern on answers to other drug questions. The study was designed this way to minimise attrition due to the survey length; nevertheless, attrition rates were high. All participants in the final sample completed questions relating to alcohol and cannabis, and the majority of participants (76.6%) completed questions relating to additional substances. However, only one-quarter (23.0%) of participants completed questions relating to all nine substances. Future research may benefit from focusing on a particular substance of concern, rather than attempting to retain participant engagement over the duration of a lengthy survey on many substances. Furthermore, it should be noted that each substance was only asked about its potential to impact memory in general, rather than at specific doses. Given research suggesting there may be dose-response effects (e.g. less impairment at lower doses), future research should consider police perceptions of these substances at specific doses.

Additionally, all participating police officers from within one organization were grouped together as a sample, meaning that within each police force, there was likely to be variation in the roles of these officers and their specialisations. For example, some of these police roles are not public facing (e.g. administration) and as such those police officers may have less experience (or need for training) in responding to intoxicated people. As we did not do any role-based comparisons (due to wide variation and limited sample size), future studies may wish to explore this distinction further. Third, differences were evident with regard to the age and level of experience held by Australian and Indonesian police officers. INP were found to be significantly younger and had significantly fewer years of experience compared to AFP. In addition, AFP officers had more frequent interactions with intoxicated people, relative to their Indonesian counterparts. This may reflect the different recruitment strategies for each sample, with AFP officers responding to an ad posted to their intranet site while INP respondents were approached during a training seminar. Despite fewer average years of enrolment in the police force, a baseline level of experience was supported among INP respondents by the requirement that sufficient work experience (i.e. two to three years at a variety of policing units) was gained prior to attendance at the training academy. Differences in demographic characteristics and frequency of interaction with intoxicated individuals reinforces that a one-size-fits-all approach to understanding perceptions of intoxication is not appropriate. These differences suggest that future research may be needed so that training can be targeted to the specific misconceptions among different cohorts.

Importantly, police decisions on how to interact with an intoxicated suspect, witness, or victim are made after they have determined that person to be intoxicated. Objective measures of intoxication (e.g. breathalyzer or saliva drug screen) can provide some useful information in this regard (although recent research has identified limitations in more recent device technologies; e.g. Arkell et al., 2019). However, they are generally only deployed for suspects, not witnesses or victims. For victims or witnesses, police rely on disclosure of AOD consumption, or their own observational skills to detect intoxication (Crossland et al., 2018). Research on police observational skills for intoxication suggest relatively low accuracy rates (see Monds et al., 2019b; for a review). It is therefore important to assess actual ability to detect intoxication in future research.

The current study was the first to compare perceptions of police officers from a WEIRD (Australia) and non-WEIRD (Indonesia) country on the effects of AOD intoxication on memory and credibility. Results highlight significant differences between the perceptions of Australian and Indonesian police officers regarding how intoxication may affect the credibility of victims and witnesses, as well as the best time to obtain accurate information from them. These results raise important questions for police practices in terms of whether and how the treatment of intoxicated persons should be adapted based on memory effects associated with different substances. Results from the present investigation also highlight the importance of further research to elucidate the

specific nature of these effects. Finally, contrasts in AFP and INP officers perceptions are also informative in terms of understanding the effects of police attitudes to intoxication on investigative procedures, highlighting discrepancies in practice and the need for targeted evidence-based training.

Notes

1. Issues relating to intoxication detection training, ability to detect intoxication, and the cues that officers used to determine intoxication by different substances are not the focus of the current paper and thus have not been reported in the results.
2. Qualitative justifications for responses are not the focus of the current paper and thus have not been reported in the results.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix

Table A1. Perceptions regarding credibility of intoxicated victims compared with sober victims.

Substance	Country	n	More credible	Just as credible	Less credible	I don't know	Prefer not to answer	FET, p, Cramer's V
Alcohol*	AFP	121	-	26.4%	61.2%	11.6%	0.8%	FET = 26.31, p< .001,
	INP	88	2.3%	4.5%	83.0%	5.7%	4.5%	φ_c = .35
Amphetamines	AFP	70	2.9%	5.7%	62.9%	22.9%	5.7%	FET = 1.61, p= .873, φ_c
	INP	25	4.0%	4.0	64.0%	28.0%	-	= .14
Cannabis*	AFP	93	1.1%	21.5%	54.8%	19.4%	3.2%	FET = 18.29, p< .001,
	INP	81	1.2%	2.5%	71.6%	16.0%	8.6%	φ_c = .31
Cocaine*	AFP	29	-	10.3%	27.6%	48.3%	13.8%	FET = 9.60, p= .023, φ_c
	INP	18	5.6%	5.6%	66.7%	22.2%	-	= .47
Ecstasy	AFP	27	3.7%	3.7%	44.4%	37.0%	11.1%	FET = 5.26, p= .237, φ_c
	INP	19	10.5%	-	68.4%	21.1%	-	= .35
GHB	AFP	28	-	3.6%	42.9%	35.7%	17.9%	FET = 2.48, p= .807, φ_c
	INP	14	7.1%	-	42.9%	35.7%	14.3%	= .25
Hallucinogens	AFP	29	-	-	65.5%	20.7%	13.8%	FET = 1.86, p= .394, φ_c
	INP	13	-	-	69.2%	30.8%	-	= .23
Opioids	AFP	23	-	-	60.9%	26.1%	13.0%	FET = 3.96, p= .233, φ_c
	INP	18	5.6%	-	77.8%	16.7%	-	= .33
Sedatives	AFP	17	-	11.8%	41.2%	29.4%	17.6%	FET = 4.35, p= .203, φ_c
	INP	14	-	-	50.0%	50.0%	-	= .41

Note. *$p \leq$ .0056. Differences between the number of respondents indicating safety concerns relating to each substance (see Table 1) and the number of responses to survey items reflect instances in which a respondent discontinued before completing the survey.

Table A2. Perceptions of best time for interviewing a victim intoxicated by different substances.

Substance	Country	n	Soon after the crime, still intoxicated	As soon as they are sober	After a delay, when intoxicated again	After a delay, when sober	I don't know	Prefer not to answer	FET, p, Cramer's V
Alcohol*	AFP	117	45.3%	18.8%	-	10.3%	23.1%	2.6%	FET = 78.40,
	INP	88	1.1%	27.3%	2.3%	43.2%	18.2%	8.0%	p< .001,
									φ_c = 0.57
Amphetamines*	AFP	69	24.6%	21.7%	-	10.1%	39.1%	4.3%	FET = 17.57,
	INP	25	-	28.0%	4.0%	36.0%	32.0%	-	p= .001,
									φ_c = 0.43
Cannabis*	AFP	88	34.1%	20.5%	1.1%	5.7%	36.4%	2.3%	FET = 55.30,
	INP	80	2.5%	22.5%	2.5%	40.0%	23.8%	8.8%	p< .001,
									φ_c = 0.55
Cocaine*	AFP	29	20.7%	10.3%	-	3.4%	48.3%	17.2%	FET = 21.19,
	INP	18	-	27.8%	-	50.0%	22.2%	-	p< .001,
									φ_c = 0.69
Ecstasy*	AFP	26	19.2%	23.1%	-	-	50.0%	7.7%	FET = 18.97,
	INP	19	-	26.3%	-	47.4%	26.3%	-	p< .001,
									φ_c = 0.65
GHB*	AFP	28	21.4%	17.9%	-	-	42.9%	17.9%	FET = 14.35,
	INP	14	-	14.3%	7.1%	35.7%	35.7%	7.1%	p= .004,
									φ_c = 0.62
Hallucinogens	AFP	29	6.9%	20.7%	-	6.9%	48.3%	17.2%	FET = 9.47,
	INP	13	-	7.7%	-	46.2%	46.2%	-	p= .026,
									φ_c = 0.52
Opioids*	AFP	22	31.8%	18.2%	-	36.4%	13.6%	-	FET = 21.94,
	INP	17	-	17.6%	58.8%	23.5%	-	-	p< .001,
									φ_c = 0.74
Sedatives	AFP	17	11.8%	35.3%	-	35.3%	17.6%	-	FET = 9.88,
	INP	14	-	14.3%	28.6%	57.1%	-	-	p= .019,
									φ_c = 0.60

Note. *$p \leq$ .0056. Differences between the number of respondents indicating safety concerns relating to each substance (see Table 1) and the number of responses to survey items reflect instances in which a respondent discontinued before completing the survey.