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How to think about your drink: Action-identification and the relation between mindfulness and dyscontrolled drinking

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HIGHLIGHTS

- Previous findings indicate a relation between mindfulness and control of alcohol use.
- We examined whether action identification (AI) of alcohol use explains this relation.
- Results showed that more mindful individuals reported greater control of alcohol.
- Mindful individuals reported less high-level AI (instrumental drinking).
- High-level AI partly mediated the relation between mindfulness and alcohol control.

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ABSTRACT

Cross-sectional and intervention research have shown that mindfulness is inversely associated with difficulties in controlling alcohol use. However, little is known regarding the mechanisms through which mindfulness is related to increased control over drinking. One potential mechanism consists of the way individuals represent their drinking behaviour. Action identification theory proposes that self-control of behaviour is improved by shifting from high-level representations regarding the meaning of a behaviour to lower-level representations regarding “how-to” aspects of a behaviour. Because mindfulness involves present-moment awareness, it may help to facilitate such shifts. We hypothesized that an inverse relation between mindfulness and dyscontrolled drinking would be partially accounted for by the way individuals mentally represent their drinking behaviour – i.e., reduced levels of high-level action identification and increased levels of low-level action identification. One hundred and twenty five undergraduate psychology students completed self-report measures of mindful awareness, action identification of alcohol use, and difficulty in controlling alcohol use. Results supported the hypothesis that high-level action identification partially mediates the relation between mindfulness and dyscontrolled drinking but did not support a mediating role for low-level action identification. These results suggest that mindfulness can improve self-control of alcohol by changing the way we think about our drinking behaviour.

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1. Introduction

A central element of alcohol and drug addiction is difficulty in restraining use (de Wit, 2008; Widiger & Smith, 1994). As might be expected, difficulties in the self-control of drinking behaviour are related with consumption and alcohol-related problems (Connor, George, Gullo, Kelly, & Young, 2011). These problems include a variety of diseases and increased likelihood of engaging in violent behaviour and being involved in car accidents (National Institute of Alcohol Abuse and Alcoholism, 2012; Rehm et al., 2009). Such difficulties in controlling

drinking are prevalent, as demonstrated by more than 17 million adults and nearly 1 million adolescents being diagnosed with an alcohol use disorder (AUD) in the US in 2012 (National Institute on Alcohol Abuse and Alcoholism, 2012).

Given the considerable social and economic costs of hazardous and harmful drinking, there is a need to develop innovative treatment strategies to augment the modest effects of current interventions (Magill & Ray, 2009). Mindfulness training represents one possibility for improving the treatment of AUD. Mindfulness has been defined as an awareness of present moment experience and having a nonjudgmental and accepting attitude toward that experience (Bishop et al., 2004). The awareness element involves paying attention to present-moment experience (behaviours or sensations) in contrast to mental representations regarding the past or the future. The accepting attitude element

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involves giving up an emotion regulation agenda (i.e., to increase positive or decrease negative emotion) and instead involves just allowing experiences (emotions, thoughts, impulses) to come and go on their own.

Initial research suggests that mindfulness based treatments may hold promise as an intervention for addictive behaviours. For example, a pilot study found that meditation training led to a significant decrease in alcohol consumption during the eight weeks of training (Zgierska et al., 2008). Recent research has shown that compared to both cognitive-behavioural relapse prevention and treatment as usual, mindfulness-based relapse prevention participants demonstrated less alcohol consumption at a 12-month follow-up (Bowen et al., 2014). The benefits of mindfulness training have also been shown for other addictive behaviours, such as nicotine and other drug use (Bowen et al., 2014; Brewer et al., 2011; Gifford et al., 2004).

The potential importance of mindfulness in alcohol-related self-control has been further supported by research on individual differences (Fernandez, Wood, Stein, & Rossi, 2010; Karyadi & Cyders, 2015). This work has elucidated the role of different facets of mindfulness. For example, one widely-used mindfulness measure assesses five facets, including *acting with awareness* (being present in the moment and conscious of one's action), *describing* (ability to verbalize internal experiences), *observing* (extent to which the individual attends to internal and external experiences), *nonjudging of inner experiences* (accepting sensations and experiences without evaluating them as positive or negative), and *nonreactivity toward inner experiences* (letting thoughts and emotions come and go instead of getting involved with them; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Mindful awareness appears to be particularly important in alcohol use, as previous research has found that the acting with awareness facet predicts variance of alcohol use unique from the other mindfulness facets (Karyadi & Cyders, 2015; Fernandez et al., 2010) and that it is the best predictor of dyscontrolled drinking as indicated by current and past AUD (Levin, Dalrymple, & Zimmerman, 2014).

Although the intervention and cross-sectional research reviewed above suggests a role for mindful awareness in reducing dyscontrolled drinking, little is known about the processes through which mindfulness enhances control over alcohol. One possible mechanism consists of the abstractness with which behaviour is represented in the mind. Action identification theory proposes that any action can be represented at different levels of abstractness, such as low-level, concrete muscle movements and at higher-levels, such as means of obtaining a goal or fulfilling a value (Vallacher & Wegner, 1987). For example, playing a musical instrument can be represented with low-level act identities (e.g., *moving fingers on the string*) and with high-level act identities (e.g., *being a musician*). Similarly, drinking alcohol can be represented with low-level (e.g., *swallowing liquid*) and high-level (e.g., *relieving tension*) act identities. The theory proposes that when a behaviour is unfamiliar, low-level representations will predominate and that continued practice automatizes the behaviour as habit, allowing for the development of high-level act identities. It is important to note that low-level and high-level representations do not reflect a bipolar scale of act identities. An individual can have both types of representations available, as is demonstrated by positive correlations between low and high-level act identity scales (Wegner, Vallacher, & Dizadji, 1989).

Action identification theory further proposes that the availability of both low-level and high-level act identities can benefit the self-regulation of behaviour (Vallacher & Wegner, 1987). High-level representations may be beneficial in facilitating the individual to transcend the immediate situation in the service of longer-term objectives, such as enhancing motivation for daily guitar practice by thinking of oneself as a musician (Trope & Liberman, 2010). In a somewhat analogous fashion, motivational interventions aim to enhance motivation to refrain from substance use by relating consumption with values and long-term goals (e.g., *heavy drinking impedes being a good parent*; Miller & Rollnick, 1991).

At other times, high-level action identification may impede self-control. One reason is that high-level act identities represent behaviour that is motivated (e.g., drinking to achieve a desired emotional state) and habitual (e.g., automatic approach responses to alcohol cues). Previous research has shown that alcohol dyscontrol and alcohol-related problems are related with the extent to which mental representations of alcohol-related appetitive responses have become automatized (Field, Kiernan, Eastwood, & Child, 2008; Ostafin, Kassman, de Jong, & van Hemel-Ruiter, 2014; Palfai & Ostafin, 2003). Related to the habit element, high-level act identities do not, compared to low-level act identities, allow breaking the action down into the components that are involved in the execution of the action (e.g., restricting alcohol intake can be facilitated by bringing the representation of the behaviour down from *relieving tension* to *swallowing liquid*). Being aware of the components of an action allows for more opportunities to monitor one's behaviour and to prevent unwanted actions (e.g. ordering another drink).

The role of action identification in the self-control of alcohol use has been shown in several studies. For example, compared to participants who consumed alcohol at more moderate levels, alcoholic inpatients reported both (a) greater scores on high-level action identification of alcohol behaviour (e.g., *feeling relaxed*) and (b) lower scores on low-level action identification (e.g., *lifting a glass*; Wegner et al., 1989). A more recent study extended these findings by examining level of action identification immediately following a single drinking episode rather than in regard to usual drinking behaviour (Palfai & Ostafin, 2010). In this study, hazardous drinkers completed self-report measures of typical alcohol consumption and dyscontrolled drinking behaviour. Participants then engaged in a taste test drinking task in which they rated the taste of three different glasses of beer, followed by an assessment of their action identification for their consumption during the taste test. Results showed a positive relation between trait difficulty in controlling typical alcohol use and high-level action identification of the taste test drinking behaviour. This relation remained when controlling for average alcohol consumption per week and amount consumed during the drinking task, thereby providing stronger evidence that this finding indicated an association between action identification and self-control rather than simply heavier use (i.e., it may be that some people drink heavily by choice rather than as a result of failed self-control).

Given that mindful awareness involves shifting awareness from abstract thinking (e.g., daydreaming; thinking about the past or future) to what one is actually doing in the present moment (Brown, Ryan, & Creswell, 2007), it should be inversely related to high-level action identification of alcohol use and positively related to low-level action identification. This idea is supported by findings that mindfulness predicts less high-level action identification in other disorders. For instance, research on the relationship of mindfulness and depression has found that mindfulness treatments help depressed people to replace abstract repetitive negative thinking (rumination) with a more concrete thinking style (Hawley et al., 2014; Ramel, Goldin, Carmona, & McQuaid, 2004). These findings are further supported with results showing an inverse relation between trait mindfulness and rumination (Evans & Segerstrom, 2011; Raes & Williams, 2010).

In sum, there is increasing evidence for an inverse relation between mindful awareness and dyscontrolled drinking. Action identification represents a possible mechanism for this relation, both because mindful awareness involves bringing attention from the abstract (future and past) to the concrete present and because such shifts seem to be involved in better self-control of alcohol behaviour. The current study was designed to examine this possibility. We hypothesized that an inverse relation between mindful awareness and dyscontrolled drinking would be partially accounted for by action identification of drinking behaviour. We expected that individuals high in trait mindfulness would experience less difficulty in controlling their alcohol use and that this would be partly explained by mindful individuals demonstrating less high-level action identification and more low-level action identification. These hypotheses

were examined with a sample of undergraduate participants who completed self-report measures of these constructs.

2. Method

2.1. Participants

One hundred twenty-eight undergraduate students volunteered to participate in a study on alcohol and attention as partial fulfillment of a class requirement. The data from three participants were not used in the analyses because of lack of fluency in English (reporting being “Not at all fluent” on a language fluency question), leaving a final sample of 125 ($M_{\text{age}} = 20.25$ years, $SD_{\text{age}} = 1.90$; 74 females). Participants reported drinking a mean of 11.65 ($SD = 10.02$) servings of alcohol per week over the previous month.

2.2. Measures

2.2.1. Drinking behaviour

Drinking behaviour was assessed with the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985). Participants recorded the number of drinks they consumed each day of a typical week over the previous month. This measure has demonstrated good convergent validity (Collins et al., 1985) and test–retest reliability (Collins, Carey, & Sliwinski, 2002).

2.2.2. Dyscontrolled alcohol use

Difficulty in controlling drinking behaviour was assessed with the Leeds Dependence Questionnaire (Raistrick et al., 1994). The Leeds assesses the incentive salience of alcohol and difficulty of controlling consumption with 10 items (e.g., “Is drinking alcohol more important than anything else you might do during the day?”; “Do you feel that your need for alcohol is too strong to control?”) using a Likert scale ranging from 0 (*Never*) to 3 (*Nearly always*). The Leeds showed good internal consistency ($\alpha = .76$).

2.2.3. Mindful awareness

Trait mindfulness was assessed with the Acting with awareness scale from the short form of the Five Facet Mindfulness Questionnaire (Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011). The scale consists of five items (e.g., “I find myself doing things without paying attention”; reverse-scored) and used a Likert scale ranging from 1 (*Never or very rarely true*) to 5 (*Very often or always true*). The scale demonstrated good internal consistency ($\alpha = .83$).

2.2.4. Action identification of alcohol behaviour

The availability of low- and high-level act identities for drinking was assessed with the scales developed by Wegner et al. (1989). Participants were asked to rate the degree to which the items described how they experience their alcohol consumption. All items were assessed with a Likert scale ranging from 1 (*Does not describe*) to 7 (*Describes very well*). The low-level action identification scale consisted of 9 items (e.g., “Lifting a glass”, “Experiencing a taste”) and showed good internal consistency ($\alpha = .88$). The high-level action identification scale was modified from Wegner et al. in two ways. First, we omitted the negative consequences items (e.g., “Causing damage to my health”) in order to focus on higher-order meaning representations regarding appetitive motivation (e.g., “Getting my mind off my problems”, “Getting myself energized”). Second, we omitted two items that were redundant (i.e., we kept “Relieving tension” but omitted “Relieving tension by drinking” and kept “Rewarding myself” but omitted “Rewarding myself by drinking”). The remaining 14 items showed good internal consistency ($\alpha = .91$).

2.3. Procedure

Participants completed assessment procedures in groups consisting of one to three participants seated in private workstations. After signing an informed consent form, participants completed a packet of measures that included demographics and the measures listed above.

3. Results

3.1. Correlation analyses

Bivariate correlation analyses showed that mindful awareness was inversely related both with high-level action identification of alcohol use and with difficulties controlling alcohol use as measured by the Leeds questionnaire (see Table 1).¹ Mindfulness was not related to typical amount of alcohol consumed per week. Contrary to our expectations, mindfulness was not related with low-level action identification. Similar to the findings of Palfai and Ostafin (2010), high-level, but not low-level, action identification was correlated with difficulty in controlling alcohol use and this relation remained significant when controlling for typical amount of alcohol consumed, $pr(122) = .473$, $p < .001$.

3.2. Mediation analyses

Given the nonsignificant relation between mindful awareness and low-level action identification, only high-level action identification was examined as a potential mediator. The hypothesis that high-level action identification would partially mediate the relation between mindful awareness and dyscontrol over drinking was tested using the PROCESS macro for SPSS (Hayes, 2013), in which dyscontrolled drinking was regressed on mindful awareness, with individual differences in high-level action identification entered as the proposed mediator. A bias-corrected bootstrap 95% confidence interval for the indirect effect ($= -.513$) based on 10,000 bootstrap samples did not include zero (-1.019 to $-.129$), indicating a model in which the relation between mindfulness and dyscontrolled drinking is partially accounted for by individual differences in high-level action identification of drinking behaviour. The total effect (i.e., direct and indirect effects) reduced from $B = -1.053$, $t = -2.955$, $p = .0037$ to a direct effect of $B = -0.540$, $t = -1.693$, $p = .093$. A regression analysis of dyscontrolled drinking on mindful awareness and high-level action identification showed that the model yielded an R^2 of .304.

A more direct examination of difficulty controlling alcohol use was examined by conducting the mediation analysis again while controlling for typical amount of alcohol consumed. The confidence interval for the indirect effect ($= -.396$) based on 10,000 bootstrap samples again did not include zero (-0.892 to -0.092). Fig. 1 illustrates that high-level action identification was related both to mindful awareness and alcohol dyscontrol and that the relation between mindfulness and alcohol dyscontrol was reduced when controlling for action identification and weekly alcohol consumption. A regression analysis of dyscontrolled drinking on mindful awareness, high-level action identification, and weekly alcohol use showed that the model yielded an R^2 of .385. In sum, these results are consistent with our hypothesis that mindful individuals are able to control their alcohol use, in part, because they are less likely to think about their drinking in terms of being instrumental to achieving emotion regulation goals.

4. Discussion

This study examined whether the abstractness with which individuals think about their drinking behaviour could partially account for

¹ The remaining scales of the FFM did not correlate with the high-level action identification variable (p 's $> .25$) or with the alcohol dyscontrol variable (with the exception of the observe scale, $r(125) = -.20$, $p = .02$; all other p 's $> .54$).

Table 1
Bivariate correlations among study variables (N = 125).

Variable	1	2	3	4
1. Mindful awareness	–			
2. High-AI	–.25**	–		
3. Low-AI	–.07	.40***	–	
4. Alcohol dyscontrol	–.26**	.54***	.10	–
5. Weekly alcohol use	–.05	.30***	–.07	.43***

Note. High-AI = high-level action identification scale; Low-AI = low-level action identification scale; Alcohol dyscontrol = Leeds Dependence Questionnaire; Weekly alcohol use = servings of alcohol consumed per week over previous month.

** $p < .01$.

*** $p < .001$.

findings that mindful individuals have less difficulty controlling their alcohol use (Levin et al., 2014). Action identification theory proposes that individuals may have both low-level and high-level act identities for a particular behaviour and that these representations influence self-regulation success (Vallacher & Wegner, 1987). Based on previous results that action identification is related to dyscontrolled alcohol consumption (Palfai & Ostafin, 2010; Wegner et al., 1989) and that mindfulness may help to reduce abstractness of representations (Hawley et al., 2014; Raes & Williams, 2010), we predicted that an inverse relation between mindfulness and alcohol dyscontrol would be partially mediated by (reduced) high-level action identification and (increased) low-level action identification of alcohol use. The results supported a mediating role for high-level, but not low-level, action identification. That is, part of the reason that mindful individuals are more in control of their alcohol consumption may be due to their being less likely to represent their drinking behaviour as means to achieve emotion regulation goals.

The current finding of a positive relation between high-level action identification and alcohol dyscontrol supports previous findings that representing drinking behaviour in regards to its meaning (i.e., its instrumental function) is related to difficulties in controlling drinking behaviour (Palfai & Ostafin, 2010; Wegner et al., 1989). This interpretation is strengthened by the finding that high-level action identification and alcohol dyscontrol remained significant when controlling for typical alcohol consumption. That is, given a particular level of alcohol consumption, more abstract representations of drinking behaviour predict failure to control one's alcohol use. It may be that self-regulation of alcohol consumption is, at times, facilitated by shifting from high-level representations regarding the meaning of a behaviour. However, high-level representations may also improve self-control (Trope & Liberman, 2010). As suggested in the introduction, motivation to persist in difficult tasks (e.g., learning to play the guitar; refraining from addictive behaviour) may be enhanced by representing that behaviour in terms of values and long-term goals (becoming a musician; being a good parent). It may thus be that self-control is enhanced by a combination of deactivating some high-level representations (e.g., related to short-term

emotion regulation goals) and activating other high-level representations (e.g., related to long-term emotion regulation goals).

The mediation findings suggest a model in which mindful individuals are better able to control their alcohol use because, in part, they are less likely to get caught in high-level action identities of their drinking behaviour. These findings further suggest that mindfulness interventions for improving control of drinking behaviour may benefit from elaborating instructions on enhancing a general awareness of behaviour in the present moment and perhaps awareness specifically of the behavioural elements of drinking behaviour. The importance of the awareness element of mindfulness is supported by the finding that the other mindfulness factors failed to predict high-level action identification or alcohol dyscontrol (see Footnote 1).

Contrary to our expectations, low-level action identification did not act as a mediator in the model and was in fact unrelated to both the mindful awareness and dyscontrolled drinking variables. Previous research on the relation between low-level action identification and dyscontrolled drinking have shown inconsistent results, with some positive (Wegner et al., 1989) and some negative (Palfai & Ostafin, 2010) findings. One possible reason for the inconsistency is that the current study and Palfai and Ostafin (2010) had a more restricted range of dyscontrolled drinking compared to Wegner et al., who included light drinking college students and inpatients at an alcohol treatment clinic. Alternatively, the low-level action identity scale as currently constructed may simply lack predictive validity for dyscontrolled drinking. As noted in the introduction, self-regulation may benefit from different levels of action identification depending on the context (e.g., motivating one's efforts to learn a new skill versus how to actually practice the skill). From this perspective, the role of low-level action identities of drinking may perhaps be made more clear by assessing not only the *tendency* to represent drinking at low-levels but also the *ability* to shift representations of drinking from high- to low-level representations.

Other results from this study contribute to the literature on mindfulness and alcohol use. For example, trait mindfulness and weekly alcohol consumption did not show a significant inverse relation. This is in line with some previous findings (Ostafin et al., 2013) but contrasts with studies showing that more mindful individuals drink less (Fernandez et al., 2010; Karyadi & Cyders, 2015). One possible reason for the discrepancy consists of restriction of range, as the studies showing significant effects had considerably larger sample sizes those showing a non-relation. Another potential reason is that mindfulness plays a more protective role in drinking behaviour when individuals want to restrain use (i.e., in situations of potential (dys)control) than when individuals are not motivated to restrain. In the former situation, mindfulness is proposed to facilitate self-regulation toward a restraint goal. In the latter situation, mindfulness could even show a positive relation with drinking due to a number of factors such as increased awareness of alcohol urges. That mindfulness is particularly important for dyscontrol is supported by the Fernandez et al. (2010) findings that mindfulness more strongly predicts alcohol-related problems than alcohol consumption per se.

Fig. 1. Model of the indirect effect of mindful awareness on alcohol dyscontrol through high-level action identification of drinking behaviour, controlling for average alcohol consumption. Coefficients represent unstandardized coefficients. ** $p < .01$. *** $p < .001$.

The study had several limitations. Importantly, the cross-sectional nature of the data prevents conclusions about the direction of the relations in the mediation analyses. In addition, although the findings suggest that action identification is part of the reason why mindful individuals are better able to control their drinking, the lack of an experimental design prevents making causal inferences regarding the proposed role of high-level action identification in dyscontrolled drinking behaviour. The results are better interpreted as initial findings that are consistent with the possibility of a causal/mediation role of high-level action identification. In order to examine this possibility, future research should use experimental designs to examine the effects of mindfulness training (and with addicted samples in order to determine the clinical relevance of the current findings). Such experimental designs would also address limitations involved in using self-reports of mindfulness. For example, given that Westerners may be relatively unfamiliar with the concept and experience of mindfulness, several authors have questioned the validity of self-report measures to assess mindfulness (Davidson, 2010; Grossman, 2008; Rosch, 2007). It would also be of interest to examine whether the effects of mindfulness training on alcohol dyscontrol are primarily mediated by high-level act identities that are related to the instrumental value of drinking (e.g., emotion regulation) or other types of high-level representations (e.g., alcohol as part of one's self-identity; Lindgren et al., 2013). Last, the self-report nature of alcohol dyscontrol used in this study represents another measurement limitation. Specifically, because the measure assessed perceived control, it is unclear whether the same pattern of findings would occur for more objective measures of dyscontrol. Although there is evidence that the Leeds Dependence Questionnaire is a valid measure of dyscontrol, including known-groups research (Raistrick et al., 1994) and the correlation between the Leeds and drinking behaviour in the current study (see Palfai & Ostafin, 2010 for similar findings), future research would benefit from using additional methods such as discrepancies between alcohol consumption intentions assessed pre-drinking and actual drinking behaviour.

In sum, the current study contributes to an understanding of the relation between mindfulness and addiction. Although initial research suggests that mindfulness interventions may help to bring addictive behaviour under control (Bowen et al., 2014; Brewer et al., 2011), little is known about the mechanisms of such benefits. The current findings suggest that paying attention to our behaviour may change the way we think about it, thereby purchasing an amount of control over our impulses.

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Contributors

The first author contributed to the writing of the manuscript. The second author contributed to the design of the study and to the writing of the manuscript. The third and fourth authors contributed to the manuscript.

Conflict of interest

No conflicted declared.

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