

Summary

This report concerns the validation of an aggression test battery, which could be used in future research into alcohol thresholds in the association between alcohol use and aggression. This report was sponsored by the Research and Documentation Centre (WODC). The study was conducted from September 2017 until October 2018. On the first of January 2017 a new law regarding substance use in violent offenders came into force in the Netherlands. This new law gives the police the authority to obtain an alcohol/drug- test if there is a suspicion of a violent act under the influence of substances. The aim of this new law is to improve the approach towards alcohol and drug induced violence, to reduce violence and to increase the safety in public places and households. The main goal of this current study was to investigate the validity of a test battery that will be suitable to use in research on threshold values of alcohol in alcohol-induced aggression.

For the present study, 52 males from the community were recruited. The participants were randomly allocated to a group that received alcohol (the alcohol group) or a group that received a non-alcoholic drink (placebo group). We tested these two groups with an aggression test battery on two moments, to determine the test-retest reliability. The test battery included two tasks; an *aggression task*, the Point Subtraction Aggression Paradigm (PSAP; Cherek, 1992), that measures the tendency to aggressive behavior and an *attention task*, the Dot-Probe task, a task that measures the attention towards angry faces (attention bias).

The participants also completed six self-report questionnaires that covered impulsivity (Barratt Impulsiveness Scale; BIS-11), reactive and proactive aggression (Reactive and Proactive Aggression Questionnaire; RPQ), tendency towards angry behavior (State-Strait Anger Expression Inventory; STAXI-2), sensation seeking (Brief Sensation Seeking Scale; BSSS), dispositional empathy (Interpersonal Reactivity Index; IRI) and the consideration of future behavior (Consideration of Future Consequences; CFC).

The alcohol percentage in the body was measured using the Blood-Alcohol Concentration (BAC) and was determined with a breathing device (. Hormonal values were collected using cotton swabs. The BAC and hormonal values were obtained at four moments in the session; during baseline (T0), just before the first task (PSAP) started (T1), after the first task had ended (T2) and after the second task (Dot-Probe) ended (T3). To test for the

neurophysiological effects (i.e., the N2pc component of the EEG) of alcohol on aggression, a measurement of Electro-encephalography (EEG) was collected.

Expectations

Based on the literature, we expected that participants under the influence of alcohol would react more aggressively during the aggression task. We also expected, based on the alcoholmyopia-hypothesis (Quigley and Leonard, 2006), that participants under the influence of alcohol would pay more attention to an angry opponent in the attention task if that opponent had led to frustration in the aggression task. This would be reflected in a faster response time and better accuracy on the test. In terms of brain processes, we expected a larger N2pc amplitude in response to an angry opponent who raised frustration. Together, these expected outcomes would show that people under the influence of alcohol would have more aggression and therefore a greater attention bias for angry faces.

Reliability and validity of the tests

To determine if the outcome measures of the aggression task (the aggressive responses) and the attention task (reaction-time, accuracy and N2pc) are reliable (“is the task reliable and precise”), analysis of reliability was assessed on the outcomes of Day 1 and Day 2. The aggression task (PSAP) appeared to have an acceptable test-retest reliability, nevertheless was this effect only present in the alcohol group. Unfortunately, the attention task (Dot-Probe) had insufficient test-retest reliability in the present study.

To determine the validity (“does the task measure what it claims to measure”), the outcome measures were related to relevant outcomes on the two tasks, hormonal values and self-report questionnaires. In contrast to what we expected, the results in the alcohol condition showed a significant negative correlation between the ratio of Testosterone/ Cortisol (T/C ratio) and the responsivity during the experiment, measured in ‘the area under the curve’ (AUC) and accuracy on the attention task. This means that participants with higher testosterone values relative to cortisol values responded less accurate on the attention task and thus seemed to have less attention towards the angry face. In the placebo group there was a significant positive correlation between sensation seeking and aggressive responses. Which means in this case that individuals who have a low score on sensation seeking showed more aggression. This outcome was also not what we expected. Furthermore, a positive relation was found between empathy and accuracy on the attention task. Meaning that individuals with a higher score on empathic abilities

showed increased attention towards the opponent with the angry facial expression.

In addition, a significant negative relation was found between impulsivity and the N2pc, meaning that individuals with a higher scores on impulsivity showed more attention towards the opponent with the angry facial expression.

We had expected that people who received alcohol would react more aggressively during the aggression task and would pay more attention to the angry face during the attention task. Contrary to our expectations, we could not find a difference between the alcohol group and the placebo group on the aggression task (PSAP) and the attention task (Dot-Probe).

Recommendation and future research

The current study showed that the aggression task (PSAP) is a reliable instrument to test individuals under the influence of alcohol. However, adequate validity of the PSAP task could not be shown in the present study. In contrary, the dot-probe task was found not to be reliable as a measure for aggression in this population, and its validity is found to be very poor. Because the attention task is not reliable, we cannot recommend this as a measurement for practical use. The PSAP seems reliable and valuable enough to investigate further in order to investigate and improve its validity. Based on a literature search, there is no alternative measure available at this moment. This research shows that the PSAP shows more ecological validity than other instruments that are often used, such as the Taylor Aggression Paradigm (TAP). Additionally, previous studies have shown that the TAP is not so reliable when used repeatedly (i.e. test-retest reliability).

For future research into threshold values in alcohol-induced aggression, researchers could use the aggression task (PSAP), because the task gives reliable results, and furthermore previous research showed the task is valid. Even though this current research and previous research shows that there is no relationship between self-reported aggression and the aggression task, the task does seem to provoke and frustrate participants.

In addition, it is relevant for future research to keep in mind the low and diverse BAC values of the participants after drinking the alcoholic beverage. Even though the calculations – based on bodyweight- should result in a BAC of 0.8, large individual differences emerged between the participants. Nevertheless, almost all participants reported they clearly felt being under the influence of alcohol (“tipsy” or “intoxicated”). For future references it is of importance

how to manipulate BAC values, to correctly indicate the differences in the BAC threshold values.

As an alternative to experimental research, one could also think of using case based epidemiological research to elucidate the factors involved in alcohol induced aggression.