Lineup Identification Accuracy:

The Effects of Alcohol, Target Presence, Confidence Ratings and Response Time

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Abstract

Despite the intoxication of many eyewitnesses at crime scenes, only four published studies to date have investigated the effects of alcohol intoxication on eyewitness identification performance. While one found intoxication significantly increased false identification rates from target absent showups, three found no such effect using the more traditional lineup procedure. The present study sought to further explore the effects of alcohol intoxication on identification performance and examine whether accurate decisions from intoxicated witnesses could be postdicted by confidence and response times. One hundred and twenty participants engaged in a study examining the effects of intoxication (control, placebo, and mild intoxication) and target presence on identification performance. Participants viewed a simultaneous lineup one week after watching a mock crime video of a man attempting to steal cars. Ethanol intoxication (0.6 ml/kg) was found to make no significant difference to identification accuracy and such identifications from intoxicated individuals were made no less confidently or slowly than those from sober witnesses. These results are discussed with respect to the previous research examining intoxicated witness identification accuracy and the misconceptions the criminal justice system holds about the accuracy of such witnesses.

Keywords: Alcohol intoxication, eyewitness identification accuracy, confidence, decision times

Research suggests that approximately half of all violent crimes committed in the UK are perpetrated by individuals under the influence of alcohol (Kershaw, Nicholas, & Walker, 2008), and in many of these cases victims and witnesses were also intoxicated (Murdoch et al., 1990, cited in Finney, 2004). A similar pattern is found in the USA where Evans, Schreiber-Compo, and Russano (2009) found that nearly 53% of law enforcement officers surveyed routinely dealt with intoxicated witnesses and suspects, interviewing an average of four drunken witnesses per week. As many of these encounters result in a police investigation and subsequent prosecution (e.g., Mohler-Kuo, Dowdall, Koss, & Weschler, 2004), obtaining accurate evidence from intoxicated victims and witnesses is obviously extremely important.

Identification Accuracy of Intoxicated Witnesses

The adverse impact of alcohol on memory performance is well documented (e.g., Craik, 1977; Petros, Kerbela, Beckwitha, Sacksa, & Sarafolean, 1984; White, Signer, Kraus, & Swartzelder, 2004); specifically the detrimental effect that intoxication has on the ability to encode episodic memories (Mintzer, 2007) and form new long-term memories (White, 2003). In fact, such is the influence of this evidence, 90% of legal experts questioned state it is of sufficient strength to report in court that alcohol impairs eyewitness performance (Kassin, Tubb, Hosch, & Memon, 2001). Furthermore, studies have found that potential jurors not only agree with expert witness views regarding alcohol and memory (Benton, Ross, Bradshaw, Thomas, & Bradshaw, 2006), but also that they perceive intoxicated witnesses to be more cognitively impaired than sober ones (Evans & Schreiber-Compo, 2010). Despite these widespread beliefs, specific evidence linking alcohol intoxication to poorer eyewitness identification performance is lacking. Only four studies have examined the effects of alcohol intoxication on face identification using forensically valid eyewitness identification procedures (Dysart, Lindsay, MacDonald, & Wicke, 2002; Hagsand, Roos-af-Hjelmsater, Granhag, Fahlke, & Soderpalm-Gordh, 2013; Harvey, Kneller, & Campbell, 2013; Yuille & Tollestrup, 1990), and only one has revealed a negative effect of alcohol intoxication on face identification (Dysart et al., 2002). Dysart et al. employed a pair of female recruiters to invite patrons of two local bars to take part in their study. Volunteers were introduced to an experimenter in an adjoining room where they were given a breathalyzer test, a filler task then, crucially, a memory test in which they were required to state whether a photograph of a female presented to them either was or was not one of the recruiters they had met earlier (a procedure known as a show-up). Participants' ability to identify the recruiter from her true photographic image was the same regardless of their breath alcohol concentration (BrAC), but individuals with higher BrAC readings were significantly more likely to falsely identify the recruiter from a photograph showing a different (albeit similar looking) female.

In accounting for their findings, Dysart et al. refer to the Alcohol Myopia Theory (AMT) of Steele and Josephs (1990), suggesting that alcohol decreases the attentional capacity of eyewitnesses to the extent that only the most immediate, central or striking target stimulus features are processed. Once encoded, these salient facial cues, Dysart et al. (2002) suggest, are sufficient for discriminating a perpetrator when s/he is present in a lineup, but the absence in memory of more subtle or peripheral facial details impairs the drinker's ability to spot the absence of the perpetrator from a lineup. This theoretical conclusion was, however, formed on the basis of the showup method, a highly suggestive identification procedure for which the risk of a false positive identification is substantially higher than for the lineup procedure in which multiple individuals are presented to the witness (Cicchini & Easton, 2010). Dysart et al. (2002) also administered the showup shortly after their participants were initially exposed to the target, when the alcohol group remained intoxicated. Hence, the results of this study may reflect an adverse effect of alcohol on processes of face memory retrieval rather than face encoding. It is also important to note that alcohol participants in this field study had estimated breath alcohol concentrations ranging from .01% – .20%, so some were likely to have been substantially more intoxicated than participants in more recent lab-based studies in which no effects of intoxication were observed (e.g., Hagsand et al., 2013; Harvey et al., 2013). It is therefore possible that any attentional narrowing effects of alcohol on to specific facial features may only begin to occur at relatively high levels of intoxication.

On balance, from the research outlined above, it seems that the face identification skills of moderately intoxicated witnesses are quite reliable – provided witnesses are sober during the retrieval process – a conclusion that contradicts the views of many expert witnesses (Kassin et al., 2001) and jurors who question the testimony of intoxicated witnesses (Evans & Schreiber-Compo, 2010). This is not to suggest that the testimony of moderately intoxicated is not problematic (cf. Dysart et al., 2002; Hilliar, Kemp, & Denson, 2010), but that the important issue is distinguishing the reliable intoxicated witness from the unreliable. One approach to this problem is to examine those factors, or postdictors, that previous research suggests may be indicative of accurate identification decisions.

Confidence-Accuracy Relationship

Juries are often persuaded by confident witnesses (Boyce, Beaudry, & Lindsay, 2007), however, studies of the relationship between witness confidence and identification accuracy report that the relationship between post-decision confidence and accuracy is only small to medium at best (e.g., r = .25, Bothwell, Deffenbacher, & Brigham, 1987; r = .28, Sporer, Penrod, Read, & Cutler, 1995), although shown to vary depending on the circumstances. For example, Sporer et al. (1995) reported that the confidence-accuracy relationship was stronger for choosers (i.e., those witnesses who make a selection from a lineup) than non-choosers (i.e., those who reject the lineup). This finding is also supported by more recent research using the calibration approach, which compares both the objective and subjective probabilities of the decision being correct then determines the proportion of correct responses at each confidence interval measured, typically on a 0-100% scale (e.g., Sauer, Brewer, Zweck, & Weber, 2010; Sauerland & Sporer, 2009; Weber & Brewer, 2006). This is forensically important as choosers appear in court more often than non-choosers because non-identifications do not support criminal prosecutions. In their recent study, Hagsand et al. (2013) examined identification confidence across intoxication levels, but they did not explore its relationship with identification accuracy nor, hence, its usefulness as a postdictor of accuracy. A principle aim of the present study is to rectify this gap in the research literature.

Decision Time-Accuracy Relationship

In addition to the confidence-accuracy relationship, research has also demonstrated a negative relationship between decision time and identification accuracy for choosers but not for non-choosers. Dunning and Perretta (2002) established an empirical, absolute time boundary (between 10-12 s) that best discriminates between accurate and inaccurate choices. However, others have failed to replicate this 10-12 s rule (e.g., Brewer, Weber, Clark, & Wells, 2008; Weber, Brewer, Wells, Semmler, & Keast 2004). Sauerland and Sporer (2007) found that 64.7% of correct identifications were made by fast (< 18 s) and confident choosers. Choosers who were slower than 18 seconds and less confident were wrong in 95% of cases. Furthermore, with a shorter retention period between the stimulus event and identification task (e.g., 30 seconds), approximately 97% of highly confident choosers have been found to make an identification decision within 6 seconds (Sauerland & Sporer, 2009). However, no reliable postdictors were found for non-choosers. Therefore, an important question addressed in the present study is whether this decision time-accuracy relationship holds for accurate choosers who are intoxicated at the time they witness a stimulus event.

The final issue affecting some of the previous research conducted in this area concerns that of placebo effects. Importantly, Dysart et al. (2002) observed an adverse effect of intoxication in the absence of a placebo control. Hence, the impaired performance of their intoxicated participants relative to sober counterparts may be driven, at least in part, by alcohol expectancy effects. The possibility of placebo effects is therefore an important issue to examine, and we address it here by examining the effects of alcohol intoxication at encoding on subsequent identification decisions from participants randomly assigned to an alcohol, alcohol-placebo or no-alcohol control condition.

To summarise, the main aims of the present study were to investigate the effect of alcohol intoxication on eyewitness identification performance and examine whether the previously identified postdictors of decision time, confidence level and choosing status associated with sober witnesses are reliable indicators of intoxicated witness accuracy. If we make the reasonable assumption that the face of a person perpetrating a crime is central and salient to that context, then alcohol myopia theory predicts that intoxicated witnesses will perform no worse at the identification task in this study than sober counterparts, under target-present (TA) and target-absent (TA) lineup conditions, at least at mild to moderate levels of intoxication. Given the findings of Dysart et al (2002), however, whose intoxicated participants were more likely than sober counterparts to misidentify a foil in TA showups, we also tentatively hypothesized that intoxicated participants in the TA lineup condition, even if not intoxicated enough to show impaired identification performance, may nevertheless express lower confidence in their identification decisions than sober controls, due to the poorer encoding and discrimination processes referred to above. Thirdly, we expected to replicate Sporer et al's (1995) finding of a stronger confidence-accuracy relationship for choosers shown a TP lineup compared to those who did not make a choice but we predicted this relationship to be significantly weakened by alcohol intoxication. Fourthly, in line with previous studies, we expected to find an overall small to moderate positive accuracy-confidence relationship. Finally, if the alcohol doses administered in this study are sufficient to slow reaction times, we hypothesized that the alcohol group would show the slowest identification decision times in the TA lineup conditions due again, perhaps, to the possible encoding deficits outlined above.

Method

Participants. One hundred and twenty undergraduate psychology students were offered either course credit or £10 for participation in the study. The size of this sample was determined by an *a priori* power analysis (β = .8) based on the identification data of Yuille and Tollestrup (1990) who observed a small effect of alcohol intoxication on identification accuracy for TA lineups (r_m = .245) for a contingency table with 1df. The sample consisted of 23 males and 97 females, all aged between 18-40 years (*M* = 20.40 years, *SD* = 4.12).

Design. A 3 × 2 between-subjects design was used to examine the effect of alcohol intoxication on subsequent identification accuracy, confidence level and decision time. The two variables manipulated were alcohol ingestion (no alcohol control, placebo control, and alcohol) and lineup type (TP vs. TA). In both TP and TA lineups, the position of the perpetrator's image (or its replacement in the case of the TA condition) was rotated such that it appeared in each of the six possible positions across participants with the foil faces being presented in a random order for each lineup. Participants were randomly allocated to each of the experimental conditions.

Measures. The measure of identification performance was simply whether or not participants correctly identified the presence or absence of the perpetrator from the line-up one week after witnessing him in the video footage. The confidence each participant had in the accuracy of their identification decision was recorded via a 7-point Likert scale (where 1 = not at all confident, and 7 = very confident). Decision time was defined as the time taken in milliseconds between the lineup being presented on the screen to the time the participant made a key press to either identify the number of the photograph they believed to be the target or to reject the lineup. The BrAC in participants' deep lung air was recorded using a Lion Alcolmeter 500, a device that is Type Approved by the UK Home Office for police screening and evidential testing. The unit for this measure was milligrams of alcohol per litre of breath (mg/l). Participants were also asked to report their perceived level of intoxication on a scale of 0 (completely sober) – 100 (extremely drunk).

Materials. The stimulus event was a colour video of a young man (i.e., the target) furtively inspecting vehicles in a car park, apparently searching for one to break into. The video was a little grainy so as to represent CCTV footage and has been used successfully in previous published research (Kneller, Memon, & Stevenage, 2001). The video was approximately 60 seconds long with the target, the only person visible, shot at close range and from a distance.

For the lineup presentation participants were presented with either a TP or TA lineup consisting of six 10cm (height) by 7cm (width) color portrait photographs showing the head and shoulders of six young males displayed in a 2 (rows) × 3 (columns) array. All photographs were taken using identical background, lighting and distance. The TP condition included the target along with five foil faces that had been previously rated as similar in appearance to the target. In the TA conditions the target was replaced by a similar looking sixth foil. All lineups were presented using Superlab 4.0 Stimulus Presentation Software.

Procedure. Prior to arriving at the lab all participants were advised that they may consume alcohol in the study and that they should not therefore drive to the experiment venue, or do anything that might be considered inappropriate (e.g., attending a lecture) or risky (e.g., play sport, operate machinery) immediately after the experimental session, as they may still be intoxicated. Additionally, they completed a screening process, conducted by the principle researcher, confirming their eligibility to take part in the study and that they had consumed at least the same amount of alcohol used in the study (at least 1.42 liters of beer with 5% alcohol content, or its equivalent) within a single drinking session in the past month. To assist in the accurate reporting of drinking behaviours, participants were issued with information relating to how much alcohol was equivalent to one standard unit, as provided by the World Health Organisation Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). Our alcohol screen excluded all participants who reported that they were on medication, or had been given medical advice not to drink alcohol. Participants were also asked to report any other reasons why they should not drink alcohol.

On their arrival at the lab, participants were read an experiment information sheet, confirmed that the information they provided on the screening form was correct, that they were not driving that day or engaging in any activity that would be risky whilst intoxicated, and signed a consent form. They were then breathalyzed (to confirm their BrAC was zero) and randomly assigned to one of the three alcohol treatment conditions.

Those in the alcohol group were weighed, to determine their alcohol dosage, then given a 450ml drink containing 0.6ml of ethanol alcohol per kg of body weight mixed with pure fruit juice. So, for example, a person weighing 50kg would receive 30ml of ethanol and 420ml of orange juice. Participants in the placebo condition were also weighed to maintain the ruse that they would be given alcohol but were just given an equivalent volume of pure fruit juice with a few drops of ethanol floating on the surface. The rim of the glass was spritzed with a 50:50 mixture of ethanol and water to provide an odour of alcohol. This was deemed sufficient to create an illusion of drinking alcohol whilst not actually leading to intoxication (see Fillmore & Vogel-Sprott, 1995). Participants in both alcohol and placebo conditions were told their drink contained alcohol. Those in the control group were served 450ml of pure fruit juice only and were reassured that the drink contained no alcohol. All participants consumed their drink within a 15-minute period after which they relaxed for a further 15-minute alcohol absorption period, during which they were free to read magazines supplied by the researchers, browse on their smartphones or chat to the experimenter.

A second BrAC measure was then recorded to determine the intoxication level, followed by an additional measure of subjective intoxication. Participants were then asked to simply watch the video without being informed of its purpose. After this initial testing phase sober participants left the lab but intoxicated and placebo participants were strongly encouraged to stay behind and relax in a comfortable room with magazines and soft drink facilities until their BrAC returned well below 0.35mg/l (which approximates 0.08% BAC, the legal UK driving limit). Those who elected not to stay behind were required to sign a disclaimer form confirming their awareness that they had recently consumed alcohol and that they may therefore be in excess of the legal limit for driving. All participants were informed that they were to return to the lab a week later to undergo a few further measures and not to discuss the video with anybody.

On their return participants were randomly assigned to one of the two identification conditions and asked to identify the man seen in the video footage from the associated photographic lineup. All six photographs were presented simultaneously on the screen and were numbered from 1-6. Participants were asked to either identify, via a key-press, the number of the photograph they believed to be the target, or reject the lineup by pressing the ‘r’ key. For all lineups, participants received unbiased instructions to the effect that the target may or may not be present in the lineup.

Once participants had made their identification decision they were presented with the question on their level of confidence in that decision. After testing, all participants were fully debriefed as to the nature of the study and their performance.

Results

Data Analysis. The data met parametric assumptions and were hence tested for significance using Analysis of Variance (ANOVA) and hierarchical log linear analysis (HILOG) with an alpha value of .05 taken as the criterion of significance. Data were first tested for the effect of the target and his replacement’s lineup position on accuracy. No significant effect was identified, $\chi^2(5, N = 120) = 5.99$, $p = .31$, Cramer’s V = .22. Due to an unequal proportion of male and female participants, the effect of gender on accuracy was also examined. No significant effect of gender was found; $\chi^2(1, N = 120) = 0.09$, $p = .82$; Cramer’s V = .03.

BrAC measures. The amount of alcohol given to the 40 participants in the alcohol condition ranged from 41.19 to 83.17ml (*M* = 59.21ml, *SD* = 10.80). Subsequent measures of participant's BrAC taken immediately prior to viewing the video ranged from 0.11 – 0.40mg/l (*M* = 0.23mg/l, *SD* = 0.07).

Subjective intoxication level. Those who received alcohol reported a mean subjective level of intoxication of 45.18 (*SD* = 15.81), compared to the placebo group who reported a mean of 13.13 (*SD* = 11.29), and the control group who reported a mean level of 2.77 (*SD* = 5.26). A one-way independent ANOVA indicated a highly significant effect of alcohol treatment on the subjective level of intoxication, $F(2, 117) = 144.83$, $MSE = 134.97$, $p < .001$, $\eta_p^2 = .7$. Post hoc pairwise comparisons further revealed that the subjective intoxication levels of all three groups were significantly different from each other (all *p*'s < 0.001), indicating that the placebo condition was successful in producing an expectation of intoxication, albeit one significantly lower than that of the alcohol group.

Overall identification accuracy. Responses for all lineups were initially analyzed by examining the frequency of correct responses (target hits from the TP lineups and correct rejections of the TA lineups) and incorrect responses (foil identifications from, and incorrect rejections of, TP lineups or incorrect identifications from TA lineups). Table 1 shows the effect of alcohol intoxication on identification performance for both TP and TA lineups. Overall, 37.5% of participants provided a correct response.

[please insert Table 1 about here]

An analysis was first conducted to test the hypothesis that accuracy would be significantly impaired by alcohol intoxication. Collapsed across target presence, 40% of the intoxicated group, 40% of the placebo group and 32.5% of the control group gave correct responses, although subsequent analysis revealed no significant difference in accuracy between these three groups, $\chi^2(2, N = 120) = 0.21$, $p = .89$; Cramer's V = .04. A hierarchical loglinear analysis (HILOG) with alcohol, lineup type and accuracy (accurate/inaccurate) as factors revealed no significant three way interaction, $\chi^2(2, N = 120) = 0.66$, ns, and no significant two-way interactions (all *p*'s > .05). Only the main effect of accuracy was significant, with participants more likely to make an inaccurate decision than an accurate one, $\chi^2(1, N = 120) = 7.58$, $p = .006$.

Analyses were subsequently conducted separately for TP and TA lineups to see, specifically, if alcohol intoxication caused an increase in false identifications in the TA lineup condition, as per the findings of Dysart et al. (2002).

Target present decisions. The data revealed that intoxicated participants were no less likely than sober or placebo participants to make an accurate identification from a TP lineup, $\chi^2(2, N = 60) = 2.22$, $p = .69$; Cramer's V = .14.

Target absent decisions. Overall, whilst participants tended to make more false identifications than correct rejections, no significant association between alcohol condition and identification decision was found, $\chi^2(2, N = 60) = 0.40$, $p = .82$; Cramer's V = .08.

Decision confidence. Table 2 displays the mean confidence ratings by alcohol condition, target presence and accuracy. While alcohol intoxication was expected to have no significant effect on confidence for witnesses shown a TP lineup, we expected a lower level of confidence from those intoxicated witnesses shown a TA lineup. However, a 3 (Alcohol Condition) × 2 (Target Presence) × 2 (Accuracy) independent-measures ANOVA revealed only a significant main effect of accuracy on decision confidence, with accurate witnesses (M = 4.89, SD = 0.21) being more confident than inaccurate witnesses (M = 3.98, SD = 0.16), $F(1, 108) = 11.89$, $p = .001$, $\eta_p^2 = .09$. The main effect of alcohol ($F(2, 108) = 1.56$, $p = .94$, $\eta_p^2 = .02$), the main effect of target presence on confidence ($F(1, 108) = 0.07$, $p = .78$, $\eta_p^2 = .001$), nor any of the interactions (all p's > .05) reached significance.

An additional analysis was conducted to examine confidence between those who made an accurate choice from a TP lineup and those whose decision was incorrect. A 3 (Alcohol Condition) × 2 (Choice) × 2 (Identification Accuracy) ANOVA revealed, again, only a significant main effect of accuracy, with correct decisions (M = 4.86, SD = 0.21) being made significantly more confidently than incorrect decisions (M = 3.94, SD = 0.18), $F(1, 51) = 3.93$, $p = .05$, $\eta_p^2 = .07$. Both the main effects of alcohol ($F(2, 51) = 1.55$, $p = .22$, $\eta_p^2 = .06$) and choice ($F(1, 51) = 0.005$, $p = .94$, $\eta_p^2 = .00$) were found to be non-significant, as were all interactions (all p's > .05).

[please insert Table 2 about here]

Decision time. As a result of significant positive skewness the decision time data were log-transformed (i.e., log base 10). However, means are reported for back-transformed values and are displayed in Table 2. It was predicted that intoxicated witnesses would take the longest time to reach their decisions, particularly when shown a TA lineup. The 3-way ANOVA examining alcohol condition, target presence and accuracy revealed only a significant effect of accuracy, with accurate witnesses reaching their decisions faster (*M* = 14.65, *SD* = 2.08) than inaccurate witnesses (*M* = 20.01, *SD* = 2.00), $F(1, 108) = 5.53$, $p = .02$, $\eta_p^2 = .05$. Neither the main effect of alcohol, $F(2, 108) = 1.56$, $p = .21$, $\eta_p^2 = .03$, nor the main effect of target presence on confidence, $F(1, 108) = 3.45$, $p = .07$, $\eta_p^2 = .03$,were significant. None of the interactions reached significance (all *p*'s > .05).

Analyses were then conducted to explore the effect of choice alongside alcohol condition and accuracy on decision times. The main effect of accuracy was close to significance, $F(1, 108) = 3.70$, $p = .057$, $\eta_p^2 = .03$, with accurate decisions (*M* = 14.7, 95% CI [10.6, 18.7]) being made quicker than inaccurate decisions (*M* = 20.1, 95% CI [16.6, 23.6]). Neither the main effect of alcohol ($F(2, 108) = 0.97$, $p = .38$, $\eta_p^2 = .02$) nor the main effect of choice on decision time ($F(1, 108) = 0.01$, $p = .92$, $\eta_p^2 = .00$) were significant. The interaction between accuracy and choice was also found to be significant. Whilst the decision times for correct and incorrect non-choosers were similar (correct non-chooser *M* = 16.4 s, 95% CI [11.3, 21.6]; incorrect non-choosers, *M* = 16.5, 95% CI [10.6, 22.5]), accurate choosers produced faster decisions (*M* = 12.9 seconds, 95% CI [6.6, 19.2]) than inaccurate choosers (*M* = 23.8, 95% CI [20.1 27.4]), $F(1, 108) = 5.19$, $p =.02$, $\eta_p^2 = .05$. No other interactions were significant (all *p*'s > 0.05).

Discussion

The aim of this study was to examine the effect of alcohol intoxication on eyewitness identification accuracy, confidence and decision times. Specifically, we compared the face identification accuracy of sober and intoxicated participants, together with a placebo group, under lineup conditions in which the target was either present or absent, and examined the effects of alcohol intoxication on participants' identification accuracy, confidence and decision times, which are each discussed in turn.

Identification accuracy. According to AMT, alcohol intoxication should not impair identification performance when the target face is central to the scene witnessed. Our results are consistent with this prediction, and also with the findings of similar studies published previously (Hagsand et al., 2013; Harvey et al., 2013; Yuille & Tollestrup, 1990). However, these null effects of alcohol on face identification are inconsistent with the results of Dysart et al. (2002), who found higher levels of intoxication (in a real-world drinking scenario) to be associated with an increased likelihood of making false identifications in a TA showup task. It therefore remains possible that the extent of attentional narrowing under alcohol is dose dependent. At the low to moderate levels of intoxication obtained in the present experiment the scope of the inebriated witness's visual attention may be narrowed, but perhaps remains wide enough to permit the encoding of an entire target face. However, the visual attention of highly intoxicated witnesses, such as those included in Dysart et al's alcohol group, may be narrowed to the extent that only specific salient facial features can be processed, leading to poor identification performance, particularly under more challenging TA showup or lineup conditions. This hypothesis could be tested in future studies, by including a dose manipulation to alcohol-challenge lineup tasks such as the one presented here (as discussed below), and by introducing an additional recognition test for specific facial features. For the latter task, according to AMT, the face identification performance of highly intoxicated viewers should be impaired under TA test conditions, but their ability to identify specific, especially salient, facial features should be unimpaired. Sober controls, on the hand, are not expected to show this dissociation. Until such studies are conducted we may only conclude that eyewitnesses intoxicated with small to moderate doses of alcohol are no less capable than sober counterparts at ascertaining a perpetrator's presence or absence from a lineup.

The present study is also limited in its use of only a single target to measure identification performance. Future research should employ more than one exemplar to reduce the possibility of target-specific results (see Wells & Windschitl, 1999, for a discussion of this issue) and consider also the use of multiple lineups in improving identification decisions, as per the work of Sauerland, Stockmar, Sporer, and Broers (2013).

We also note that the overall rate of correct identifications in the present study was somewhat low, raising the possibility that floor effects reduced the study's sensitivity to detect small alcohol effects. We point out, however, that our data are comparable to those reported by Hagsand et al. (2013) and other researchers examining eyewitness identification (e.g., Brewer et al. 2008), who used entirely different stimulus materials. Furthermore, the stimulus video and accompanying lineups employed in the present study have produced higher decision accuracy rates elsewhere (Kneller et al., 2001).

Decision confidence. We sought to examine how the confidence-accuracy relationship was influenced by intoxication, predicting that the strength of this relationship would be weaker for intoxicated witnesses, yet we observed only negligible differences in the level of decision confidence between sober and intoxicated groups. Thus, it appears that mild levels of intoxication cause no reduction in decision confidence scores compared to those reported by sober witnesses. This suggests that the testimony of a mildly intoxicated witness should be regarded as no less reliable than that of a sober witness displaying the same level of confidence in their identification decision.

Our results do reveal, however, that accurate witnesses had significantly more confidence in their identification decisions overall than inaccurate witnesses, regardless of their choosing status. This outcome supports the findings of Bothwell et al. (1987), and Sporer et al. (1995), whose meta-analyses revealed a small but significant confidence-accuracy relationship. Additionally, and as predicted, we observed a significant relationship between accuracy and confidence for choosers also observed previously by Sporer et al. but, in the present study, this relationship was not mediated by alcohol intoxication.

Decision time. It was predicted that the alcohol group would have the slowest reaction times of all three groups, particularly in the TA condition, as intoxicated participants may not have encoded enough details of the target face to quickly determine its absence from a lineup. However, intoxicated witnesses were found to be no slower at making an identification decision than control or placebo groups. Although, as mentioned previously, it is possible that the mild levels of intoxication achieved here may have been insufficient to impair the face memory representations of our alcohol group, via the narrowing of visual attention. Nevertheless, findings from previous research demonstrating a negative relationship between decision time and accuracy were replicated in the present study, with accurate decisions being made significantly more quickly than inaccurate decisions. Yet, despite this observation, the decision times of our accurate witnesses were considerably slower than the 10-12 second rule suggested by Dunning and Perretta (2002). Nonetheless, 95% of accurate witnesses made their decisions within 18.75 seconds, which supports Sauerland and Sporer’s (2007) accuracy cut-off point of 18 seconds (using the same delay of one week between witnessing the crime and making an identification). Thus, we propose that moderately intoxicated witnesses making an accurate decision do so just as quickly as their sober counterparts.

Further study limitations. As discussed above, one aspect of the present study that requires consideration is the level of intoxication reached by our participants. As we were ethically constrained in the amount of alcohol we were permitted to give our participants, those in the alcohol group failed, on average, to reach a mean BrAC measurement matching that of the UK and US drink driving limit, which is currently 0.35mg/l (BAC ≈ 0.08%). It could therefore be argued that the level of intoxication reached by the participants in the present study (*M* = 0.23mg/l) was not sufficient to obtain significant detrimental effects on identification performance. This issue may have been further compounded by our sample of British undergraduate students, a population with a tendency towards excessive alcohol consumption (e.g., Gill, 2002) thus, possibly, a tolerance for the drug significantly higher than that of their non-student contemporaries (e.g., Kypri, Langley & Stephenson, 2005). Hence, future studies should incorporate tiered dosing to determine the level of intoxication at which witnesses' identification decisions become less reliable, especially when using British undergraduate samples. Additionally, previous research examining alcohol intoxication and eyewitness identification not corrected for gender when calculating alcohol dosage (e.g., Hagsand et al., 2013; Harvey et al., 2013). Further research should consider such a correction as previous research has identified that females are likely to post higher BAC readings compared to males when administered comparable dosages (Graham, Wilsnack, Dawson, & Vogeltanz, 1998). It should be noted, though, that analysis of accuracy by gender in the present study revealed no significant differences.

It is also acknowledged that by measuring decision confidence using a 7-point Likert scale, we were unable to analyse the data using the calibration approach. However, the intention of the current research was to examine whether there were any differences in the confidence-accuracy relationship between sober and intoxicated witnesses, not to establish precise relationships for these cohorts. Further research may nevertheless wish to examine the relationship for intoxicated witnesses using calibration approaches. Finally we acknowledge that, due to practical limitations, administration of the lineup was not conducted by a researcher who was blind to the participants' condition, the identification of the target or to the study's hypotheses. However, while the utmost care was taken by the experimenter not to give any verbal or non-verbal cues to participants as to the target's identity, we appreciate that these shortcomings may have influenced the results and should be addressed in future research.

Summary and concluding remarks. Our study suggests that mildly intoxicated witnesses are no less able than sober counterparts to accurately identify a target from a lineup in which he is present, or reject lineups in which he is absent. In addition, we have demonstrated that accurate mildly intoxicated witnesses are not significantly less confident or slower in their decisions than sober witnesses. Thus, it is argued that the belief oft held by legal experts (Kassin et al., 2001) and potential jurors (Evans & Schreiber-Compo, 2010) regarding the performance of intoxicated witnesses is not yet empirically justified. Nonetheless, it remains important to determine the conditions under which they cease to be reliable, particularly with respect to the level of intoxication they may be under at the time of witnessing a crime.

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Table 1

Percentage (frequency) of identification decisions as a function of alcohol condition and target presence (N = 120)

	Target Present			Target Absent	
Alcohol Condition	Hit	Foil ID	No ID	Correct rejection	Foil ID
Alcohol (n = 40)	35% (7)	25% (5)	40% (8)	45% (9)	55% (11)
Placebo (n = 40)	30% (6)	45% (9)	25% (5)	50% (10)	50% (10)
Control (n = 40)	25% (5)	40% (8)	35% (7)	40% (8)	60% (12)
Totals	30% (18)	36.7% (22)	33.3% (20)	45% (27)	55% (33)

Table 2

Mean (SD) confidence levels and decision times by alcohol group, target presence and decision accuracy.

	Target Present		Target Absent	
Alcohol Group	Accurate Decision	Inaccurate Decision	Accurate Decision	Inaccurate Decision
Intoxicated				
Confidence	5.71 (1.11)	4.15 (1.35)	4.78 (1.09)	4.00 (1.27)
Dec time (s)	12.02 (11.32)	25.51 (18.19)	18.35 (16.67)	32.86 (22.93)
Placebo				
Confidence	4.67 (0.52)	3.64 (1.22)	5.25 (1.39)	4.08 (1.38)
Dec time (s)	12.69 (6.47)	13.67 (8.55)	16.21 (9.99)	17.05 (16.22)
Control				
Confidence	4.20 (1.79)	4.00 (1.65)	4.70 (1.42)	4.00 (1.56)
Dec time (s)	13.93 (12.41)	17.45 (8.98)	14.79 (3.82)	22.03 (14.89)
Total				
Confidence	4.94 (1.31)	3.93 (1.40)	4.89 (1.28)	4.03 (1.36)
Dec time (s)	12.77 (9.71)	18.68 (13.09)	16.39 (10.95)	23.83 (19.06)

Analyses were conducted with log-transformed values. The mean and standard deviations for the decision times displayed here were back-transformed from log.