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A strong alcoholic drink does not influence self-assessments of the big five personality traits

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Abstract
cAlohol affects how people think, feel, and behave, and how they perceive the physical and social world around them. But does alcohol also influence how people perceive themselves? Past work points to a number of possibilities, suggesting intoxication could lead to positive biases, to negative biases, or have no effects on self-assessments at all. Here we tested whether alcoholic intoxication affects self-assessments of personality within the Big Five personality framework. We hypothesized that intoxicated participants would see themselves more positively than non-intoxicated individuals would. We conducted a preregistered laboratory experiment on participants divided into three groups: alcohol intoxication ($n = 106$), placebo ($n = 114$), and control conditions ($n = 109$). Contrary to predictions, we found no differences in self-assessments of personality across conditions. Findings point to the possibility that self-assessments of personality may be too stable to be affected by the momentary changes in thoughts and feelings caused by alcoholic intoxication.

Keywords Alcohol · Personality traits · Big five personality model · Self-assessment

Consumption of alcohol is known to influence a wide array of psychological processes, ranging from basic perceptual processes (e.g., blurring vision; Watten & Lie, 1996; Wegner & Fahle, 1999) to more complex emotional and cognitive processes (e.g., lower dispositional empathy or reduced executive cognitive functioning: Euser & Franken, 2012; Giancola et al., 2010; Ray et al., 2012; Sayette et al., 2012; Thoma et al., 2013). These effects may, in turn, influence social perception, such as making others appear more physically and sexually attractive (Bowdring & Sayette, 2018; Rehm et al., 2012). Such perceptions are consequential because they can influence an individual's actions. For example, drunk people may become more impulsive, violent, aggressive, and less sexually controlled, which can sometimes even lead to criminal violations (Exum, 2006; Greenfield, 1998; Heath & Hardy-Vallée, 2015; Pernanen, 1991; Roizen, 1997).

However, the effects of alcohol on perceptions of the self have received little research attention. On the one hand, it is possible that alcohol will not have an impact on personality self-assessments. Personality has a large heritable component and is generally thought to be stable, such that short-term deviations from characterful behavior are usually attributed to mood (e.g., being happy versus sad) or contextual factors (e.g., being at a party versus a library) without undermining the existence of underlying stable traits (Fleeson, 2001, 2004). On the other hand, it is also possible that alcohol will impact self-assessments of personality. There are three reasons to believe that drunk people may change their self-perceptions: (1) their moods and emotional states change (Cohen et al., 1958; Corazzini et al., 2015; Euser & Franken, 2012; Giancola et al., 2010; Kuntsche & Cooper, 2010; Ray et al., 2012; Sayette et al., 2012); (2) their cognitive reasoning is distorted (Euser & Franken, 2012; Giancola et al., 2010; Heath & Hardy-Vallée, 2015; Steele & Josephs, 1990; Weafer et al., 2016); (3) alcohol affects their behaviors (Bodnár et al., 2020; Exum, 2006; Greenfield, 1998; Heath

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& Hardy-Vallée, 2015; Pernanen, 1991; Roizen, 1997), upon which self-assessments may be based. Before examining the processes that might drive self-assessment processes, it is necessary to determine whether alcoholic intoxication really does influence self-assessment; that was the aim of this study.

Mechanisms potentially affecting self-assessments of personality

There are numerous mechanisms by which self-assessments of personality might be affected by alcohol. Most directly, the self is a social object, so it is potentially susceptible to the same cognitive, emotional, and perceptual processes that influence intoxicated individuals' assessments of others. In addition, intoxication may change a person's behavior (e.g., becoming more talkative and impulsive), and an intoxicated individual may take such behavior into account in their self-assessments. Below we describe past studies examining how alcohol affects people. To match the participants in our sample, we focus on studies of non-addicted participants; we omit studies of addicts and other long-term alcohol users, who are subject to much more damage to the brain, body, and human functioning (Oscar-Berman & Marinković, 2007).

The first class of mechanisms that could affect self-assessments of personality stem from the effects of alcohol on mood and emotion. Alcohol intoxication is associated with increased emotional reactivity and selective attention toward emotional cues (Euser & Franken, 2012; Giancola et al., 2010; Ray et al., 2012; Sayette et al., 2012). More specifically, drinking alcohol tends to improve individuals' moods (Kuntsche & Cooper, 2010), often stimulating euphoria in the immediate aftermath of consumption; alcohol consumption "creates the illusion of well-being" (Banaji & Steele, 1989, p. 147) or makes people feel happier (Cohen et al., 1958; Corazzini et al., 2015). Positive emotions are more readily processed than negative ones (Carvajal et al., 2004), and positive mood predicts positive self-assessments (Peters et al., 2006); therefore, alcohol consumption may increase positive self-assessments, including those regarding personality traits.

Second, cognitive reasoning is distorted in drunk people (Giancola et al., 2010), such that alcohol impairs cognitive control, reaction time, and memory (Weafer et al., 2016); so self-assessments could be biased as a result of decreased cognitive capacities. There are at least two ways that intoxication may play a role here, one regarding reduced cognitive focus (known as "alcohol myopia") and the other regarding higher levels of disinhibition (Euser & Franken, 2012; Heath & Hardy-Vallée, 2015).

Alcohol myopia theory refers to the tendency of alcohol to increase a subject's concentration upon immediate events and reduce awareness of events that are distant, which is why intoxicated people tend to focus on one central thing, idea, problem, or person (Steele & Josephs, 1990). Thus, alcohol may lead intoxicated individuals to process information in simpler ways, with less nuance and balance than they would when sober. Most people perceive themselves in a positive light (Allison et al., 1989; Felson, 1981; Van Lange & Sedikides, 1998), so when cognitive resources are depleted by intoxication, the resulting myopic perspective may focus on this single cognitively available self-view, resulting in exaggerated positive self-assessments.

One robust cognitive effect of intoxication is decreased inhibition (Giancola et al., 2010)). Intoxicated people are more likely than non-intoxicated people to break the rules and overstep social norms (Heath & Hardy-Vallée, 2015). One pervasive norm discourages people from bragging about themselves. Thus, when disinhibited by alcohol, individuals may be more willing than usual to say good things about themselves, resulting in more positive self-assessments.

A third mechanism by which alcohol could affect self-assessments is through its effects on behavior. For example, alcohol increases muscle relaxation (which usually makes drunk people more relaxed) and disinhibition (which can make people more confident and talkative) (Bodnár et al., 2020). If individuals draw upon these positive behaviors when making self-assessments, then we may expect drunk people to see themselves as more emotionally stable, more extroverted, and more open to new experiences. However, the social disinhibition associated with alcohol consumption can also lead to impulsive, violent, and less sexually controlled behaviors (Exum, 2006; Greenfield, 1998; Heath & Hardy-Vallée, 2015; Pernanen, 1991; Roizen, 1997). If individuals draw upon these negative behaviors when making self-assessments, then we may expect drunk people to see themselves as less agreeable, less conscientious, and less emotionally stable.

Finally, there is also a possibility that alcohol will not impact self-assessments of personality. As noted earlier, personality is generally thought to be a stable set of characteristics; consequently, short-term deviations from characterful behavior may be attributed to mood or contextual factors (e.g., being at a party versus a library) without undermining the existence of underlying stable traits (Fleeson, 2001, 2004). So, even if alcohol influences people's thoughts, feelings, behaviors, and perceptions, those temporary alterations may not be deemed relevant to individuals' self-assessments of intrinsically stable characteristics, such as personality traits.

Previous research

We were able to identify only a single previous study (Banaji & Steele, 1989) on the effects of alcohol on self-assessments. In that study, alcohol inflated self-assessments across various characteristics, suggesting that alcohol might make people's self-assessments more positive. However, the study was subject to several methodological limitations that call for additional work on the topic. First, the study used a small sample, with only 10–14 participants per condition. Second, there was no control condition, meaning the researchers could only compare the intoxicated participants with participants believing that they were intoxicated (i.e., the placebo condition); the lack of a full control condition means the study could not evaluate the effects on self-assessment of believing one had consumed alcohol. Third, no standard personality scale was used. Instead, participants rated themselves using bipolar scales (e.g., friendly vs. unfriendly) (Banaji & Steele, 1989).

Hypothesis

Following the results of Banaji and Steele (1989), we hypothesized that intoxicated participants would self-assess their personality traits more positively than non-intoxicated individuals would.

Study

Methods

The study was approved by the Ethical Committee of University of Silesia in Katowice and preregistered. All the materials, data, including preregistration, are available at the OSF https://osf.io/t8wkm/?view_only=None.

Sample

This study was part of a larger study on utilitarian decision-making (Paruzel-Czachura et al., 2021); the sample size for that larger study was determined by a power analysis seeking 80% power to detect an effect of $f = 0.107$ or $f = 0.097$ (depending on the type of measure), assuming a correlation of $r = .30$ between measures of moral decision making and a nonsphericity correction of $\varepsilon = 1$, resulting in a target sample size of 300. We sought to collect the largest possible sample size given our budget, laboratory resources, and the possibility that some participants would not pass all attention checks. Participants were recruited through advertisements on local university websites, Facebook websites, and local newspapers. Potential participants were informed that the study was related to moral decision-making under the influence of alcohol. Individuals who had health problems, were pregnant, reported alcohol addiction, or were younger than 18 years old (before the laboratory invitation) were not eligible to participate. To verify this information, all interested participants completed a long anonymous screening online survey about sociodemographic characteristics and health before receiving the invitation to the study and before making an appointment at the laboratory. When participants arrived at the laboratory, they answered some sociodemographic questions, completed the first survey about moral decision-making (Paruzel-Czachura et al., 2021), and then took part in this study. $N = 1079$ participants filled out the first screening survey. Of these, $N = 387$ participants (198 females), aged from 18 to 52 years ($M = 25.7$; $SD = 7.4$), who had no contraindications, were invited to the laboratory. 39% were students, 35% worked in a full-time job, 13% worked in a part-time job, 7% were unemployed, 5% were self-employed, 1% chose the "other" option. $N = 58$ participants failed the attention checks and were excluded from analyses, so our final analyzed sample was $N = 329$ (163 females), aged from 18 to 52 years ($M = 25.1$; $SD = 6.2$). Participants were randomly assigned to the alcohol ($n = 106$; 53 females), placebo ($n = 114$; 57 females), and control ($n = 109$; 53 females) conditions.

Measures

Personality Several comprehensive instruments have been developed to measure the Big Five personality dimensions (Benet-Martínez & John, 1998; Costa & McCrae, 1992; Goldberg, 1992; John & Srivastava, 1999; Saucier, 1994). However, completing them can pose a challenge for participants under the influence of alcohol because of their length. So, we used a short but still valid 10-item measure of the Big Five, the Ten-Item Personality Inventory (TIPI; Gosling et al., 2003), in a Polish adaptation (Sorokowska et al., 2014). The TIPI consists of ten items, with two for each of the Big Five traits: (1) Extraversion: "extraverted, enthusiastic", and "reserved, quiet" (*reversed*); (2) Agreeableness: "critical, quarrelsome" (*reversed*), and "sympathetic, warm"; (3) Conscientiousness: "dependable, self-disciplined", "disorganized, careless" (*reversed*); (4) Emotional Stability: "anxious, easily upset" (*reversed*), and "calm, emotionally stable"; (5) Openness to Experience: "open to new experiences, complex", and "conventional, uncreative" (*reversed*). Participants evaluated to what extent they see themselves as [trait] on a scale from 1 (*disagree strongly*) to 7 (*agree strongly*). The score for each trait is calculated as a mean of two items pertaining to a given dimension. Given that each trait is measured with two items only, and these items cover broad content areas, the Cronbach alphas for the TIPI scale are expected to be rather low (Kline, 2000; Woods & Hampson, 2005), and that was the case in both in the original

publication (0.68, 0.40, 0.50, 0.73, and 0.45) (Gosling et al., 2003), and in our study (0.68, 0.49, 0.68, 0.63 and 0.31 for Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience, respectively). In such cases, test-retest reliability is considered a more appropriate measure of reliability; past research has demonstrated acceptable levels of test-retest reliability for the TIPI (e.g., Akhtar, 2018; Chiorri et al., 2015; Gosling et al., 2003; Klimanska & Haletska, 2019; Renau et al., 2013; Sorokowska et al., 2014).

Procedure

We used a double-blind between-subjects design with three experimental conditions (alcohol, placebo, control). We randomly assigned participants to one of the conditions.

Participants in the control condition drank no alcohol but juice, and they were informed that there was no alcohol in their juice. Participants in the placebo condition were informed that they received an alcoholic drink, but they drank a juice sprayed with alcohol to create the impression of actual alcohol consumption. Participants in the alcohol condition received a strong alcoholic drink, which was prepared according to the rule: 1.6 g of alcohol at 40% strength for each 1 kg of their body weight to reach a mean blood alcohol level of 0.54‰ in permille. The alcohol was mixed with the same juice as in other conditions. In every condition, participants came into the laboratory, drank (10 min for this task), and watched a movie (a touristic documentary without any strong emotional content, 51 min. long). We waited a sufficient time (i.e., 51 min) for the alcohol to influence the participants (Cederbaum, 2012), after which they completed the online target survey. We measured participants' blood alcohol levels by the breathalyzer while entering the lab (to make sure that all participants were sober), after the movie clip (to measure the level of alcohol in the experimental condition and to make participants in the placebo condition believe that they had consumed the alcohol – in this case, using a fake breathalyzer), and at the end of the study (for the same reasons).

Statistical analysis

Manipulation check

The effectiveness of the experimental manipulation was investigated by directly asking participants in which condition they thought they were after explaining the aim of the study: control ("I didn't drink alcohol"), placebo ("You told me I was drinking alcohol, but it wasn't there"), or alcohol conditions ("I drank alcohol"). We also measured the alcohol level in blood using a breathalyzer before the study, after the movie, and finally after the whole survey.

Deviations from preregistration

We followed the preregistered procedure exactly, so there are no deviations from preregistration to report. However, our sample is larger than anticipated (29 more participants) because we allowed all appointed participants to participate in the study on the last day. All future appointments were canceled. During the course of the peer-review process, it was suggested that we perform an additional exploratory analysis with participants' responses to the "guess condition" question as a between-subject factor.

Differences between the experimental, placebo, and control groups

As indicated in the preregistration of this study, the data were analyzed by means of a multivariate analysis of variance with five personality scales used as response variables, and with three experimental groups (between-subject) x two sexes (male/female, between-subject) as fixed factors, controlling for subjects' age. The analysis was followed by significance tests involving comparisons of the three experimental groups with the individual dependent variables assessed separately, with an alpha level set to 0.05. As suggested by a reviewer in the peer-review process, we also performed an additional exploratory analysis with participants' responses to the "guess condition" question (yes/no, between-subject) x two sexes (male/female, between-subject) as fixed factors, controlling for subjects' age.

Results

Manipulation check

We compared experimental groups by their breathalyzer data taken after the movie clip but before the personality survey. Only the experimental group was intoxicated ($M = 0.54$‰ in permilles, $SD = 0.12$‰), and participants in all other conditions were sober ($M < 0.001$‰). All pairwise comparisons between the experimental groups and other conditions were significant at $p < .001$.

We also asked participants to self-classify to a condition they believed they were assigned. Participants were correct in guessing that they belonged to the control condition (99.1%), to the experimental condition (96.3%) but far less accurate in the placebo condition (65.8%), $\chi^2(2) = 65.72$, $p < .001$. So, although our placebo manipulation was not perfect, similarly to previous studies using placebo and alcohol conditions (Bodnár et al., 2020; Hróbjartsson & Gøtzsche,

2004; Lachenmeier et al., 2016; Mendelson et al., 1984; Sayette et al., 1994; Schlauch et al., 2010), the accuracy in guessing whether alcohol was indeed consumed was the lowest in the placebo condition and approached the guessing accuracy of 50%.

Differences between the experimental, placebo, and control groups

Descriptive statistics for all study groups are presented in Table 1, and Supplementary Tables S1 and S2 additionally show intercorrelations between all personality traits as well as between single TIPI items across participants. Table 2 presents all main and interaction effects observed in our study. With regard to the study hypothesis, we found no effect of alcohol on personality self-assessments.

Consistent with previous research on sex differences in personality (Weisberg et al., 2011), we found a significant difference between men and women in conscientiousness, $F = 7.67$, $p = .006$, $\eta^2 = 0.02$, and emotional stability, $F = 25.55$, $p < .001$, $\eta^2 = 0.07$; posthoc comparisons with Tukey corrections indicated that men reported being lower, on average, in conscientiousness than women did (M_{men}=4.76, 95% LCI = 4.54, UCI = 4.97 vs. M_{women}=5.19, 95% LCI = 4.97, UCI = 5.40), p_{tukey}=0.004 and higher in emotional stability than women did (M_{men}=4.55, 95% LCI = 4.32, UCI = 4.79 vs. M_{women}=3.69, 95% LCI = 3.45, UCI = 3.93), p_{tukey}<.001. We found no other significant main or interaction effects in the main analysis.

As mentioned above, we also performed an exploratory analysis focused on the self-assessed consumption of alcohol; all main and interaction effects are presented in Supplementary Table S3. The results of this analysis were mostly consistent with the actual alcohol consumption effects reported above. Self-assessed consumption of alcohol had no significant effects on the agreeableness, conscientiousness, emotional stability, or openness to experience reported by the participating men and women. However, we found that men who thought they consumed alcohol as a part of the experimental manipulation assessed their extraversion as lower than men who thought they had no alcohol ($M_{alcohol}$=4.75, 95% LCI = 5.12, UCI = 5.69 vs. $M_{noalcohol}$=5.41, 95% LCI = 5.12, UCI = 5.69), p_{tukey}=.018.

Discussion

We hypothesized that intoxicated participants would see themselves more positively than non-intoxicated individuals. We tested this hypothesis using a design devised to address the shortcomings of the previous work on this topic. Specifically, we used a well-established personality scale (Gosling et al., 2003), a well-powered sample size, and sufficient time (51 min.) for alcohol to influence the participants. Finally, we included both control and placebo conditions. Our analysis yielded no significant effects of the experimental manipulation on self-assessments of personality.

Alcohol influences individuals' cognitive functioning and emotional states (Heath & Hardy-Vallée, 2015), so why did it not affect self-assessments of personality, which are theoretically linked to cognitive and emotional processes? The lack of changes in self-assessments points to the overall

Table 1 Descriptive statistics of personality traits for three study groups

Personality trait	Control $n = 109$		Placebo $n = 114$		Experimental $n = 106$	
	M (*SD*)	Min/Max	*M* (*SD*)	Min/Max	*M* (*SD*)	Min/Max
Extraversion	5.26 (1.34)	1.00/7.00	5.33 (1.34)	1.50/7.00	5.04 (1.58)	1.00/7.00
Agreeableness	5.29 (1.17)	1.50/7.00	5.10 (1.20)	1.00/6.50	5.22 (1.24)	1.00/7.00
Conscientiousness	5.13 (1.41)	1.50/7.00	5.04 (1.29)	2.00/7.00	4.74 (1.55)	1.50/7.00
Emotional Stability	4.10 (1.58)	1.00/7.00	3.93 (1.59)	1.00/7.00	4.34 (1.66)	1.00/7.00
Openness to Experience	4.84 (1.23)	1.00/7.00	5.10 (1.17)	1.50/7.00	4.92 (1.07)	2.50/7.00

Note. The numbers reflect the average responses for two items per one personality trait

Table 2 Main and interaction effects observed in the study

	Group effect		Sex effect		Sex*Group effect	
	F	η^2	*F*	η^2	*F*	η^2
Extraversion	1.29	0.01	1.37	0.01	1.76	0.01
Agreeableness	0.68	0.01	0.84	0.01	0.03	0.01
Conscientiousness	2.36	0.01	7.67*	0.02	0.74	0.01
Emotional Stability	1.95	0.01	25.55**	0.07	0.60	0.01
Openness to Experience	1.42	0.01	0.24	0.01	0.06	0.01

Note. ** $p < .001$, * $p = .006$

stability of personality traits noted in the introduction—people are accustomed to experiencing fluctuations in mood and fluctuations in personality-related behaviors (Fleeson, 2001; Fleeson, 2004), without those fluctuations changing self-assessments of one's core personality traits. So, even if alcohol changes peoples' emotions, thoughts, behaviors, and perceptions (Heath & Hardy-Vallée, 2015; Giancola et al., 2010), people may know themselves too well to change their fundamental assessments of their personalities after a drink or two.

Our study was subject to several limitations, which should be noted. First, we measured only the Big Five personality dimensions; it would also be worth measuring other constructs such as self-esteem or abilities, which could provide a broader perspective on the influence of alcohol on self-assessments. Second, it is possible that participants with certain personality traits took part in the study, introducing a selection bias (Ellenberg, 1994). Our invitation to study was public, so we could not control who exactly would answer it. One problematic point is that participants knew that this study required drinking alcohol, and we already know that personality traits are related to preferences for alcohol consumption (Hakulinen et al., 2015); so it is possible that our participants represented a limited range of personality scores (e.g., more open to experience) and were, therefore, less able to reveal certain effects (e.g., an increase in openness to experience scores). Third, participants in this study were not free to engage in a broad range of behaviors (e.g., chatting, dancing) that might have affected their self-assessments (Kirkpatrick & de Wit, 2013). Future research should seek to replicate these findings in a context with greater ecological validity (e.g., a bar). Fourth, the TIPI had poor internal consistency. However, researchers have argued that internal consistency is a misleading measure of reliability in instruments designed to measure very broad domains with only two items per dimension and using items at both the positive and negative poles (Kline, 2000; Woods & Hampson, 2005). For this reason, test-retest reliability may be a more appropriate measure of reliability for very brief measures like the TIPI; past research has demonstrated that the TIPI achieves acceptable levels of test-retest reliability (e.g., Akhtar, 2018; Chiorri et al., 2015; Gosling et al., 2003; Klimanska & Haletska, 2019; Renau et al., 2013; Sorokowska et al., 2014). Nonetheless, future studies could use longer measures of personality. Fifth, not all the participants in the placebo condition believed they were given alcohol. In practice, it is difficult to convince people that they are drunk if they are not because the experience of alcohol intoxication is quite common, and many challenges with using a placebo in alcohol studies have been identified (Bodnár et al., 2020). However, in our study, participants were asked to guess which condition they had been in only after debriefing, and this guessing task itself may have inflated the estimates of how many people knew they were in the placebo condition. Sixth, we did not use a within-subject design, comparing the same person's scores twice (when sober and drunk). Future studies could use this design to shed more light on the effects of alcohol on self-reported personality. Finally, our results may not generalize to all cultures or samples (Simons et al., 2017).

Our findings also potentially touch on the broader question of why there has been so little previous research on this topic. A Google Scholar search for "effects of alcohol" yielded over 3.5 million results. In light of the enormous literature on the effects of alcohol, we were surprised to find only one previous study on the effects of self-assessments. Our null findings point to one possible reason—in light of the field's former reluctance to publish null findings (Aczel et al., 2018; Fanelli, 2010; Franco et al., 2014; Szucs & Ioannidis, 2017), our findings raise the possibility that alcohol does not affect self-assessments of personality and that many unpublished findings supporting this fact are sitting in researchers' file drawers. Clearly, and as many other scholars have noted (Button et al., 2016; Ferguson & Heene, 2012; Giner-Sorolla, 2012; Hartgerink et al., 2017; Munafò et al., 2017), progress in the field rests not just on finding differences where they are expected, but also in documenting their absence. Here, we documented that self-assessments of personality were unaffected by intoxication in a laboratory experiment.

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Author contributions All authors contributed to the study conceptualization and writing. MPC and PB contributed to data collection and data preparation. MPC and AS analyzed the data.

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Data availability The dataset generated during the current study is available in the Open Science Framework repository, https://osf.io/t8wkm/?view_only=None.

Declarations

The questionnaire and methodology for this study were approved by the Human Research Ethics committee of the University of University of Silesia in Katowice (Ethics approval number: KEUS.26/04.2020). Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors declare no conflict of interest.

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