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Dutch courage? Effects of acute alcohol consumption on self-ratings and observer ratings of foreign language skills

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Abstract

Aims: A popular belief is that alcohol improves the ability to speak in a foreign language. The effect of acute alcohol consumption on perceived foreign language performance and actual foreign language performance in foreign language learners has not been investigated. The aim of the current study was to test the effects of acute alcohol consumption on self-rated and observer-rated verbal foreign language performance in participants who have recently learned this language.

Methods: Fifty native German speakers who had recently learned Dutch were randomized to receive either a low dose of alcohol or a control beverage that contained no alcohol. Following the experimental manipulation, participants took part in a standardized discussion in Dutch with a blinded experimenter. The discussion was audio-recorded and foreign language skills were subsequently rated by two native Dutch speakers who were blind to the experimental condition (observer-rating). Participants also rated their own individual Dutch language skills during the discussion (self-rating).

Results: Participants who consumed alcohol had significantly better observer-ratings for their Dutch language, specifically better pronunciation, compared with those who did not consume alcohol. However, alcohol had no effect on self-ratings of Dutch language skills.

Conclusions: Acute alcohol consumption may have beneficial effects on the pronunciation of a foreign language in people who have recently learned that language.

Keywords

Acute alcohol consumption, executive functioning, popular beliefs

Introduction

The adverse effects of acute alcohol consumption on executive functioning are well established. Laboratory-based studies have shown that acute administration of alcohol impairs several aspects of cognitive functioning, including inhibitory control (for a review see Field et al., 2010), working memory (Balodis et al., 2007) and mental set shifting (Guillot et al., 2010). These cognitive functions are necessary for fluent production, processing and comprehension of language (for a review see Ye and Zhou, 2009). One aspect of language fluency, phonemic fluency (the capacity to generate words beginning with a particular letter), has been shown to be impaired by acute alcohol consumption (Christiansen et al., 2013). In the present study, we tested whether the detrimental effects of alcohol on language fluency extend to self-rated and observer-rated verbal foreign language performance in bilingual speakers.

The ability to speak a foreign language relies on executive functioning. When someone is learning/speaking a foreign language, lexical items of both languages (native and foreign) are activated at the same time and compete for selection (e.g. Green and Eckhardt, 1998). Speaking a foreign language is partially dependent on an inhibitory control mechanism that allows the individual to select the (correct) target item rather than the competing item (Kroll et al., 2008). Given that alcohol consumption impairs executive functioning, including inhibitory control, it can be expected that alcohol consumption would impair foreign language fluency in bilingual speakers.

However, contrary to what would be expected based on theory, it is a widely held belief among bilingual speakers that alcohol consumption improves foreign language fluency, as is evident in anecdotal evidence from numerous discussions in social and popular media (e.g. Fonseca Rendeiro, 2013; MacDonald, 2014; Moritz-Saladino, 2016). In line with this anecdotal evidence and the common belief that alcohol improves foreign language

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fluency, one previous study has shown that a small dose of alcohol had positive effects on the pronunciation of words of an unknown foreign language (Thai) in English-speaking participants (Guiora et al., 1972). Another study demonstrated that, after consuming alcohol, participants made more errors in pronouncing ‘tongue twisters’ in their native language, while the pronunciation of foreign words was not impaired (Tisljar-Szabo et al., 2014). Although such findings support the popular belief among bilingual speakers that alcohol consumption improves foreign language ability, to the best of our knowledge, the effects of alcohol on foreign language abilities in individuals who learn a foreign language have not yet been investigated.

There are at least two possible explanations for the popular belief that alcohol improves foreign language abilities. 1) Alcohol might actually improve the ability to speak in a foreign language, that is, lead to *actual improvements* in foreign language performance. 2) Alcohol might alter bilingual speakers’ *perception* of their own ability to speak the second language, that is, lead to *subjectively perceived improvements* in foreign language performance. In line with the latter explanation, research showed that alcohol consumption leads to overconfidence in performance self-ratings on a cognitive task (Tiplady et al., 2004; Wilde et al., 1989). A general increase in confidence gained from consuming alcohol (also referred to as ‘Dutch courage’) is one potential mechanism that could account for inflated self-evaluations about one’s language performance.

Research has shown that self-esteem predicts overconfidence in task performance (Farh and Dobbins, 1989), and increased self-confidence as a result of alcohol consumption is a commonly reported outcome (Young and Knight, 1989). Therefore, increased self-esteem after drinking alcohol might be associated with more positive perceptions of one’s own foreign language performance, even if this does not reflect actual foreign language performance.

The aim of the current study was to test the effects of acute alcohol consumption on self-rated and observer-rated foreign language skills in participants who had recently learned this language. Participants took part in a foreign language discussion after drinking either alcohol or water. By using water as a control drink, we deliberately confounded expectancy effects with pharmacological effects of alcohol consumption. We decided to use water as control drink rather than a placebo drink (a drink that contains no alcohol, but appears to contain alcohol) because previous research has shown that alcohol placebo can influence subjective states (Christiansen et al., 2013, 2017) and impair cognitive functions (Bombeke et al., 2013; Christiansen et al., 2016), just like ‘real’ alcohol. In some cases, the effects of alcohol placebo are so potent that they can obscure differences between placebo and real alcohol (Christiansen et al., 2013). Therefore, for an initial investigation of the effects of acute alcohol consumption on self-rated and observer-rated foreign language skills, it seems reasonable to deliberately confound the pharmacological and anticipated effects of alcohol consumption.

To test whether the hypothesized overconfidence in the foreign language task in the alcohol condition (i.e. higher self-ratings in the alcohol vs. water condition) would generalize to another, non-language-related task, we also tested the effects of alcohol on self-rated skills to perform a completely unrelated (arithmetic) task. To examine whether increased self-esteem would account for the hypothesized effect of alcohol on perceived language performance, we measured self-esteem (Rosenberg, 1965) before and after the language task. We hypothesized that participants who consumed alcohol would rate their performance in the foreign language discussion more highly compared with those who consumed water, in line with the popular belief that alcohol increases the ability to speak in a foreign language (Hypothesis 1). We further hypothesized that participants who consumed alcohol would receive lower observer-rated foreign language performance ratings compared with participants who consumed water, due to alcohol’s detrimental effect on executive functioning (Hypothesis 2). Regarding the specificity of the expected effects, we hypothesized that the higher self-ratings in foreign language skills by participants who consumed alcohol would generalize to performance ratings in a non-language task, replicating earlier findings (Hypothesis 3). Finally, we hypothesized that the effects of alcohol on the subjective overestimation of foreign language skills (i.e. higher self-ratings in the alcohol vs. water condition) would be explained by a general overconfidence (indicated by self-esteem ratings) gained from drinking alcohol (‘Dutch courage’; Hypothesis 4).

Method

Design

We used a between-subjects experimental design with two conditions. Participants randomized to the experimental condition (alcohol condition) consumed an alcoholic drink (Smirnoff Red, 37.5% alcohol) mixed with bitter lemon, whereas participants randomized to the control condition (water condition) consumed a control drink consisting of water. Experimental condition (alcohol/water) was the independent variable. Language performance (self-ratings and observer-ratings) were the main dependent variables.

Participants

Fifty undergraduate psychology students at Maastricht University, the Netherlands were recruited via poster advertisements. We aimed to include a homogeneous sample of participants with comparable proficiency in the foreign language under study (Dutch). At the time of testing, the Psychology bachelor programme at Maastricht University was taught in Dutch, and therefore all non-native students had to pass the recognized state language exam ‘Dutch as a second language (NT2)’ in order to be admitted to the study programme. Maastricht is located in the south of the Netherlands close to the German border, and the majority of foreign students at Maastricht University are native German speakers. Therefore, we exclusively included native German-speaking students who were in the second year of the Bachelor Psychology programme at Maastricht University and who had passed the NT2 exam.

Participants were included if they indicated that they drank alcohol at least occasionally. Participants were excluded if they reported being pregnant, if they reported using medication that could interact with alcohol, or if they had any allergies to the drink contents (vodka and bitter lemon). The mean age of participants was 22.59 years, $SD = 1.02$, and did not differ between the two groups (alcohol condition: $M = 22.38$, $SD = 1.01$; water condition: $M = 22.80$, $SD = 1.00$, $t(47) = 1.48$, $p = .15$). The majority of participants were female (n = 35 (70%)), and gender distribution did not differ between the two groups: χ^2 (1, n = 50) = 2.38, p = .12.

Materials

Experimental alcohol manipulation. In the alcohol condition, we aimed to achieve a moderate blood alcohol level of about 0.4‰. Vodka was used as an alcoholic drink (Smirnoff Red, 37.5% alcohol) and mixed with bitter lemon to make an approximately 250-mL long drink. An online calculator (www.pcpit.ch/nuetzliches/alkoholberechnung) was used to determine the amount of alcohol necessary to achieve the target alcohol level based on gender and body weight. Before the testing session, participants were informed that they might receive a drink containing alcohol during the study. However, participants were not explicitly informed whether their drink contained alcohol. Participants were instructed to consume the drink within 10 minutes, and an alcohol breath analyser (Dräger Alcotest®) was administered in both groups after 15 minutes' waiting time, allowing the alcohol to be absorbed into the blood flow (alcohol condition). Participants were not informed about the result of the breath analyser test. During consumption and waiting time, participants listened to instrumental music via headphones. Before the administration of the alcohol breath analyser, participants were asked to take a sip of water. In the control group, participants were offered approximately 250 mL of chilled water and received exactly the same experimental procedure.

Self-reported foreign language skills prior to experiment. To assess whether self-reported foreign language (Dutch) skills prior to the experiment were similar across groups, participants rated their Dutch language skills on a scale from 1 (poor) to 5 (excellent) on four dimensions (general language skills, speaking skills, listening skills and reading skills) before the experimental testing session.

Foreign language performance task. Participants were instructed to argue for or against animal testing in Dutch for two minutes. The discussion was audio-recorded. If participants needed less time, the experimenter encouraged them to continue talking using standardized questions (e.g. 'How much do you know about animal testing?'). Directly after the foreign language performance task, participants rated their spoken Dutch performance as an index of subjective foreign language skills.

Self-rated foreign language skills. To test our first hypothesis, that participants in the alcohol condition would rate their foreign language skills performance more highly compared with those in the water condition, participants were asked to evaluate their own (verbal) foreign language performance during the foreign language performance task on nine criteria along 100-mm Visual Analogue Scales (VAS) ranging from 0 (Absolutely not) to 100 (Very much). The items explicitly referred to the subjective evaluation of several aspects of their Dutch language skills specifically related to their performance during the language task (e.g. overall quality, understandability, vocabulary, pronunciation, word selection and fluency). The specific items were: 1) '*In general, how good did you find your Dutch language skills during the discussion?*', 2) '*How comprehensible did you find your argumentation during the discussion?*', 3) '*I feel that my wordpool was sufficient to engage in the discussion*', 4) '*I feel that I had to keep looking for the right words in my memory to engage in the discussion*', 5) '*I think that my pronunciation was clear during the discussion*' (reverse scored), 6) '*I think that my pronunciation was unequivocal and clear during the discussion*', 7) '*I think I almost always used the correct grammar during the discussion*', 8) '*I think that my Dutch was fluent during the discussion*' and 9) '*In general, I think that my Dutch was very comprehensible during the discussion*'. The mean of the nine VAS scales was used as an overall index of Dutch subjective language skills (range 0–100, with higher scores indicating a more positive evaluation of Dutch language skills).

Observer-rated foreign language skills. To test our second hypothesis, that participants randomized to the alcohol condition would receive lower observer-rated foreign language performance scores compared with participants randomized to the water condition, two native Dutch speakers (blind to condition) evaluated the audio recordings of the foreign language performance task using the same rating scales that were used for the self-ratings. The average of the nine VAS scales was used as an overall index of observer-rated Dutch language skills (range 0–100, with higher scores indicating a more positive evaluation of Dutch language skills). In addition to the nine VAS scales, lay raters assigned grades to the pronunciation, grammar, vocabulary and argumentation quality of the participants (range 1 = poor to 10 = outstanding, in accordance with the Dutch university grading system).

Non-language control task. To test our third hypothesis, that the subjective overestimation of foreign language skills by participants in the alcohol condition (i.e. higher self-ratings in the alcohol vs. water condition) would generalize to performance ratings in a non-language task, participants engaged in a 2-minute task that involved solving 13 arithmetic problems that increased in complexity from easy (e.g. *22 + 67 = ?*) to difficult (e.g. *(2 + 7) x (17 – 4) = ?*). Directly following the completion of the task, participants were asked to evaluate their performance in this task using four VAS scales: '*How well do you think you performed in the arithmetic task in general?*', '*How well do you think you performed compared to others?*', '*How many mistakes do you think you made?*' and '*How easy did you find the arithmetic task?*' The mean of the four VAS scales was used as an index of subjective evaluation of arithmetic performance (VAS arithmetic performance rating). In addition to these questions, participants were asked to assign a grade to their performance on a scale ranging from 1 (poor) to 10 (outstanding) (self-assigned arithmetic grade). The number of correctly solved problems was used as an objective measure of arithmetic performance.

State self-esteem – Rosenberg Self Esteem scale (Rosenberg, 1965). To test our fourth hypothesis, that the effects of alcohol on the subjective foreign language skills ratings could be attributed to general overconfidence gained from drinking alcohol ('Dutch courage'), we measured state self-esteem before (at screening) and after the language task with the Rosenberg Self Esteem scale (Rosenberg, 1965). The scale consists of 10 items answered on a

4-point Likert scale (3 = strongly agree, 2 = agree, 1 = disagree, 0 = strongly disagree). Example items include '*On the whole, I am satisfied with myself*'. Items, 3, 5, 8, 9 and 10 are reverse scored. All items are summed to derive a total score ranging from 0 to 30, with higher scores indicating higher self-esteem.

Procedure. The study protocol was approved by the local ethics committee at the Faculty of Psychology and Neuroscience, Maastricht University, the Netherlands. Interested potential participants who responded to poster advertisements completed screening questions and the Rosenberg Self Esteem Scale via email. Eligible participants were invited to the testing session. Testing took place between 1.00 pm and 4.00 pm at a laboratory visually resembling a pub. The sessions were led by two experimenters.

The first experimenter prepared and offered the drinks, and the second experimenter carried out the foreign language performance task. This was to ensure blinding of the experimenter conducting the foreign language performance task. The first experimenter welcomed the participant, provided verbal and written information about the study, and obtained written informed consent. The baseline blood alcohol level of participants was determined using a Dräger breath alcohol analyser. Then, participants were offered the drink (alcoholic drink in the experimental condition, water in the control condition). Participants were then instructed to wait and relax for 15 minutes while listening to instrumental music via headphones. Directly after the waiting time, the alcohol level was determined again. Participants were instructed not to talk about the first part of the experiment with the second experimenter. This was to ensure that the second experimenter remained blinded to the experimental condition. The second experimenter then conducted the foreign language performance task. Following the task, participants completed the subjective foreign language skills rating (self-ratings). Then, participants completed the non-language control task, followed by the subjective arithmetic skills evaluation questionnaire. Finally, participants again completed the Rosenberg Self Esteem scale. At the end of the testing session, the first experimenter determined the blood alcohol level of the participant and explained the danger and the Dutch legal norms of drinking and driving or cycling. Participants were asked to sign an agreement stating that they would not drive or cycle until their breath alcohol level declined below 0.2‰. Participants who had an alcohol level above 0.2‰ were asked to wait in a waiting area until their alcohol level had declined below this level.

Data analysis

We computed a self-language-rating index and an observer-language-rating index as the mean of the individual VAS items for self-ratings and the mean of individual VAS items for observer ratings, respectively. To test for between-group differences in self-ratings and observer ratings of language performance, two independent sample *t*-tests were conducted. Additional independent sample *t*-tests were conducted for observer grades on language performance and for objective and subjective performance on the non-language control task (arithmetic performance). Between-group effect-sizes (Cohen, 1982) were computed as the standardized mean difference between the two groups (Cohen's $d = M$ alcohol condition – M water condition / SD_{pooled}). To explore associations between language ratings (self- and observer ratings) and blood alcohol level, we computed Pearson correlations (within the alcohol condition only). To test whether any effect of alcohol on language proficiency might be explained by increased self-confidence, we conducted a mixed measures/factorial analysis of variance with the self-esteem total score at screening and the self-esteem total score following the experimental manipulation as the within-subjects factors and condition as the between-subjects factor.

Results

Self-reported foreign language skills prior to experiment. On average, prior to the experiment, participants rated their Dutch language skills as *average* to *good* (General skills: $M = 3.80$, $SD = 0.61$; Speaking skills: $M = 3.53$, $SD = 0.71$; Listening skills: $M = 3.93$, $SD = 0.66$; Reading skills: $M = 4.06$, $SD = 0.56$). There were no statistically significant differences between the experimental and control groups on self-reported Dutch language skills prior to the experiment on any of these scales (all p-values >.05).

Manipulation check. The average estimated blood alcohol level of participants 15 minutes after consumption of alcohol/water was 0.32 g/kg ($SD = 0.10$, minimum: 0.20, maximum: 0.63) in the alcohol condition and 0.00 g/kg ($SD = 0.00$) in the water condition.

Effect of alcohol on language performance

Self-rated foreign language skills (Table 1). Our first hypothesis was that participants who consumed alcohol would rate their subjective foreign language skills more highly compared with those in the water condition. Contrary to our hypothesis, subjective foreign language ratings of participants in the alcohol condition ($M = 55.53$, $SD = 12.96$) did not significantly differ from those of participants in the control condition ($M = 53.59$, $SD = 15.69$, $t(48) = 0.48$, $p = .64$, $d = 0.13$).

Observer-rated foreign language skills (Table 1). Our second hypothesis was that participants who consumed alcohol would receive lower observer-rated language performance scores compared with participants who consumed water. An independent samples *t*-test demonstrated that blinded raters rated the language performance of participants who consumed alcohol significantly *better* ($M = 61.53$, $SD = 5.69$) than that of participants who consumed water ($M = 56.65$, $SD = 7.67$, $t(47) = 2.54$, $p = .02$, $d = 0.72$). Additional exploratory independent samples *t*-tests demonstrated that this global evaluation could be accounted for by higher scores for pronunciation in the alcohol condition ($M = 6.72$, $SD = 0.68$) compared with the water condition ($M = 6.27$, $SD = 0.88$, $t(47) = 2.00$, $p = .05$, $d = 0.66$). Ratings for grammar, vocabulary and argumentation did not significantly differ between groups (all p-values >.05).

Associations between blood alcohol level and foreign language skills ratings. To further explore the relation between alcohol consumption and performance on the language test, we correlated the blood alcohol level, assessed prior to the language test, with the language evaluations (self- and observer ratings)

Table 1. Mean self-ratings and observer-ratings of language and arithmetic performance for participants in the experimental and control condition.

Variable	Alcohol (n = 25)	Water (n = 25)	t (df)	p	Cohen's d
	M (SD)	M (SD)			
Language performance					
VAS language rating index					
Self-ratings (participant ratings)	55.53 (12.96)	53.59 (15.69)	0.48 (48)	.64	.13
Observer ratings (blinded raters)	61.53 (5.69)	56.65 (7.67)	2.54 (47)	.02	.72
Observer grades (blinded raters)					
Pronunciation	6.72 (0.68)	6.27 (0.88)	2.00 (47)	.05	.66
Grammar	6.29 (0.62)	6.04 (0.62)	1.40 (47)	.17	.40
Vocabulary	6.55 (0.61)	6.23 (0.97)	1.39 (47)	.17	.52
Argumentation	6.43 (0.66)	6.20 (0.73)	1.18 (47)	.25	.35
Arithmetic performance					
Objective performance					
Number of correctly solved arithmetic problems	9.84 (2.03)	10.8 (1.58)	1.86 (48)	.07	.53
Subjective performance					
VAS arithmetic rating index	63.73 (18.41)	62.76 (16.51)	.196 (48)	.85	.06
Self-assigned arithmetic grade	7.15 (1.61)	8.00 (1.19)	2.09 (46)	.04	.60

N=50 for the self-ratings and all arithmetic measures; N=49 for the observer ratings due to one missing recorded discussion. VAS language rating index comprises the average of nine VAS scales rated by participants (self-ratings) and by blinded raters (observer-ratings), respectively. Ratings range between 0 and 100; higher scores indicate more positive foreign language skills ratings. Observer grades refer to grades assigned by blinded raters to foreign language skills. Grades range between 0 and 10; higher scores indicate better grades. Objective arithmetic performance was determined based on the number of correctly solved arithmetic problems, which could range between 0 and 13, with higher numbers indicating better performance. VAS arithmetic rating index comprises the average of four VAS scales rated by participants (subjective rating). Ratings range between 0 and 100; higher scores indicate more positive arithmetic skills ratings. Self-assigned arithmetic grades refer to grades assigned by participants to their arithmetic performance. Grades range between 0 and 10; higher scores indicate better grades.

within the alcohol condition only. There were no statistically significant correlations between blood alcohol level and the ratings (all p-values >.05). In the overall sample, all observer language skills ratings were positively and statistically significantly correlated with the self-ratings of language skills (all p-values >.01).

Effect of alcohol on arithmetic performance. Our third hypothesis was that the subjective overestimation of foreign language skills by participants in the alcohol condition (i.e. higher self-ratings in the alcohol vs. water condition) would generalize to performance ratings of a non-language-related task. An independent samples t-test demonstrated that mean performance ratings for the arithmetic task did not differ between the alcohol condition (M = 63.73, SD = 18.41) and the water condition (M = 62.76, SD = 16.51, $t(48)$ = 0.196, p = .85, d = 0.06). However, a separate independent samples t-test showed that participants in the alcohol condition assigned significantly lower grades to their own performance in the arithmetic task (M = 7.15, SD = 1.61) than participants in the control condition (M = 8.00, SD = 1.19, $t(46)$ = 2.09, p = .04, d = 0.60). Regarding their objective performance, participants in the water condition solved marginally more arithmetic problems (M = 10.80, SD = 1.58) than participants in the alcohol condition (M = 9.84, SD = 2.03). However, this difference was not statistically significant: $t(48)$ = 1.86, p = .07, d = 0.53.

Effects of alcohol on state self-esteem. Our fourth hypothesis was that the effects of alcohol on subjective foreign language skills ratings could be explained by a general overconfidence gained from drinking alcohol. State self-esteem ratings during screening were statistically significantly lower (M = 21.78, SD = 3.50) compared with state self-esteem ratings following the experimental manipulation (M = 22.90, SD = 4.34, $F(1, 47)$ = 10.52, p = <.01). The interaction between change in self-esteem ratings and experimental condition was not significant ($F(1, 47)$ = 0.51, p = .48), suggesting that alcohol consumption had no impact on self-esteem ratings.

Discussion

It is a popular belief that alcohol improves foreign language skills (e.g. Fonseca Rendeiro, 2013; MacDonald, 2014; Moritz-Saladino, 2016). This study tested the effects of acute alcohol consumption on self-rated and observer-rated foreign language skills in individuals who had recently learned this language. We hypothesized 1) that participants who consumed alcohol would rate their perceived foreign language skills more highly compared with those who consumed water; 2) that they would receive lower ratings of their foreign language skills from blinded language raters compared with those who consumed water; 3) that the effects of alcohol on perceived foreign language skills would generalize to a non-language task and that 4) the effects of alcohol on perceived performance ratings would be explained by a general increase in confidence gained from drinking alcohol ('Dutch courage').

Contrary to our hypotheses, participants in the alcohol condition did not differ from participants in the non-alcohol condition on their perceived foreign language skills (self-ratings) during a two-minute conversation in the foreign language. In contrast, participants in the alcohol condition received more positive ratings of their foreign language skills from two native speakers who were blind to experimental conditions (observer-ratings) than participants in the control condition.

Acute administration of alcohol has disinhibiting effects (e.g. de Wit et al., 2000; Marczinski et al., 2005). This might enable foreign language speakers to speak more fluently in the foreign language after drinking a small amount of alcohol, which could explain the higher fluency scores after drinking alcohol. We tested whether self-confidence gained from drinking alcohol ('Dutch courage') might explain differences in foreign language skills ratings between participants in the two conditions and found that alcohol consumption did not affect self-confidence ratings. We further hypothesized that an overestimation of subjective foreign language skills by participants in the alcohol condition would not be foreign-language specific but instead, would generalize to non-language-related tasks, replicating earlier findings. In line with the finding that participants in the alcohol condition did not overestimate their foreign language skills, they did also not overestimate their skills on a non-language (arithmetic) task. Furthermore, participants rated their performance on the non-language task less favourably than participants who drank water. Thus, in this study a low dosage of alcohol did not lead to subjective overestimations of performance on a non-language task.

A possible mechanism that could account for the effects of alcohol on both self- and observer ratings of foreign language is language anxiety, defined as 'the feeling of tension and apprehension specifically associated with second language contexts' (MacIntyre and Gardner, 1994, pp. 284). Language anxiety is negatively related to actual and perceived second language proficiency (MacIntyre et al., 1997). Students with high language anxiety performed worse on a language task than students with low language anxiety (MacIntyre et al., 1997). Additionally, language anxiety affected their subjective evaluations of their language proficiency: students with high levels of language anxiety were more likely to underestimate their performance compared with students with low levels of language anxiety. Alcohol is known for its tension-reducing properties (Gilman et al., 2008). It is possible that a low to moderate dose of alcohol reduces language anxiety and therefore increases both one's foreign language proficiency and one's subjective foreign language evaluation. These explanations are speculative and cannot be tested in the current study (because we did not measure language anxiety). The mechanisms that account for the effects of acute alcohol consumption on foreign language proficiency should be tested in future studies.

The finding that alcohol had a positive impact on the observer ratings of foreign language skills are in contrast to findings from a previous study showing that alcohol had a negative impact on phonemic fluency, an aspect of verbal fluency in the native language (Christiansen et al., 2013). The present study did not formally assess phonemic or verbal fluency but rather, overall skills of speaking in a foreign language. Moreover, the study by Christiansen et al. assessed verbal fluency in a native language, as an index of executive functioning, and might therefore not be comparable to the findings of the present study in this respect. Another possible explanation for the contrasting findings could be that the dosage of alcohol administered in the Christiansen et al. study was markedly higher than that administered in the present study.

When evaluating the effects of acute alcohol consumption on the ability to speak in a foreign language, one important factor to consider is the amount of alcohol that is consumed. Acute alcohol consumption can result in 'slurred speech' and speech disfluency at higher levels of alcohol intoxication (Sobell and Sobell, 1972; Sobell et al., 1982). In the present study, there was no association between alcohol level and the self- and observer ratings of foreign language skills. However, the range of alcohol intoxication in the current study was low. It is likely that at higher levels of alcohol intoxication, alcohol levels might be negatively related to observer-rated foreign language skills.

The present findings are consistent with the broader literature showing that the effects of alcohol on self-report often emerge after those effects can be detected through other means such as objective measures or observer ratings. For example, in the context of drink-driving, participants are dose-dependently impaired objectively (increased brake reaction times) in the absence of any subjective effects (Liguori et al., 1999). An implication of the present findings for future alcohol administration studies is that it is important to include both self-report and objective measures of the target construct, where possible.

Limitations

First, we only tested native German-speaking students who learned Dutch as a second language. It is unclear how these findings generalize to other, non-student populations and to other languages. Second, we recruited a convenience sample and did not conduct a sample-size calculation. Third, we did not include a formal, professional language assessment as an objective language skills rating, and it therefore remains unclear whether our foreign language assessment skills rating covered all relevant aspects of foreign language production. On the other hand, including non-expert native speakers as lay raters of foreign language skills represents a more realistic and ecologically valid approach, more closely resembling real-life situations in which a native speaker would comment on the language skills of a foreign language learner. Fourth, as the alcohol condition differed from the control condition in two aspects (pharmacological action and alcohol expectancies), it is unclear whether the effects of alcohol consumption on observer-rated foreign language skills were specifically due to either one or both of these components. Given that alcohol placebo effects can in some cases obscure pharmacological effects (Christiansen et al., 2013), we decided to deliberately confound the pharmacological and anticipated effects of alcohol consumption for this initial investigation. Future research on this topic should include an alcohol placebo condition to disentangle the relative impact of pharmacological vs. expectancy effects. Fifth, we included participants who indicated that they drank alcohol at least occasionally, but we did not set further inclusion criteria for the range of minimum/maximum alcohol consumption, which could have added additional noise to our data, especially in the light of a relatively small sample size. Sixth, we did not conduct an awareness check, and therefore we cannot rule out that part of the findings might be explained by demand characteristics. Finally, we did not compare participants' foreign language performance with their native language performance, which would have enabled us to test the specificity of results with respect to the second language.

Conclusions

Does alcohol improve foreign language skills? Our findings suggest that consumption of a low dose of alcohol results in higher observer ratings of foreign language skills, whereas the self-evaluation of one's own foreign language skills is unaffected by a low dose of alcohol. A general overconfidence gained from drinking alcohol ('Dutch courage') could not account for these findings. The findings of this study need replication in future studies, testing participants learning languages other than Dutch and varying the amount of alcohol that is consumed to further explore the effects of acute alcohol consumption on foreign language proficiency.

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