Alcohol and Drug Expectancies as Anticipated Changes in Affect: Negative Reinforcement Is Not Sedation

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Goldman and Darkes (2004) argued that all three basic alcohol-expectancy factors can be assessed with a brief questionnaire (AEMax), related to the circumplex model of emotion. I argue that negative reinforcement, one of the three basic expectancy factors, is not assessed with the AEMax. Importantly, negative reinforcement is positively related to problem drinking while sedation (the AEMax-factor that comes closest) is not. In a new dataset (from 119 students, collected in 2002), I demonstrate that sedation is related to negative expectancies and not to negative reinforcement. Different ways to assess all major expectancy factors are proposed.

Keywords alcohol; expectancies; motives; AEMax; affect; circumplex model

Introduction

In a recent paper, Goldman and Darkes (2004; G&D) presented an innovative attempt to merge the factor-analytic and multidimensional scaling (MDS) approaches to the analysis of alcohol expectancies, which resulted in the presentation of a new instrument: the Alcohol Expectancy Multiaxial Assessment (AEMax). Many alcohol expectancies and motives for drinking can be conceptualized as anticipated changes in affect due to drinking alcohol (Cooper, Frone, Russell, and Mudar, 1995; G&D) and the AEMax is related to the circumplex model of affect or emotion. In this article, I briefly describe G&D’s approach, followed by the identification of a problem with the interpretation of their data: while G&D claim that the AEMax can be used to assess all three major factors that emerged from expectancy research, including negative reinforcement, I argue that the latter factor is not captured by the AEMax. One of the AEMax factors (sedation) superficially resembles negative reinforcement, but I will show that both in G&D’s own data and in other research, these two factors behave in a markedly different way: negative reinforcement is positively correlated with alcohol problems, while sedation is not and often even negatively correlated with alcohol problems. Next, I compare two factor models in a new dataset and these data further confirm that sedation expectancies are not related to negative reinforcement but to negative expectancies. I end with discussing the source of the problem and offer two solutions: the simple one is replace the AEMax or to supplement it with a scale that assesses negative
reinforcement. The more complex (but theoretically interesting) solution is to develop a new instrument based on the emotion circumplex, which takes a crucial third dimension into account: time. I argue that adding this dimension is crucial to capture anticipated changes in affect. Given the fact that expectancies and motives have been found to be similar for other drugs than alcohol (e.g., Comeau, Stewart, and Loba, 2001; Linkovich Kyle and Dunn, 2001; Schafer and Brown, 1991), the conclusions are also relevant for the assessment of anticipated affective changes for other substances.

Combining Factor Analysis and Multidimensional Scaling: The AEMax

In the development of the AEMax, G&D combined two different research methods in the assessment of alcohol expectancies: factor analysis and MDS. In the factor-analytic method, the initial focus was on positive expectancies (Brown, Goldman, Inn, and Anderson, 1980), while it was later recognized that negative expectancies have additional predictive power (e.g., Fromme, Stroot, and Kaplan, 1993; Jones and McMahon, 1994; Leigh and Stacy, 1993). Within the category of positive expectancies, positive and negative reinforcement expectancies have been distinguished, especially in research on the “conceptually similar” (D&G, p. 4) construct motives for drinking (Cooper, 1994; Cooper et al., 1995). Positive reinforcement refers to expected pleasurable outcomes, while negative reinforcement refers to the relief from aversive states (drinking to cope or to reduce tension). While some debate may remain about the relative importance of these basic expectancy factors (e.g., Goldman, Del Boca, and Darkes, 1999, vs. Jones, Corbin, and Fromme, 2001), I concur with G&D that “three sets of constructs have emerged as the leading contenders for the basic expectancy factors” (p. 4): positive and negative reinforcement expectancies and negative expectancies. The first two factors are positive predictors of drinking, as has been demonstrated in many cross-sectional studies and with more modest results in prospective studies (G&D; Goldman et al., 1999; Jones et al., 2001; Leigh and Stacy, 1993; Wiers, Hoogeveen, Sergeant, and Gunning, 1997). The role of negative expectancies has been less clear-cut: in cross-sectional studies with students it is generally found that they negatively predict alcohol use (e.g., Fromme et al., 1993; Goldman et al., 1999; Leigh and Stacy, 1993; Wiers et al., 1997). However, there is also evidence that once drinking becomes problematic, negative expectancies (of the effects of continued alcohol abuse) become important and predict successful treatment outcome (Jones and McMahon, 1994, 1996), probably because negative expectancies fuel motivation to change behavior (Jones and McMahon, 1998). Note that the two types of expectancies are not theoretically equivalent: the scales that assess both positive and negative expectancies consist of expected punishment items (e.g., feel stupid, feel bad after drinking alcohol), while the scale of Jones and McMahon (1994) also contains negative expectancies of the response-cost type (if I continue drinking like this, I might lose my job/wife, etc.; see Note 2). Note further that, opposite to what one might expect, positive and negative expectancies are not opposites: correlations have been found to be small (both small positive and small negative correlations have been reported; Goldman et al., 1999; Jones et al., 2001).

A second strategy used to assess expectancies is to use MDS to analyze the structure underlying responses to single adjectives. This procedure yields an n-dimensional map that represents perceived similarities between concepts. Unlike factor analytic techniques, MDS does not depend on assumptions about the relationship between dimensions (factors) and items (indicators), and it has been argued that this is a better way to represent a memory network (see G&D). In a series of studies, the authors extracted a two-dimensional
structure representing alcohol-expectancies, with valence (positive-negative) and activation (arousal-sedation) as the two orthogonal dimensions (G&D; Rather and Goldman, 1994; Rather, Goldman, Roehrich, and Brannick, 1992). The authors noted that the same circumplex structure underlies emotion or affect. This is not surprising given the fact that many alcohol expectancies represent anticipated affective changes (G&D; Goldman et al., 1999; cf. Comeau et al., 2001; Cooper, et al., 1995).

One may question why G&D wanted to integrate these two different methods with different assumptions. The reason was that despite the advantage of being able to integrate expectancy research in cognitive science, MDS-derived models are distinctly limited in their ability to connect with the large body of expectancy research that has been based on more traditional psychometric approaches. For example, MDS-derived models cannot be entered into traditional models of statistical prediction, and they cannot be used with the quickly emerging methods of latent variable (LV) and latent trajectory analyses. (G&D, p. 5)

The goal of their study was to “allow conversion of MDS models to factor models and thereby to bridge the cognitive and psychometric approaches to expectancy” (G&D, p. 5). To attain this goal, the authors first confirmed the two-dimensional MDS-solution comprising of a valence and an arousal dimension. Note that (as in their earlier MDS-work), a three-dimensional solution offered a slightly better fit, but a two-dimensional solution was chosen for reasons of simplicity and ease of interpretation. The two-dimensional solution was divided into eight octants that differentially combine valence and arousal (see Figure 1a). Using CFA, a first-order measurement model with eight correlated LVs representing these eight octants showed an adequate fit to the data. A second-order model was then fitted, consisting of three correlated higher-order factors: Positive Arousal, combining the octants aroused; Positive Aroused and Positive (in terms of the emotion circumplex: happy, excited and active, Figure 1); “Negative,” combining Negative and Negative-Aroused (sad and distressed in Figure 1); and “Sedation” combining Positive-Sedated; Sedated and Negative Sedated (bored, passive and relaxed in Figure 1). Unfortunately, G&D provided no comparisons with alternative second-order models, such as a model in which the first-order factor negative-sedation (bored) loads on the second-order factor “Negative” instead of it’s current loading on “Sedation” or a two-factor model with a factor combining positive and arousal octants and a factor combining negative and sedation octants. On the basis of this result, it was concluded that the three basic expectancy factors can be assessed with the MDS-derived AEMax:

Because the MDS-based models included the major expectancy dimensions noted in the literature and described earlier in this article (see Goldman et al., 1999), the resulting instrument also subsumes these dimensions (factors). That is, the use of this instrument allows for the measurement of expectancy dimensions that heretofore would have required the use of separate instruments. (G&D, p. 12)
introduction of G&D). At first sight, this may seem like magic: the three major expectancy factors are represented in a two-dimensional circumplex model. Further inspection shows that is possible because the three higher order factors are highly correlated (0.49-0.67). The positive-arousal factor in the AEMax resembles the general positive reinforcement factor of expectancy research, and the negative factor the general negative factor. They also behave similarly to the corresponding expectancy factors from other questionnaires: positive reinforcement expectancies (positive-arousal in the AEMax) positively predict alcohol use and negative expectancies negatively predict alcohol use. This leaves the AEMax Sedation factor as the supposed equivalent for the third general expectancy factor: negative reinforcement. This is not a strange idea, given that one of the typical words in the positive-sedated octant is “relaxed” (Goldman et al., 1999; Rather and Goldman, 1994), although this word does not feature in the AEMax (the three words for positive sedation are woozy, dizzy, and light-headed). So maybe “sedation” or “positive sedation” is similar to negative reinforcement. But maybe not. How are they related to the external variables of major interest, alcohol use, and problems?

In G&D, the higher order sedation factor is negatively correlated with alcohol use. Further inspection of the regression including the eight first-order factors (figure 4, G&D, p. 11) that comprise the sedation factor indicates that this is primarily due to the negative-sedation factor (“sick”), which is negatively correlated with alcohol use. Both the sedation factor (“sleepy”) and the positive sedation factor (“woozy”) did not correlate significantly with alcohol use, so even when negative sedation would be moved to the higher order negative factor, the remaining positive-sedation factor would not correlate with alcohol use. The negative correlation between sedation and alcohol use is consistent with other MDS research reporting that light drinkers hold relatively strong sedation expectancies while heavy drinkers hold relatively strong arousal expectancies (Goldman et al., 1999; Rather and Goldman, 1994; Rather et al., 1992). However, these findings are opposite to the literature on negative reinforcement cognitions (expectancies and motives), where it has been repeatedly found that negative reinforcement is a strong positive predictor of alcohol use and problems (e.g., Brown, Goldman, and Christiansen, 1985; Carey and Carey, 1995; Carey and Correia, 1997; Christiansen, Goldman, and Brown, 1985; Christiansen, Goldman, and Inn, 1982; Cooper, 1994; Cooper et al., 1995; Kuntsche, Knibbe, Gmel, and Engels, 2006; Stewart et al., 2002; see Kuntsche, Knibbe, Gmel and Engels, 2005, for a review). The robust finding that negative reinforcement cognitions predict problem drinking may reflect the “clinical wisdom” that alcohol use often becomes problematic once people begin to drink to escape their problems. The underlying reason is that even though alcohol may temporarily alleviate negative affect, it will result in more negative affect in the long run, which will lead to more drinking to alleviate the negative affect, thus creating a vicious cycle (e.g., Cox and Klinger, 1988; Marlatt and Gordon, 1985; Sher, 1991; Stewart, 1996; Wiers, Sergeant, and Gunning, 1994).

As Goldman and colleagues (1999) noted, sedation expectancies are most likely related to the pharmacological effects of alcohol (cf. Dunn and Earleywine, 2001; Earleywine and Martin, 1993) and may constitute a cognitive representation of a relatively strong or fast sedative reaction to alcohol, which has been found to negatively predict future drinking (e.g., Schuckit and Smith, 1996). Hence, negative reinforcement and sedation expectancies behave very differently: sedation expectancies may protect from problem drinking, while negative reinforce
reinforcement expectancies positively predict problem drinking. From equating negative reinforcement to (positive) sedation, one may draw wrong conclusions for interventions. For example, a study using an MDS expectancy approach in an expectancy challenge (Dunn, Lau, and Cruz, 2000) found that after this intervention, male heavy drinkers’ expectancies changed from positive arousal to positive sedation, which cooccurred with a reduction in average alcohol consumption. (Note that this result should not be taken as proof for a causal relationship between a change in expectancies and a change in drinking, because there was no control-group and no mediation analysis; cf. Jones et al., 2001; Wiers, Van de Luitgaarden, Van den Wildenberg, and Smulders, 2005.) This result was interpreted as a positive outcome, which is in line with findings that sedation expectancies are related to light rather than heavy drinking (Goldman et al., 1999). However, when positive sedation expectancies are equal to negative reinforcement expectancies, the outcome would have been less applauded, given the robust association between negative reinforcement expectancies and drinking problems.

**Negative Reinforcement Is Not Sedation: An Empirical Demonstration**

In a recent study, 119 light and heavy drinking undergraduate students (61 women) filled out a number of questionnaires as part of a larger study focused on the assessment of alcohol-related cognitions with different implicit tests. In this study, we assessed both Cooper’s (1994) Drinking Motives Questionnaire Revised (DMQ-R), which contains the most often used scales for Negative Reinforcement Motives (Kuntsche et al., 2005) and a questionnaire similar to the AEMax to assess alcohol expectancies. The difference was that not all octants were assessed (see Figure 1a) but that the four endpoints of the Affect/Expectancy space (positive, negative, arousal, and sedation) were assessed with 6 items each (responses on a seven-point Likert scale), as explicit counterparts of the words used in the implicit tests (the focus of this study; cf. Wiers et al., 2005; Wiers, Van Woerden, Smulders, and De Jong, 2002). Words had been selected based on a separate study of first associations (Wiers, 2002) and with use of the general emotion circumplex (Larsen and Diener, 1992; cf. Goldman et al., 1999). The scales consisted of the following words (Cronbach alpha between brackets): Sedation: sleepy, quiet, calm, still, restful, and silent (0.73); Positive: sympathetic, happy, friendly, cheerful, social, pleased (0.86); Arousal: talkative, intense, enthusiastic, direct, impulsive, and turbulent (0.79); Negative: unhappy, lonely, depressive, moody, gloomy, and sad (0.83). The Cronbach alphas of the four scales of the DMQ-R were also satisfactory: Enhancement (0.78), Coping (0.77), Social (0.82), and Conformity (0.75). With this dataset, I investigated whether the sedation scale would be related to negative reinforcement (as implied by G&D) or not.

In a confirmatory factor analysis, I compared two models: a model in which negative reinforcement (coping motives) and sedation expectancies loaded on the same factor, and a model in which sedation expectancies load on a negative expectancies factor (see Figure 2). In both models, a first factor consists of positive reinforcement expectancies and motives (positive and arousal expectancies, enhancement and social motives). The critical issue is whether the sedation expectancies better fit with negative expectancies (Figure 2a) or with negative reinforcement (coping and conformity motives, Figure 2b). In order to test
Model 1: Sedation with negative expectancies.

\[ \chi^2 (23 \text{ df}) = 21.8; \ p (\text{misfit}) = .53; \ RMSEA = .00. \]

![Diagram of Model 1](image1)

Model 2: Sedation with negative reinforcement.

\[ \chi^2 (23 \text{ df}) = 36.8; \ p (\text{misfit}) = .034; \ RMSEA = .07. \]

![Diagram of Model 2](image2)

Figure 1. Two confirmatory factor models comparing the fit of sedation with negative expectancies (1A) and with negative reinforcement (1B).

The second model, the negative expectancies factor was split into two halves (each latent variable needs to have at least two indicators). For reasons of comparison, I therefore also split the negative expectancies factor in the first model (Figure 2a). The three factors were allowed to correlate.

The results were clear-cut. The first model (Figure 2a), with sedation loading on the negative expectancies factor, demonstrated an excellent fit to the data: \( \chi^2 (23 \text{ df}) = 21.8, \ p > .50. \) When the sedation expectancies were moved to the negative reinforcement factor (Figure 2b), the data no longer showed a significant fit to the data: \( \chi^2 (23 \text{ df}) = 36.8, \ p = 0.034 \) (note that in CFA, a significant \( p \)-value denotes a significant misfit of the model to the data). The other fit indices also indicate that the first model fits the data well, whilst the second does not (e.g., an RMSEA under .05 is often interpreted as a good fit). Since
Figure 2. It represents the circumplex of momentary affect (e.g., Russell and Carroll, 1999). The axes are valence (pleasant-unpleasant) and arousal (high activation-low activation). In italics: prototypical affective states are given for each of the eight octants (from Larsen and Diener, 1992). In G&D’s model, the three major alcohol expectancy factors are represented as combinations of these octants: positive reinforcement comprises the octants high on pleasant and active (in the emotion circumplex: happy, excited, and active); negative reinforcement comprises the octants with low activation (here relaxed, passive, and bored), and negative expectancies the octants that are negative and not low on activation (here sad and distressed). Figure 1b represents the alternative conceptualization, where expectancies are represented as anticipated changes in affect. The third dimension is time (represented as an arrow in affect space). In example 1b, both the antecedent affect and the expected affect after drinking are relaxed. In this case relaxed does not qualify as negative reinforcement (no expected reduction of negative affect). Figures 1c and 1d represent two different types of negative reinforcement. The first (1c) concerns tension reduction expectancies: a change from a distressed to a more relaxed state. The second (1d) concerns relief of boredom. Personality profiles that have been related to the emotion circumplex are represented in the outer ring (e.g., Larsen and Diener, 1992), indicating personality types likely to develop specific expectancies.
the power of this CFA approach of models of close fit is quite low (MacCallum, Browne, and Sugawara, 1996), it can be concluded that the discrepancy between the model and the observed data was large for the second model (1B, with sedation and negative reinforcement motives on the same factor). Conversely, the fact that model 1A was not rejected should not be interpreted as strong evidence in favor of sedation and negative expectancies loading on one and the same factor. But the analysis clearly indicates that negative reinforcement and sedation do not assess a similar construct (which also follows from the lack of correlation between sedation expectancies and coping motives in this sample, \( r = .06, p > .50 \)).

Next, I inspected the correlations of these factors (the factors of Figure 2a) with alcohol use and problems. Alcohol use was assessed with a retrospective daily diary method based on the timeline follow-back method (Sobell and Sobell, 1995), in which participants indicated how much they drank on each day of the previous week (as in Wiers et al., 2002, 1997). Alcohol-related problems were assessed with the RAPI (White and Labouvie, 1989). Further, the AUDIT (Saunders, Aasland, Babor, De la Fuente, and Grant, 1993), which combines alcohol use and problems, was assessed. Consistent with the literature on negative reinforcement, negative reinforcement motives correlated primarily with alcohol-related problems \( (r = 0.33, p < 0.001) \), and less strongly with the AUDIT \( (r = 0.19, p < 0.05) \), and not significantly with alcohol use \( (r = 0.16, p < 0.10) \). Negative and sedation expectancies did not significantly correlate with alcohol use or problems in this sample, either as a combined factor or as separate expectancy-factors \( (ps > .10) \). Also in line with the expectancy literature (and with G&D), the strongest predictors of alcohol use were Positive Reinforcement cognitions \( (a correlation of 0.39 with alcohol use and the Audit, p < 0.01, and of 0.31 with the RAPI, p = 0.01) \).

In summary, both in many previous studies, in the work of G&D, and in the study briefly described here, negative reinforcement and sedation expectancies behave very differently with respect to their relationship with alcohol use and problems: negative reinforcement is a positive predictor of alcohol use and especially problems, while sedation expectancies are either unrelated or negatively related to alcohol involvement. Hence, the conclusion that an instrument like the AEMax measures all three basic factors or dimensions of expectancies (including negative reinforcement) because a sedation factor can be modeled is incorrect, as is the conclusion that therefore the use of separate instruments to assess these factors is no longer needed.

A Theoretical Analysis of the Problem

Before we can attempt to solve the problem, it may be useful to further analyze it. Why do sedation and negative reinforcement expectancies behave so differently? I believe that there is a crucial ingredient missing in the AEMax and in similar instruments which use single adjectives to assess expectancies: time. Essential to the notion of negative reinforcement is the idea that alcohol or other drugs are taken to obtain a desired change in affective state, and changes involve time. Negative reinforcement means expectancies refer to being in a negative affective state and consuming alcohol (or another drug) to alleviate this state. Is this notion not captured by a single adjective like relaxation? It is not, because the single adjective relaxation does not distinguish between the situation in which one is distressed (for example, after a stressful day at work), drinks alcohol to alleviate the stress and the situation in which one is already relaxed (for example, a lazy afternoon on the beach), then drinks alcohol and remains relaxed. The first is an example of negative reinforcement,
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Two Solutions

Based on this analysis, I propose two solutions. The first is a simple one: if one wants to assess the three major factors or dimensions that have come out of expectancy research (G&D, Wiers et al., 2006), the AEMax alone does not suffice and one should use a different instrument. If one prefers the motives formulation, Cooper’s DMQ-R is the instrument of choice (Kuntsche et al., 2005). However, in this instrument reasons for abstaining or moderating drinking (similar to negative expectancies) are not included. One could also use an expectancy instrument that does assess all three major factors, such as the expectancy questionnaire developed by Leigh and Stacy (1993). Note that instruments that assess negative reinforcement expectancies or motives do not consist of single adjectives and indicate a change in affect from negative to positive. Typical items are “When I drink alcohol I feel less stressed” (Leigh and Stacy, 1993), and “I drink to cheer up when I am in a bad mood” (Cooper, 1994).

I will sketch a second more general solution. The idea is to explore whether it is possible to assess negative reinforcement in a way more directly related to the emotion circumplex. I believe this avenue is worth exploring, for similar reasons why Goldman and colleagues were enthusiastic about the MDS approach to the study of alcohol expectancies (G&D, Goldman et al., 1999): the interesting relationships between expected alcohol and drug effects, affect, and personality. From the present analysis it follows that the time dimension is crucial to represent anticipated changes in affect state (see Figures 1b–d). From this perspective, one could ask participants how they expect alcohol (or other drugs) will change their affective state (e.g., for each octant of the emotion circumplex). Examples are

- When I feel distressed, drinking alcohol makes me feel relaxed (Figure 1c);
- When I feel sad, drinking alcohol makes me feel happy (not depicted).
- When I feel bored, drinking alcohol makes me feel more excited (Figure 1d).

Alternative conceptualizations are possible, such as using open ended questions (When I feel distressed, alcohol makes me . . .), using motive formulations (e.g., When I feel sad, I drink alcohol to feel better). In addition, it could be tested whether the emotion circumplex can be directly used to make people mark anticipated changes in affect as a result of drinking or drug use (e.g., by letting participants draw arrows in affect space, similar to Figures 2c and 2d; cf. Russell, Weiss, and Mendelsohn, 1989). One advantage of using the momentary affect circumplex with time as a third dimension as a starting point to develop an instrument
to assess expected changes in affect is that it points to potentially interesting different subtypes of negative reinforcement: relief from stress may be different from relief from negative sedation or boredom (cf. Figures 1c and 2d), and again different from relief from sadness (which would be represented as a horizontal arrow from sadness to happiness). These potential different subtypes are not assessed in a systematic way in any existing assessment tool I am aware of.

In designing an instrument targeted at assessing anticipated changes in affect, it may be advantageous to start from the general emotion circumplex rather than from the alcohol expectancy MDS solution (as in the AEMax). G&D have used a bottom-up approach to derive their two-dimensional MDS expectancy solution. Although this approach has been important in the original research linking the expectancy literature to the emotion literature (Goldman et al., 1999), the current conceptualization makes the comparison with the general circumplex models of emotion difficult. For example, in measures based on the emotion circumplex (e.g., Larsen and Diener, 1992; Russell et al., 1989), the neutral valence arousal octant is referred to as “extremely high arousal”, which matches MDS solutions of affective words for this octant (“aroused,” “astonished,” “stimulated,” “surprised,” “active,” and “intense”; Larsen and Diener, 1992). In the MDS expectancy solution (and in the AEMax), the same octant consists of the words: “attractive,” “appealing,” and “beautiful.” One may question whether these words adequately represent neutral-valenced arousal or whether they represent a peculiarity of the samples used (American college students, in large majority girls). In addition, conceptualizing expectancies as changes in affect has the advantage that it makes it easier to link expectancy research to personality, as has been done with the emotion circumplex. The relationship between ease of experiencing negative arousal and neuroticism has been firmly established, as has the relationship between positive arousal and extraversion (Larsen and Diener, 1992). Hence, individuals scoring high on neuroticism are most likely to develop tension reduction expectancies (Figure 1c). When people are generally relaxed, there is little need to drink to obtain this outcome, even though these individuals may associate alcohol with relaxation (as the starting point of drinking, Figure 1b). Extraversion has often been associated with frequent experiences of positive arousal and with a need for stimulation (Larsen and Diener, 1992). The latter aspect of this personality type could make these individuals more susceptible to the second type of negative reinforcement: relief from boredom (Figure 1d). In line with this idea, we recently found in two independent samples of heavy drinkers that implicit positive arousal associations were positively correlated with explicit negative reinforcement expectancies (Van den Wildenberg, Beckers, Van Lambaart, Conrod, and Wiers, 2006; Wiers et al., 2005). Hence, in some drinkers negative reinforcement may be more related to arousal (or relief from under-arousal or boredom) than to “relaxation.”

The general idea that certain personality types give rise to an “acquired preparedness” to develop specific expectancies has received support in recent years (McCarthy, Miller, Smith, and Smith, 2001; Smith and Anderson, 2001; Vangsness, Bry, and LaBouvie, 2005). Further, a number of studies have demonstrated that individual differences in susceptibility to the anxiety reducing effects of alcohol are dependent on the extent to which the individual reports anxiety prior to an alcohol challenge (Conrod, Pihl, and Vassileva, 1998; MacDonald, Stewart, Hutson, Rhyno, and Loughlin, 2001). In line with this idea, Conrod and colleagues have developed treatments in which personality profiles (anxiety sensitive, hopeless, impulsive and sensation seekers) are matched to specific treatments in which specific expectancies are targeted (Conrod, Stewart, Comeau, and Maclean, 2006; Conrod et al., 2000). An adapted AEMax could be most useful in such a context. In sum, the idea to link expectancies to emotion and personality using the general emotion
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circumplex may be a viable one, once the crucial third dimension is taken into account: time.

Finally, one may wonder whether the three dimensions proposed here (valence, arousal, and time) suffice to describe all major alcohol consumption-related (or drug) expectancies. First, as noted by G&D, many but not all expectancies represent anticipated changes in affect (e.g., anticipated cognitive changes). Second, the emotion circumplex has been criticized in the emotion literature, because positive and negative feelings are not always mutually exclusive (Cacioppo and Berntson, 1994; Larsen, McGraw, and Cacioppo, 2001; but see Russell and Carroll, 1999), and as noted above, in alcohol expectancy research the two are not each others opposite (cf. G&D, Wiers et al., 2006): people typically expect both positive and negative outcomes from drinking alcohol. Adding the time dimension to the momentary affect circumplex to represent alcohol expectancies may be particularly helpful, because positive and arousing expectancies reflect direct expected effects, while negative and sedating effects reflect more distal anticipated effects (e.g., Earleywine and Martin, 1993). In addition, expectancies differ with respect to the dose of alcohol used (Fromme et al., 1993; Wiers et al., 1997), which could also be incorporated into a modified AEMax. Finally, further research may indicate that a fourth dimension could be relevant: a good candidate seems the feeling of power, which has been proposed as a fundamental personality dimension (e.g., McClelland, Koestner, and Weinberger, 1989), as one of the alcohol expectancy factors (e.g., Brown et al., 1980), and as a central element in a recent evolutionary theory of addiction (Newlin, 2002). Obviously these ideas need further development and empirical testing, which is beyond the scope of this article.

Conclusions

First, G&D proposed that all three major expectancy factors (valence, arousal, and positive vs. negative reinforcement) can be assessed with a simple instrument based on the MDS-solutions for alcohol expectancy words: the AEMax. I argue that this is not the case, because negative reinforcement is not assessed in this way. The sedation factor that bears superficial resemblance behaves very differently: it is associated with negative expectancies and light drinking, while negative reinforcement expectancies are associated with heavy and problem drinking. This distinction is important: interventions that enhance sedation expectancies can be beneficial, while interventions that enhance negative reinforcement expectancies are likely to be harmful. In contrast, interventions that decrease negative reinforcement expectancies appear to be helpful in reducing drinking (Stewart et al., 2005). It is undesirable to lose the distinction between negative reinforcement and sedation expectancies, as is the case in the interpretation of the AEMax data by G&D. Second, I proposed two solutions to the problem. The first simple solution is to replace the AEMax by an instrument that does assess negative reinforcement. The second solution is to adjust the AEMax in such a way that it may be used to assess negative reinforcement, by adding a crucial third dimension: time. In this way, anticipated changes in affect from drinking alcohol (or using other drugs) can be assessed. In order to optimize the potential to investigate relationships with emotion and personality, I argued that it may be better to start with the general emotion circumplex than with the bottom-up MDS solution for alcohol.

In conclusion, I hope this article serves two purposes: first, to correct the idea proposed by G&D that sedation and negative reinforcement expectancies are identical, and the related idea that the AEMax can be used to assess all major expectancy dimensions or factors including negative reinforcement. Second, to stimulate further research into the interesting
link between cognition, emotion and personality in relation to the use and misuse of alcohol and other drugs.

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RÉSUMÉ

Attentes vis-à-vis de l’alcool et de la drogue en tant que modifications attendues des sentiments: le renforcement négatif n’équivaut pas à la sédation

Goldman et Darkes (2004) ont argumenté que chacun des trois facteurs de base des attentes liées à l’alcool peut être évalué au travers d’un bref questionnaire (AEMax) lié au modèle circomplex des émotions. Je soutiens que le renfort négatif, un des trois facteurs de base des attentes, n’est pas estimé avec l’AEMax. D’une manière primordiale, le renfort négatif est positivement lié à une consommation à problème alors que la sédation (le facteur AEMax qui est le plus proche) ne l’est pas. Au travers d’une nouvelle base de données (119 étudiants, collectée en 2002), je démontre que la sédation est liée aux attentes négatives et non pas au renforcement négatif. Différentes manières d’estimer tous les facteurs principaux d’attentes sont proposées.

RESUMEN

La expectación del alcohol y de las drogas como anticipo a los cambios en el afecto: el refuerzo negativo no equivale a la sedación

Goldman y Darkes (2004) argumentaron que los tres factores básicos de expectativa de alcoholismo pueden ser calculados con una lista de chequeo (AEMax), relacionada con el modelo circunplexo de la emoción. Yo argumento que el refuerzo negativo, uno de los tres factores básicos de expectación, no se puede evaluar con el AEMax. De forma notable, el refuerzo negativo está positivamente relacionado con el problema de la bebida, mientras que la sedación (hecho al que se aproxima el factor AEMax) no lo está. A partir de un nuevo conjunto de datos (de 119 estudiantes seleccionados en el año 2002), demuestro como la sedación está relacionada con la expectación negativa, y no con el refuerzo negativo. Se proponen así diferentes caminos para evaluar todos los principales factores de expectación.
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Notes

1. Motives are defined somewhat differently than expectancies: as “reasons for drinking” vs. “expected outcomes,” respectively. One may expect an outcome but not drink for this reason (e.g., aggression). In line with this idea, Cooper et al. (1995) hypothesized and found that motives are more proximal predictors of drinking than expectancies (see also Kuntsche, Knibbe, Engels, and Gmel, in press). However, I agree with Goldman and colleagues that the differences between the two concepts are rather minimal (Goldman et al., 1999), as also indicated by the high correlations between the constructs (e.g., Cooper et al., 1995).

For example, to a participant the two following items will look very similar:

- “When I drink alcohol, it is fun” (an expectancy item from Leigh and Stacy, 1993);
- “I drink because it’s fun” (a motivation item from Cooper, 1994).

From a somewhat broader perspective, both expectancies and motives are examples of explicit alcohol-related cognitions, which may be contrasted with more automatic or implicit alcohol-related cognitions (see Deutsch and Strack, 2006; Stacy, 1997; Wiers et al., 2006, 2005, 2002).

2. Both an anonymous reviewer and Emmanuel Kuntsche pointed out that it may also be useful to distinguish between two types of negative expectancies (in accordance with motives formulations): something positive will reduce (e.g., an intimate relationship with continued drinking; cf. Jones and McMahon, 1994) or something negative may occur after continued drinking (e.g., a headache).

References


Negative Reinforcement Is Not Sedation


