Resisting temptation: Alcohol specific self-efficacy mediates the impacts of compensatory health beliefs and behaviours on alcohol consumption

Title page

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Abstract

Excessive alcohol consumption can have detrimental consequences on health and although people are aware of the risks, this appears to have little influence on how much they drink. Compensatory health beliefs (CHBs), in which the consequences of unhealthy behaviour are considered to be neutralised by additional healthy behaviours, are one way of justifying poor health choices. Currently, the role of CHBs within the context of drinking behaviour is not well understood and there is less research on the role of compensatory health behaviours. This research examined associations between alcohol compensatory health beliefs (ACH-Beliefs) and behaviours (ACH-Behaviours), alcohol consumption and alcohol specific self-efficacy. Adults aged 18+ years were asked about alcohol consumption, and alcohol specific compensatory health beliefs and behaviours in an online survey completed by 249 respondents (63.1% female; *M* age = 41.62 years; *SD* = 14.80). Higher ACH-Beliefs were associated with greater ACH-Behaviours. While both were able to predict alcohol consumption, a greater proportion of variance was explained by ACH-Behaviours. Alcohol specific self-efficacy (ASE) was a significant mediator of those relationships; those with higher ASE may be better able to overcome motivational conflict and resist temptation. It is recommended that future research includes both compensatory health belief and behaviour measures within an experimental design, and investigates the role of other related cognitions such as compensatory behaviour intentions. Alcohol misuse interventions may wish to consider the potential roles of compensatory health beliefs and behaviours in facilitating maladaptive coping strategies, and how addressing these may reduce harms.

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Introduction

Alcohol misuse is estimated to result in 3.3 million deaths worldwide each year (World Health Organisation, 2015). Developing an understanding of factors influencing poor health choices, such as excessive alcohol consumption, may help to reduce the incidence of associated diseases and fatalities. UK government recommendations published in January 2016, suggest that although drinking less than 14 units of alcohol per week may be considered 'low-risk' there are no 'safe' drinking levels (Department of Health, 2016; NHS 2016a). However, despite having some knowledge of alcohol related health risks (Jones & Bellis, 2013) many find it difficult to regulate alcohol consumption. In England alone more than 10 million people drink more than recommended limits (NHS, 2016b). One way of justifying unhealthy choices is the creation of compensatory health beliefs (CHBs), in which the harmful effects of those choices are thought to be neutralised or reduced by additional health enhancing behaviours e.g. "I can eat a slice of cake now, because I will go to the gym this evening" (Knäuper, Rabiau, Cohen & Patriciu, 2004).

CHBs are thought to be part of a cognitive strategy that may be activated when people are tempted to indulge in an activity that they consider unhealthy (Rabiau, Knäuper & Miquelon, 2006). Desire for the temptation creates motivational conflict, which Rabiau et al. (2006) describe as the interaction between a short term affective state (desire) and long term motivational goals (better health). The CHBs model (see figure 1) suggests that there are three options for alleviating motivational conflict, including one behavioural and two cognitive strategies. In the behavioural strategy, the desire for the temptation is resisted. The first cognitive strategy is based on adaptation and adjustment, in which risks are perceived to

be minimal and healthy outcomes expected. The second cognitive strategy involves the generation of CHBs. Having activated the compensatory health belief, this leads to compensatory behaviour intentions and potentially, although not necessarily, the implementation of compensatory behaviour (Rabiau et al., 2006).

[Insert Figure 1]

Rabiau et al. (2006) did not expect compensatory behaviours to be implemented in most instances, but when they were performed, it was thought unlikely that these would fully negate the harm of the unhealthy behaviour. The generation of CHBs is thus generally considered to be a maladaptive cognitive strategy. Knäuper et al. (2004) found significant associations between higher CHB scores and more symptoms of illness, which supports the assumption that compensatory strategies lead to poor health.

Self-efficacy, the perception an individual has of their own ability and competence to successfully perform actions, plays an important role at two points in the CHBs model (Rabiau et al 2006). Individuals with high self-efficacy are thought to be more likely to resist their desires, but a certain degree of self-efficacy is also needed to generate CHBs i.e. people need to believe that compensatory behaviour is achievable.

There is some support for the claim that higher CHB scores are associated with low self-efficacy (Knäuper et al., 2004). Significant negative relationships between CHBs and self-efficacy measures have also been reported for chronic heart disease patients (Tăut & Băban, 2008), adolescent smokers (Radtke, Scholz, Keller, Knäuper & Hornung, 2011) and those choosing not to participate in employer sponsored flu vaccination programs (Ernsting, Schwarzer, Lippke & Schneider, 2012). However, no significant relationships have been found between self-efficacy and CHBs in studies examining influences on dieting (Radtke,

Kaklamanou, Scholz, Hornung & Armitage, 2014; Fleig et al., 2015) and physical activity (Berli, Loretini, Radtke, Hornung & Scholz, 2014; Fleig et al., 2015). The lack of significant associations between CHBs and self-efficacy seems curious, given the prominence of this construct in the CHBs model.

Increases in CHBs have also been linked to potentially detrimental behaviours and behavioural intentions across several health domains, including greater caloric intake among dieters (Kronick, Auerbach, Stich & Knäuper, 2011), poor nutritional style among chronic heart disease patients (Tăut & Băban, 2008), along with reductions in readiness to stop smoking (Radtke et al., 2011), intentions to stop smoking (Radtke, Scholz, Keller & Hornung, 2012), levels of physical activity (Fleig et al., 2015) and intentions to be physically active (Berli et al., 2014).

Current research concerning CHBS and alcohol consumption is limited. CHBs were found to be significantly positively associated with alcohol consumption by Kaklamanou and Armitage (2012) in a study testing the overall scales. Similarly, behaviours such as exercise and dietary restriction have been reported as strategies employed to compensate for calories consumed whilst drinking alcohol (Bryant, Darkes & Rahal, 2012). More recently, a study by Sleigh and Campbell Westmoreland (2014) found no association between alcohol consumption and CHBs, although this study employed a different approach to the measurement of compensatory beliefs. Participants were asked to "answer the following based on your own *beliefs and behaviours*", rather than "rate how closely the idea matches your own *belief*" (Knäuper et al., 2004). As the two measures were combined in one question, it is unknown whether participants' answers reflect compensatory beliefs, behaviours or both. Kaklamanou, Armitage and Jones (2013) highlighted issues concerning distinctions between beliefs and behaviours when measuring CHBs. Some participants in the study indicated that although they may not entirely believe certain behaviours to be

compensatory, they may still behave in a way that suggested they may hold such beliefs. An additional, and separate, measure of compensatory health behaviours, rated by frequency, was recommended for future research (Kaklamanou et al., 2013; Berli et al., 2014).

While CHB measures have been applied to many health behaviours such as diet (Kronick et al., 2011) and smoking (Radtke et al., 2011), to our knowledge there are no existing studies which employ alcohol specific measures. Thus we conducted the present study to explore the inclusion of both compensatory health belief and behaviour measures, with a specific focus on alcohol and the role of alcohol specific self-efficacy. The aims of the study were to (1) explore the relationship between alcohol specific compensatory beliefs (ACH-Beliefs) and alcohol specific compensatory health behaviours (ACH-Behaviours) and (2) investigate the extent to which ACH-Beliefs and ACH-Behaviours are related to alcohol consumption, and (3) examine the role of alcohol self-efficacy in relation to ACH-Beliefs, ACH-Behaviours and alcohol consumption.

Method

Participants and procedure

Adults (N = 249) aged 18-79 years (M = 41.62, SD = 14.80, 63.1% female, 27.3% male) were recruited through opportunistic and snowball sampling primarily through email and social media. Potential participants were supplied with background information about the study and provided consent by submitting their answers. Participants predominantly resided in the UK (85.5%) and were educated to degree level or above (77.5%).

Design

The study employed a cross-sectional survey, which was administered online using Qualtrics software and took approximately 15 minutes to complete. Participants were not asked for

their names and IP addresses were not collected to ensure anonymity of responses. The study was approved by XXX Research Ethics Committee (ref XXX).

Measures

Alcohol-specific compensatory health beliefs (ACH-Beliefs) were measured using alcohol items taken from the general scale developed by Knäuper et al. (2004), such as "the effects of regularly drinking alcohol can be made up for by eating healthy" and items from the original scale adapted for alcohol use such as "exercise can compensate for drinking alcohol". Participants were asked "How clearly does each of the following **match your own belief**?" With five response options of 'not at all', to 'very much', and a total score calculated (8 items, $\alpha = .787$).

Alcohol Specific Compensatory Health Behaviours (ACH-Behaviours), which employed the same items used for measuring ACH-Beliefs. As with ACH-Beliefs, items included those from the original scale such as "it is alright to drink a lot of alcohol as long as one drink lots of water to flush it" and items from the original scale adapted for alcohol use such as "the effects of drinking too much alcohol can be compensated for by extra sleep". The question was posed as follows: Regardless of how much these statement match your own beliefs, how **often** do you think you use these as a reason to do something which might be considered unhealthy? Response options were 'never', to 'frequently', and a total of the scores was calculated (8 items, $\alpha = .910$).

Alcohol consumption was measured using the screening tool AUDIT-C (Rubinksy, Dawson, Williams, Kivlahan & Bradley, 2013; 3 items, $\alpha = .714$).

Alcohol self-efficacy was measured using three items from Schwarzer and Renner's Health-Specific Self-Efficacy Scales (2009), such as "I am certain that I can control myself to reduce my alcohol consumption". A 4-point scale was used which included 'not at all true', 'hardly true', 'moderately true' and 'exactly true measures', and a total score calculated (3 items, α = .823). Demographic measures included age, gender, country or UK regional location and level of educational attainment. Further details of items used to measure main study variables can be found in Appendix 1.

Analysis

Statistical analyses were conducted in SPSS version 22. Where participants had any missing data for any of the main measures they were excluded from those analyses, but retained elsewhere to avoid loss of data and their individual effort. Spearman correlations and Wilcoxon tests were used as some of the data were skewed. Data met the assumptions for regression analysis, which was employed at address aims 1 and 2. Aim 3 was tested using the PROCESS macro in SPSS (Hayes, 2012).

Results

Descriptive statistics

The mean AUDIT-C score was just below the level at which increasing or higher risk drinking (5+) is designated. A Wilcoxon signed-ranks test indicated that the mean of the ACH-Behaviours score was significantly higher than the mean of the ACH-Beliefs score (Z = -.272, p = .006, r = -0.18). Table 1 provides further details of the main study variables including correlations, means and standard deviations.

[Insert table 1]

Aim 1: *The relationship between ACH-Beliefs and ACH-Behaviours.*

A significant moderately strong positive relationship was found between ACH-Beliefs and ACH-Behaviours (see table 1). A simple regression indicated that 32.8% of variance in ACH-Behaviours was predicted by ACH-Beliefs ($R^2 = .328$, $F(1,230) = 111.677$, $p < .001$), suggesting that those with higher ACH-Beliefs scores are more likely to engage in ACH-Behaviours (see table 2).

[Insert table 2]

Aim 2: *The relationship between alcohol consumption and compensatory health measures.*

Hierarchical regression was performed, with ACH-Beliefs entered at step one, and ACH-Behaviours at step two. ACH-Beliefs predicted a small but significant proportion of the variance in AUDIT-C ($R^2 = .08$, $F(1,208) = 19.81$, $p < .001$). Adding ACH-Behaviours significantly increased the amount of variance explained by the model ($R^2 = .14$, $F(1,207) = 17.30$, $p < .001$). This suggested that engagement in ACH-Behaviours is able to predict alcohol consumption over and above ACH-Beliefs.

[Insert table 3]

Aim 3: *The role of alcohol self-efficacy in relation to ACH-Beliefs, ACH-Behaviours and alcohol consumption.*

ACH-Beliefs were significantly associated with ASE (path a), b = -.12, p<.001. Higher ACH-Beliefs were associated with lower ASE. ASE was significantly associated with AUDIT-C (path b), b = -.55, p<.001. Higher ASE was associated with lower AUDIT-C scores. The total effect (c path) of ACH-Beliefs on AUDIT-C was also significant, b = .18, p<.001. Higher ACH-Beliefs were associated with higher AUDIT-C scores. The direct effect (c' path) of ACH Beliefs on AUDIT-C was reduced by including ASE as a mediator, b = .11, p=.003, although the relationship remained significant. There was a significant indirect effect of ACH Beliefs on AUDIT-C through self-efficacy, b = .07, BCa CI [0.026, 0.122], with a small effect size b = .12, BCa CI [0.048, 0.205] (Figure 2). The Sobell test confirmed that there was significant mediation effect z = 3.35 , p <.001.

[Insert Figure 2]

ACH-Behaviours were significantly associated with ASE (path a), b = -.11, p<.001. Higher ACH-Behaviours were associated with lower ASE. ASE was significantly associated with AUDIT C (path b), b = -.54, p<.001. Higher ASE was associated with lower AUDIT-C scores. The total effect (c path) of ACH-Behaviours on AUDIT-C was also significant, b = .16, p<.001. Higher ACH-Behaviours were associated with higher AUDIT-C scores. The direct effect (c' path) of ACH-Behaviours on AUDIT-C was reduced by including ASE as a mediator, b = .097, p<.001, although the relationship remained significant. There was a significant indirect effect of ACH-Behaviours on AUDIT-C through ASE b = 0.062, BCa CI [0.032, 0.098] with a small effect size b = .14, BCa CI [0.082, 0.213] (Figure 3). The Sobell test confirmed that there was a significant mediation effect z = 4.00, p <.001.

[Insert Figure 3]

Discussion

Greater alcohol consumption was associated with higher levels of ACH-Beliefs and ACH-Behaviours, and lower levels of alcohol self-efficacy. ACH-Beliefs were found to be a significant positive predictor of ACH-Behaviours. Regression analysis showed that ACH-Behaviours were able to predict alcohol consumption over and above ACH-Beliefs. Alcohol specific self-efficacy had a mediating effect on the relationship between both ACH measures and alcohol consumption, with a stronger effect observed for ACH-Behaviours compared to ACH-Beliefs.

This study is thought to be one of the first to include separate measures of both compensatory health beliefs and compensatory health behaviours. Scores were positively and moderately strongly correlated, suggesting that ACH-Beliefs and ACH-Behaviours are similar but not the same constructs. ACH-Beliefs scores were significantly lower than mean ACH-Behaviour scores, and ACH-Behaviours were better able to predict alcohol consumption than ACH-Beliefs. These findings indicated that ACH-Behaviours sometimes, but not always, result from ACH-Beliefs, as suggested by the CHBs model (Rabiau et al. 2006). These results support findings from a study by Kaklamanou et al., (2013) in which participants indicated that whilst they may engage in compensatory behaviours, they may not entirely believe that these healthy behaviours compensate for the unhealthy ones.

A modest proportion of variance in alcohol consumption (as measured by AUDIT-C) was explained by a model based on ACH-Beliefs and ACH-Behaviours. ACH-Behaviours were able to account for a greater proportion of the variance in alcohol consumption than ACH-Beliefs. This supports previous findings by Kaklamanou and Armitage (2012) in which CHBs were significantly positively associated with alcohol consumption. The findings from this study conflict with results from research by Sleigh and Campbell Westmoreland (2014), in which alcohol consumption was not significantly related to the generation of CHBs. The

CHBs measure in Sleigh and Campbell Westmoreland (2014)'s research results from a question about combined beliefs and behaviours, and were not alcohol specific whereas the compensatory belief and behaviour results in the current study are based on separate measurements related to alcohol.

ASE mediated the relationship between ACH-Beliefs and alcohol consumption and ACH-Behaviours and alcohol consumption. These findings further highlight the important role of self-efficacy in the CHB model. Those with higher levels of ASE may be less vulnerable to the effects of ACH-Beliefs or ACH-Behaviours on their subsequent alcohol consumption. While they may still hold ACH-Beliefs, such as the belief that exercise can reduce the effects of alcohol, and engage in ACH-Behaviours, such as eating a healthy diet, their overall alcohol consumption may be lower. It may be that these individuals may have a healthier lifestyle overall, and that their reduced levels of drinking are connected to this healthy approach. However, the finding that ASE has a mediating effect could also be important for intervention development. Targeting ASE in heavier drinking individuals may lead to them adopting other strategies to resist motivational conflict, such as being more able to resist having an extra drink. This finding is in line with a recent meta-analysis showing that self-efficacy interventions can have important impacts on behaviour (Sheeran et al., 2016), and elaborates one of the mechanisms by which enhanced self-efficacy can have a protective effect on behaviour.

The research design has facilitated an initial exploration of relationships between ACH-Beliefs, ACH-Behaviours, ASE and alcohol consumption, but is not without limitations. Causal inferences based on cross sectional data may require confirmation through experimental or longitudinal research (Storm et al., 2016). For instance, it may beneficial to investigate whether differences in predictive validity and test-retest reliability of the alcohol-specific measures emerge over time. We also acknowledge that self-report measures of

alcohol consumption may be subject to social desirability bias, however, some studies suggest that self-report can accurately reflect objective measures (Simons, Wills, Emery, & Marks, 2015).

Future CHBs research in other behavioural domains may wish to consider including both a compensatory health beliefs and behaviours scale in order to facilitate comparisons between the two, and investigate whether similar findings occur when studying different types of behaviour.

Further research may also benefit from the addition of other cognitive measures referenced in the CHBs model such as compensatory behaviour intentions. Few studies have investigated the influence of CHBs on compensatory behaviour intentions, and how these intentions are related to compensatory behaviour. Studies by Kronick and Knäuper (2010) and Kronick et al. (2011) found that compensatory behaviour intentions were formed when dieters were tempted by high calorie snacks, and that generating CHBs and compensatory behaviour intentions predicted an increase in calorie intake. Apart from dieting studies though, no research on compensatory intentions has been conducted in other health domains, including alcohol consumption.

In conclusion, higher ACH-Beliefs scores were associated with higher ACH-Behaviours. While both were able to predict alcohol consumption, a greater proportion of variance was explained by ACH-Behaviours. ASE was a significant mediator of those relationships; those with higher ASE may be better able to overcome motivational conflict and resist temptation. Initiatives aimed at reducing alcohol-related harm may benefit from recognising and addressing the role of these compensatory constructs as maladaptive coping strategies and targeting self-efficacy to reduce their impact.

References

Berli, C., Loretini, P., Radtke, T., Hornung, R., & Scholz, U. (2014). Predicting physical activity in adolescents: The role of compensatory health beliefs within the Health Action Process Approach. *Psychology & Health, 29(4)*, 458-474.

Bryant, J. B., Darkes, J., & Rahal, C. (2012). College Students' Compensatory Eating and Behaviors in Response to Alcohol Consumption. *Journal of American College Health, 60(5)*, 350-356.

Department of Health, 2016. Alcohol Guidelines Review – Report from the Guidelines Development Group to the UK Chief Medical Officers. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/489797/CMO_Alcohol_Report.pdf.

Ernsting, A., Schwarzer, R., Lippke, S., & Schneider, M. (2012). 'I do not need a flu shot because I lead a healthy lifestyle': Compensatory health beliefs make vaccination less likely. *Journal of Health Psychology, 18(6)*, 825-836.

Fleig, L., Ngo, J., Roman, B., Ntzani, E., Satta, P., Warner, L. M., Schwarzer, R., & Brandi, M., L. (2015). Beyond single behaviour theory: Adding cross-behaviour cognitions to the health action process. *British Journal of Health Psychology, 20*, 824-841.

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling* [White paper]. Retrieved from http://www.afhayes.com/ public/process2012.pdf

Jones, L., & Bellis, M. A. (2013). *CMO Alcohol Guidelines Review: A summary of the evidence on understanding and response to public health guidelines.* Retrieved 23 November 2016 from http://www.cph.org.uk/wp-content/uploads/2016/01/LJMU_CMO-Alcohol-Guidelines-Behavioural-Review.pdf

Kaklamanou, D., & Armitage, C. J. (2012). Testing compensatory health beliefs in a UK population. *Psychology & Health, 27(9)*, 1062-1074.

Kaklamanou, D., Armitage, C. J., & Jones, C. R. (2013). A further look into compensatory health beliefs: A think aloud study. *British Journal of Health Psychology, 18*, 139-154.

Knäuper, B., Rabiau, M., Cohen, O., & Patriciu, N. (2004). Compensatory health beliefs: Scale development and psychometric properties. *Psychology & Health, 19(5)*, 607-624.

Kronick, I., Auerbach, R. P., Stich, C., & Knäuper, B. (2011). Compensatory beliefs and intentions contribute to the prediction of calorific intake in dieters. *Appetite, 57*, 435-438.

Kronick, I., & Knäuper, B. (2010). Temptations elicit compensatory intentions. *Appetite, 54*, 398-401.

NHS, 2016a. 'The risks of drinking too much'. Retrieved 20 July 2017 from http://www.nhs.uk/Livewell/alcohol/Pages/Effectsofalcohol.aspx

NHS, 2016b (revised from 2012). 'Social Drinking': the hidden risks. Retrieved 23 November 2016 from http://www.nhs.uk/Livewell/alcohol/Pages/Socialdrinking.aspx

Rabiau, M., Knäuper, B., & Miquelon, P. (2006). The eternal quest for optimal balance between maximizing pleasure and minimizing harm: The compensatory health beliefs model. *British Journal of Health Psychology, 11*, 139-153.

Radtke, T., Kaklamanou, D., Scholz, U., Hornung, R., & Armitage, C. J. (2014). Are diet-specific compensatory health beliefs predictive of dieting intentions and behaviour? *Appetite, 76*, 36-43.

Radtke, T., Scholz, U., Keller, R., Knäuper, B., & Hornung, R. (2011). Smoking-specific compensatory health beliefs and the readiness to stop smoking in adolescents. *British Journal of Health Psychology, 16*, 610-625.

Radtke, T., Scholz, U., Keller, R., & Hornung, R. (2012). Smoking is ok as long as I eat healthily: Compensatory Health Beliefs and their role for intentions and smoking within the Health Action Process Approach. *Psychology & Health, 27(2),* 91-107.

Rubinksy, A. D., Dawson, D. A., Williams, E. C., Kivlahan, D. R., & Bradley, K. A., (2013). AUDIT-C Score as a Scaled Marker of Mean Daily Drinking, Alcohol Use Disorder Severity, and Probability of Alcohol Dependence in a U.S. General Population Sample of Drinkers. *Alcoholism Clinical and Experimental Research, 37(8),* 1380-1390.

Schwarzer, R., & Renner, B. (2009). *Health-Specific Self-Efficacy Scales*. Retrieved 21 April 2016 from http://userpage.fu-berlin.de/~health/healself.pdf.

Sheeran, P., Maki, A., Montanaro, E., Avishai-Yitshak, A., Bryan, A., Klein, W. M. P., Miles, E. & Rothman, A. J. (2016). The Impact of Changing Attitudes, Norms, and Self-Efficacy on Health-Related Intentions and Behavior: A Meta-Analysis. *Health Psychology, 35(11)*, 1178-1188.

Sleigh, M. J., & Campbell Westmoreland, L. (2014). Relations among compensatory health beliefs, impulsivity, coping styles, and health perceptions. *Psi Chi Journal of Psychological Research, 19(3),* 108-118.

Simons, J. S., Wills, T. A., Emery, N. N., & Marks, R. M. (2015). Quantifying alcohol consumption: Self-report, transdermal assessment, and prediction of dependence symptoms. *Addictive Behaviors*, 50, 205-212. doi:http://dx.doi.org/10.1016/j.addbeh.2015.06.042

Storm, V., Reinwand, D., Wienert, J., Kuhlmann, T., De Vries, H., & Lippke, S. (2016). Brief report: Compensatory health beliefs are negatively associated with intentions for regular fruit and vegetable consumption when self-efficacy is low. *Journal of Health Psychology*, Published online before print January 28, 2016, doi: 10.1177/1359105315625358.

Tăut, D., & Băban, A. (2008). Examination of the relationship between self-regulation strategies and healthy eating patterns in coronary heart disease patients. The relevance of compensatory health beliefs. *Cognition, Brain, Behaviour, 12(2),* 219-231.

World Health Organisation (2015). *Alcohol Fact Sheet*. Retrieved 04 December 2015 from http://www.who.int/mediacentre/factsheets/fs349/en/

Tables and figures

Table 1. Spearman correlations, means and standard deviations for main study variables.

	1	2	3	Mean	SD
1. AUDIT-C				4.75	2.63
2. ACH-Beliefs	.30*			12.45	4.34
3. ACH-Behaviours	.45*	.59*		13.60	6.28
4. ASE	-.53*	-.25*	-.42*	10.03	2.22

Note: * $p < .01$

Table 2. Results of regression model predicting ACH-Behaviours from ACH-Beliefs.

Variable	Unstandardised coefficients (B)	Standard Error (B)	Standardised Coefficients (β)	t	*p value*
Constant	3.320	1.033		3.215	.001
ACH-Beliefs	.825	.078	.573	10.568	.000

Table 3. Results of hierarchical regression model predicting AUDIT-C from ACH-Beliefs and ACH-Behaviours.

	Unstandardised coefficients (B)	Standard Error (B)	Standardised Coefficients (β)	t	*p value*
Step 1					
Constant	2.515	.531		4.74	.000
ACH-Beliefs	.176	.040	.295	4.45	.000
Step 2					
Constant	2.145	.525		4.086	.000
ACH-Beliefs	.064	.049	.107	1.311	.191
ACH-Behaviours	.129	.035	.302	3.686	.000

Figures

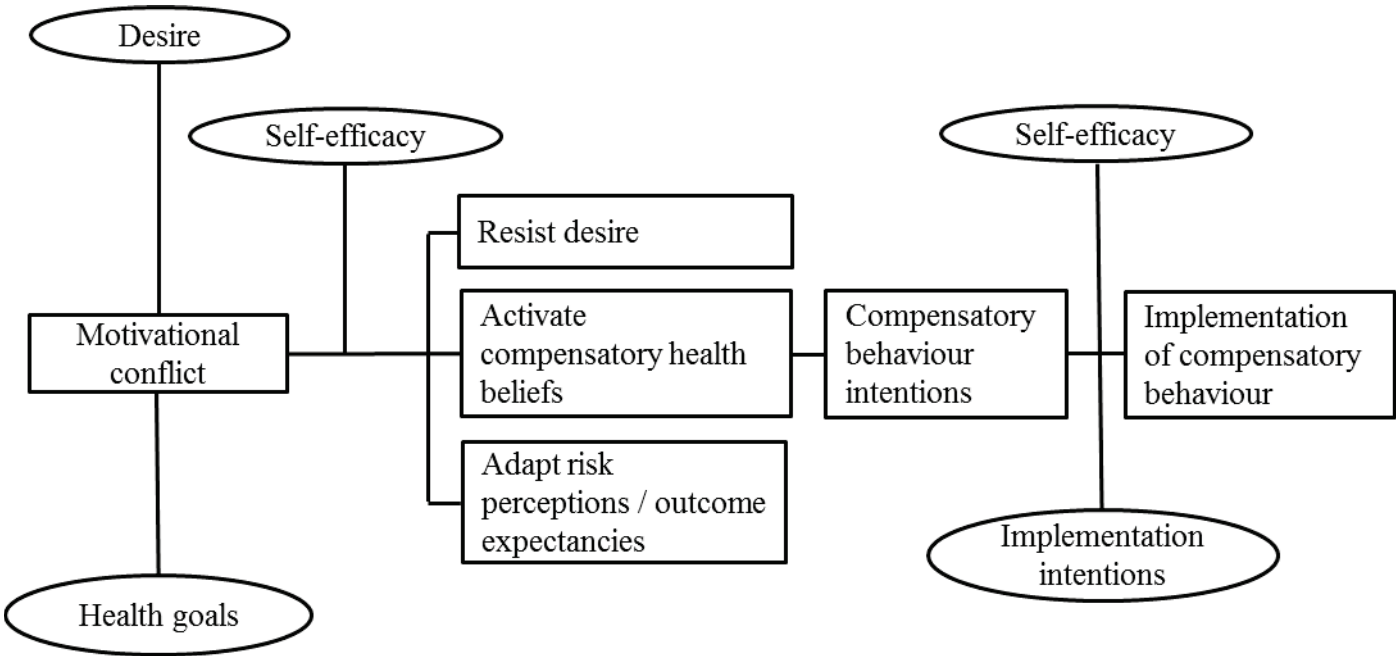

Figure 1: Compensatory Health Beliefs model (Rabiau, Knäuper & Miquelon, 2006).

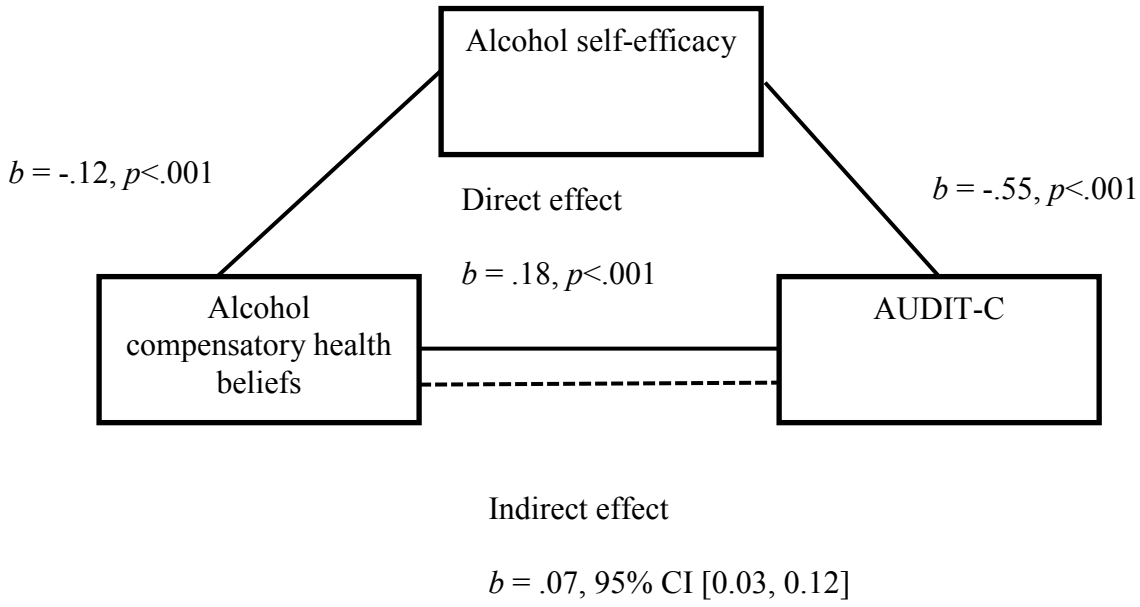

Figure 2: Mediation model of ACH-Beliefs as a predictor of AUDIT-C mediated by alcohol self-efficacy. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 1000 samples, $R^2 = .294$

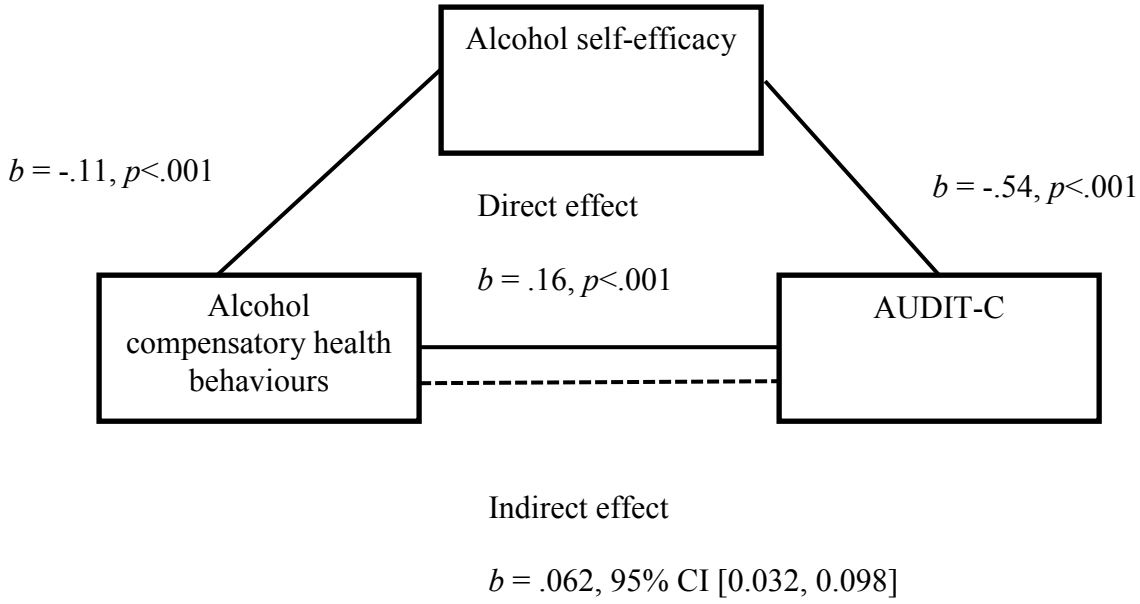

Figure 3: Mediation model of ACH-Behaviours as a predictor of AUDIT-C mediated by alcohol self-efficacy. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 1000 samples $R^2 = .32$

Appendices

Appendix 1. Items used to measure main study variables

Alcohol specific compensatory health beliefs (ACH-Beliefs).
Q: Different people believe different things about their health. Below is a list of beliefs that everyone may hold to some degree. Please read each statement carefully and rate how closely the idea matches your own belief. Since we all believe different things, there are no correct or incorrect choices. How clearly does each of the following match your own belief?
A: Not all / a little / somewhat / quite a bit / very much.

Calories consumed from drinking alcohol can be made up for by skipping a meal
The effects of regularly drinking alcohol can be made up for by healthy eating
It is alright to drink a lot of alcohol as long as one drinks lots of water to flush it
Drinking a lot from time to time is OK if one eats healthy
The effects of drinking alcohol can be balanced by drinking equal amounts of non-alcoholic drinks
The effects of drinking too much alcohol during the weekend can be made up for by not drinking during the week
Exercising can compensate for drinking alcohol
The effects of drinking too much alcohol can be compensated for by extra sleep

Alcohol specific compensatory health behaviours (ACH-Behaviours).
Q: Regardless of how much these statement match your own beliefs, how often do you think you use these as a reason to do something which might be considered unhealthy?
A: Never / rarely / sometimes / fairly often / frequently.

Calories consumed from drinking alcohol can be made up for by skipping a meal
The effects of regularly drinking alcohol can be made up for by healthy eating
It is alright to drink a lot of alcohol as long as one drinks lots of water to flush it
Drinking a lot from time to time is OK if one eats healthy
The effects of drinking alcohol can be balanced by drinking equal amounts of non-alcoholic drinks
The effects of drinking too much alcohol during the weekend can be made up for by not drinking during the week
Exercising can compensate for drinking alcohol
The effects of drinking too much alcohol can be compensated for by extra sleep

Alcohol self-efficacy.

Q: Thinking about how the statements below apply to you, how true would you say they are?
A: Not at all true / hardly true / moderately true / exactly true.

I am certain that I can control myself to reduce my alcohol consumption
I am certain that I can control myself to not drink any alcohol at all
I am certain that I can control myself to drink only on special occasions

AUDIT-C

How often do you have a drink containing alcohol?
How many units of alcohol do you drink on a typical day when you are drinking?
How often do you have six or more units (women) or eight or more units (men) on one occasion?