2

Psychological Theories of Alcohol Consumption

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Introduction

Psychological theories are a way of making sense of the world around us. They propose explanations for psychological phenomena such as why one person engages in heavy episodic drinking (HED; see Chap. 1), while another does not. Psychological theories of alcohol consumption, such as alcohol expectancy theory (Oei & Baldwin, 1994), the cognitive model of binge drinking (Oei & Morawska, 2004), and the incentive motivation model (Cox & Klinger, 1988), and theories of human motivation like the Theories of Reasoned Action (TRA; Ajzen & Fishbein, 1973) and Planned Behaviour (Ajzen, 1991) that have been used to predict consumption, all assume that we act after careful consideration of the pros and cons of an action. According to these theories, an individual's decision to drink alcohol (or not) is driven by *psychological* variables, their beliefs, expectancies, intentions, and motives about drinking alcohol, which are used to inform a careful consideration of the pros and cons of drinking behaviour. These theories all propose that psychological variables act as key determinants of drinking behaviour. The present chapter focuses on theories that characterise humans as rational actors, rather than dual process or implicit models, which attempt to account for

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R. Cooke et al. (eds.), *The Palgrave Handbook of Psychological Perspectives on Alcohol Consumption*, https://doi.org/10.1007/978-3-030-66941-6_2

unplanned or spontaneous behaviours (see Chap. 3 for a discussion of such models). The chapter begins by providing a brief outline of each theory before reviewing existing evidence that theories account for drinking behaviour. Next, the chapter compares and contrasts theories in terms of conceptual overlap and research evidence, before discussing methodological issues with research in this field. Finally, the chapter draws together the results of this discussion.

Alcohol Expectancy Theory

Alcohol Expectancy Theory (Oei & Baldwin, 1994) stems from Bandura's Social Learning Theory (Bandura, 1977) and proposes that we (i) learn about alcohol consumption by observing others (see Chaps. 15 and 16) and (ii) internalise expectancies (beliefs) about alcohol consumption. Two types of expectancies are referenced in alcohol expectancy theory: outcome expectancies (i.e., what we expect will happen when we drink alcohol—labelled Alcohol Expectancies) and efficacy expectancies (i.e., how confident we are that we can refuse alcohol—labelled Drinking Refusal Self-Efficacy).

Alcohol Expectancies seek to capture expectancies people hold about consumption; does an individual expect that drinking alcohol will make them happy or sad? Will it relax or impair them? Will it increase their attractiveness to members of the opposite sex? Alcohol expectancies reflect a range of different positive or negative outcomes that are expected to follow consumption. Scales used to assess alcohol expectancies, like the Alcohol Outcomes Expectancies Scale (Leigh & Stacy, 1993), contain several sub-scales: Social Positive; Fun; Sex; Tension Reduction; Social Negative; Cognitive; Emotional; Physical. Individuals who score high on alcohol expectancies sub-scales are assumed to drink more alcohol, showing a positive relationship between expectancies and consumption.

Drinking refusal self-efficacy aims to capture the extent to which an individual feels confident (i.e., high in self-efficacy) they can refuse the offer of an alcoholic drink (see Chap. 14 for more on this issue). Those who score high on drinking refusal self-efficacy are assumed to drink less alcohol, because they have refused drink offers, so, researchers expect to find a negative relationship between drinking refusal self-efficacy scores and consumption. Instruments such as the Drinking Refusal Self-Efficacy Questionnaire (Young & Oei, 1990) are used to tap the construct. Scale items can either be summed into an overall score or used as three sub-scales representing emotional relief

(e.g., 'when I am angry'), opportunistic drinking (e.g., 'when I am watching TV'), and social pressure (e.g., 'when my friends are drinking').

As noted by Cook et al. in Chap. 15, even young children report alcohol expectancies, based on observations of others' (e.g., their parents) drinking. This shows that alcohol expectancies can exist prior to experience of alcohol consumption. According to Oei and Morawska (2004), most research studies testing alcohol expectancy theory focused on alcohol expectancies as the main determinant of alcohol consumption, rather than testing both constructs as predictor variables, which makes it hard to evaluate claims for the theory; while researchers have continued to test the effects of alcohol expectancies and drinking refusal self-efficacy as predictors of consumption, reflection on the sufficiency of the theory is lacking. Reflection on alcohol expectancy theory did, however, inspire the creation of the cognitive model of binge drinking, described in the next section.

The Cognitive Model of Binge Drinking

The cognitive model of binge drinking (Oei & Morawska, 2004) is an application of Alcohol Expectancy Theory to predict a drinking pattern, binge drinking, which has been defined as consuming more than a threshold number of drinks, or volume of alcohol, during a single drinking episode (e.g., HED, see Chap. 1). Like Alcohol Expectancy Theory, the model comprises alcohol expectancies and drinking refusal self-efficacy. Where this model differs is that Oei and Morawska (2004) apply the theoretical underpinnings of Alcohol Expectancy Theory to address two key issues related to binge drinking.

First, the cognitive model of binge drinking has been used to underpin a drinking typology using scores from model variables (i.e., expectancies and refusal self-efficacy). At one extreme, non-drinkers are expected to possess both low alcohol expectancies (i.e., they do not expect alcohol consumption will lead to desirable outcomes) and high drinking refusal self-efficacy (i.e., they find it easy to refuse drinks; see Chap. 14 for more). At the other extreme, alcoholics are expected to hold both high alcohol expectancies (i.e., they expect alcohol consumption will lead to desirable outcomes) and low drinking refusal self-efficacy (i.e., they find it hard to refuse drinks). Between these extremes other drinker types—binge drinkers, social drinkers, and problematic drinkers—are located, with drinker types varying in terms of either their alcohol expectancies or their drinking refusal self-efficacy. For example, binge drinkers are argued to possess higher alcohol expectancies than social drinkers; they anticipate more desirable outcomes from drinking. However, both

binge and social drinkers are assumed to possess higher drinking refusal self-efficacy than problematic drinkers, who share binge drinkers' high expectancies about alcohol consumption but also possess low drinking refusal self-efficacy. Morawska and Oei (2005) provided evidence for this typology in a sample of Australian university students. They showed that binge drinkers reported more positive alcohol expectancies than social drinkers and that both drinker types reported similar drinking refusal self-efficacy scores that were higher than scores reported by problematic drinkers.

Second, the model has been used to predict alcohol consumption. For example, Oei and Jardim (2007) tested the predictive utility of the model for alcohol consumption among self-defined Asian Australian and white Australian university students. Separate regression analyses were conducted to predict consumption in these samples. For Asian students, the model accounted for 19% of the variance in consumption, with drinking refusal self-efficacy a significant predictor, but with no other significant effects; variation in drinking refusal self-efficacy may be all that matters when predicting drinking among Asian students. In contrast, the model accounted for 37% of the variance in consumption among white students with significant effects for both predictors. In addition, entry of the interaction term between the two predictors added 7% variance to the model and reduced alcohol expectancies to non-significance. Decomposing this interaction showed that when drinking refusal self-efficacy was high, there was no difference in consumption regardless of alcohol expectancies. However, when drinking refusal self-efficacy was low, individuals with positive expectancies drank more.

One interpretation of these results is that white students who are high in drinking refusal self-efficacy behave in the same way as Asian students do in that their alcohol expectancies do not predict their consumption. In contrast, alcohol expectancies predict consumption for white students low in drinking refusal self-efficacy. This study shows that drinking refusal self-efficacy was the most important predictor of alcohol consumption for both groups and that alcohol expectancies were only important for white university students *low* in drinking refusal self-efficacy.

Oei and Jardim noted that Asian students had significantly higher average drinking refusal self-efficacy scores than white students. Thus, it is possible that alcohol expectancies are unimportant in this sample because they *only* matter when drinking refusal self-efficacy is low, which was not the case in this sample of Asian students. This study suggests that there are cultural differences in alcohol expectancies, a proposal backed up by group comparisons which show that white students reported higher positive expectancies on

several sub-scales (confidence, sexual interest, tension reduction) compared to Asian students and that Asian students reported higher negative expectancies.

If Asian students score higher for negative expectancies, then they may focus more on drinking refusal self-efficacy rather when considering drinking. A paper by Oh and Kim (2014) tested the importance of drinking refusal self-efficacy in a sample of Korean university students. They used the three sub-scales of drinking refusal self-efficacy (Social Pressure, Opportunistic Drinking, Emotional Relief) to predict frequency and quantity of alcohol consumption. All three sub-scales were significant predictors of consumption, with models accounting for 39% of the variance in drinking frequency and 37% of the variance in drinking quantity. These results support Oei and Jardim's findings that drinking refusal self-efficacy predicts consumption in Asian students; however, because the authors did not measure alcohol expectancies, we cannot make any claims about the cognitive model of binge drinking.

Finally, a study by Newton, Barrett, Swaffield, and Teesson (2014) used a longitudinal design to provide a test of the effects of the model in a sample of Australian adolescents; follow-up data was collected on three occasions: 6 months later; 12 months later; 18 months later. Alcohol expectancies and drinking refusal self-efficacy both predicted consumption over time, with a one unit increase in alcohol expectancies being associated with a 51% increase in binge drinking, while a one unit increase in drinking refusal self-efficacy was associated with a 27% decrease in binge drinking over the study duration. Such results support the proposals of the cognitive model of binge drinking and using a longitudinal design increases confidence in findings. Findings are also interesting because they come from an adolescent sample who are experiencing a developmental trajectory for drinking, as discussed in Chaps. 16 and 17.

Augmenting the Cognitive Model of Binge Drinking with Other Variables

Other studies have sought to augment the cognitive model of binge drinking by measuring additional constructs, like measures of mental health. For example, Goldsmith, Thompson, Black, Tran, and Smith (2012) included a measure of generalised anxiety disorder alongside measures of drinking refusal self-efficacy and tension reduction alcohol expectancies in a model to predict consumption in a sample of US university students. This model accounted for 35% of the variance in consumption with main effects for all predictors and a significant three-way interaction.

Decomposing the interaction showed that at *high* levels of drinking refusal self-efficacy there was little difference in rates of alcohol consumption depending on the combination of generalised anxiety disorder and tension reduction alcohol expectancies. Conversely, when drinking refusal self-efficacy was *low*, individuals who also reported low anxiety scores showed the highest alcohol consumption, regardless of tension reduction expectancies; the combination of low ability to refuse a drink and low anxiety = high alcohol consumption. Among individuals with low drinking refusal self-efficacy who also had high anxiety scores, tension reduction expectancies helped to determine consumption; students who scored high on tension reduction expectancies (i.e., believing that alcohol consumption reduces tension) drank more alcohol than those who scored low. Indeed, students who scored low for all three variables reported the lowest levels of alcohol consumption. This study's results show that when drinking refusal self-efficacy is high, other factors do not predict consumption. When drinking refusal self-efficacy is low, other factors have a role to play in prediction, a result that mirrors what Oei and Jardim (2007) found.

Alternatively, Hasking, Boyes, and Mullan (2015) proposed a sequence of action where cognitive model constructs are consequent on other predictors; the sequence of action that leads to drinking alcohol begins with sensitivity to reward and sensitivity to punishment from Reinforcement Sensitivity Theory (Gray, 1970, see Chap. 5), which informs alcohol expectancies. These expectancies inform drinking refusal self-efficacy, which ultimately predicts drinking. Hasking et al. tested their model in a sample of drinkers (44% were university students) with a *cross-sectional* design, where alcohol consumption was measured using the Alcohol Use Disorders Identification Test (AUDIT; see Chap. 1). Fifty-two percent of the variance in AUDIT scores was accounted for by the model, providing support for the proposed sequence of action: sensitivity to reward had a positive relationship with alcohol expectancies (confidence) and sensitivity to punishment had a positive relationship with negative alcohol expectancies. Higher confidence was associated with lower social pressure drinking refusal self-efficacy, and more negative expectancies were linked to reduced belief in emotional relief drinking refusal self-efficacy. Both sub-scales negatively predicted consumption.

While this paper provides a useful example of how to integrate theories when predicting alcohol consumption, the use of a cross-sectional design undermines confidence in results (see Study Design Issues below) and could explain why the variance accounted for by this model is quite high. Further tests of this model using prospective designs are needed to increase confidence in this sequence of action.

A key issue with the cognitive model of binge drinking is that it is rarely referenced by researchers testing the model; a search of the Web of Science database yielded only two hits (Oei & Jardim, 2007; Oei & Morawska, 2004) and yet other papers discussed in the chapter have tested the model. Given the promising results found for drinking refusal self-efficacy as a predictor of consumption in general, and for alcohol expectancies among those with low self-efficacy, researchers need to reference the model more often when they use it. Two other methodological issues with the cognitive model are that (1) studies have used cross-sectional designs to test the cognitive model of binge drinking, which limit the conclusions one can draw about the model in predictive terms, and (2) researchers do not always use the same measures to assess constructs, with drinking refusal self-efficacy measured in a variety of ways, some of which lack construct validity. For example, Hasking et al. (2015) created their own measure rather than using a validated scale. It is challenging to advance knowledge if constructs are not measured consistently.

In some ways, the cognitive model of binge drinking remains overshadowed by the Alcohol Expectancy Theory literature it emerged from, which is a shame because results to date show that drinking refusal self-efficacy, rather than alcohol expectancies, is the better predictor of consumption. Overall, results suggest that constructs from the cognitive model of binge drinking can predict alcohol consumption but more research is needed to confirm the theoretical underpinnings of the model.

Incentive Motivation Model

Cox and Klinger's (1988) incentive motivation model proposes that humans are motivated to pursue positive incentives and avoid negative incentives. When applied to alcohol, Cox and Klinger state:

> [A] person's motivation to use alcohol is intertwined with his or her incentive motivation in this and other life areas and the affective change that results from that motivation. (p. 169)

The authors go on to note that affective change—a change in affect from its current state—occurs as a result of pursuing positive incentives or avoiding negative incentives. After acknowledging the pharmacological effects of alcohol on affective change, and noting there are situational drivers of alcohol consumption, including whether a person is alone or with other people, and if with other people, the degree to which they encourage or discourage

drinking, as well as the availability of alcohol in the immediate situation (see Sect. 2), this model focuses primarily on the motivational effects of alcohol consumption, with a particular emphasis on weighing up the positive affective outcomes one would anticipate following from drinking alcohol against the positive affective outcomes one would anticipate following from *not* drinking alcohol.

Overall, the incentive motivation model positions the individual as the main agent of their drinking behaviour, although the authors make the point that while they view drinking initiation as a conscious weighing of pros and cons, subsequent drinking might be driven by habitual or implicit processes (see Chaps. 3 and 22).

Alcohol researchers who have followed Cox and Klinger's theorising have tended to focus on two tenets of the model. First, outcomes sought from substance use can be done for internal (i.e., am I drinking because I want to) or external reasons (i.e., am I drinking in response to other people). Second, if drinking alcohol is perceived to lead to an 'approach positive' goal (i.e., feel more confident) or an 'avoid negative' goal (i.e., stop feeling stressed), then it is likely that alcohol consumption will follow; in both situations the incentive to drink outweighs the incentive to not drink. Alternatively, if drinking alcohol is perceived to lead to an 'approach negative' goal (i.e., feel sick) or an 'avoid positive' goal (i.e., act embarrassingly in front of a date), it is *unlikely* that alcohol consumption will follow; in both situations the incentive to not drink outweighs the incentive to drink.

Cooper (1994) proposed crossing these two dimensions to provide four motives for alcohol consumption: conformity (external, negative); coping (internal, negative); enhancement (internal, positive); and social (external, positive). She developed the Drinking Motives Questionnaire-Revised (DMQ-R) to measure these motives. The DMQ-R has been used to assess the predictive relationships between motives and alcohol consumption as well as being used to determine which motive is the most important driver of an individual's drinking.

A recent literature review by Cooper, Kuntsche, Levitt, Barber, and Wolf (2015) provides evidence that drinking motives are linked to both alcohol use and HED enhancement motives had, on average, a medium-sized correlation with consumption ($r = 0.49$) and a large-sized correlation with HED ($r = 0.51$); social motives had medium-sized relationships with consumption ($r = 0.42$) and HED ($r = 0.40$); coping motives had medium-sized links with consumption ($r = 0.30$) and HED ($r = 0.36$); and conformity motives had small-sized relationships with consumption ($r = 0.09$) and HED ($r = 0.15$). See Chap. 4 for more on the individual drinking motives.

Cooper et al. also reported that when the four motives were simultaneously regressed on consumption, the hierarchy of

enhancement > social > coping > conformity

was found. In contrast, when the same regression analysis was run for HED, coping motives were shown to be more important than social motives, suggesting that internal motives (enhancement and coping) are key predictors of HED. A key limitation with these analyses, however, is that most of the studies used cross-sectional designs, which means they were predicting consumption and HED that had already occurred.

Nevertheless, they do match results reported when prospective designs were used (Cooper, 1994; Cooper et al., 2008; Kuntsche & Cooper, 2010). Kuntsche and Cooper (2010) asked a sample of young adults, who had completed baseline measures of drinking and the DMQ-R, to respond to text messages sent at 1 pm on four consecutive Saturdays and Sundays. These messages asked them to indicate their consumption in the past 24 hours, to capture Friday night and Saturday night drinking, respectively. Kuntsche and Cooper found that after controlling for past drinking, gender, age, and weekend day (i.e., Friday vs. Saturday), enhancement motives significantly predicted alcohol consumption. In another study, Cooper et al. (2008) showed that coping and enhancement motives predicted alcohol consumption 15 years after they were measured in a sample of US adolescents aged 13–19 years. This is impressive evidence that internal motives for drinking are a stable guide to future alcohol consumption.

In sum, there is evidence that enhancement and coping motives predict consumption and HED. Such results imply that internal motives are more important drivers of consumption than external motives. The lack of evidence that conformity motives predict consumption undermines the model to a degree.

Having outlined theories of alcohol consumption, two theories of human motivation that have used to predict alcohol use—the Theories of Reasoned Action and Planned Behaviour—are considered.

The Theories of Reasoned Action and Planned Behaviour

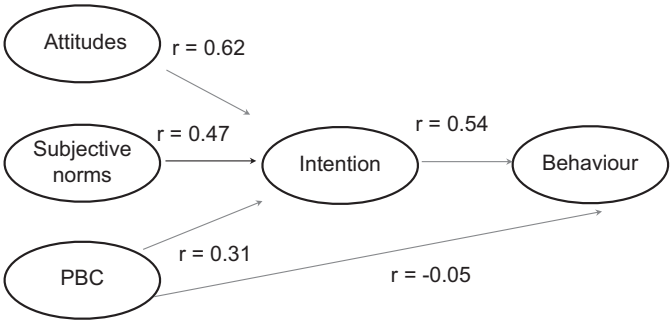
The Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1973) proposes that a person's intention to act is the most proximal predictor of their action. Intentions are assessed by asking individuals how strongly they agree with items like 'I intend to drink alcohol in the next week' on a Likert scale from

Strongly Disagree to Strongly Agree. Individuals who strongly agree with such items are assumed to be more likely to consume alcohol compared to individuals who strongly disagree. Intentions are based on two constructs: attitudes (i.e., positive or negative evaluations of behavioural performance) and subjective norms (i.e., perceptions of important others' approval or disapproval of behavioural performance). The TRA assumes that behavioural performance is mostly under one's control, an assumption that is especially problematic for alcohol consumption, where people admit to it being outside of their control at least on occasion (Norman, Bennett, & Lewis, 1998). Schlegel, DAvernas, Zanna, DeCourville, and Manske (1992) illustrated the importance of this issue by comparing prediction of alcohol consumption among problem and non-problem drinkers in a 12-year longitudinal study. They found that while intentions predicted alcohol consumption among both drinker types, a measure of *perceived behavioural control* over drinking also predicted consumption among problem drinkers.

Ajzen's (1991) Theory of Planned Behaviour (TPB) is an extension of the TRA with the main difference between the models being that the TPB includes an additional variable, perceived behavioural control, to account for the fact that many behaviours are not fully under an individual's control. This is important in applying the models to consumption as it is widely recognised that consumption is not always fully under one's control (see Sect. 2).

In the TPB, intentions are based on three constructs: attitudes, subjective norms, and perceived behavioural control (i.e., perceptions of control over behavioural performance). Ajzen conceptualised perceived behavioural control as a combination of two constructs: self-efficacy (i.e., one's confidence that they can perform a behaviour; Bandura, 1977) and perceived control (i.e., how much control over behavioural performance an individual has; Ajzen, 2002). Perceived behavioural control is also viewed as a predictor of behaviour to the extent that responses reflect *actual* control over behavioural performance; if perceptions are not accurate, then perceived behavioural control will not predict behaviour (Ajzen, 2002).

A meta-analysis published by Cooke, Dahdah, Norman, and French (2016) provides a statistical review of TPB relationships for alcohol studies (see Fig. 2.1). They included 40 studies that tested cross-sectional relationships between intentions, attitudes, subjective norms, and perceived behavioural control and 19 studies that prospectively tested consumption relationships with intentions and perceived behavioural control. Cooke et al. found a large-sized, sample-weighted, average correlation between attitudes and intentions ($r_+ = 0.62$) and a medium-sized, sample-weighted, average correlation between subjective norms and intentions ($r_+ = 0.47$). These results support Ajzen's



Note. Values are sample-weighted average correlations reported in Cooke et al. (2016)

Fig. 2.1 The theory of planned behaviour overlaid with sample weighted average correlations for relationships reported in Cooke et al.'s (2016) meta-analysis of alcohol studies

claim that attitudes and subjective norms are related to drinking intentions. There was also a large-sized sample-weighted average correlation between intentions and consumption ($r_+ = 0.54$), supporting the proposal that intentions predict alcohol consumption prospectively.

By contrast, results from Cooke et al.'s meta-analysis provide limited support for the pathways between perceived behavioural control and intentions. While there was a medium-sized, sample-weighted, average correlation between perceived behavioural control and intentions ($r_+ = 0.31$), inspection of the forest plot showed that several studies reported negative correlations—this means that higher intentions to drink alcohol were associated with *lower* perceived behavioural control. This pattern did not occur in equivalent forest plots for the attitude-intention and subjective norm-intention relationships and is not consistent with model tenets. In addition, the perceived behavioural control-consumption pathway was null and negative ($r_+ = -0.05$); because the confidence intervals included zero it is possible that the 'true' correlation between consumption and perceived behavioural control is zero. Several of the correlations were negative showing that *low* perceived behavioural control was related to *high* consumption, which while making intuitive sense, goes against the model's tenets.

Cooke et al. offered three explanations for the effects found for perceived behavioural control. First, they suggested that when completing measures, participants may overestimate how much control they actually have over consumption, leading to inaccurate responses. Second, participants may misinterpret what is meant by control when answering items; a think aloud study by French, Cooke, Mclean, Williams, and Sutton (2007) found that while

answering perceived behavioural control items, some participants discussed control over behaviour that follows drinking (i.e., running around naked, acting embarrassingly) rather than control over *drinking* itself. Misinterpreting items in this way is likely to generate inaccurate responses which attenuate the size of relationships. Finally, Cooke et al. suggested that some individuals might wish to attribute a lack of control over their behaviour; sub-group analyses showed that while perceived behavioural control had a negative relationship with studies that focused on 'getting drunk,' its relation with light drinking (i.e., low risk; see Chap. 1) was positive. This means that individuals appear happier to attribute being in control when thinking about low-risk drinking patterns, but don't want to admit to being in control (or acknowledge that they are not in control) over more harmful patterns of consumption.

Burgess, Cooke, and Davies's (2019) recent paper offers an alternative view on how control links to consumption. In this study, drinkers were asked to describe in their own words how they feel as they approach their 'tipping point' (i.e., the point at which they have drunk too much; see Chap. 1). Two common patterns were reported. The first pattern was of anxiety, fear, and worry about losing control and not wanting to reach the 'tipping point.' The second pattern consisted of generally positive feelings resulting from drinking, such as enjoyment and relaxation. These findings provide a further explanation for the negative perceived behavioural control-behaviour relationship reported in Cooke et al.'s meta-analysis. Perhaps participants recruited into studies where a negative perceived behavioural control-behaviour relationship was found either (1) maintained high levels of control by drinking low amounts of alcohol and/or (2) wanted to lose control and did so by drinking high amounts of alcohol (Norman et al., 1998). In both groups there is a negative relationship. Alternatively, because Burgess et al.'s data shows that people in a sample can drink to achieve opposing goals, this has the potential to reduce the size of the correlations between perceived behavioural control, intention, and consumption, because scores are averaged across the whole sample.

Due to concerns about the size of the perceived behavioural control relationships, Cooke et al. also reported results for studies which measured the sub-components: perceived control and self-efficacy, separately. These analyses show that self-efficacy had medium-sized relationships with intentions ($r_+ = 0.48$) and consumption ($r_+ = 0.41$), while perceived control had null relationships with both intentions ($r_+ = -0.10$) and consumption ($r_+ = -0.13$). It should be noted that there were only eight self-efficacy studies and five perceived control studies, so, caution should be used when interpreting these

effect sizes. Several limitations of Cooke et al.'s meta-analysis should be acknowledged. Most of the samples were drawn from university student populations and almost all included studies had majority female samples.

Notwithstanding these issues, this meta-analysis provides evidence to support several TPB pathways including those from attitudes, and subjective norms, to intentions and from intentions to consumption. In contrast, the perceived behavioural control pathways varied in both size and direction, with some studies reporting that no relationship exists. Overall, there is evidence to support the claim that the TPB can predict alcohol consumption and intentions. This section ends by providing some observations about the theories covered in depth.

Observations About Theories Covered in the Chapter

A systematic review of studies testing alcohol expectancy theory or the cognitive model of binge drinking would help clarify the evidence base for these theories, establish the extent to which drinking refusal self-efficacy predicts alcohol consumption, and the role of alcohol expectancies in predicting consumption. Given that alcohol expectancies rarely predict consumption when included alongside drinking refusal self-efficacy in regression models, consideration should be given to reframing the role of alcohol expectancies in these theories. One option would be to propose alcohol expectancies as a moderator of the relationship between drinking refusal self-efficacy and consumption. Evidence that alcohol expectancies moderates the relationship between drinking refusal self-efficacy and alcohol consumption has been shown in several studies (e.g., Goldsmith et al., 2012; Oei & Jardim, 2007).

Alternatively, consideration should also be given to Oei and Burrow's (2000) suggestion that drinking refusal-self-efficacy mediates the effects of alcohol expectancies on drinking. These authors made this claim after showing that entering alcohol expectancies *after* drinking refusal self-efficacy into a regression model indicated expectancies had no predictive effect on consumption. In contrast, entering expectancies *before* drinking refusal self-efficacy showed expectancies predicted consumption. Unfortunately, as this is not a formal test of mediation further tests are required. However, conducting such tests in future studies would be worthwhile because research shows that young children with no personal experience of drinking alcohol report alcohol expectancies based on their perceptions of older children and adults (see Chap. 15). Such expectancies may inform perceptions of drinking refusal self-efficacy, which are likely to develop at a later age because it relates to refusing a drink

and one has to be offered a drink to be able to demonstrate confidence in refusing it (see Chap. 14).

Considering the incentive motivation model, Cooper et al.'s (2015) review of the drinking motives literature found that enhancement motives were the strongest predictor of both alcohol consumption and HED and that conformity motives were the weakest predictor of both outcomes. Social motives predicted alcohol consumption better than HED and, vice versa, coping motives better predicted HED than consumption. Based on this evidence, it would seem that (i) enhancement motives should always be measured in alcohol studies as they have been repeatedly shown to predict alcohol consumption and HED, (ii) conformity motives should only be measured when there is a clear justification for doing so, such as to test the idea that conformity motives predict light drinking patterns (Cooper et al., 2015), and (iii) researchers should consider measuring social motives if they are interested in alcohol consumption and coping motives if the focus is on HED.

An additional point to make is to consider the factor structure of the four-factor model. Fernandes-Jesus et al. (2016) used confirmatory factor analysis to test the factor structure of the model and found that an 18-item version of the DMQ-R had better psychometric properties than the 20-item version. One of the two items that loaded sub-optimally in this study, the coping item 'Because you feel more self-confident and sure of yourself,' also had a low factor loading in the original paper by Cooper (1994) and a study conducted by Hauck-Filho, Teixeira, and Cooper (2012). Given that Kuntsche et al. have now developed and validated a short-form version of the DMQ-R that has 12 items, it appears that future studies are needed to confirm the psychometric properties of the original and new scales.

The biggest challenge to the TPB as a model to predict alcohol consumption is the lack of evidence for the path from perceived behaviour control to consumption. While an obvious option would be to return to using the TRA, as outlined earlier, research has shown that perceptions of control can predict alcohol consumption, with this relationship stronger for problem drinkers (Schlegel et al., 1992). An alternative approach would be to replace perceived behaviour control with self-efficacy; Cooke et al. (2016) found that self-efficacy had medium-sized relationships with both consumption and intentions, albeit based on data from only eight studies, so, including self-efficacy instead of perceived behavioural control would produce a TPB which is similar to the shibboleths of the theory but replaces a predictor variable that has an inconsistent relationship with consumption and intentions with one that appears to have a stronger relationship.

However, a potentially more useful approach would be to replace perceived behavioural control with drinking refusal self-efficacy; Foster, Dukes, and Sartor (2016) found that drinking refusal self-efficacy predicted consumption alongside intentions. Including drinking refusal self-efficacy has the potential to change the focus of TPB alcohol studies from seeing if the theory predicts alcohol consumption (i.e., the more one intends to drink, the more one should drink) to seeing if the theory predicts limiting or reducing consumption (i.e., the more one intends to *limit* one's drinking, the less they should drink; cf., Ajzen & Sheikh, 2013; Cooke, Sniehotta, & Schuz, 2007). Changing the focus from control or self-efficacy over drinking to control or self-efficacy over drink *refusal* may further encourage researchers to consider how the TPB could be used to inform interventions to reduce alcohol consumption (see Chap. 21) and would be a welcome example of theoretical integration.

A final point is that few studies have used longitudinal designs to test the predictive utility of the TPB as a model of alcohol consumption. This is in contrast to the other theories covered in this chapter. Given that much TPB research in this area is done with university samples there are challenges to using longitudinal designs, however, researchers are encouraged to employ these designs where possible to provide tests of prediction over longer timeframes. Now the theories have been considered individually, the next section compares and contrasts results across theories.

Conceptual Overlap in Psychological Theories of Alcohol Consumption

Several theories covered in this chapter include similar constructs. For example, alcohol expectancies are alcohol-specific outcome expectancies, which according to Ajzen, are one of the two beliefs that underpin attitudes. Similarly, drinking refusal self-efficacy is the opposite of self-efficacy that is sometimes measured in TPB alcohol studies (Norman & Conner, 2006). Inspection of the items used to assess alcohol expectancies and drinking motives shows that there is some overlap between items tapping positive alcohol expectancies and enhancement motives, but little overlap between negative alcohol expectancies and motive items. There is no obvious overlap between drinking motives and TPB constructs. Thus, drinking motives appear to be relatively independent of constructs in other theories.

Competition Between Theories to Predict Alcohol Consumption

One way to compare prediction of theories used to predict alcohol consumption is to examine results from studies that have measured variables from two or more theories. Doing so allows researchers to determine which variables remain significant predictors of consumption after accounting for the effects of variables from competitor theories. For example, Foster et al. (2016) reported the results of a study that compared prediction of consumption using alcohol expectancies, drinking refusal self-efficacy, and intentions—directly testing the cognitive model of binge drinking and the TPB. Results provided support for both theories as drinking refusal self-efficacy and intentions predicted alcohol consumption, while alcohol expectancies did not predict consumption.

Additionally, Atwell, Abraham, and Duka (2011) sought to develop a parsimonious model of alcohol consumption. After reviewing the literature they noted a multitude of competing predictor variables and decided to measure as many predictors as possible, to control for the effects of competing predictors. In total, they included 30 predictor variables, including variables from the cognitive model of binge drinking, the incentive motivation model, and the TPB, in a regression analysis predicting AUDIT scores (see Chap. 1). A model containing six predictors—age of onset; descriptive norm frequency; descriptive norm quantity; self-efficacy; sensation seeking; social motives—accounted for 58% of the variance in AUDIT scores. These results provide support for the incentive motivation model, because social motives were a significant predictor, and some support for the TPB, which sometimes contains a measure of self-efficacy, but no support for the cognitive model of binge drinking. It should be noted that Atwell et al. did not measure drinking refusal self-efficacy and used a cross-sectional design.

Finally, Cooke et al.'s (2021) study was inspired by Atwell et al.'s paper, while noting that a cross-sectional design limits the conclusions one can make. They measured a large set of predictors at baseline and then used a longitudinal design with follow-up consumption measured six months later. In addition, university students were recruited from six different European countries, providing a rare example of a cross-cultural sample. Included in the set of predictors were variables from all of the models covered in this chapter—alcohol expectancies, drinking motives, drinking refusal self-efficacy, intentions, and perceived behavioural control—along with baseline measures of past consumption, demographic variables, personality variables including

sensation seeking (see Chap. 5) and prototypes (see Chap. 3). Cooke et al. found that similarity to prototypical abstinent drinker predicted quantity of alcohol consumption while having lower drinking refusal self-efficacy, and higher conformity motives, predicted frequency of alcohol consumption. However, none of the psychological predictors drawn from the models described in this chapter predicted HED. These results provide some support for the cognitive model of binge drinking and incentive motivation model, but no support for the TPB as neither intentions nor perceived behavioural control predicted consumption or HED after controlling for the effects of other predictors.

Cooke et al.'s (2021) study has a number of limitations, including a medium-term follow-up—longer than most studies testing predictive relationships for theories—that might have been too stringent a test of prediction—predictor variables might have changed between baseline and follow-up six months later—and a sample that mainly reported light drinking patterns. The sample also overrepresented women and white participants. Nevertheless, Cooke et al. (2021) provide a comprehensive test of the predictive power of variables from different theories and will hopefully encourage other researchers to conduct similar studies to provide direct tests of the claims of theories.

Cooke et al.'s (2021) results for HED might reflect the fact that most participants reported light drinking patterns; over 60% of the sample scored in the low-risk category on the AUDIT (Cooke et al., 2019). Alternatively, a recent paper by Cooke, Bailey, Jennings, Yuen, and Gardner (2020) found that the only predictor of HED was scores on the self-report habit index (Gardner, de Bruijn, & Lally, 2012), with psychological variables like intentions and perceived behavioural control not predicting HED. While it should be acknowledged that this study has a small sample size, and a two-week follow-up, these results suggest it is possible that heavier patterns of drinking are better predicted by habitual processes. These are measured in relatively few studies that test theories, although when they are they often add to prediction (Gardner et al., 2012; Norman, 2011; see Chap. 4 for more on this topic).

Theoretical Integration

Atwell et al. (2011), Cooke et al. (2021), and Foster et al.'s (2016) studies allow researchers to directly test competing theoretical accounts of consumption which have the potential to suggest revisions to theories. For example, one interpretation of Foster et al.'s findings is that alcohol expectancies may be antecedent to other predictors (cf. Hasking et al., 2015). This idea was

examined in a novel paper by Urbán, Kökönyei, and Demetrovics (2008) where they tested the following logic model in a sample of Hungarian adolescents:

sensation seeking → expectancies → drinking motives → alcohol consumption

Urban et al.'s hypothesis was that those with higher levels of sensation seeking (see Chap. 5) will form more positive alcohol expectancies, which produce more positive drinking motives, and these positive motives lead to increased consumption. Path analysis provided support for the hypothesised sequence of action although there are two caveats.

First, based on a principal components analysis the authors determined that there was only one factor that accounted for the drinking motives items. Thus, in contrast to Cooper's (1994) recommendations, they created a composite item reflecting all 20 items, rather than keeping the four motives separate. This means we do not know the size of the relationships between the four motives and consumption. Second, despite measuring alcohol consumption 30 days after assessing psychological variables the authors created a composite variable based on 30-day consumption and six indices all based on past consumption. This means we cannot be sure that this model predicts future consumption. Notwithstanding these caveats, Urban et al. provide a welcome addition to theorising because by attempting to integrate theories together (see Chap. 13 for more on theoretical integration). Having compared theories, the next section considers methodological issues with theoretical research studies.

Methodological Issues with Theoretical Research on Alcohol Consumption

Selective Testing of Variables

Selective testing of variables, for instance, testing constructs from one theory while accounting for demographic predictors, limits understanding of which theories predict alcohol consumption. If you only test one theory, then you cannot know if results will remain the same when you test constructs from other theories in your analysis. Taken to extremes, the research literature becomes a set of disconnected papers each claiming to show that the variables they measured are the 'best' predictor(s) of consumption, while neglecting to

mention that they may only be the 'best' predictor because they have not been compared to other 'best' predictors! Studies that have tested two or more models—Atwell et al. (2011), Cooke et al. (2020), Foster et al. (2016)—are more useful than any number of studies testing only one model because they allow researchers to compare competing theoretical accounts for consumption.

Study Design Issues

There is an over-reliance on cross-sectional study designs in the alcohol literature. For example, Cooper et al. (2015) noted this issue as a limitation of their review of the drinking motives literature. The main issue with cross-sectional designs is that studies are not predicting alcohol consumption—consumption has already taken place. As a result, cross-sectional designs are unable to tell us if a set of variables predict consumption in the future.

When researchers do use prospective designs they typically use short-term follow-ups for a number of reasons ranging from a desire to minimise the time between measurement of predictors and measurement of behaviour because of concerns that predictors might change (Ajzen, 1996) to concerns over attrition associated with longer-term follow-ups, an issue that has been highlighted in the literature testing alcohol interventions (Radtke, Ostergaard, Cooke, & Scholz, 2017). There is also consideration of the timeframe that participants are asked to report their behaviour over—it is easier for you to recall what you did in the past week compared to the past two weeks, month, three months, and so on. Unfortunately, while these are all sound reasons for minimising the gap between measurement of predictors and behaviour, this does mean that research, to date, has provided favourable conditions for predictor variables to account for variance in alcohol consumption. Because predictors are unlikely to change one week after they have been measured, then this can create an impression that predictors will remain effective at predicting alcohol consumption over longer time periods.

Cooke et al. (2021) show this phenomenon to be a potential illusion. In most studies, past drinking behaviour has a large-sized correlation with future drinking behaviour. In Cooke et al.'s study, they showed that the correlation between baseline HED drinking and HED measured six months later was $r = 0.35$, much smaller than you normally find when the gap between measurements is shorter. Such results should encourage tests of prediction over longer timeframes to confirm that predictive effects persist over time.

A related issue is that there are relatively few longitudinal designs testing prediction of alcohol consumption using psychological theories. Such studies provide a useful insight into how scores on predictor variables measured at one time can predict alcohol consumption in the future. For example, Cooper et al. (2008) found that adolescents' scores on coping and enhancement motives predicted alcohol consumption 15 years later, suggesting they are viable targets for interventions aimed at adolescents. Obviously, such studies are resource intensive and can require co-ordination with organisations that run cohort or longitudinal surveys, so they are not the default option for future research studies testing psychological theories. Nevertheless, such studies are now needed to test the competing claims of theories. Studies are routinely done to monitor trends in consumption over time, we need similar studies to monitor trends in *prediction* of consumption over time. Such studies would allow us to more fully test the claims of psychological theories of alcohol consumption.

Experimental Evidence for Alcohol Theories

There is the lack of experimental research conducted to test theoretical claims about alcohol consumption; if we modify alcohol expectancies or increase drinking refusal self-efficacy, using an intervention, does this change subsequent consumption? If theories are a valid description of why people drink, successfully modifying the variables in the theories in an intervention should bring about changes in consumption (see Chap. 21). As an example, the TPB has been used for this purpose (Cameron et al., 2015; Epton et al., 2014; Norman et al., 2018) with interventions targeting the antecedents to intentions (attitudes, subjective norms, perceived behavioural control) using persuasive communications. While results for these interventions have been mixed, they do provide a test of the TPB's claims that changing beliefs that underpin intentions brings about changes in intentions that, ultimately, lead to changes in consumption. Indeed, Norman et al. (2018) found in their intervention study that changes in intentions mediated the effects of the intervention on consumption six months later (see Chap. 21 for more on this study). There is a dearth of equivalent interventions studies based on alcohol expectancy theory/cognitive model of binge drinking or the incentive motivation model. One recent study by Fearnow-Kenny et al. (Fearnow-Kenney et al., 2016) targeted alcohol expectancies among college-student athletes, however, the intervention failed to produce changes in expectancies in the intervention group.

Non-University Samples

Few studies cited in this chapter recruited samples of non-university students; Cooke et al. (2016) noted that 33 of the 40 studies included in their TPB meta-analysis recruited such samples. While this pattern is not so apparent for the other theories covered in this chapter, there is still a preponderance of theory-testing taking place with university samples, with adolescents the next most commonly sampled population. What is lacking is research testing theories in older populations, such as those who had graduated and are now working, those who are parents, and those who are retired. There is also an absence of studies with young adult populations not recruited from university settings. We know very little about the utility of psychological theories to predict alcohol consumption reported by samples who have left school and entered the workforce without attending university. For theories to provide general accounts of alcohol consumption, there is a need to recruit samples who have not entered higher education or training upon reaching adulthood.

Future Research Directions for Psychological Theories of Alcohol Consumption

Following Atwell et al.'s (2011) example researchers are encouraged to test predictors from multiple theories in future studies. This research is needed to test the competing claims of different theories of alcohol consumption. There is also a need for more theoretical integration to synthesise ideas from different theories; because there is not unequivocal evidence to support any of the theories covered in this chapter—alcohol expectancies do not predict consumption in the presence of drinking refusal self-efficacy; conformity motives rarely predict consumption; perceived behavioural control has an inconsistent relationship with consumption—now is the time to propose new theories of alcohol consumption that draw together insights across theoretical traditions. Researchers should consider creating theories that contain constructs shown to predict consumption from different theories: drinking refusal self-efficacy, enhancement motives, and intentions. Because most tests of theories have focused on only one theory, existing evidence for constructs from different theories is largely independent of evidence for competing theories and constructs within them. Thought should be given to how these hybrid theories—containing constructs from different theories—would fit together to influence consumption and each other. In addition, when creating new theories, there

is also a need to incorporates measures of implicit or automatic processes (e.g., habits, prototypes, willingness; see Chaps. 3 and 4) to capture these influences that are generally overlooked by theories of consumption and human motivation covered in this chapter. While such a theory may still focus on individual action, it is important to acknowledge the role of external/cultural/contextual/environmental/social influences on consumption in a manner that is mostly lacking from the existing literature on theories of alcohol consumption.

Conclusions

This chapter has outlined and reviewed the evidence for three frequently tested psychological theories of alcohol consumption: the cognitive model of binge drinking, the incentive motivation model, and the TPB. In general, research evidence supports some of the predictions made by these theories. However, a range of methodological issues, including an over-reliance on cross-sectional study designs and over-sampling of university students, means that caution should be exercised before making definitive claims about the utility of these theories. There is also an urgent need for studies comparing prediction *between* theories. Such studies will extend existing findings and improve our understanding of which theories provide the best account of alcohol consumption and allow for the possibility of theoretical integration, especially there is more evidence for particular predictor variables than theories as a whole at the present time.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I. (1996). The directive influence of attitudes on behavior. In P. M. Gollwitzer & J. A. Bargh (Eds.), *Psychology of action* (pp. 385–403). New York, NY: Guildford Press.

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology, 32*, 665–683.

Ajzen, I., & Fishbein, M. (1973). Attitudinal and normative variables as predictors of specific behaviors. *Journal of Personality and Social Psychology, 27*, 41–57.

Ajzen, I., & Sheikh, S. (2013). Action versus inaction: Anticipated affect in the theory of planned behavior: Anticipated affect. *Journal of Applied Social Psychology, 43*(1), 155–162. https://doi.org/10.1111/j.1559-1816.2012.00989.x

Atwell, K., Abraham, C., & Duka, T. (2011). A parsimonious, integrative model of key psychological correlates of UK university students' alcohol consumption. *Alcohol and Alcoholism (Oxford, Oxfordshire), 46*(3), 253–260. https://doi.org/10.1093/alcalc/agr016

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215.

Burgess, M., Cooke, R., & Davies, E. L. (2019). *My own personal hell*: Approaching and exceeding thresholds of too much alcohol. *Psychology & Health, 34*(12), 1451–1469. https://doi.org/10.1080/08870446.2019.1616087

Cameron, D., Epton, T., Norman, P., Sheeran, P., Harris, P. R., Webb, T. L., … Shah, I. (2015). A theory-based online health behaviour intervention for new university students (U@Uni:LifeGuide): Results from a repeat randomized controlled trial. *Trials, 16*. https://doi.org/10.1186/s13063-015-1092-4

Cooke, R., Bailey, O., Jennings, J., Yuen, C., & Gardner, B. (2020). Do preparatory behaviours predict alcohol consumption among UK university students? *British Journal of Health Psychology*, https://doi.org/10.1111/bjhp.12489

Cooke, R., Beccaria, F., Demant, J., Fernandes-Jesus, M., Fleig, L., Negreiros, J., Scholz, U., & de Visser, R. (2019). Patterns of alcohol consumption and alcohol-related harm among European university students. *European Journal of Public Health*, ckz067. https://doi.org/10.1093/eurpub/ckz067.

Cooke, R., Beccaria, F., Demant, J., Fernandes-Jesus, M., Fleig, L., Scholz, U., & de Visser, R. O. (2021). Predicting alcohol consumption among European university students using data from the CALIBRATE study. *Unpublished manuscript*

Cooke, R., Dahdah, M., Norman, P., & French, D. P. (2016). How well does the theory of planned behaviour predict alcohol consumption? A systematic review and meta-analysis. *Health Psychology Review, 10*, 148–167. https://doi.org/10.1080/17437199.2014.947547

Cooke, R., Sniehotta, F., & Schuz, B. (2007). Predicting binge-drinking behaviour using an extended TPB: Examining the impact of anticipated regret and descriptive norms. *Alcohol and Alcoholism, 42*(2), 84–91. https://doi.org/10.1093/alcalc/agl115

Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment, 6*(2), 117–128. https://doi.org/10.1037/1040-3590.6.2.117

Cooper, M. L., Krull, J. L., Agocha, V. B., Flanagan, M. E., Orcutt, H. K., Grabe, S., … Jackson, M. (2008). Motivational pathways to alcohol use and abuse among Black and White adolescents. *Journal of Abnormal Psychology, 117*(3), 485–501. https://doi.org/10.1037/a0012592

Cooper, M. L., Kuntsche, E., Levitt, A., Barber, L. L., & Wolf, S. (2015). Motivational models of substance use: A review of theory and research on motives for using

alcohol, marijuana, and tobacco. In K. J. Sher (Ed.), *The Oxford handbook of substance use disorders* (Vol. 1). Oxford, England: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199381678.013.017

Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology, 97*(2), 168–180.

Epton, T., Norman, P., Dadzie, A.-S., Harris, P. R., Webb, T. L., Sheeran, P., … Shah, I. (2014). A theory-based online health behaviour intervention for new university students (U@Uni): Results from a randomised controlled trial. *BMC Public Health, 14*. https://doi.org/10.1186/1471-2458-14-563

Fearnow-Kenney, M., Wyrick, D. L., Milroy, J. J., Reifsteck, E. J., Day, T., & Kelly, S. E. (2016). The effects of a web-based alcohol prevention program on social norms, expectancies, and intentions to prevent harm among college student-athletes. *The Sport Psychologist, 30*, 113–122.

Fernandes-Jesus, M., Beccaria, F., Demant, J., Fleig, L., Menezes, I., Scholz, U., … Cooke, R. (2016). Validation of the drinking motives questionnaire—Revised in six European countries. *Addictive Behaviors, 62*, 91–98. https://doi.org/10.1016/j.addbeh.2016.06.010

Foster, D. W., Dukes, K., & Sartor, C. E. (2016). The road to drink is paved with high intentions: Expectancies, refusal self-efficacy, and intentions among heavy drinking college students. *Alcohol, 50*, 65–71. https://doi.org/10.1016/j.alcohol.2015.11.004

French, D. P., Cooke, R., Mclean, N., Williams, M., & Sutton, S. (2007). What do people think about when they answer theory of planned behaviour questionnaires?: A 'think aloud' study. *Journal of Health Psychology, 12*(4), 672–687. https://doi.org/10.1177/1359105307078174

Gardner, B., de Bruijn, G.-J., & Lally, P. (2012). Habit, identity, and repetitive action: A prospective study of binge-drinking in UK students: Habit, identity, and repetitive action. *British Journal of Health Psychology, 17*(3), 565–581. https://doi.org/10.1111/j.2044-8287.2011.02056.x

Goldsmith, A. A., Thompson, R. D., Black, J. J., Tran, G. Q., & Smith, J. P. (2012). Drinking refusal self-efficacy and tension-reduction alcohol expectancies moderating the relationship between generalized anxiety and drinking behaviors in young adult drinkers. *Psychology of Addictive Behaviors, 26*(1), 59–67. https://doi.org/10.1037/a0024766

Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behavior Research and Therapy, 8*, 249–266.

Hasking, P., Boyes, M., & Mullan, B. (2015). Reward and cognition: Integrating reinforcement sensitivity theory and social cognitive theory to predict drinking behavior. *Substance Use & Misuse, 50*(10), 1316–1324. https://doi.org/10.3109/10826084.2015.1005315

Hauck-Filho, N., Teixeira, M. A. P., & Cooper, M. L. (2012). Confirmatory factor analysis of the Brazilian version of the Drinking Motives Questionnaire-Revised

(DMQ-R). *Addictive Behaviors, 37*(4), 524–527. https://doi.org/10.1016/j.addbeh.2011.11.023

Kuntsche, E., & Cooper, M. L. (2010). Drinking to have fun and to get drunk: Motives as predictors of weekend drinking over and above usual drinking habits. *Drug and Alcohol Dependence, 110*(3), 259–262. https://doi.org/10.1016/j.drugalcdep.2010.02.021

Leigh, B. C., & Stacy, A. W. (1993). Alcohol outcome expectancies: Scale construction and predictive utility in higher order confirmatory models. *Psychological Assessment, 5*(2), 216–229. https://doi.org/10.1037/1040-3590.5.2.216

Morawska, A., & Oei, T. P. S. (2005). Binge drinking in university students: A test of the cognitive model. *Addictive Behaviors, 30*(2), 203–218. https://doi.org/10.1016/j.addbeh.2004.05.011

Newton, N. C., Barrett, E. L., Swaffield, L., & Teesson, M. (2014). Risky cognitions associated with adolescent alcohol misuse: Moral disengagement, alcohol expectancies and perceived self-regulatory efficacy. *Addictive Behaviors, 39*(1), 165–172. https://doi.org/10.1016/j.addbeh.2013.09.030

Norman, P. (2011). The theory of planned behavior and binge drinking among undergraduate students: Assessing the impact of habit strength. *Addictive Behaviors, 36*(5), 502–507. https://doi.org/10.1016/j.addbeh.2011.01.025

Norman, P., Bennett, P., & Lewis, H. (1998). Understanding binge drinking among young people: An application of the theory of planned behaviour. *Health Education Research, 13*(2), 163–169. https://doi.org/10.1093/her/13.2.163-a

Norman, P., Cameron, D., Epton, T., Webb, T. L., Harris, P. R., Millings, A., & Sheeran, P. (2018). A randomized controlled trial of a brief online intervention to reduce alcohol consumption in new university students: Combining self-affirmation, theory of planned behaviour messages, and implementation intentions. *British Journal of Health Psychology, 23*(1), 108–127. https://doi.org/10.1111/bjhp.12277

Norman, P., & Conner, M. (2006). The theory of planned behaviour and binge drinking: Assessing the moderating role of past behaviour within the theory of planned behaviour. *British Journal of Health Psychology, 11*(1), 55–70. https://doi.org/10.1348/135910705X43741

Oei, T. P. S., & Baldwin, A. R. (1994). Expectancy theory: A two-process model of alcohol use and abuse. *Journal of Studies on Alcohol, 55*(5), 525–534. https://doi.org/10.15288/jsa.1994.55.525

Oei, T. P. S., & Burrow, T. (2000). Alcohol expectancy and drinking refusal self-efficacy: A test of specificity theory. *Addictive Behaviors, 25*(4), 499–507. https://doi.org/10.1016/s0306-4603(99)00044-1

Oei, T. P. S., & Jardim, C. L. (2007). Alcohol expectancies, drinking refusal self-efficacy and drinking behaviour in Asian and Australian students. *Drug and Alcohol Dependence, 87*(2–3), 281–287. https://doi.org/10.1016/j.drugalcdep.2006.08.019

Oei, T. P. S., & Morawska, A. (2004). A cognitive model of binge drinking: The influence of alcohol expectancies and drinking refusal self-efficacy. *Addictive Behaviors, 29*(1), 159–179. https://doi.org/10.1016/S0306-4603(03)00076-5

Oh, H., & Kim, Y. (2014). Drinking behavior and drinking refusal self-efficacy in Korean college students. *Psychological Reports, 115*(3), 872–883. https://doi.org/10.2466/21.18.PR0.115c31z2

Radtke, T., Ostergaard, M., Cooke, R., & Scholz, U. (2017). Web-based alcohol intervention: Study of systematic attrition of heavy drinkers. *Journal of Medical Internet Research, 19*(6), e217. https://doi.org/10.2196/jmir.6780

Schlegel, R. P., D'Avernas, J. R., Zanna, M. P., DeCourville, N. H., & Manske, S. R. (1992). Problem drinking: A problem for the theory of reasoned action? *Journal of Applied Social Psychology, 22*(5), 358–385. https://doi.org/10.1111/j.1559-1816.1992.tb01545.x

Urbán, R., Kökönyei, G., & Demetrovics, Z. (2008). Alcohol outcome expectancies and drinking motives mediate the association between sensation seeking and alcohol use among adolescents. *Addictive Behaviors, 33*(10), 1344–1352. https://doi.org/10.1016/j.addbeh.2008.06.006

Young, R., & Oei, T. P. S. (1990). *Drinking Expectancy Profile: A manual*. University of Queensland.