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Generality and Specificity in Health Behavior: Application to Warning-Label and Social Influence Expectancies

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The authors outlined a meta-theoretical and an analytic framework for construing the predictive effects of health-behavior expectancies, or beliefs, in terms of both general and specific processes. This framework was applied empirically to the investigation of the predictive effects of outcome expectancies related to the recently mandated alcohol-warning label as well as to expectancies reflecting social influence processes. Results showed that general and specific predictive effects of expectancies on alcohol-use behaviors operated simultaneously, demonstrating the potential value of the framework. The authors summarized implications for continued theoretical development as well as for applications in prevention of alcohol abuse through warning-label and social influence interventions.

Outcome expectancy constructs, also referred to as *behavioral beliefs* (see Ajzen & Fishbein, 1980; Bandura, 1977, 1986; Bolles, 1972; Leigh, 1989), have been used to explain a number of health-related behaviors. These constructs have been found to be useful in both theory and practice. Theoretically, expectancy constructs have been incorporated into a variety of perspectives, including social learning (Bandura, 1986; Rotter, 1954), reasoned action (Fishbein & Ajzen, 1975), and memory-based (Tolman, 1932) models of how expectancies influence behavior. Practically, attempts at expectancy or belief change have played a central role in efforts to prevent health-compromising behaviors (e.g., Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990; Pentz et al., 1989), as well as in treatment strategies that focus on these behaviors (Marlatt & Gordon, 1985).

The present study focused on several specific issues within the larger body of health-related research on outcome expectancies. The first specific issue is of applied interest and focused on the predictive strength of a certain class of expectancies. These expectancies are ones that were recently targeted by legislation mandating that alcohol-warning labels be placed on all beverage containers of alcohol sold in the United States. The second specific issue was an extension and replication of earlier work that supported the distinction between general classes of positive and negative outcome expectancies related to alcohol use. This issue has both applied and theoretical implications for research on health behavior. As shown later, it is useful to investigate both of these topics with a theoretical and analytic framework that simultaneously examines specific and global outcome expectancies. Our use of this paradigm represents one application of a more general framework that distinguishes between generality and specificity in health behavior. The illustration of this framework constitutes a third, broader focus of our article. We gradually introduce the concept of generality and specificity by first outlining the specific topics to which we applied this distinction.

Alcohol-Warning-Label Legislation

In November 1989, a new law took effect requiring distributors of alcoholic beverages to place warning labels on containers of beer, wine, and liquor (Alcoholic Beverage Labeling Act of 1988). The law was designed to warn the public about the potential hazards of alcohol consumption, including health problems, birth defects in the unborn fetuses of pregnant women, drinking and driving hazards, and dangers in the operation of machinery after drinking. Although a direct evaluation of the effectiveness of product-warning labels was beyond the scope of this study, our assessment of the predictive strength of expectancies targeted by the warning label provided information relevant to some of the ways in which warning labels may affect behavior.

The text of the alcohol-warning-label legislation states that this new law was enacted to inform alcohol users about the consequences of alcohol use. One way in which such information could influence alcohol-related behavior is through its effect on the subjective probability, or expectancy, of experiencing negative consequences from drinking alcohol or from engaging in hazardous alcohol-related behaviors (e.g., driving under the influence of alcohol, or DUI). The critical assumption of this approach is that outcome expectancies influence behavior. Although direct causation of behavior by outcome expectancies is difficult to evaluate (for discussions, see Leigh, 1989; Goldman, Brown, Christiansen, & Smith, 1991; Stacy, Newcomb, & Bentler, 1991a), certain necessary (but not sufficient) criteria

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consistent with a causal process can be readily investigated (e.g., Campbell & Stanley, 1966; Hirschi & Selvin, 1973). In the present study, we investigated one of the necessary but not sufficient criteria, namely, that expectancies for outcomes on warning labels significantly predict alcohol-related behavior. Because some outcomes on warning labels (e.g., birth defects) may be differentially salient to males and females, we also evaluated possible gender differences in prediction.

The types of outcomes mandated to appear on alcohol-warning labels are the negative outcomes listed earlier, such as DUI and health consequences. On the one hand, it is useful to consider different types of negative outcome expectancies as different factors, or scales, of expectancies. These different types of outcomes, after all, refer mostly to events having different antecedents. For example, the events leading up to an accident after drinking while operating machinery are likely to differ from the events leading up to the onset of chronic health problems. In some instances, the specific consequences may also be dissimilar. For example, DUI has different consequences than does drinking during pregnancy.

On the other hand, each of the warning-label consequences refer to negative events that occur from drinking, and the extent to which subjects respond to expectancies about such negative events may be quite similar. Responses to these expectancies may be based on a type of quasi-attitudinal response of negativity toward the behavior, rather than on anything in particular about the specific consequence. Because both of these possibilities are tenable, we assessed the predictive association of expectancies about negative outcomes (hereinafter termed *negative expectancy*) in terms of both specific factors of expectancy and general, or higher order, factors of positive and negative expectancy. We argue more fully for this strategy in the following sections.

Positive and Negative Outcome Expectancies

General Expectancy Dimensions and Attitude

In an evaluation of confirmatory factor analysis models, Stacy, Widaman, and Marlatt (1990) found that general constructs of positive and negative expectancies toward alcohol use were empirically distinguishable from one another and from the more unitary construct of attitude toward drinking. Furthermore, these expectancy and attitude constructs showed different levels of cross-sectional and prospective prediction of alcohol-use behavior. Because of these findings, Stacy, Widaman, and Marlatt suggested that the expectancy factors did not operate merely as predictors or indicators of attitude (as in the theory of reasoned action; Fishbein & Ajzen, 1975) or as components that should be summed together into a combined-scale score (as in utility theory; Bauman, Fisher, Bryan, & Chenoweth, 1985). In addition, the predictive superiority of positive expectancies over negative expectancies and attitude suggested that models that focus primarily on health beliefs referring to negative outcomes of a behavior are likely to be incomplete explanations of health behavior. Other research also has found support for the distinction between positive and negative expectancies (Christiansen, Goldman, & Inn, 1982; Rohsenow, 1983; Stacy, Dent, et al., 1990).

More Specific Expectancy Dimensions

Although some evidence has accumulated for the conceptual and empirical separation of positive and negative expectancies, another line of research suggests that for alcohol use it is more useful to consider many diverse types of outcome expectancies, not just positive and negative ones. A number of studies have used a multidimensional scale of alcohol outcome expectancies first proposed by Brown, Goldman, Inn, and Anderson (1980). Although there has been debate about the discriminant validity of this multidimensional scale and its variants (e.g., Goldman et al., 1991; Leigh & Stacy, 1991), there are practical and conceptual reasons for trying to use such a scale (Christiansen et al., 1982). For example, if specific types of expectancies could be identified as being most predictive of health behavior, then perhaps those expectancies should receive the most attention in interventions designed to change behavior. If only attitude or a global expectancy dimension (e.g., negative expectancies) are used to represent alcohol-use predispositions, however, it is not clear what type of information might be used in an informational intervention (such as warning-label legislation). Although predictive strength and informational content are not the only criteria to consider when choosing the focus of such interventions, in many instances they are the only scientifically based criteria available to guide the focus of preventive interventions.

In our study, we made no attempt to measure every possible type of specific expectancy related to alcohol use. Instead, we assessed specific expectancies of frequent concern to prevention programs. In addition to assessing the negative expectancies of concern to the warning-label preventive intervention, we assessed expectancies related to social influence processes that are thought to underlie the community-based prevention of adolescent alcohol abuse (e.g., MacKinnon et al., 1991; Pentz et al., 1989). These types of expectancies are ones that reflect normative social influences (Deutsch & Gerard, 1955) regarding alcohol use, in which anticipated outcomes of social acceptance affect behavioral decisions about drinking. For example, in accord with this type of explanation, people may drink in part because they think others will like them more if they drink. This class of expectancy may show some gender differences in prediction, in line with theories suggesting that females may be somewhat more susceptible to normative pressures than males (Eagly, 1983).

We assessed a second type of positive social outcome expectancy to reflect expectancies about anticipated social disinhibition from drinking alcohol. Although this social outcome has not received widespread attention in prevention programs, it is frequently listed as an expected positive outcome of drinking among samples of youth who have completed free-response listings of alcohol-use outcomes (Leigh, Stacy, & Aramburu, 1989). Because this outcome appears to reflect something different from traditional notions of social acceptance (normative) outcomes, we expected that it would reflect a different specific factor from social acceptance expectancies. Social disinhibition expectancies may be products of informational social influences (e.g., Bandura, 1977; Deutsch & Gerard, 1955; Sussman, 1989) rather than reflections of normative social influence. Subsequently, we evaluated whether the predictive effects of these two types of expectancies could be distinguished empirically from the predictive effects of their common (general factor) variance.

Generality Versus Specificity in Health Behavior

Each of the specific topics just outlined can be conceptualized and studied using different levels of abstraction with respect to outcome expectancies. In fact, there are many behaviors in health-related research in which either global dimensions of positive and negative expectancy or specific expectancy dimensions, such as expectancies toward social acceptance or health problems, are appropriate theoretically. However, an empirical strategy that constrains the investigation to either general or specific expectancies may produce misleading results. For example, if specific expectancies form a general factor, such as Negative Expectancy, then omitting the general factor from the analysis may lead to biased estimation of the predictive strength of the specific expectancy dimensions. On the other hand, if the variance of specific expectancy dimensions has a component of reliable variance unique from the general factor, then combining the specific expectancies into a general scale (Stacy, Widaman, & Marlatt, 1990) may mask differences among the specific dimensions.

Because debate about the usefulness of different types of expectancy dimensions continues, it is probably best to use a conceptual and analytic framework that is not bound to strong assumptions regarding levels of abstraction or dimensionality. Fortunately, such a framework does exist and can be applied readily to health-behavior research. In sociological inquiry, Osgood and his colleagues (Osgood, Johnston, O'Malley, & Bachman, 1988; also see Newcomb & Bentler, 1988) have made the important distinction between generality and specificity. In this framework, concepts may be construed simultaneously as manifestations of both general and specific processes. Constructs explained by general processes are those that are unified in their prediction of other constructs or in their ability to be predicted by other constructs. In other words, different manifestations of a more general process do not diverge from the common variance of all the manifestations in their pattern of association with other constructs. In the framework of Osgood et al., conceptual coherence of constructs is not a sufficient criterion for generality. Conceptually coherent constructs may diverge in their prediction of other constructs or in their ability to be predicted by other constructs. Divergent effects are likely to represent specific processes. One of the primary contributions of Osgood et al., as well as of Newcomb and Bentler, was not so much that general and specific effects could be differentiated, but that these effects could be differentiated simultaneously within a general conceptual and analytical model that was useful in a variety of domains.

It is important to emphasize that empirical support for either generality, specificity, or a combination of processes would only provide one, rather abstract, level of corroboration for any particular theory of health behavior. For example, the study of generality versus specificity in health-behavior expectancies has implications for attitudinal, global expectancy, and specific expectancy approaches to health behavior. However, the predominance of one type of effect over the other would only hint at the specific nature of the underlying process, whether it is considered to be based in neurophysiology (e.g., Wise, 1988), reasoned action (Ajzen & Fishbein, 1980), memory (e.g., Goldman et al., 1991; Stacy, Widaman, & Marlatt, 1990), or judgment heuristics. Nevertheless, the distinction between generality and specificity in health behavior is likely to advance theories in ways that have important applied implications, as we point out with respect to the alcohol-warning-label intervention and other prevention efforts. In addition, this distinction is relevant to generality and specificity in gender differences. For example, research on gender differences in social influence (Eagly, 1983) has suggested that only certain, specific types of positive expectancies may show gender differences in the prediction of behavior. These are expectancies that measure social pressures, such as our measures of social acceptance expectancies, rather than expectancies for other types of specific outcomes or more general factors of expectancies.

Overview

Using an analytic framework that distinguished between generality and specificity, we assessed the predictive strength of different types of expectancy constructs in a sample of 12th-grade high school students. This allowed us to investigate each of the specific topics just summarized, as well as to illustrate the use of the generality and specificity framework in this area of research. The age group sampled was of high risk for certain alcohol-related problems that are targeted by warning-label and educational interventions, such as DUI. We formulated the expectancy constructs to represent both higher order (positive and negative) and lower order (specific expectancies, such as social acceptance or impaired driving) factors of expected outcomes of alcohol consumption. These factors were used for the concurrent prediction of alcohol use, behavior regarding one's own level of DUI, and behavior regarding the prevention of DUI. Because it was possible that some of the expectancy constructs might have shown gender differences in prediction, we evaluated predictive models separately for each gender.

Method

Subjects

Our subjects were 813 high school students in the 12th grade; 52% of the students were male. Students were from classes randomly sampled from all 27 high schools in a single county in Indiana (MacKinnon, Pentz, & Stacy, 1993). We measured all students in the randomly sampled classrooms. Because the focus of our research was individual-level health behavior and because we sampled a large number of classrooms, we did not adjust for clustering caused by random sampling at the classroom level. Although our results might be more generalizable to an Indiana student population if we had sampled randomly at the individual level, that form of random sampling was not feasible; a classroom unit of analysis was also not practical. Assessments oc-

Table 1
Means, Standard Deviations, and Correlations Among Indicators in Both Samples

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	—	.54	.31	.40	.41	.41	.54	.13	.09	.15	.13	−.04	.04	.06	.05
2.	.53	—	.49	.32	.32	.29	.40	.01	.02	.05	−.04	−.09	−.06	−.02	.07
3.	.27	.47	—	.19	.17	.07	.21	.01	−.02	−.05	−.04	−.10	−.13	−.08	−.01
4.	.46	.28	.16	—	.54	.47	.64	.05	.00	.09	.02	−.13	−.10	−.03	−.08
5.	.53	.35	.19	.56	—	.56	.60	.05	.04	.10	.10	−.10	−.04	.00	.01
6.	.53	.27	.15	.53	.58	—	.56	.04	.04	.04	.07	−.10	−.09	−.03	−.09
7.	.66	.44	.21	.54	.61	.60	—	.08	.08	.11	.11	−.09	−.04	−.02	−.05
8.	.06	.02	−.11	−.01	.04	−.03	.08	—	.68	.44	.31	.29	.24	.27	.20
9.	−.01	.00	−.11	−.02	−.04	−.03	−.02	.53	—	.38	.37	.36	.30	.24	.21
10.	.03	.00	−.01	.04	.12	.04	.08	.07	.22	—	.50	.27	.29	.27	.16
11.	.12	.08	.02	.10	.07	.04	.11	.14	.21	.41	—	.38	.34	.38	.24
12.	.07	.03	−.08	−.05	.03	−.05	.10	.19	.25	.12	.14	—	.61	.34	.32
13.	.11	.06	−.05	−.04	.06	−.02	.07	.28	.20	.01	.17	.51	—	.36	.41
14.	.05	.03	−.04	−.02	−.06	−.01	−.04	.07	.15	.07	.31	.23	.37	—	.42
15.	.04	.01	−.04	−.02	−.01	−.02	−.05	.02	.12	.08	.20	.23	.30	.35	—
16.	.10	.06	−.13	.06	.09	.09	.08	.22	.21	.17	.25	.28	.21	.29	.18
17.	.00	−.05	−.02	.02	.11	.03	.04	.06	.09	.60	.15	.16	.03	.07	.08
18.	.12	.06	.02	.17	.24	.25	.21	.08	.05	.06	.07	−.03	−.05	−.14	−.07
19.	.16	.15	.00	.26	.33	.27	.24	.07	.06	.08	.08	−.05	−.13	−.19	−.11
20.	.14	.12	.05	.20	.28	.22	.23	.06	.04	.08	.07	−.04	−.06	−.20	−.11
21.	.07	.07	.04	.06	.12	.14	.12	.01	−.02	−.02	−.02	−.03	−.02	−.16	.02
22.	.05	.09	.04	.06	.11	.09	.11	−.03	−.05	−.05	−.09	−.03	.03	−.25	−.11
23.	.04	−.01	−.04	−.02	−.08	−.04	−.05	−.05	−.06	−.02	.03	.03	.07	.07	.03
24.	.03	−.01	−.05	−.02	.04	.11	−.01	.03	.02	.03	.02	.03	.08	.02	−.02

Note. Correlations for male students are above the diagonal; correlations for female students are below the diagonal. 1 = part of group; 2 = more warning-label wording; 9 = birth defects, alternative wording; 10 = machinery operation, warning-label wording; 11 = machinery operation, family problems; 15 = other negative expectancies, can be addicted; 16 = impaired driving, warning-label wording; 17 = impaired driving, driver; 23 = times tried to stop others from driving under the influence; 24 = times chose not to ride with drinking driver.

curred between October 1990 and February 1991. The students in the study constituted a subsample of students from the larger sample (N = 2,006). To address different substantive issues about drug use and other health-related behaviors, students from each classroom in the larger sample were randomly assigned different questionnaires. The students in the present subsample were those who completed questionnaires that focused on both positive and negative expectancies about the effects of alcohol; only students who had drunk alcohol at least once in their lives were retained for subsequent analysis. Students voluntarily completed questionnaires and were told that their responses would be kept totally anonymous. Descriptive information about the sample characteristics and correlation matrices for male and female students are provided in Table 1.

Measures

Negative expectancy. Measures representing expectancies for the negative outcomes of drinking emphasized the outcomes targeted by the recently mandated alcohol-warning label: outcomes related to DUI, health problems, birth defects, and impaired operation of machinery. Each of these outcomes was represented by a specific factor of negative expectancies, assessed with a pair of items. For one item in each pair, we attempted to retain wording highly similar to that in the actual warning label (warning-label wording); for the second item in each pair, we changed the wording to reflect a more colloquial form of description (alternative wording). For example, for impaired driving expectancies, one item asked "Can drinking alcohol impair your ability to drive a car?" whereas the second item asked "Can drinking alcohol cause you to get in an accident?" As we did with all of the expectancy items, we mixed the negative items together such that no two items from the same pair (specific factor) or the same general factor (positive vs. negative) were adjacent in the questionnaire. For each of the expectancy warning-label items, respondents indicated on 4-point scales (coded from 1 = *no* to 4 = *yes, definitely*) whether they thought drinking alcohol would lead to the outcome. The four outcomes for warning-label expectancies included impaired driving, health problems, birth defects if consumption occurred during pregnancy, and impaired operation of machinery. Two additional negative expectancy items were also assessed, representing a specific factor of negative outcomes not listed on the warning label. These two measures were assessed on the same scale of measurement and included the outcomes of family problems and addiction from alcohol. We assessed these items because we wished to measure some items that did not overlap in content with the items on the warning label. The choice of which other items to pick was fairly arbitrary but was constrained by limits on the number of additional items we could include in the questionnaire.

Positive expectancy. These measures were scaled in the same way as the negative expectancy items. We measured two specific factors of positive expectancies to reflect two different types of social outcomes of likely concern to adolescents: Social Acceptance and Social Disinhibition. The Social Acceptance outcomes were measured with three items: "Can drinking alcohol make you feel part of the group?" "Can drinking alcohol help you be more accepted by people your age?" and "If you drink alcohol, will your friends like you more?" Social Disinhibition was measured with four items: "Can drinking alcohol make you more outgoing?" "Can drinking alcohol cause you to be friendlier?" "Can drinking alcohol help you to talk more freely?" and "Can drinking alcohol make you feel more social?" It is important to mention that

									Female student		Male student	
16	17	18	19	20	21	22	23	24	*M*	*SD*	*M*	*SD*
.01	.09	.09	.11	.12	.08	.04	−.03	.01	2.66	1.01	2.83	1.01
−.02	.05	.07	.03	.04	.09	.07	−.07	.01	2.34	1.01	2.58	0.96
−.02	−.03	.06	.04	.02	.05	.05	−.02	.05	1.58	0.74	1.85	0.81
−.01	.07	.16	.12	.11	.05	.11	−.03	−.06	2.39	1.07	2.69	1.06
−.02	.09	.20	.26	.22	.14	.17	−.05	.00	2.54	1.02	2.65	1.01
−.05	.03	.21	.23	.20	.09	.16	.05	−.02	2.81	1.10	2.87	1.09
−.01	.08	.24	.24	.22	.11	.18	−.03	−.02	2.78	1.00	2.97	0.99
.28	.39	−.17	−.04	−.08	−.10	−.10	.01	.00	3.90	0.32	3.80	0.47
.27	.48	−.15	−.03	−.04	−.12	−.15	.02	.02	3.94	0.24	3.85	0.44
.36	.61	−.14	−.01	−.06	−.10	−.08	−.04	−.04	3.89	0.37	3.88	0.42
.53	.42	−.15	−.02	−.07	−.18	−.13	.01	.05	3.87	0.41	3.82	0.49
.37	.29	−.21	−.13	−.18	−.20	−.21	.01	.02	3.88	0.36	3.83	0.42
.34	.21	−.17	−.11	−.12	−.17	−.15	−.02	.03	3.79	0.51	3.70	0.59
.31	.14	−.26	−.15	−.25	−.20	−.12	−.07	−.01	3.78	0.50	3.72	0.59
.27	.12	−.15	−.14	−.15	−.14	−.18	−.02	.04	3.63	0.68	3.42	0.84
—	.33	−.18	−.12	−.13	−.21	−.19	.00	.05	3.84	0.43	3.80	0.45
.17	—	−.12	−.05	−.07	−.11	−.09	.01	−.03	3.94	0.33	3.92	0.41
.01	.02	—	.63	.80	.50	.50	.17	.12	2.15	1.15	2.37	1.31
.01	.04	.61	—	.64	.35	.33	.11	.05	4.20	2.15	5.11	2.86
.00	.02	.73	.65	—	.50	.42	.16	.15	3.94	2.37	4.58	2.95
.02	−.01	.40	.31	.41	—	.63	.17	.15	1.20	0.66	1.41	0.95
−.08	−.07	.37	.35	.43	.40	—	.12	.14	1.60	1.04	1.56	1.04
.04	−.01	.12	.12	.13	.03	.09	—	.50	1.38	0.81	1.42	0.95
.05	.00	.24	.21	.25	.10	.18	.54	—	1.69	1.02	1.64	1.08

accepted; 3 = friends like you more; 4 = more outgoing; 5 = cause you to be friendlier; 6 = talk more freely; 7 = feel more social; 8 = birth defects, alternative wording; 12 = health problems, warning-label wording; 13 = health problems, alternative wording; 14 = other negative expectancies, alternative wording; 18 = times drunk; 19 = quantity; 20 = quantity and frequency; 21 = times drove after drinking; 22 = times rode with drinking

the Social Acceptance expectancies were quite consistent with social psychological definitions of normative pressure toward performing a behavior, in which the rewarding properties of social acceptance are emphasized (Deutsch & Gerard, 1955). The Social Disinhibition expectancies were in line with evidence that these expectancies are frequently listed as desirable outcomes of drinking in youth (Leigh et al., 1989).

Alcohol use. Three indicators of alcohol consumption were used to represent a factor of Alcohol Use. The first indicator assessed the number of times the respondent had gotten drunk in the last 30 days, coded from 1 (*never*) to 7 (*more than 10 times*). The second indicator measured quantity and assessed the number of drinks consumed during a typical sitting, from 1 (*none*) to 10 (*more than 10 drinks*). The third indicator represented a quantity and frequency measure of current consumption and was the sum of two items. One item asked how many alcoholic drinks the respondent had in the last month, whereas the second item asked how many drinks were consumed in the past 7 days (both scales were coded from 1 = *none* to 7 = *more than 100*). Because these two items had very similar variances, they did not need to be standardized before the summation. These two items were summed into one indicator to reduce the complexity of the model as well as to maximize the reliability of the indicator.

DUI behavior. This factor was represented by two items that assessed the number of times drinking-and-driving behavior was exhibited over the last 30 days, on scales scored from 1 (*none*) to 5 (*more than four times*). The first item asked respondents to indicate the number of times they had driven after drinking. The second item asked respondents to indicate the number of times they had ridden with someone who drove after drinking.

DUI prevention. This factor was represented by two items that assessed the number of times respondents had done something to prevent their own or others' involvement in DUI over the last 30 days, on scales scored from 1 (*none*) to 5 (*more than four times*). The first item asked respondents to indicate the number of times they had tried to stop someone from driving after drinking. The second item asked respondents to indicate how many times they had chosen not to ride with someone who was driving after drinking.

General Analytical Procedure

We analyzed the distinction between generality and specificity in outcome expectancies using structural equation modeling (SEM) procedures in both single- and multiple-group analyses (Bentler, 1989; Byrne, Shavelson, & Muthén, 1989; MacCallum, 1986; Newcomb & Bentler, 1988). Use of SEM procedures provides for the evaluation of both general and specific effects, because these procedures allow for the partitioning of variance of constructs into both general and specific elements that can be used simultaneously as predictors (or as dependent variables). We used the EQS program (Bentler, 1989) for all SEM procedures, with maximum likelihood (ML) estimation. We used two indexes of model fit from this program, the nonnormed fit index (NNFI; Bentler & Bonett, 1980) and the comparative fit index (CFI; Bentler, 1989, 1990), to evaluate the fit of the final models. Both of these fit indexes are relatively robust to sample-size biases compared with alternative fit indexes (see Bentler, 1990; Marsh, Balla, & McDonald, 1988). We also performed a series of supplementary analyses using robust estimates of model fit and parameter significance (Bentler & Dijkstra, 1985; Satorra & Bentler, 1988), which could only be performed in the single-group analysis and was not available for the evaluation of multiple-group models. The models using the robust procedures are not reported here, but they were virtually identical to the single-group models that we report later.

In their analytic strategy, Osgood et al. (1988) used SEM procedures to simultaneously evaluate general and specific predictive effects. Osgood et al.'s strategy involves partitioning the variance of constructs to be represented by both general factors (shared variance among constructs) and specific variances of observed variables. A similar analytic strategy has been used successfully by Newcomb and Bentler (e.g., Newcomb & Bentler, 1988; Stacy et al., 1991a). As an extension of this general strategy, we represented general factors as higher order factors of positive and negative expectancy and specific factors as lower order factors of the specific type of expectancy (e.g., social disinhibition and health problems). The lower order factors had the measured-variable indicators that we outlined in the Measures section. The higher order factors used the lower order expectancy factors as indicators. That is, the higher order factor of Positive Expectancies represented the common variance of the lower order factors of Social Acceptance and Social Disinhibition, which both loaded on this higher order factor. The higher order factor of Negative Expectancies represented the common variance of the lower order factors of Health Problems, Impaired Driving, Birth Defects, Impaired Operation of Machinery, and Other (nonwarning-label) Negative Expectancies. We make the specifics of this strategy more clear as the analysis progresses.

The regression paths of central concern to this analysis were from the higher order and lower order expectancy factors to the Alcohol-Use and DUI factors. These are the paths that represented potential distinctions between generality and specificity. Although we assumed a priori, on the basis of previous results (Stacy, Widaman, & Marlatt, 1990), that positive and negative higher order factors would be empirically separable, we estimated the correlation between these higher order factors as an indication of whether this assumption was valid. A contrary finding, of a large correlation between these higher order factors, would have suggested that an extreme form of generality might be preferable. That is, perhaps the higher order expectancies should be considered as a unitary construct, such as an attitude. A less extreme form of generality would be supported by the predominance of the higher order expectancy factors as predictors of the dependent variables. Specificity would be supported by a predominance of the lower order expectancy factors as predictors of the dependent variables. A final alternative is an absence of a clear predominance of generality versus specificity and of support for a mixed-effect model similar to that of Osgood et al. (1988).

In line with these general alternatives, our subsequent analysis emphasized the global comparison of general and specific effects, rather than the testing of a circumscribed set of very specific hypotheses. In this study, this approach seems optimal for two reasons: (a) We sought to give general and specific effects at least a roughly equal chance for retention in the models, and (b) our focus was on generality and specificity as general classes of effects, rather than on a specific theory of expectancy effects. For evaluations of specific theories, evaluation of a set of highly circumscribed, a priori models might be preferable (e.g., Stacy, Widaman, & Marlatt, 1990).

A final point in our analytical procedure concerns the use of Lagrange multiplier (LM) modification indexes and the Wald test (Chou & Bentler, 1990). Our use of these tests in SEM procedures served as an efficient means of performing model evaluations that otherwise would take a number of separate chi-square difference tests. The LM test is used to evaluate whether additional parameter estimates are needed in a model to provide an adequate goodness of fit. However, the LM test can be constrained to evaluate the significance of only a small subset of hypothesized parameter estimates (Bentler, 1989), as we have done in the present analysis. In addition, the entry of path estimates on the basis of the LM test must take into account that suppression effects sometimes become likely as estimates are added. We did not add path estimates with inappropriate signs, opposite to the bivariate association, to the models in obvious instances of "net suppression" (J. Cohen & Cohen, 1975, p. 89). The Wald test is used to evaluate the significance of parameter estimates that are already in a model. Our use of Wald tests is explained later. We used the LM and Wald tests mostly in the preliminary, single-group analyses. These tests were not available for use in our final, multiple-group analysis reported below, except for LM tests of equality constraints, which were imposed across groups. Finally, we used two-tailed tests for all significance tests, and input the data into EQS in raw form, which automatically leads to the analyses of covariance, rather than correlation, matrices in this program.

Results

An initial analysis of the difference between covariance matrices revealed that the male and female student matrices were significantly different, $\chi^2(300, N = 813) = 729.20$, $p < .001$. This result, together with our expectation that some differences might be found, supported the analysis of the male and female student samples as separate groups. Using the general analytical procedures just outlined as well as additional steps described below, we performed two series of analyses based on the recommendations for the analysis of multiple groups in covariance structure modeling (Byrne et al., 1989). The first series of analyses obtained a relatively good-fitting model in each group (male students vs. female students) separately. The second series used the models derived from the first series to evaluate in multiple-group models critical alternatives in the investigation of generality and specificity. The multiple-group evaluation included tests of factorial invariance, which are critical to the appropriate comparison of group differences in structural parameters.

Preliminary, Single-Group Analyses

Before we could address the statistical significance of alternative paths pertaining to the major substantive issues through a multiple-group comparison, we needed to separately derive a relatively good-fitting model for each of the gender groups. The necessity for deriving a model of good fit before alternative hypotheses can be investigated has been made clear by MacCallum (1986) and has been addressed in the multiple-group context by Byrne et al. (1989).

We first analyzed an initial model in both groups that included the following: all possible paths from the higher order factors (Positive and Negative Expectancies) to the dependent factors of Alcohol Use, DUI Behavior, and DUI Prevention; a correlation between the two higher order expectancy factors; the three correlations between the Alcohol-Use and DUI dependent factor residuals; and all hypothesized higher order and lower order factor loadings. Because only two lower order factors loaded on the higher order factor of Positive Expectancies, and because this local underidentification of the factor appeared to lead to condition codes (in this instance, estimation problems involving a residual variance), these two loadings were constrained to be equal in the initial model. The constraint led to local just identification of this higher order factor and solved the estimation problem with Positive Expectancies in the male initial model but not in the female model. We retained this constraint in both the female and male models for several reasons: It helped empirically identify the male model, we desired to keep the two models as similar as possible in measurement parameters, and the inclusion of the constraint did not significantly change the fit of the female model, $\chi^2(1, N = 389) = 0.02$, $p > .05$. Fit indexes for the initial model for male students were as follows: NNFI = .910, CFI = .923, $\chi^2(236, N = 424) = 532.439$, $p < .001$. Fit indexes for the initial model for female students were as follows: NNFI = .853; CFI = .875, $\chi^2(236, N = 389) = 591.717$, $p < .001$.

In the next step, we ran LM tests for the significance of additional correlational estimates, which may have been needed in the model to preclude bias in the path estimates. These estimates were correlations among the specific expectancy factor residuals and correlations among residuals of measured-variable indicators. On the basis of these LM tests, we added four correlations among measured-variable residuals and two correlations among specific expectancy factor residuals to the model for male students and three correlations among measured-variable residuals to the model for female students. The two correlated residuals of specific expectancy factors that were significant (only among male students) were relevant to the distinction between generality and specificity. These correlations were between Health Problems and Social Acceptance ($r = -.25$, $p < .05$) and between Health Problems and Social Disinhibition ($r = -.48$, $p < .05$). We were somewhat concerned that the estimation of these latter two correlations in the model for male students but not for female students might differentially affect the subsequent estimation of path estimates in the two models, even though the correlations were not significant in the female model. However, the presence or absence of these correlations made no difference to the significance of the paths in the final models reported below.

In the next step of model evaluation, we performed a second set of LM tests for the possible addition of paths from specific expectancy factor residuals to the Alcohol-Use and DUI dependent factors. We evaluated paths from the specific expectancy factor residuals instead of paths from the specific expectancy factors because these residual factors constituted the portion of variance of the specific factor that did not overlap with the higher order expectancy factors. In this step of model evaluation we also ran LM tests for the possible addition of paths from indicator residuals of the specific expectancy factors to the Alcohol-Use and DUI dependent factors. These paths were tested because in some instances an indicator may diverge from the specific factor in its prediction of another factor; to assess the possibility of this type of prediction, the residual of the indicator must be used for prediction, because the residual represents the portion of variance of the indicator that does not overlap with the specific factor. These paths were substantively meaningful in the present framework, if one considers them to represent the most extreme form of specificity. Substantive meaning is also likely to the extent that method effects (e.g., Stacy, Widaman, Hays, & DiMatteo, 1985) do not seem to be responsible for the path; when these paths are used to predict a dependent factor having multiple indicators whose common variance does not overlap uniquely in method with the predictor, substantive, rather than methodological, interpretations are tenable.

After we evaluated the preceding parameter estimates and included significant ($p < .05$) estimates, we conducted the final stage of model evaluation. In this stage, we used the Wald test (Chou & Bentler, 1990) to delete sets of nonsignificant parameter estimates in constrained steps (Stacy, Newcomb, & Bentler, 1991b). Our use of constrained steps means that we deleted small subsets of nonsignificant parameters one at a time to avoid inappropriately deleting possibly significant estimates. We deleted nonsignificant ($p > .05$) parameter estimates until no nonsignificant effects remained in the model. The final single-group models resulting from these procedures adequately reproduced the sample covariance matrices using ML estimation, with respect to the practical indexes of fit for male students, NNFI = .965, CFI = .971, $\chi^2(231, N = 424) = 343.335$, $p < .001$, and for female students, NNFI = .967, CFI = .972, $\chi^2(232, N = 389) = 310.808$, $p < .001$. The pattern of significance of the estimates was subjected to further scrutiny in the more rigorous, multiple-group analysis, which we report below. Subsequently, we report the significance of estimates critical to our examination of generality and specificity.

Multiple-Group Analysis

In the multiple-group analysis, it was useful to first evaluate a series of models that contained the same pattern of significant beta paths in both groups (male and female). To do this, we included in the model for each group in the multiple-group analysis significant beta paths from both of the final models from the single-group analyses; that is, the model for female students (and for male students) included paths that were significant in either the male or the female model from the single-group model, such that both models specified an identical pattern of paths. Consistent with the recommendations of Byrne et al. (1989), we retained the several differences in correlated residuals in the male and female models in the multiple-group analysis. In the model evaluations, we first compared the models from the two groups in terms of the equality of their factor loadings. Subsequently, we evaluated differences in regression paths in the two groups.

Invariance in first-order factor loadings. The first model evaluated in the multiple-group analysis, Model 1, imposed no equality constraints across groups, $\chi^2(457, N = 813) = 647.541$, $p < .001$. The next model, Model 2, imposed equality constraints on the free factor loadings across groups to assess the degree to which the measurement models in the two groups were invariant (e.g., Byrne et al., 1989). Model 2, $\chi^2(471, N = 813) = 683.244$, $p < .001$, fit the data significantly worse than did Model 1, $\chi^2(14, N = 813) = 35.70$, $p < .05$. Although complete invariance of factor loadings across groups was not supported in this analysis, Byrne et al. argued that multiple-group comparisons are still valid if some degree of invariance is supported. In examining the multivariate LM tests of equality constraints from Model 2, we found that one of the equality constraints led to a highly significant ($p < .001$) decrease in model fit. In Model 3, we relaxed this single constraint, which involved the loading of the indicator of times rode with drinking driver on the DUI Behavior factor. Model 3, $\chi^2(470, N = 813) = 669.837$, $p < .001$, was not significantly different from Model 1, in which no equality constraints across groups were imposed, $\chi^2(13, N = 813) = 22.29$, $p > .05$. Model 3 provided support for our subsequent use of a measurement model with partial invariance in its factor loadings. However, interpretations of multiple-group results concerning the DUI Behavior factor must be made with caution because it did not have even partial invariance in its factor loadings. As shown later, this finding did not unduly complicate our interpretation.

Invariance in second-order factor loadings. Although previous recommendations regarding factorial invariance (e.g., Byrne et al., 1989) have not addressed invariance of higher order factor loadings, we conducted an analysis of invariance of these loadings that was analogous to the analysis of invariance of the lower order factor loadings. That is, we again assessed the fit of models with different degrees of factorial invariance and "accepted" a model only if it was not significantly different from the previous model (Model 3), for which we did not impose equality constraints on second-order factor loadings. As was also found in the earlier analysis, complete factorial invariance was not supported. However, a model with partial invariance, Model 4, $\chi^2(472, N = 813) = 672.953$, $p < .001$, was not significantly different in fit compared with Model 3, $\chi^2(2, N = 813) = 3.12$, $p > .05$. In Model 4 we imposed two equality constraints on second-order factor loadings, one for each of the two second-order factors: For the Positive Expectancies second-order factor, we constrained the loading on Social Disinhibition to be equal across the two gender groups; for the Negative Expectancies second-order factor, we constrained the loading on Other Negative Expectancies to be equal across the two groups. Because at least one loading on each higher order factor was invariant, Model 4 revealed some degree of partial factorial invariance at the second-order factor level. Model 4 was used as a comparison model in the next step of the analysis, in which we evaluated group equivalence of predictive effects of the expectancy factors on the alcohol and DUI dependent constructs.

Final model and further tests of equality of paths. To derive the final multiple-group model, we conducted a series of tests that evaluated possible group differences in regression paths representing the predictive effects of expectancy factors on the alcohol and DUI factors. In the first model in this series, Model 5, we imposed equality constraints for each of these 10 regression paths across the two gender groups. Model 5, $\chi^2(482, N = 813) = 710.028$, $p < .001$, fit the data significantly worse than did Model 4, $\chi^2(10, N = 813) = 37.08$, $p < .001$. Because Model 5 yielded a severe condition code (linear dependency), we did not use its LM-test results. Instead, we evaluated the equality constraints in a series of single degree-of-freedom chi-square difference tests, in which we imposed only 1 equality constraint at a time in models compared with Model 4. In these evaluations, 6 out of 10 equality constraints led to nonsignificant ($p > .05$) decreases in model fit compared with Model 4. In Model 6, $\chi^2(478, N = 813) = 679.963$, $p < .001$, each of these 6 constraints was added to Model 4, yielding a nonsignificant decrease in fit compared with Model 4, $\chi^2(6, N = 813) = 7.01$, $p > .05$.

In the final stage of model evaluation, we deleted nonsignificant parameter estimates from Model 6. Although Wald tests of nonsignificant estimates are not provided in multiple-group analyses, we performed an equivalent deletion of nonsignificant parameter estimates from Model 6 by dropping estimates that had the smallest, nonsignificant scores on z tests. These estimates were dropped in a series of three hierarchical steps, in which not more than three estimates were dropped at a time from the tested models. None of these model evaluations led to a significant ($p < .05$) decrease in model fit when compared with the previously analyzed model, confirming the z-test results. Two of the nonsignificant, deleted paths had previously been constrained to be equal across groups. In addition to deleting several nonsignificant regression weights in this series of tests, we also deleted one covariance between first-order factor residuals because of nonsignificance. The final multiple-group model resulting from these tests, Model 7, $\chi^2(484, N = 813) = 691.855$, $p < .001$, did not lead to a significant decrease in model fit compared with Model 6, $\chi^2(6, N = 813) = 11.89$, $p > .05$. Model 7 fit the data well with respect to practical levels of significance (NNFI = .965, CFI = .969) and did not show any signs of estimation problems (e.g., linear dependencies). The results from the measurement-model aspect of Model 7, the pattern of significance of paths, and group differences of concern to our theoretical topics are described below.

Measurement Model for Indicators of Lower Order Factors

Each of the hypothesized factor loadings for the measured-variable indicators of the lower order factors was significant ($p < .001$) in Model 7 for both genders. For ease of interpretation, standardized loadings are presented in this measurement model, which is depicted in Figure 1. However, we imposed the aforementioned equality constraints on unstandardized loadings in this model, and these constraints do not imply that the standardized loadings are equal; the EQS program uses a form of within-group, rather than pooled-group, standardization (Bentler, 1989). We reiterate in Figure 1 which loadings were constrained to be equal in the unstandardized metric, in which all model evaluations and tests of significance were made.

Although all loadings were significant, some loadings were smaller than we would have liked. One potential effect of modest factor loadings in latent-variable structural modeling is an overcorrection for measurement error in the factor, resulting in exaggerated sizes of path coefficients involving the factor (P. Cohen, Cohen, Teresi, Marchi, & Velez, 1990). The several factors that had one or more modest loadings in the present study did not significantly predict the alcohol or DUI factors independently from the second-order factors, so overcorrection for attenuation obviously was not an issue for these factors.

SEM Paths and Correlations Relevant to Generality and Specificity

The paths from factor to factor derived from Model 7 are depicted in Figure 2 for the female sample and in Figure 3 for the male sample. Paths from indicator residuals to factors are listed below. The pattern of significant covariances in these

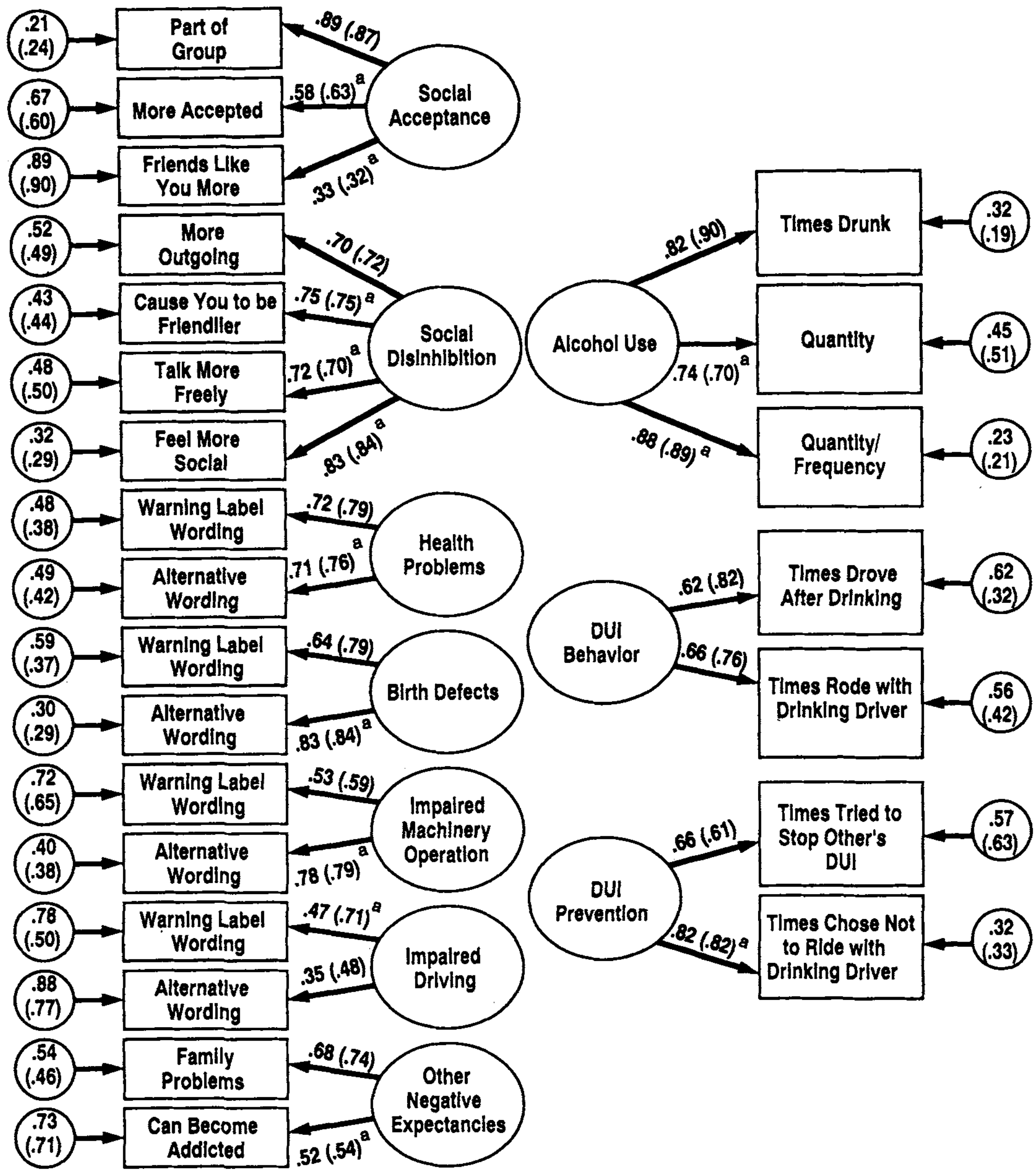

Figure 1. Final confirmatory-factor-analysis measurement model. (DUI = driving under the influence of alcohol. Large ovals represent specific factors, rectangles are measured variables, and small circles are residual variables, with residual variances shown. Standardized estimates for female students are provided; standardized estimates for male students are in parentheses. To set the scale of measurement, one indicator on each factor was fixed at 1.00 in the unstandardized metric. All estimated factor loadings were significant at $p < .001$, on the basis of unstandardized estimates. [a]Parameter constrained to be equal across gender group in unstandardized metric.)

models was the same as described in the single-group analyses, except for the deletion of one covariance in the male model; this nonsignificant covariance was between the factor residuals of Social Acceptance and Health Problems. As in Figure 1, the estimates in Figures 2 and 3 are standardized, but the equality constraints apply only to the unstandardized metric, which was used in tests of significance and model comparisons. In interpretations of these results, it is best to emphasize the significance levels of the estimates rather than the size of the standardized estimates, but standardized estimates may be helpful in some comparisons of estimates within the same group.

In Model 7, as well as the other multiple-group models, paths from the higher order expectancy factors (Positive and Negative Expectancies) to the lower order specific expectancy factors

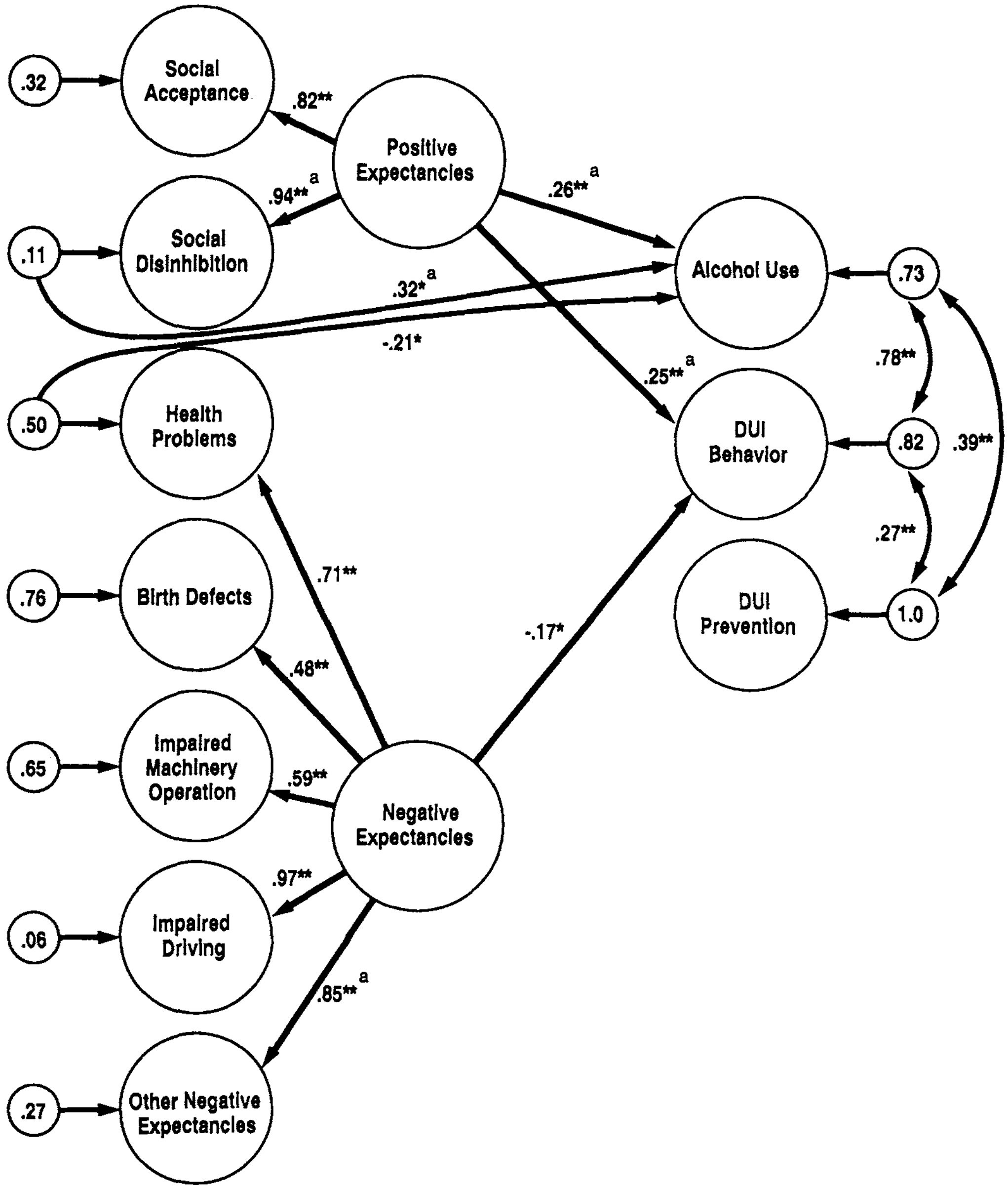

Figure 2. Final higher order structural equation model and standardized estimates in female student sample. (DUI = driving under the influence of alcohol. Larger circles designate second-order, or general, factors; medium-sized circles reflect first-order, or specific, factors; small circles represent construct residuals. Single-headed arrows depict path coefficients, and double-headed arrows represent correlations between dependent factor residuals. Significance levels were based on critical ratios on unstandardized estimates, $^*p < .05$, $^{**}p < .001$. Several additional specific regression effects, not depicted in this figure, are described in the text. [a]Parameter constrained to be equal across gender group in unstandardized metric.)

(e.g., Social Acceptance and Health Problems) are analogous to factor loadings on the higher order factors. As shown in Figures 2 and 3, each of these loadings was significant statistically. The other paths in these figures represent the prediction of the Alcohol-Use and DUI factors by the higher order and lower order expectancy factors. Several additional paths could not be depicted in the figures without making the illustrations confusing, namely, the specific paths from indicator residuals to the dependent factors of Alcohol Use and DUI, but these paths are described below. We next provide a summary of all the significant paths and their relevance to the distinction between generality and specificity.

Generality. The most global level at which generality could be addressed in these data is at the level of correlation between the two higher order factors of Positive and Negative Expectancies. The correlation between these general expectancy factors was not significantly different from zero in either the female or the male final model, as depicted by the absence of a correla-

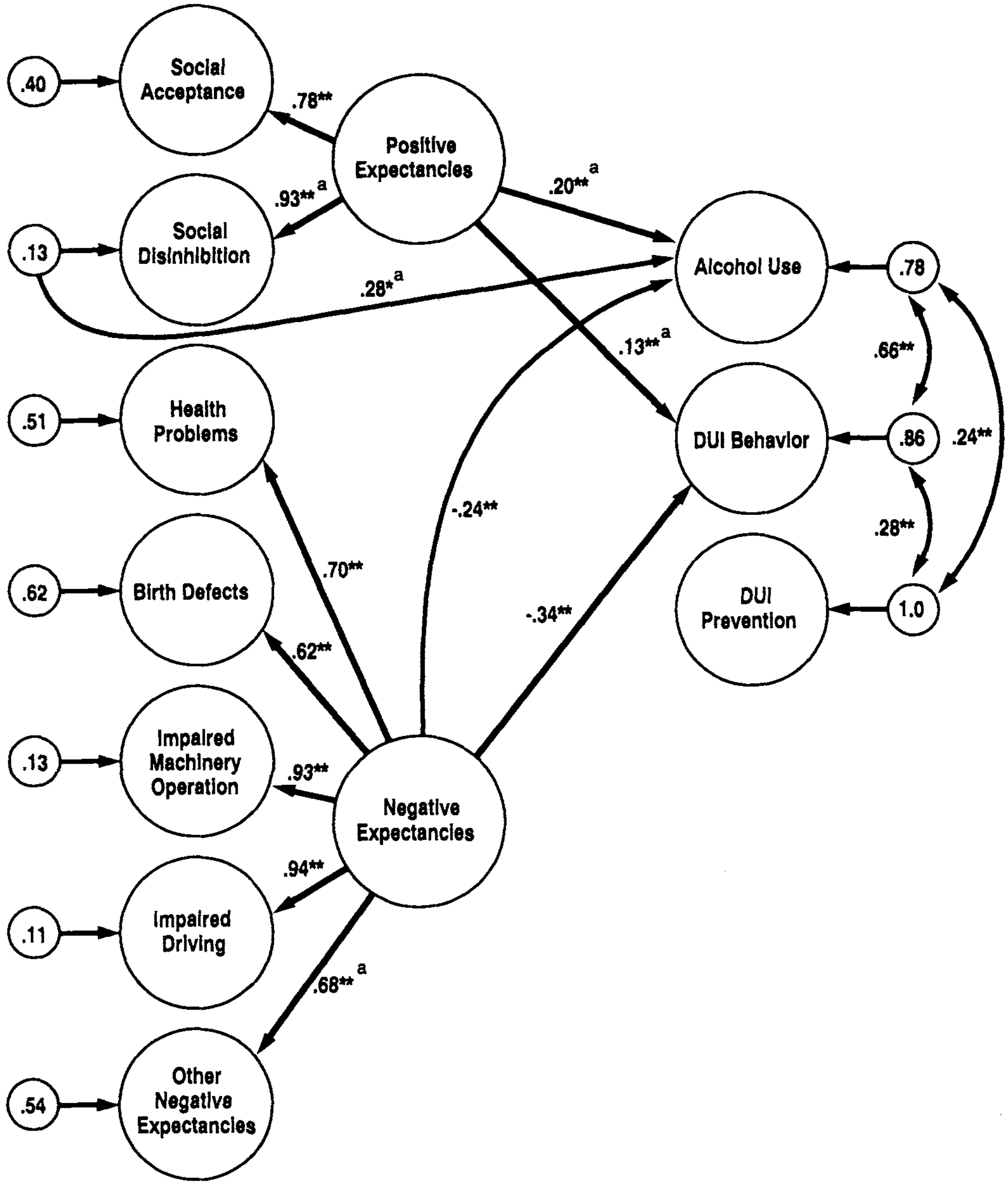

Figure 3. Final higher order structural equation model and standardized estimates in male student sample. (DUI = driving under the influence of alcohol. Larger circles designate second-order, or general, factors; medium-sized circles reflect first-order, or specific, factors; small circles represent construct residuals. Single-headed arrows depict path coefficients, and double-headed arrows represent correlations between dependent factor residuals. Significance levels were based on critical ratios on unstandardized estimates, $*p < .05$, $**p < .001$. Several additional specific regression effects, not depicted in this figure, are described in the text. [a]Parameter constrained to be equal across gender group in unstandardized metric.)

tional arrow between these factors in Figure 2 and Figure 3. This result was inconsistent with the view that an extreme form of generality best describes the association between these two factors. These results supported a level of generality that retained these two higher order factors as distinct, rather than combining them into a still more general factor, somewhat analogous to an attitudinal construct.

The next level of generality addressed was at the level of prediction of the Alcohol-Use and DUI factors by the higher order expectancy factors. In the male sample, both the positive and negative higher order factors of expectancy significantly predicted Alcohol Use and DUI Behavior, but neither of these expectancy factors predicted DUI Prevention. These paths are depicted with single-headed arrows from the two largest circles to the Alcohol-Use and DUI factors in Figure 3. In the female model, both of the higher order expectancy factors predicted DUI Behavior, but only Positive Expectancies predicted Alcohol Use (see Figure 2). Again, neither higher order factor predicted DUI Prevention. Consistent with theoretical anticipations, our results showed that when Positive Expectancies predicted a dependent factor the sign was always in the positive direction, and when Negative Expectancies predicted a dependent factor the sign was always in the negative direction. Regarding comparisons of general-effect paths that were significant in both genders, our previously reported analyses supported the retention of the equality constraints across gender for the paths from Positive Expectancies to Alcohol Use and from Positive Expectancies to DUI Behavior, implying the absence of gender differences on these paths. The previous deletion of the equality constraint across gender for the path from Negative Expectancies to DUI Behavior implied that this path was significantly larger among male students than it was among female students.

Specificity. One level of specificity involved predicting the Alcohol-Use and DUI factors by the residuals of the specific (lower order) expectancy factors. In the female sample, two of the residuals of these specific expectancy factors significantly predicted Alcohol Use; these paths are depicted as single-headed arrows from the smallest circles to the Alcohol-Use factor in Figure 2. In one instance, the residual of expectancies for Health Problems predicted (less) Alcohol Use. In the second instance, the residual of the Social Disinhibition expectancy factor predicted (more) Alcohol Use. This latter path also was significant in the male sample, but no other specific expectancy factor residuals predicted the dependent factors among male students (see Figure 3). In addition, the prediction of Alcohol Use by the Social Disinhibition residual was not significantly different in the two samples, as evidenced by the retention of the equality constraint for this path across gender in Model 7.

The final level of specificity involved predicting the Alcohol-Use and DUI factors by the residuals of the specific expectancy indicators. These indicator residuals were depicted as small ovals in Figure 1, but the predictive paths from these indicators to the dependent factors are reported here. In the female sample, the residual indicator of family problems significantly predicted (less) Alcohol Use ($\beta = -.23$, $p < .001$) and less DUI Behavior ($\beta = -.30$, $p < .001$). In the male sample, only one residual of an indicator significantly predicted a dependent factor. This path was the negative prediction of Alcohol Use by family problems ($\beta = -.20$, $p < .001$); this path was not significantly different from the same path in the female sample, as evidenced by the retention of the equality constraint for this path across gender in Model 7.

Generality versus specificity in predicting DUI Behavior. One of the striking findings just presented was the lack of a unique prediction of DUI Behavior by the first-order factor of Impaired Driving expectancies. One possible explanation of this result is that the residual variance of Impaired Driving, left unexplained by the general (higher order) factor of Negative Expectancies, was too small to show any predictive utility. In addition, the best overall indicator of Negative Expectancies was Impaired Driving, suggesting that the predictive effect of Negative Expectancies on DUI Behavior may have been because of the substantial contribution of Impaired Driving to the general factor of Negative Expectancies. In a supplementary analysis, we respecified the final multiple-group model (Model 7) such that Impaired Driving did not load on the higher order factor of Negative Expectancies. Instead, we simply correlated Impaired Driving with the Negative Expectancies factor. This model, termed *Model 8,* was identical to Model 7 in every way except for this respecification. Model 8, $\chi^2(484, N = 813) = 691.856$, $p < .001$, fit the data similarly to Model 7, though the lack of nesting in these models prevents us from reporting a statistical test of difference in fit. It is important to note that the correlation between Impaired Driving expectancies and Negative Expectancies was substantial (*r*s = .94 among male students and .97 among female students, *p*s < .001). Next, we added a single path to Model 8, in which Impaired Driving expectancies were allowed to predict DUI Behavior. This nested model, Model 9, $\chi^2(482, N = 813) = 691.811$, $p < .001$, did not fit the data significantly better than did Model 8 ($p > .05$).

Interestingly, z tests revealed that both the path from Negative Expectancies to DUI Behavior and the path from Impaired Driving to DUI Behavior were nonsignificant in Model 9. Yet, in Model 7 and Model 8, the former path was significant. We performed a number of additional model evaluations, the descriptions of which are beyond the space limitations of this article. Taken together, all reported and unreported evaluations revealed that the Negative Expectancies and Impaired Driving factors were basically redundant predictors of DUI Behavior. Our interpretation of these results is that Impaired Driving was a very good indicator factor of Negative Expectancies in Model 7—good enough to replace Negative Expectancies as a predictor of DUI Behavior. However, because Negative Expectancies can also replace Impaired Driving as a predictor of DUI Behavior, the predictive utility of Impaired Driving expectancies did not seem to depend on any unique content of this factor, such as content specifically related to DUI. The small amount of residual variance in Impaired Driving in Model 7 also supported the notion that something more general than specific content of the Impaired Driving factor may underlie this pattern of findings.

Discussion

We evaluated the concurrent prediction of Alcohol-Use and DUI factors by expectancy factors at several different levels of generality and specificity. Although the types of inferences made on the basis of these findings must be limited to suggestive evidence, rather than causal inference, the findings nevertheless have important implications. In addition, expectancy constructs have been found to be important predictors of alcohol-related behavior in previous prospective work (Bauman et al., 1985; Christiansen, Smith, Roehling, & Goldman, 1989; Stacy et al., 1991a; Stacy, Widaman, & Marlatt, 1990), suggesting that at least some cross-sectional findings are likely to replicate in more rigorous longitudinal designs.

Generality and Specificity

One of the theoretical implications of our findings concerns the level of generality at which health-behavior expectancies are best construed. At least in the case of alcohol expectancies, this study adds to a growing body of evidence demonstrating the empirical distinction between positive and negative expectancies (e.g., Christiansen et al., 1982; Rohsenow, 1983; Stacy, Widaman, & Marlatt, 1990). Our results corroborated the distinction between positive and negative expectancies both in terms of the nonsignificant correlation between the two higher order factors and in terms of a divergent pattern of predictive effects on Alcohol-Use and DUI factors. The level of distinction found in these data as well as in earlier studies suggests that a more global form of representation, in which positive and negative components are combined as a more unitary construct, may not well represent the structure of health-behavior expectancies.

Although generality at the level of higher order factors of Positive and Negative Expectancies was corroborated by our findings, some evidence of specificity was also demonstrated. Specificity in predictive effects was found in terms of prediction of Alcohol-Use and DUI factors by the residuals of several of the specific factors as well as by the residuals of several indicators. On the other hand, specific effects had a greater chance of attaining significance, because there were many more possible specific than general effects in the models; such effects may be prone to Type I error (Stacy et al., 1991b). Even so, not many specific effects were significant and not all of these effects were consistent across groups. These results may imply that although generality and specificity may coexist, generality is more important in terms of predictive efficiency.

The coexistence of generality and specificity is consistent with findings in other research domains (Newcomb & Bentler, 1988; Osgood et al., 1988) that suggest that different aspects or components of variance of a construct can have simultaneous and distinct effects. Such an argument also was recently advanced by Goldman et al. (1991), who outlined a semantic-memory theory of general and specific effects of alcohol expectancies. Other theories of memory could also be used to explain the coexistence of generality and specificity (e.g., episodic-memory approaches applied to expectancies; Stacy, Widaman, & Marlatt, 1990), and still other alternatives exist that do not depend on long-term memory processes at all. (Several of these approaches are addressed below.) Overall, there is evidence showing that a simultaneous consideration of generality and specificity is useful in health-behavior research, but there is presently little evidence favoring one specific theory of simultaneous effects over another.

Because general effects may be somewhat more important than specific effects, at least in terms of predictive efficiency, we now consider why these effects occurred at the level of positive and negative expectancies. Previous research focusing on what we have termed the *expectancy accessibility model* has considered these constructs as distinct cognitive and motivational predispositions toward alcohol and other drug use (Stacy, Dent, et al., 1990; Stacy, Widaman, & Marlatt, 1990). This approach assumes that these constructs are not merely self-perceptions or judgments reported only on a questionnaire, but are instead reflections of previous direct and vicarious learning of alcohol effects.

The operation of an alternative, self-perception process would suggest that a different, more abstract level of generality would be supported by the present findings. In this latter approach, expectancies are attitudinal attributions made on the basis of self-perceptions of one's own previous behavior (Stacy et al., 1991a); self-perception theory suggests that self-attributions made on the basis of one's behavior influence attitudinal responses (Bem, 1978). To understand the implications of this self-perception process, one must consider in more detail the conceptualization of attitudinal responses. Most standard operational definitions of attitude are bipolar in construction and hence assume a consideration of both positive and negative elements of affect; these operational definitions imply that the attitude construct itself involves a simultaneous, generalized representation of positive and negative affect (e.g., Fishbein & Ajzen, 1975). In line with this predominant view of attitude, if unipolar scales are used to tap positive and negative dimensions separately, scores on these dimensions should be highly negatively correlated if an attitudinal response is being measured. However, our constructs of positive and negative higher order expectancies were not correlated, and therefore it seems unlikely that an attitudinal response, as traditionally defined, was being assessed. Because self-perception theory is closely allied to traditional definitions of attitude, self-perception theory does not provide a process through which self-perceptions would have separate, uncorrelated effects on different types of expected outcomes (e.g., positive vs. negative). On the other hand, distinct measurement and effects of positive and negative expectancies are consistent with opposing views of generality, such as the assumption in the expectancy accessibility model that these two general types of expectancies are distinct because they are encoded and made accessible from memory under different sets of conditions (Stacy, Dent, et al., 1990; Stacy et al., 1991b; Stacy, Widaman, & Marlatt, 1990).

The pattern of general effects in the present study was fairly similar across the gender groups. The only major difference was in the prediction of alcohol use by negative expectancies. The Negative Expectancies factor predicted Alcohol Use among male students but not among female students. It is possible that adolescent girls have less direct experience with negative outcomes from drinking, because of their lower levels of alcohol consumption (as reported in this sample). Less direct experience may imply that generalized negative expectancies are less accessible from memory, hindering the use of these expectancies in making decisions about drinking (cf. Fazio, Powell, & Herr, 1983; Stacy, 1986). Positive expectancies may not show as many differences in prediction, because positive outcomes of drinking may be more generally accessible from memory in both genders (Stacy, Widaman, & Marlatt, 1990). The possibility that negative expectancies as a group may not influence alcohol consumption in some samples underscores the need to conduct additional research addressing both the reason for this finding and intervention methods that may be used to increase the effects of negative expectancies. In addition to the general effects just discussed, several specific factors of positive and negative expectancies had predictive effects that differed across gender. The implications of these effects for generality and specificity are described below in terms of warning-label and social influence interventions.

Negative Expectancies and Warning-Label Interventions

One of the more specific issues addressed in this study was the investigation of how expectancies about negative outcomes targeted by the alcohol-warning label may predict alcohol use and DUI. A basic concern was whether these expectancies operated through a general process, in which negative expectancies predict behavior through a type of quasi-attitudinal representation of negativity toward the behavior, or through a specific process, in which certain negative expectancies predominate in the prediction of behavior. This concern is of applied as well as theoretical interest, because its investigation has implications for the type of warning-label message most likely to succeed in reducing alcohol-related problems.

The general (higher order) factor of Negative Expectancies predicted DUI Behavior in both genders, suggesting that a type of general process may have been operational. In this process, any particular type of negative outcome of drinking can be seen merely as an indicator of a quasi-attitudinal tendency toward this behavior. Yet this tendency was not truly attitudinal, in the traditional sense of the term, because positive and negative dimensions of expectancies were found to be distinct. We call the tendency *quasi attitudinal* because the general predictive effect of the higher order negative expectancy factor did not appear to depend on any particular type of outcome, as long as it was a negative outcome. Perhaps the most convincing demonstration of generality can be seen in the prediction of DUI Behavior by the general factor of Negative Expectancies, without any accompanying unique prediction by the specific factor of expectancies regarding Impaired Driving. A general predictive effect was also found in the prediction of Alcohol Use by the Negative Expectancies factor in the male sample, but this effect was not significant in the female sample.

As introduced earlier, we also obtained specific predictive effects of negative expectancies. The specific expectancy factor of Health Problems predicted alcohol use among female students but not among male students; despite the absence of replication across gender, this path was highly significant statistically and thus seems unlikely to be a chance finding. Although we thought that the Birth Defects specific factor of Negative Expectancies might have some unique predictive effects among female students, we did not find any unique effects for this factor in either gender. However, the residual variance of the family problems indicator of Other Negative Expectancies predicted Alcohol Use among both genders and predicted DUI Behavior among female students. No other specific effects of negative expectancies were significant. Thus, the most consistent specific effect of negative expectancies was the prediction of Alcohol Use by the family problems indicator of Other Negative Expectancies. This was one of the expectancies that was not part of the warning label.

The most general implication of the present findings with respect to the warning-label legislation is that negative expectancies are generally predictive of alcohol-related behavior, especially DUI. These predictive effects imply that it is at least possible that expectancies about the negative outcomes targeted by the warning label, as well as some expectancies not targeted by the label, influence alcohol-related behavior. Another finding relevant to warning-label interventions is that no single type of negative expectancy stood out as a paramount predictor, though one item not on the label (family problems) did show unique predictive effects on Alcohol Use in both genders.

In the expectancy framework, the effects of alcohol-warning labels on behavior operate through the expectancies about outcomes addressed by the warning label. One of the fundamental assumptions of this approach is that warning-label expectancies predict behavior. The present findings support this assumption, but do not address the many other issues necessary to document whether alcohol-warning labels are, or can be, effective as a behavioral-change agent. Additional research is needed to examine a range of theoretical perspectives on warning-label effects so that the processes through which warning labels affect behavior can be better understood. As McGuire (1980) has noted, a full appreciation of the range of processes accounting for health-behavior change is likely to maximize the potential of any intervention.

Social Influence Processes and Expectancies

The specific factor residual of Social Disinhibition was more uniquely predictive of Alcohol Use than was the other positive expectancy factor residual of Social Acceptance. It is important to speculate on at least one of the processes that may account for this finding, which was consistent across both gender groups. In an analysis of frequency-norm data of expected effects of drinking among college students only slightly older than the students in our sample (Leigh et al., 1989), outcomes representing social disinhibition were much more frequently written down as expected outcomes of drinking than were outcomes related to social acceptance. We consider these frequency-norm data somewhat analogous to the type of controlled-association-norm data obtained in basic research on human memory, in which frequency norms are taken as rough estimates of associative strength between concepts in memory. On the basis of this logic and the Leigh et al. norms, we believe that social disinhibition may represent a strong associate of alcohol use and that social acceptance may represent a weaker associate of drinking. If social disinhibition outcomes are more strongly associated with alcohol use in memory, then cognitions about these outcomes should be more accessible when drinking decisions are being made. On the basis of the expectancy accessibility model, expectancies that are more accessible from memory should be better predictors of a behavior than are less accessible expectancies. Cultural messages about the socially lubricating function of alcohol use are certainly widespread, which may simultaneously influence expectancies about this outcome and the associative strength of this outcome with alcohol use. However, the fit of the present data to what would be predicted on the basis of associative frequency norms provides only limited and indirect evidence for this type of memory process.

Although Social Acceptance did not have unique predictive effects, the general factor of Positive Expectancies was a highly significant predictor of Alcohol-Use and DUI factors. It was also clear from our results that the Positive Expectancies factor explained most of the variance in the Social Acceptance and

Social Disinhibition factors. These findings suggest that responses to social acceptance and disinhibition expectancy questions were not very distinct and perhaps represent a general response of "positivity" toward drinking. Another possibility is that different expected social outcomes were highly related because these outcomes are anticipated to occur together during drinking episodes or may even be related causally during these episodes. Additional alternatives are listed below.

Regardless of the specific nature of the process underlying these findings, it is clear from this study and previous research that socially related expectancies for drinking are important predictors. Although social acceptance expectancies, or alternative measures of normative social influence, have been addressed in previous prevention research among adolescents, there has been much less focus on social disinhibition expectancies in prevention efforts for this population. Our findings suggest that both types of expectancies may be important. Finally, we should point out that the predictive effects of these constructs did not differ by gender, consistent with a lack of gender differences in social influences on use of other substances (Stacy, Sussman, Dent, Burton, & Flay, 1992).

Measurement and Other Methodological Issues

Several issues should be addressed as possible limitations of this study. We have already qualified our findings on the basis of our cross-sectional design. One of the additional concerns is that all measurements in this study were based on self-reports. On the basis of previous validation research on anonymous self-reports of alcohol use (Murray & Perry, 1987; Stacy et al., 1985; Stacy, Widaman, & Marlatt, 1990), we determined that certain types of self-report biases appear unlikely to have strongly influenced our findings. For example, the correlation between positive expectancies and self-reported drinking has been found to be very similar to the correlation between positive expectancies and independent reports on the subjects' drinking (Stacy, Widaman, & Marlatt, 1990). However, in the present study as well as in most previous studies on this topic, both self-reported alcohol use and expectancies were assessed, and the measurement of one of these constructs could influence the measurement of the other construct. There are many ways in which such influences could occur. For example, people may try to justify their drinking to themselves by responding more affirmatively toward positive expectancies or more adversely toward negative expectancies, constituting a type of motivational bias (cf. Marks & Miller, 1987). Alternatively, as demonstrated in Feldman and Lynch's (1988) account of cognitive processes underlying questionnaire responses, judgments made in a questionnaire are likely to be based on information that is most accessible from long-term memory and on information currently active in working memory (a short-term-memory buffer that temporarily represents highly activated memories and current thoughts; Baddeley, 1986). Working memory for recent questionnaire or other judgment responses could very easily bias subsequent responses in the study (Feldman & Lynch, 1988; Hastie & Park, 1986; Ottati, Riggle, Wyer, Schwarz, & Kuklinski, 1989; Wyer & Srull, 1989). Although these processes cannot be ruled out by the present study, findings from previous prospective studies strongly suggest that expectancy constructs have nonspurious effects on subsequent drinking behavior (Bauman et al., 1985; Christiansen et al., 1989; Stacy et al., 1991a; Stacy, Widaman, & Marlatt, 1990). These previous results imply that expectancies are more than just ephemeral judgments.

Another general concern about our results involves the existence of alternative classes of models of expectancy–behavior relations. Our framework constrained the investigation to a certain class of models, in which expectancy factors were constructed as general (higher order) and specific (lower order) factors. These factors were allowed to have predictive effects on alcohol use. Within the constrained class of models we investigated, we found support for the models illustrated in the figures. However, other classes of models certainly exist, such as models postulating that alcohol use influences expectancies, that different expectancy constructs influence one another, or that all factors are merely correlated. We are certain that models such as these could be constructed to fit the data just as well as the final model from our selected class of models. Although previously cited prospective research indicates that most of our assumptions were tenable, our design could not differentiate between alternative classes of models. This problem is a general one in most nonexperimental survey research and is not limited to the choice of analytical procedures, such as covariance structure modeling, analysis of variance, or logistic regression. Our study, like most research in applied areas, must be interpreted in terms of the accumulation of converging evidence from previous studies and in terms of the investigation of alternative classes of models in future research.

Summary

We have illustrated a general conceptual and analytical framework for the study of generality and specificity in one specific area of health behavior. Although our empirical results may be somewhat provisional because of the issues just raised, one form of model replication was supported by the close parallels between the final models derived in the male and female samples. These results, if replicated further, may have important implications for both warning-label and educational interventions in the prevention of alcohol problems.

Overall, we found some support for the view that both general and specific processes may operate in the prediction of alcohol-related behavior by expectancies. However, the most statistically significant effects involved prediction by general, higher order factors, and a call for model parsimony (Bentler & Mooijaart, 1989) might suggest that an emphasis on general processes would be preferable. Still, general processes often seem more abstract conceptually and may provide fewer hints at how to devise specific strategies in prevention campaigns. Our view is that a simultaneous investigation of generality and specificity is valuable, because the focus on either type of effect alone may obscure important explanations and avenues for application. Although this approach is somewhat complex analytically and conceptually, there is no reason to believe that health-behavior change is any less complex.

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