Who's Smoking, Drinking, and Using Drugs?
Time Perspective as a Predictor of Substance Use

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Two studies examined whether those identified as having a more present time perspective (PTP) are more likely to report using alcohol, drugs, and tobacco. In Study 1, across 2,627 participants from 15 samples, we found that PTP, as assessed by the Zimbardo Time Perspective Inventory, was related to more frequent self-reported alcohol, drug, and tobacco use (Substance Use scale: average $r = .34$, $p < .001$). Future time perspective (FTP) was negatively related to reported substance use (average $r = -.16$, $p < .001$), but the relation was weaker than that of PTP, suggesting that PTP and FTP are independent constructs. In Study 2, we found that PTP was a significant predictor of reported substance use even after controlling for many personality traits that have been related to increased substance use. These findings indicate that time perspective is an important individual difference construct that should be considered when examining health-related behaviors, such as substance use and abuse, and in planning intervention programs.

The use and abuse of alcohol, drugs, and tobacco pose a continuing individual and societal problem that psychological research has attempted to understand. One half of all fatal automobile crashes are alcohol related (U.S. Department of Health and Human Services [USDHHS], 1993), and alcohol is the greatest health risk among college students (Prentice & Miller, 1993), with as many as 25% of them experiencing drinking problems (see USDHHS, 1993; Berkowitz & Perkins, 1986). Tobacco smoking and illicit drug use are also problematic behaviors. Cigarette smoking is a major factor in the development of a wide range of chronic diseases, such as cancer and cardiovascular disease (Taylor, 1991), yet 35% of 18- to 25-year-olds reported smoking cigarettes regularly (Gans, Blyth, Elster, & Gaveras, 1989). Despite the "war on drugs," 11.7 million Americans use drugs regularly, and there is "increasing usage among young people." In total, 77 million Americans have experimented with drugs (Nelson, 1995, p. A3).

Many studies have investigated factors that contribute to substance use, because such understanding is key to developing effective preventive strategies (USDHHS, 1993). Moti-

vations for substance use may arise from environmental factors, such as family role models, peer influences, social pressure, and a social environment in which substance use is encouraged (Berkowitz & Perkins, 1986; Leary, Tchividjian, & Kraxberger, 1994). There is also considerable evidence that personality factors play an important role in predicting substance use.

PREDICTORS OF SUBSTANCE ABUSE

Numerous studies have reported various individual differences as predictors of substance use, including aggression (Wills, 1986); anxiety, neuroticism, and depression (Barnes, 1979; Forsyth & Hundleby, 1987; Jones, 1968; Kozlowski, 1979); ego undercontrol (Block, Block, & Keyes, 1988; Shedler & Block, 1990; Wills, Vaccaro, & McNamara, 1994); lower ego resiliency (Block et al., 1988); emotional states (Mehrabian & O'Reilly, 1988); extraversion and higher expected dominance (Jackson & Matthews, 1988); lower impulse control (Shedler & Block, 1990; Southwick & Steele, 1987); locus of control (Martin & Pritchard, 1991; Segal, 1974); novelty seeking (Sher, Wood, Crews, & Vandiver, 1995; Wills, DuHamel, & Vaccaro, 1995; Wills et al., 1994); reward dependence (Sher et al., 1995); risk taking

(Jaccard & Turrisi, 1987); sensation seeking (Forsyth & Hundleby, 1987; Jaccard & Turrisi, 1987; Jaffe & Archer, 1987; Lipkus, Barefoot, Williams, & Siegler, 1994; Stacy, Newcomb, & Bentler, 1991; Zuckerman, 1994); and lower socioeconomic status (Brennan, Walfish, & AuBuchon, 1986; Martin & Pritchard, 1991). In addition to personality differences contributing to substance use, there are significant sex differences in tobacco, drug, and alcohol use (Berkowitz & Perkins, 1986; Lex, 1991; U.S. Department of Health and Human Services, 1993). Worldwide data surveys portray men as more likely to smoke tobacco than women, although in the United States, women now have comparable smoking rates to men (Grunberg, Winders, & Wewers, 1991). In addition, men use marijuana and hard drugs more than women do and also consume more alcohol (Brennan et al., 1986; Jackson & Matthews, 1988; Lex, 1991).

TIME PERSPECTIVE

This article examines whether time perspective plays a significant role in substance use. According to time perspective theory (Gonzalez & Zimbardo, 1985; Zimbardo & Boyd, 1997; Zimbardo, Keough, & Boyd, 1997), our view of ourselves, our world, and our relationships is filtered through temporally based cognitive processes. We learn to parcel the flow of personal experiences into the categories of past, present, and future. Time perspective is a fundamental process, a pervasive way of relating to people and events, which we learn at an early age through our culture, religion, social class, education, and family influences (Nurmi, 1991; Zaleski, 1994).

Although time helps define the nature of the human condition, controversy about the significance of time as a central process in analyzing and understanding aspects of human nature has a long history among psychologists, philosophers, and physical scientists. Kant (1781/1965) believed time conception to be an "innate ability," arguing that it richly colored the way that we experience the world. Existential philosophers and psychologists expounded upon Kant's notion of time as a fundamental dimension of human existence (Heidegger, 1927; Husserl, 1964). William James championed the concept of time as so central to psychology that he devoted an entire chapter on time perception in his classic, *The Principles of Psychology* (1890/1950). Strict behaviorists, such as Watson (1913) and Skinner (1987), challenged views that a subjective conception of time deserved a place in the scientific study of behavior. The behaviorists emphasized how past learned contingencies influenced current behavior, without concern for possible feedback of imagined or expected future environments. This narrow focus on the behavioral consequences of past experiences was rejected by the Gestalt psychologists, such as Kurt Lewin (1951), and was replaced by an approach to time more reminiscent of that proposed by existential philosophers.

The theory that has guided our thinking and research continues in the Lewinian tradition by advancing a broad conceptualization of time perspective as a foundational process in both individual and societal functioning. Time perspective is the often nonconscious process whereby the continual flow of personal and social experiences are decomposed or allocated into selected temporal categories or frames that help give order, coherence, and meaning to those events. These past, present, and future temporal frames are used in encoding, storing, and recalling experienced events, as well as in forming expectations, goals, contingencies, and imaginative scenarios. The more abstract future and past temporal frames enable individuals to transcend compelling stimulus forces in the immediate life-space setting. In contrast, our decisions can also be influenced by the sensory and social qualities associated with the dominant elements of the stimuli at hand. This more concrete and empirically centered present or immediate orientation comes largely from identifiable sources in the intensity or quality of the stimulus, the social aspects of the setting, and a resulting biological state, which combine to be "the force of situational press."

The theory suggests that a balanced time perspective allows flexible transition among the temporal orientations that are most situationally appropriate. However, specific orientations may be used too much, and others may be used too little, leading people to become "biased" in their time perspective. For example, those who are especially present oriented are best able to enjoy the moment, undistracted by past worries or future anxieties, but they also may not be able to delay gratification and plan a path to realistic goals. They also may not be influenced by warnings that their current behavior may have negative outcomes in the future. Those with high future orientation are good at setting and achieving goals and planning strategies for meeting long-term obligations. They may also be able to restrain themselves from engaging in tempting behaviors because of an increased ability to articulate a set of negative consequences more clearly, as well as visualize and formulate future goal states that then shape current judgments and decisions. On the other hand, their ambitions may lead to neglect of personal and social relationships. Those with high past orientation are able to appreciate and honor traditions and previous obligations and review memories that may have a corrective influence on current decisions, but they may also be conservative in their maintenance of the status quo and reluctant to experience the unfamiliar or deal with change.

Since the introduction of Lewin's (1951) and Fraisse's (1963) seminal ideas on the psychology of time, time perspective has been related to a host of psychological and sociological phenomena and constructs. Of greatest relevance to our present concerns, a higher level of FTP has been linked

to increased delay of gratification (Davids & Falkof, 1975; Klineberg, 1968), decreased psychopathology (Wallace, 1956), fewer behaviors that would expose one to HIV (Rothspan & Read, 1996), and, most recently, more adaptive general coping strategies of homeless adults living in temporary shelter housing (Epel, Bandura, & Zimbardo, in press). In addition, those higher in their concern for future consequences were more influenced by persuasive communications advocating a distant goal, whereas the more immediate goal message influenced those low in future concern (Strathman, Gleicher, Boninger, & Edwards, 1994). Problems with temporal orientation can disrupt an individual's view of the future, thereby affecting his or her goal-oriented behaviors, feelings of control, and possibly mental health (Cohen, 1967; Melges, 1982).

The Measurement of Time Perspective

Although the findings just cited are provocative, equivocal and contradictory results have troubled time perspective research, primarily because of variations in the methods used to assess the construct. Although the studies we have conducted have employed questionnaire measurements of time perspective, a wide array of other methods have been used with mixed results and usually without mention of their reliability. Researchers have used methods relying on story completion, choice of time-related words, Thematic Apperception Test stories, graphical measures of temporal circles, or line drawings on which experiences of past, present, and future are indicated at successive linear points, or on use of trained judges who content-analyze verbal samples of respondents' motivational events and goals in terms of temporal categories. Other researchers have focused exclusively on a single time perspective, such as FTP, and ignored the others (Zaleski, 1994). This methodological diversity has created inconsistent findings, failures to replicate, and interpretive confusion (see review by Strathman et al., 1994).

Because of the methodological problems associated with these very subjective measures, a new questionnaire measure of time perspective was developed, the Zimbardo Time Perspective Inventory (ZTPI). Approximately 12,000 readers of *Psychology Today* completed an earlier form of the ZTPI to validate time perspective theory and to measure individuals' temporal perspective (Gonzalez & Zimbardo, 1985). The studies reported in this article measured time perspective using a modified version of this ZTPI questionnaire, which has been subject to subsequent refinements through item analyses, both exploratory and confirmatory factor analyses, and reliability assessments (see Zimbardo, 1997; Zimbardo & Boyd, 1997; Zimbardo, et al., 1997). It has also been validated in a number of correlational and experimental studies (Rothspan & Read, 1996).

Time Perspective and Substance Use

Few studies that linked personality variables with substance use have examined time perspective as a contributing individual difference, even though a wide range of decisions and actions related to health maintenance, illness prevention, and risk may be associated with and influenced by the operation of temporal factors. From the little research that does exist, it appears that a person's FTP could aid in performing health maintenance or illness preventive behaviors, whereas a present time perspective (PTP) may blind individuals to the potential harm and future risks that health-compromising behaviors can bring. For example, Smart (1968) found that alcoholics had less extensive and coherent FTPs than did social drinkers, and patients in a drug treatment program were less motivated for the future than were control participants drawn from a student population (Lavell, Hammersley, & Forsyth, 1991). Additionally, individuals that continued to inject drugs could not conceptualize the future as well as those that ceased injecting drugs (Alvos, Gregson, & Ross, 1993).

Our studies examined whether there is a link between time perspective and substance use. We predicted that people who report higher PTP would be more likely to report (and engage in) alcohol, tobacco, and drug use than those who report lower PTP. We also predicted that FTP would be negatively related to reported substance use, because FTP may be a cognitive framework that imposes restraints on impulsive and risky behaviors. Furthermore, we predicted that PTP would be a more important indicator of reported substance use than FTP. In social situations where alcohol, drugs, or smoking take place, the hedonistic dimension of PTP will be more salient and dominant, thus fueling a highly motivating approach gradient relative to the avoidance gradient associated with the restraining function of future-oriented thinking. Sex was also added to the model in order to examine whether possible sex differences in time perspective account for sex differences in substance use, as the sex basis of time perspective remains provocatively uncertain (see Harber, Zimbardo, & Boyd, 1997; Nurmi, 1991).

STUDY 1

Method

We examined data from 15 separate samples to test our hypothesis that PTP would predict reported substance use and possible abuse. This large number of samples and the relatively large total sample size allowed us to examine the magnitude of the relation between time perspective and substance use in different populations and the reliability of our results across samples.

Participants

Across the 15 samples, 2,627 participants completed this study between 1992–1994, either as part of a class project, as part of their introductory psychology research requirement, or for pay. The majority of the participants were college students, came from different geographic regions (California, New York, and Illinois), and were diverse in age (range = 14–67 years), sex, and ethnicity. The college samples included students from Cornell University (*n* = 690; median age = 19, 59% female); Stanford University (*n* = 812; median age = unavailable, 55% female); three community colleges in Northern California: Cañada College, College of San Mateo, and San Francisco City College (*n* = 453; median age = 23, 57% female), as well as students from San Francisco State University (*n* = 255; median age = 21, 60% female) and the University of Illinois (*n* = 100; median age = 21, 50% female). Participants in these samples completed this study's measures as part of a larger questionnaire packet, which they completed either in class or on their own time outside of class. Two additional samples consisted of Northern Californian high school students (*n* = 210; median age = 16, 52% female), another of men incarcerated by the California Youth Authority (CYA; *n* = 24; median age = 19), and a final one of participants in an offender traffic school in Northern California (*n* = 102; median age = 33, 38% female;. California state residents have the option of attending a traffic school after receiving a minor moving violation so that the moving violation does not go on their record). All of these samples completed just the measures for this study, and they did so in a group setting in the presence of an experimenter.

Across the samples (excluding the driving school for which ethnicity data were not available), 51% reported their ethnicity as White or Caucasian, 27% Asian or Asian American, 9% Hispanic or Latino, 4.5% African American or Black, and 8.5% as other or unreported. To reduce the number of samples to be described here, we combined samples similar in demographic characteristics, resulting in nine samples.

Materials

Participants completed the following measures:

Zimbardo Time Perspective Inventory.   The ZTPI was standardized on a large population and has since been repeatedly refined through factor analyses. The version used in this study contains 22 items, which are assessed on a 5-point scale ranging from 1 (*very untrue of me*) to 5 (*very true of me;* Zimbardo et al., 1997). The items for each scale are reported in the Appendix.

The ZTPI was originally created to contain three subscales (Past, Present, and Future). Our study and the studies published by Zimbardo et al. (1997) use only FTP and PTP scales that have been refined using principal components analysis with varimax rotation and were further refined by examining Cronbach alpha reliabilities and deleting items that did not correlate highly with the total scales. The 13-item Future scale showed reasonable internal reliability across the samples (excluding the CYA, which had too few participants for inclusion), averaging α = .67 (range = .58–.72). The Present scale, which contains 9 items, had an average α = .63 (range = .57–.70; in the analyses in this article, we have deleted one item from the Present scale —"I get drunk at parties"—because of its overlap with the outcome variable). In addition to internal reliability, both the Present and Future scales are reliable over time. Using an earlier version of the ZTPI, Keough (1993) found test–retest reliabilities of $r(36)$ = .78, $p < .001$ on the Present subscale and $r(36)$ = .83, $p < .001$ on the Future subscale on two measures of time perspective taken approximately 1 month apart. Additionally, Jourdan (1993) found the test–retest reliability of the ZTPI Future scale to be .73 and the present to be .74. Sixteen weeks separated the two measurements, with 195 participants completing the ZTPI at both occasions.

Health and Risk Questionnaire.   This questionnaire contains 37 items, which are assessed on a 5-point scale according to how frequently the participants reportedly engaged in each of the 37 behaviors. Response options were 0 (*never*), 1 (*rarely*), 2 (*sometimes*), 3 (*often*), and 4 (*always*). For purposes of this article, only five items will be discussed: drinking beer, wine, or coolers; drinking hard alcohol; smoking pot; doing other drugs; and smoking cigarettes. We standardized and averaged the five items, yielding a Substance Use scale, which had an average internal reliability of α = .76 across the samples (range = .66–.85).

Beer, wine, and coolers were the most frequently reported substances used, with the means ranging from 1.08 (*SD* = 1.22) to 2.57 (*SD* = 1.50), followed by hard alcohol (range of means = 0.49, *SD* = 0.97, to 2.13, *SD* = 1.42), pot (range of means = 0.29, *SD* = 0.66, to 2.04, *SD* = 1.69), cigarettes (range of means = 0.24, *SD* = 0.63, to 1.43, *SD* = 1.73), and then other drugs (range of means = 0.04, *SD* = 0.26, to 1.13, *SD* = 1.39). Using a meta-analysis of the average effect size across all of the samples (Hedges & Olkin, 1985), we investigated sex differences on the aggregate Substance Use scale. When there were sex differences in substance use, men reported using substances more frequently than women did. The average effect size (weighted by sample sizes) for the difference between men and women on the Present scale was –0.20, and we rejected the null hypothesis that the average effect size was equal to zero (95% confidence interval of the average effect size: –0.14 to –0.30). However, the size of the sex differences was inconsistent across the samples, as indi-

cated by heterogeneity among the effect sizes, $Qt(7) = 91.80$, $p < .01$.[1]

Drinking Habits Questionnaire.   Three of the samples, the two high schools, the three community colleges, and Stanford-II, completed a revised version of the Drinking Habits Questionnaire (Cahalan, Cisin, & Crossley, 1969). This questionnaire provides a more complete description of the participants' alcohol use patterns by examining drinking patterns, quantity, and frequency. Participants indicated the most they had to drink on a single occasion in the last month by choosing one of the nine response options, which ranged from 0 (*0 drinks*) to 8 (*15 or more drinks*); a rating of how typical their drinking pattern was over the last month using a 6-point scale that ranged from 1 (*I drank a lot more this past month*) to 6 (*I did not drink at all this month and I did not drink at all during the past three months*); and the average number of drinks consumed on the weekend using a 9-point scale that ranged from 0 (*0 drinks*) to 8 (*15 or more drinks*).

Results

Before we examine the relation between time perspective and reported substance use, we present the means on the ZTPI and examine these means across samples and sex. We then discuss the significant relations found between frequency of substance use and time perspective. In this process, we examine the independence of the Future and Present subscales, and we show that PTP and FTP are not opposite poles of a continuum but rather are independent measures of an individual's psychological time perspective. The data reveal that PTP accounts for more substance use variance than FTP. Finally, we examine the importance of sex as a predictor of reported substance use, and we see that when time perspective is added to the model, sex is no longer a significant predictor.

Time Perspective Across Samples and Sex

We examined mean scores on the ZTPI, which are presented in Table 1 by sample and sex. Despite overall similarities in the central tendencies of the samples, a pattern we discuss later, men reported consistently higher present scores

than did women in every one of the samples. The average effect size (weighted by sample sizes) for the difference between men and women on the Present scale was –0.50, and we rejected the null hypothesis that the average effect size was equal to zero, 95% confidence interval of the average effect size: –0.41 to –0.58; $Qt(7) = 781.20$, $p < .01$, indicating heterogeneity among the effect sizes. Women reported higher future scores in all of the samples than did men, although this difference was not as consistently significant statistically nor was the effect size as large as was the greater PTP of men. Nevertheless, the average effect size across all of the samples for the difference between men and women on the Future scale was still significant, average effect size = .23, 95% confidence interval: 0.15 to 0.30; $Qt(7) = 167.50$, $p < .01$, indicating heterogeneity among the effect sizes.

Time Perspective and Frequency of Substance Use

Directly in line with our hypothesis, those who were higher on PTP reported more substance use. As indicated in Table 2, the correlations between substance use and the Present subscale ranged from .24 to .42 across the samples, and for all the samples, the average $r = .34$, $Z(2591) = 17.05$, $p < .001$ (a test of homogeneity revealed that the correlations were homogenous: $Qt[8] = 5.81$, $p > .05$; see Rosenthal, 1986, cited in Pratto, Sidanius, Stallworth, & Malle, 1994, for the method for summarizing correlations).[2] Thus this result strongly supports the conclusion that people high on PTP were more likely to report using alcohol, drugs, and tobacco.

Although those with a higher PTP reported higher rates of substance use than did those with lower PTP scores, the relation between FTP and substance use was not nearly as strong in any of the samples. Nevertheless, the average negative correlation between FTP and reported frequency of substance use was significant, $r = –.16$, $Z(2591) = –7.88$, $p < .001$; $Qt(8) = 7.05$, $p > .05$. Obviously the large sample sizes contributed to making these weak correlations statistically significant.

Are future and present time perspectives independent predictors?   Every one of our nine samples had a negative correlation between FTP and reported substance use and a positive correlation between PTP and reported substance use. The opposite direction of these correla-

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[1]To test for homogeneity among effect sizes, we calculated Qt, which is equal to the sum of U_i^2. To derive U_i: the weighted average of effect sizes is subtracted from the test statistic (t_i). This difference is divided by the square root of the quantity $(1 + t_i^2/2df)$, where df = degrees of freedom. This statistic is tested by a chi-square test with $(k – 1)$ degrees of freedom, where k is equal to the number of samples. See Becker (1987) and Hedges and Olkin (1985) for further information.

[2]To test for homogeneity among correlations, we again derived Qt, which was similar to the test for effect sizes. In this case, Qt is equal to the sum of $(n_i – 3) (z_i – z_{bar})^2$, and again, it is tested using a chi-square test with $(k – 1)$ *df*. z_i is Fisher's z, a transformation of r, and z_{bar} is equal to the sum of $[(n_i – 3)(z_i)]$ divided by $N – 3k$, where N = total number of participants in all samples, and n_i = the number of participants within each sample. See Becker (1987) and Hedges and Olkin (1985) for further information.

TABLE 1
Mean Scores on Future and Present Time Perspective Scales by Sample and Sex

| | | Time Perspective Scale | | | |
| | | Future | | Present | |
Sample and Sex	N	M	SD	M	SD
Two high schools	210	3.27	0.47	2.91	0.63
Men	101	3.23	0.42	3.00_c	0.64
Women	109	3.31	0.51	2.83_d	0.61
Gender difference effect size		0.18	—	–0.28	—
Cornell University	690	3.44	0.52	2.68	0.54
Men	278	3.37_a	0.55	2.80_a	0.55
Women	397	3.49_b	0.49	2.60_b	0.53
Gender difference effect size		0.23	—	–0.37	—
Stanford University I	582	3.25	0.53	2.72	0.57
Men	263	3.22	0.54	2.83_a	0.55
Women	312	3.28	0.52	2.62_b	0.56
Gender difference effect size		0.12	—	–0.38	—
Stanford University II	156	3.36	0.66	2.65	0.54
Men	67	3.35	0.60	2.82_a	0.55
Women	89	3.44	0.47	2.56_b	0.51
Gender difference effect size		0.17	—	–0.51	—
Stanford III and Illinois	148	3.51	0.48	2.67	0.58
Men	75	3.42_c	0.50	2.88_a	0.55
Women	73	3.59_d	0.44	2.45_b	0.54
Gender difference effect size		0.36	—	–0.80	—
Three community colleges	453	3.40	0.57	2.79	0.61
Men	193	3.27_a	0.58	2.98_a	0.64
Women	259	3.51_b	0.54	2.64_b	0.55
Gender difference effect size		0.43	—	–0.57	—
San Francisco State University	255	3.30	0.51	2.83	0.59
Men	95	3.23	0.54	3.02_a	0.60
Women	147	3.32	0.49	2.72_b	0.58
Gender difference effect size		0.16	—	–0.50	—
California Youth Authority	24	3.40	0.46	2.81	0.69
Men	24	3.40	0.46	2.81	0.69
Women	0		na		na
Gender difference effect size		na	na	na	na
Driving school	102	3.56	0.45	2.78	0.57
Men	64	3.55	0.48	2.91_a	0.53
Women	38	3.57	0.40	2.56_b	0.57
Gender difference effect size		0.06	—	–0.64	—

Note.   The two scales range from 1 (*very untrue of me*) to 5 (*very true of me*). Within each sample and for each scale, differences between men and women are denoted with different subscripts (a and b, $p < .005$; c and d, $p < .05$).

tions between FTP and PTP and the Substance Use scales suggests that PTP and FTP may merely be reverse-coded scales of each other. In other words, are people who are high on the Present scale and report higher frequency substance use also likely to be very low on the FTP scale? And is this low future score also predictive of substance use? If this is the case, there is no need theoretically for the two scales when attempting to predict substance use.

As we had anticipated, this was not the case. Even though the average correlation between the FTP and PTP scales across the samples was significant (see Table 2)—average $r = –.32$, $Z(2591) = –16.51$, $p < .001$; $Qt(8) =$ 17.93, $p < .05$, indicating heterogeneity in the correlations—the correlations between the PTP and the Substance

Use scales remained very high across all of the sample *after* partialing out FTP scores. Additionally, the following multiple regression analysis illustrates that PTP consistently accounted for more substance use variance than FTP. The implications of these results are considered in the Discussion section.

Regression Analysis

A simultaneous multiple regression was performed between FTP, PTP, sex, and the interactions between future and present, future and sex, and present and sex as the independent variables. The Substance Use scale was the dependent

variable in each of the samples. See Table 3 for those regression parameters that significantly predicted reported substance use, though all parameters were included in the analyses. Of primary interest, PTP was a significant predictor of substance use in all of the eight samples. Interestingly, sex contributed to the prediction of substance use in only one of the samples, and the interaction between future and PTP predicted substance use in two of the samples. Scatterplots of the data suggest that at high levels of PTP and FTP, the high future score attenuated the relation between PTP and drug use.

Time Perspective and the Quantity and Patterns of Alcohol Use

Our results suggest that higher PTP is related to more frequent self-reported substance use. We further investigated the relation between time perspective and alcohol use by asking participants about the quantity of alcohol they consumed and the patterns of their alcohol use. We predicted that increased PTP would be related to greater reported quantities

of alcohol consumed, in addition to higher reported frequency of use.

We examined the correlations between items on the Drinking Habits Questionnaire and the PTP and FTP scales in the samples from the two high schools, Stanford–II, and the three community colleges. Consistent with our predictions, people who reported higher PTP scores were more likely to report drinking more drinks on a single occasion—average $r = .30$, $Z(739) = 8.07$, $p < .01$; $Qt(2) = .08$, $p > .05$, indicating homogeneity among the correlations—and to report drinking more than average during the past month—on this measure, a lower score represents more drinking; average $r = -.14$, $Z(680) = -3.63$, $p < .01$; $Qt(2) = 1.50$, $p > .05$, indicating homogeneity—than people with lower present scores. Finally, people higher on PTP were more likely to report a higher number of drinks consumed over the typical weekend during the past month—average $r = .32$, $Z(684) = 8.25$, $p < .01$; $Qt(2) = 2.21$, $p > .05$, indicating homogeneity—than were people with lower present scores.

Although the positive relation between PTP and drinking quantity and patterns held when using this standardized

TABLE 2
Correlations Between Substance Use and Time Perspective Scales by Sample

		Time Perspective Scale			
Sample	N	Future	Present	Present Partialling Out Future	Correlation Between Present and Future
Two high schools	210	−.19*	.42**	.38**	−.28**
Cornell University	690	−.11*	.32**	.30**	−.38**
Stanford University I	582	−.20**	.35**	.31**	−.36**
Stanford University II	156	−.13	.32**	.30**	−.30**
Stanford III and Illinois	146	−.08	.25*	.24*	−.27**
Three community colleges	453	−.17**	.26**	.23**	−.31**
San Francisco State	255	−.16*	.36**	.33**	−.26*
California Youth Authority	24	−.40	.24	.15	−.26
Driving school	102	−.10	.28*	.27*	−.06
Average correlations	2,591	−.16**	.34**	.30**	.33**

Note.   *$p < .01$. **$p < .001$.

TABLE 3
Significant Regression Parameters for Reported Frequency of Substance Use

Sample	R^2	Variable	B	SE B	t	p
Two high schools	.21	Present	.50	.08	5.976	.0001
		Present × Future	−.33	.16	−2.04	.04
Cornell University	.11	Present	.39	.05	7.54	.0001
Stanford University I	.14	Present	.40	.05	7.34	.0001
		Future	−.13	.06	−2.21	.03
Stanford University II	.12	Present	.40	.11	3.53	.0006
Stanford III and Illinois	.08	Present	.30	.11	2.71	.008
Three community colleges	.10	Present	.24	.06	4.33	.0001
		Sex	.15	.07	2.25	.03
San Francisco State	.18	Present	.41	.08	5.28	.0001
		Present × Future	−.48	.13	−3.62	.0004
Driving school	.11	Present	.35	.12	2.91	.005

questionnaire, the negative correlations between FTP and drinking were not consistently significant. For the single occasion item, FTP correlations ranged from –.07 to –.19, with the average $r = –.11$, $Z(702) = –2.91$, $p < .01$, $Qt(2) = 1.18$, $p > .05$; for the past month item, FTP correlations ranged from .03 to .20, average $r = .07$, $Z(702) = 1.87$, $p < .05$; $Qt(2) = 2.38$, $p > .05$; and for the typical weekend item, FTP correlations ranged from –.11 to –.27, average $r = –.15$, $Z(702) = –3.96$, $p < .01$; $Qt(2) = 2.21$, $p > .05$.

These findings, along with a series of regression analyses, lend further support to the conclusion that FTP and PTP are not opposite ends of a continuum that can be used to predict alcohol use. For each sample, simultaneous multiple regressions were performed between FTP, PTP, sex, and the interactions between future and present, future and sex, and present and sex as the independent variables. The three items—most consumed on a single occasion, drinking pattern during the past month, and amount consumed on a typical weekend—were the dependent variables. To summarize these analyses, PTP was consistently a significant predictor of the largest amount consumed on a single occasion and the amount consumed on a typical weekend, whereas FTP was not a significant predictor of these dependent variables in the three samples. The results were not as consistent for the item examining the drinking pattern during the past month. See Table 4 for those regression parameters that significantly predicted reported alcohol use, though all parameters were included in the analyses.

Discussion

The results support the prediction that a PTP was related to higher reported rates of alcohol, drug, and tobacco use across a host of diverse samples. FTP was not a consistent predictor of reported substance use. Thus time perspective is an important individual difference that should be included in attempts to understand the dynamics of substance use and abuse.

In our examination of sex effects, men reported higher PTP scores than did the women, and women reported higher FTP scores than did the men. These sex differences should be further examined, and any future research using the ZTPI, or other measures of time perspective, should be aware of and investigate the influence of these sex differences. Surprisingly, the relation between time perspective and substance use was not affected by sex. Earlier research suggested that men and women may differ in the quantities of alcohol used at each occasion, even if they do not differ in their frequency of use (Jackson & Matthews, 1988). Our results, however, contradict this literature and suggest that time perspective, had it been examined in the previous studies, may have contributed more to the variance in reported substance use than sex. We speculate further that in other studies, had time perspective been measured, women would have been lower on PTP than the men, and it would have been this difference in time perspective that would have accounted for some of the sex difference in alcohol consumption. Further examination of our results supports this speculation. For example, in the Stanford–I sample, sex, when it was the only independent variable, was a significant predictor of substance use, $t(568) = 2.08$, $p < .05$. But when PTP was added to the model, sex was no longer a significant predictor of substance use, $t(567) = 0.56$, $p = .57$, and this new model accounted for a larger portion of the variance of substance use (sex only: $R2 = .01$; present and sex: $R2 = .12$). We observed this pattern in a majority of our samples.

Although our results are strong and consistent, there are several limitations to the method of testing our hypothesis. One concern is our aggregate examination of self-reported

TABLE 4
Significant Regression Parameters for Drinking Habits Questionnaire Items

Item	Sample	R^2	Predictor	Standardized B	t	p
Most consumed	Two high schools	.10	Present	.27	3.99	.0001
	Stanford II	.14	Present	.23	2.26	.03
	Community colleges	.12	Present	.25	4.96	.0001
			Sex	.15	3.04	.003
			Present × Sex	.15	3.08	.002
Pattern last month	Two high schools	.06	Present × Sex	.16	2.15	.03
	Stanford II	.10	—	—	—	—
	Community colleges	.03	Present	–.12	–2.13	.03
			Present × Sex	–.11	–2.04	.04
Amount during weekend	Two high schools	.14	Present	.34	4.79	.0001
	Stanford II	.24	Present	.27	2.92	.004
	Community colleges	.11	Present	.21	3.95	.0001
			Sex	.17	3.19	.0015
			Present × Sex	.11	2.17	.03

alcohol, drug, and tobacco use. There is no simple solution to this concern. With our aggregation, we may lose information that could suggest that time perspective may be more highly related to the use of one substance than another. However, a separate analysis of each of these variables showed the same effects as the aggregate.

When presenting portions of this data in other forums, we have expressed a second concern, qualifying our results as based exclusively on Stanford students. We stressed that a Stanford University sample, with its high academic criteria, may be highly future oriented, so that results obtained from such a sample may not be generalizable to other populations. The diversity of our current samples allowed us to examine this caveat, and to our surprise, our caution was unwarranted, because the level of future and PTP did not vary much across the samples. Even adult respondents living in shelters for the homeless in the San Francisco Bay Area had average scores on the ZTPI for the Present and Future scales that were comparable to those in this study (Epel et al., in press). These findings suggest that when individuals assess their time perspective, they do so relative to others in their environment. For example, Stanford students would answer the questions assessing how future oriented they are relative to their friends, roommates, and classmates, most of whom are probably highly future oriented. On the other hand, one might expect that CYA men would be highly present oriented. But in filling out the questionnaire, if the CYA men assess their time perspective relative to their peers—other CYA men—they may report that they are more or less present oriented than a stereotype would imply. Thus the degree to which one is present or future oriented may be dictated by the social environment and the social comparisons made to other people in that environment.

Third, we are still left with questions of discriminant validity. Is time perspective a new variable, or is it merely a new name for a personality trait that has already been related to self-reported substance use? In Study 2, we first replicate the results from Study 1, and then we go on to investigate the discriminant validity of PTP by examining its ability to predict reported substance use independently when compared to 13 individual difference variables that have been previously related to reported substance use. Specifically, we examine aggression, depression, ego undercontrol, ego resiliency, impulse control, novelty seeking, reward dependence, sensation seeking, anxiety, and family income. Additionally, we examine how well time perspective predicts self-reported substance use compared to other variables that are conceptually similar to either FTP or PTP, or correlated with them, such as conscientiousness (see Harber et al., 1997), consideration of future consequences (see Strathman et al., 1994), and preference for consistency (see Cialdini, Trost, & Newsom, 1995).

STUDY 2

Method

Participants

Students from the College of San Mateo, a community college in Northern California, completed the study ($n = 206$, 65% female). Participants' ages ranged from 16 to 62 years ($M = 23.63$, $SD = 8.60$), and 49% reported their ethnicity as White or Caucasian, 24% Asian or Asian American, 14% Hispanic or Latino, 2% African American or Black, and 11% other. The median family yearly income was $70,000 to $100,000, and the participants classified their median economic class of their immediate family as middle working class. (The apparent contradiction between the participants' median family income and classifying the economic class of their immediate family as middle working class may reflect the prevalence of dual income households in the high cost-of-living San Francisco Bay Area.)

Materials and Procedure

Students voluntarily participated in the study (with the added incentive of being eligible to win one of two $50 lottery prizes if they completed the study) during the fall of 1995. They completed the following questionnaires, which, after the Health and Risk Questionnaire, are listed in alphabetical order, as an in-class project in the presence of the experimenter.

Demographics. On this questionnaire, students indicated their sex, age, year in school, race, religion, family's approximate yearly income, and the economic class of their immediate family, their mother's parents, and their father's parents by checking a 9-point scale that ranged from 1 (*lower working class*) to 9 (*top upper class*).

ZTPI. The average score on the 13-item Future scale was 3.47 ($SD = 0.49$; $\alpha = .65$), and as in Study 1, women had higher future scores than did men: women: $M = 3.53$, $SD = 0.47$; men: $M = 3.33$, $SD = 0.49$; $t(200) = 2.81$, $p < .01$; effect size (d) = .41. Again, we performed all of the analyses for this study using the Present scale without the "getting drunk" item. The average score on the Present scale was 2.94 ($SD = 0.58$); men had slightly higher scores than did women, $t(200) = -1.53$, $p = .13$; men's $M = 3.02$, $SD = 0.60$; women's $M = 2.89$, $SD = 0.56$; effect size = −.22; and the reliability was $\alpha = .60$.

Health and Risk Questionnaire.   As in Study 1, we focus on 5 of the 37 items on this questionnaire: drinking beer, wine, or coolers; drinking hard alcohol; smoking pot; doing other drugs; and smoking cigarettes. Again, these items were significantly correlated with each other (rs ranged from .35 to .42, ps < .001), so we standardized and averaged the five items into one Substance Use scale (α = .78). Men and women did not differ in their usage of these substances, $t(201)$ = –1.18, p > .05, effect size = –.17; drinking beer, wine, or coolers: overall M = 1.51, SD = 1.10; drinking hard alcohol: M = 1.09, SD = 1.02; smoking pot: M = 0.77, SD = 1.16; doing other drugs: M = 0.27, SD = 0.67; and, cigarette smoking: M = 0.90, SD = 1.35.

Aggression Questionnaire (Buss & Perry, 1992). This questionnaire contains four subscales measuring physical aggression, verbal aggression, anger, and hostility. Participants responded to the 29 items by rating how characteristic each item was of themselves on a range from 1 (*extremely uncharacteristic*) to 5 (*extremely characteristic*). Examples of items are: "If somebody hits me, I hit back" (physical aggression); "I often find myself disagreeing with people" (verbal aggression); "I have trouble controlling my temper" (anger); and "I sometimes feel that people are laughing at me behind my back" (hostility). The mean on the Present scale was 2.63 (SD = 0.58), and men scored significantly higher than did women: men M = 2.78, SD = 0.59; women M = 2.55, SD = 0.56; $t(196)$ = –2.68, p < .01; effect size = –.40. The internal reliability was α = .90.

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).   The BDI is a 14-item questionnaire that measures the negative cognitions characteristic of depressed people. Each item contains four statements, which increase in degree of negativity. Participants indicate the one statement in each group that describes the way they have been feeling during the past week. A sample item is: "I do not feel sad"; "I feel sad"; "I am sad all the time and can't snap out of it"; and "I am so sad or unhappy that I can't stand it." The BDI is scored where 0 is the least negative statement and 3 is the most negative statement, and participants' responses to the 14 items were summed (α = .84). The average score was 5.77 (SD = 5.61), and there were no sex differences on the BDI, $t(199)$ = 0.86, p > .05, effect size = .13.

Conscientiousness.   The Conscientiousness scale we used is a factor of the Big Five Questionnaire (Caprara, Barbaranelli, Borgogni, & Perugini, 1993), and it has two facets, scrupulousness and perseverance. The scrupulousness facet measures dependability, orderliness, and precision and includes items such as "I usually attend to the smallest detail

of everything" and "Before completing a job I spend a lot of time revising it." The perseverance facet measures the ability to fulfill one's tasks and commitments and includes items such as "I always pursue the decisions I've made through to the end" and "If I fail in a task, I keep trying until I succeed." The 24 items of the Conscientiousness scale are evaluated on a 5-point scale ranging from 1 (*very true of me*) to 5 (*very false of me*; α = .79). The average score on this scale was 3.50 (SD = 0.42), and women scored significantly higher than did men: women: M = 3.55, SD = 0.41; men: M = 3.40, SD = 0.42; $t(199)$ = 2.29, p < .05; effect size = .36.

Consideration of Future Consequences (CFC; Strathman et al., 1994).   This questionnaire measures a "stable individual difference in the extent to which people consider distant versus immediate consequences of potential behaviors" (Strathman et al., 1994, p. 742). On a 5-point scale ranging from 1 (*extremely uncharacteristic*) to 5 (*extremely characteristic*), participants indicated their response to 12 statements such as "I consider how things might be in the future, and try to influence those things with my day to day behavior" and "I only act to satisfy immediate concerns, figuring the future will take care of itself" (reverse coded). The average score on the scale was 3.41 (SD = 0.57), and men and women did not score differently on the CFC, $t(201)$ = 1.58, p > .05, effect size = .25; unlike they did on the Future scale of the ZTPI, on which women scored significantly higher than men. The internal reliability was α = .78.

Ego Control scale, VI (EC; Block, 1996).   The EC scale contains 38 items, and participants responded by circling a number on a 4-point scale, where 1 = *not at all* and 4 = *very true*. The scale is scored for *undercontrol*, and items include: "When I get bored, I like to stir up some excitement," "I do not always tell the truth," and "On the whole, I am a cautious person" (reverse coded). The average score was 2.57 (SD = 0.30), and there were no sex differences on this scale, $t(201)$ = –0.81, p > .05, effect size = –.10. Its internal reliability was α = .80.

Ego Resiliency (ER; Block & Kremen, 1996).   ER is the "dynamic capacity of an individual to modify a characteristic level of ego control, in either direction, as a function of the demand characteristics of the environmental context, so as to preserve or enhance system equilibration" (Block & Kremen, 1996, p. 351). The 14 items of the ER scale were interspersed with the EC scale, and participants answered them using the same 4-point scale. Examples of items are: "I like to do new and different things" and "I get over my anger at someone reasonably quickly." The average score was 3.02 (SD = 0.35), and men's and women's scores did not differ sig-

nificantly, $t(201) = 0.41$, $p > .05$, effect size = .06. The internal reliability of this scale was $\alpha = .73$.

Impulse control.   The impulse control facet of the Big Five Questionnaire (Caprara et al., 1993) assesses the ability to control irritation, discontent, and anger. The 12 items of this facet ($\alpha = .72$) are rated on a 5-point scale ranging from 1 (*very true of me*) to 5 (*very false of me*) and include questions such as "I'm rather touchy," "It bothers me a lot to be disturbed when I'm doing something that interests me," and "I don't usually lose my calm" (reverse coded). The average score was 2.84 ($SD = 0.52$), and there were no sex differences on this facet, $t(198) = -0.06$, $p > .05$, effect size = .02.

Novelty seeking (NS; Cloninger, 1987).   The NS scale we used is a subscale of the Tridimensional Personality Questionnaire (TPQ), which measures three basic personality dimensions—Novelty Seeking, Harm Avoidance, and Reward Dependence. The NS scale measures "a tendency to be attracted to unfamiliar stimuli and is characterized by frequent exploratory activity and the avoidance of monotony" (Sher et al., 1995, p. 195). It contains 34 statements ($\alpha = .79$), and participants indicate if the statements are true or false about themselves. Statements include: "I often break rules and regulations when I think I can get away with it" and "I lose my temper more quickly than most people." The average score on this scale (summing all of the true statements) was 17.93 ($SD = 5.73$), and there were no sex differences on this scale, $t(200) = -0.47$, $p > .05$, effect size =.07.

Preference for consistency (PFC) scale (Cialdini et al., 1995).   The PFC scale (brief form) measures "a tendency to base one's responses to incoming stimuli on the implications of … previous expectancies, commitments, and choices" (p. 318). Participants indicated the degree to which they agreed or disagreed with nine statements on a 9-point scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree;* $\alpha = .81$). Statements include: "I typically prefer to do things the same way" and "It doesn't bother me much if my actions are inconsistent" (reverse coded). The average score on this scale was 5.61 ($SD = 1.28$), and men and women did not respond differently, $t(201) = 1.16$, $p > .05$, effect size = .16.

Reward dependence (RD; Cloninger, 1987).   Although delay of gratification is an obvious candidate for comparison with our time perspective measure, a thorough search of the literature and personal communication with leading researchers in that area revealed that there is no adequate measure for adults. The most conceptually similar scale is Cloninger's Reward Dependence scale (1987), a subscale of the TPQ. The RD scale measures "extreme sensitivity to re-

ward cues, particularly social approval, and greater resistance to extinction of behavior" (Sher et al., 1995, p. 195). It contains 30 statements ($\alpha = .71$), and participants indicate if the statements are true or false about themselves. Examples are: "I like to please other people as much as I can" and "I am usually so determined that I continue to work long after other people have given up." The average score on this scale (summing all of the true statements) was 19.94 ($SD = 4.31$), and women scored significantly higher than did men: women: $M = 20.83$, $SD = 3.98$; men: $M = 18.13$, $SD = 4.38$; $t(200) = 4.45$, $p < .001$; effect size = .63.

Sensation Seeking scale (SSS).   The SSS (Zuckerman, 1994; Zuckerman, Eysenck, & Eysenck, 1978) contains 40 items on which participants choose the one of two statements that best describes their preferences. An example pair of statements is: "I prefer friends who are excitingly unpredictable" or "I prefer friends who are reliable and predictable." As with the PTP scale, the SSS contains five items that ask directly about substance use. Thus all analyses were performed without these five items. The average score for the SSS without the five problematic items was 52.46 ($SD = 5.61$), and men reported slightly higher sensation seeking scores than did women: $t(201) = -1.78$, $p = .08$; men's $M = 53.38$, $SD = 5.36$; women's $M = 51.91$, $SD = 5.75$; effect size = .26. The internal reliability was $\alpha = .79$.

State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970).   The STAI is a 20-item scale can be used to measure either state or trait anxiety. In this study, we used the trait version, which measures relatively stable individual differences between people in their tendency to respond with anxiety to situations perceived as threatening. The questionnaire asks people to describe how they *generally* feel by indicating their response on a 4-point scale ranging from 1 (*not at all*) to 4 (*very much so*) to statements such as "I feel secure" (reverse coded) and "I am inclined to take things hard." The average score on this scale was 2.12 ($SD = 0.47$); men's and women's scores were not significantly different, $t(201) = 0.25$, $p > .05$, effect size = .04; and the internal reliability was $\alpha = .89$.

Results

Time Perspective and Frequency of Substance Use

Directly in line with our hypothesis and replicating Study 1, those higher on PTP reported more substance use, $r(205) = .37$, $p < .001$. In addition, those higher on FTP reported less substance use than did those lower on FTP, $r(205) = -.19$, $p < .01$. Controlling for FTP did not substantially weaken the re-

lation between PTP and reported substance use, $r(202) = .34$, $p < .001$, again suggesting that FTP and PTP are independent predictors of self-reported substance use. A simultaneous multiple regression was performed between FTP, PTP, sex, and the interactions between sex and present, sex and future, and future and present as the independent variables and substance use as the dependent variable. PTP was the only significant predictor of reported substance use, $R^2 = .17$, $F(6, 195) = 6.86$, $p < .0001$; standardized beta $= .36$, $t(201) = 5.28$, $p < .01$.

Discriminant Validity

For the complete table of correlations between time perspective, the variables against which we tested discriminant validity, and substance use, as well as the disattenuated correlations (correlations corrected for unreliability in the scales) between time perspective and the discriminant validity variables, see Table 5. Even though the disattenuated correlations between time perspective and the variables of interest are high, we see in the next section that PTP is a significant predictor of reported substance use, even after controlling for the overlap between time perspective and the discriminant validity variables. All of the following analyses were conducted with PTP and FTP, sex, and the interactions between sex and present, sex and future, and future and present and the discriminant validity variables of interest as the independent variables and substance use as the dependent variable. The following section reports in detail only those vari-

ables that emerged as significant predictors of reported substance use in simultaneous multiple regressions when we conducted a separate analysis for each discriminant validity variable. These variables are listed in alphabetical order.

Aggression questionnaire.   PTP and aggression both significantly predicted reported substance use: $R^2 = .20$, $F(7, 189) = 6.63$, $p < .0001$; aggression: $\beta = .17$, $t(196) = 2.32$ $p < .05$; PTP: $\beta = .31$, $t(196) = 4.25$, $p < .0001$.

BDI.   PTP and depression both were significant predictors of reported substance use. The two variables together accounted for 19% of the variance: $F(7, 192) = 6.50$, $p < .0001$; depression: $\beta = .14$, $t(199) = 2.03$ $p < .05$; PTP: $\beta = .34$, $t(199) = 4.89$, $p < .0001$.

Ego Control scale (VI).   Ego undercontrol was a significant predictor of reported substance use, but PTP also accounted for a significant portion of the variance: $R^2 = .29$, $F(7, 194) = 11.35$, $p < .0001$; ego undercontrol: $\beta = .41$, $t(201) = 5.64$, $p < .0001$; PTP: $\beta = .15$, $t(201) = 2.02$, $p < .05$.

Preference for Consistency scale.   PTP and consistency were both significant predictors of reported substance use: $R^2 = .20$, $F(7, 194) = 6.83$, $p < .0001$; consistency: $\beta = -.18$, $t(201) = -2.38$, $p < .05$; PTP: $\beta = .31$, $t(201) = 4.32$, $p < .0001$.

TABLE 5
Correlations and Disattenuated Correlations Among Time Perspective, Discriminant Validity Variables, and Substance Use

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Substance Abuse	—																
2. Future	−.19	—															
3. Present	.37	−.30	—														
4. Aggression	.30	−.24	−.37	—													
5. Beck Depression Inventory	.25	−.25	−.21	.51	—												
6. Conscientiousness	−.18	.59	−.34	−.31	−.25	—											
7. Consideration of Future Consequences	−.21	.51	−.42	−.27	−.29	.55	—										
8. Ego (Under) Control	.50	−.28	.55	.49	.24	−.29	−.26	—									
9. Ego Resiliency	.11	.23	.15	−.18	−.24	.24	.16	.26	—								
10. Family Income	−.05	.06	−.06	−.12	−.12	.03	.11	−.05	.17	—							
11. Impulse Control	−.22	.22	.22	−.57	−.39	.23	.30	−.40	.16	.09	—						
12. Novelty Seeking	.30	−.32	.47	.47	.28	−.37	−.33	.65	.09	−.07	−.37	—					
13. Preference for Consistency	−.31	.41	−.40	−.30	−.10	.36	.29	−.44	.00	.09	.22	−.50	—				
14. Reward Dependence	.12	.33	−.15	−.19	−.08	.37	.18	−.17	.05	.02	.03	−.11	.22	—			
15. Sensation Seeking	.43	−.24	.45	.32	.14	.20	−.21	.64	.28	.00	−.19	.50	−.47	−.23	—		
16. State–Trait Anxiety	.13	.19	.12	.52	.70	−.24	−.20	.16	−.39	−.17	−.45	.23	−.05	.09	−.03	—	
17. Disattenuated Correlation With Future	−.27	—	—	−.31	−.34	.82	.70	−.39	.33	—	.32	−.45	.57	.49	−.33	−.25	—
18. Disattenuated Correlation With Present	.54	—	—	.50	.30	−.49	−.61	.79	.23	—	−.33	.68	−.57	−.23	.65	.16	−.48

Note.   Correlations with absolute values that exceed .14 are statistically significant, $p < .05$.

Sensation seeking.   Sensation seeking and PTP—SSS: $\beta = .32$, $t(201) = 4.47$, $p < .0001$; PTP: $\beta = .23$, $t(201) = 3.16$, $p < .001$—both contributed significantly to the model, which accounted for 25% of the variance, $F(7,194) = 9.31$, $p < .0001$.

Variables not predictive of substance use.   None of the following scales were significant predictors of the substance use scale when entered at the same time as PTP: Conscientiousness, Consideration of Future Consequences, Ego Resiliency, Family Income, Impulse Control, Novelty Seeking, Reward Dependence, and State-Trait Anxiety.

Time perspective versus all other personality variables.   In an additional analysis, we compared the predictive ability of PTP to all of the other personality variables within the same analysis. To do this, we conducted a hierarchical multiple regression in which PTP, FTP, sex, and all of the appropriate two-way interactions were entered in the first step. We then allowed all of the other personality variables to enter in the second step. Only ego control significantly added to the variance accounted for, and PTP remained a significant predictor: $R^2 = .29$, $F(7, 184) = 10.77$, $p < .0001$; ego control: $\beta = .41$, $t(201) = 5.49$, $p < .0001$; PTP: $\beta = .15$, $t(201) = 1.96$, $p = .05$.

Discussion

As in Study 1, the results from this study illustrated that PTP was related to reported substance use. Importantly, the relation between PTP and substance use survived tests of discriminant validity. The results demonstrated that PTP is not the same variable with a new name, as sensation seeking, aggression, impulse control, novelty seeking, consistency, depression, conscientiousness, consideration of future consequences, ego resiliency, family income, reward dependence, or anxiety.

GENERAL DISCUSSION AND CONCLUSIONS

This work is an important contribution to the literature on both substance use and abuse and time perspective. It demonstrated that PTP and FTP may differentially affect individuals' behaviors. This suggests that focusing on these different dimensions may allow for more precise predictions of complex social behaviors.

Additionally, this work adds to the diverse collection of individual difference variables that have been previously related to reported substance use. These variables are all broadly related to the construct of dysregulation, and it is this construct that probably accounts for the high amount of shared variance between many of the measures we tested

(such as PTP, sensation seeking, aggression, ego undercontrol, impulse control, and novelty seeking). But, through the current work, we know now that dysregulation also contains a temporal dimension that may not be captured by the other measures that make up the dysregulation construct. And this temporal dimension is an important predictor of reported substance use.

Can time perspective predict more than reported substance use? An article published in *Health Psychology* in 1996 using the ZTPI found that people higher on FTP were more likely to delay onset of sexual activity, and once sexually active, were likely to have fewer sexual partners than those lower on FTP. Moreover, those who were higher on the Present scale had higher rates of sexual behavior and more sexual partners than those lower on the Present scale (Rothspan & Read, 1996). Research from our laboratory also indicates that time perspective is a significant predictor of a wide range of behaviors (see Zimbardo, 1997; Zimbardo & Boyd, 1997). For example, homeless adults living in temporary shelter housing who had a higher PTP showed a more dysfunctional range of coping behaviors than those who had a lower PTP, whereas those high on the ZTPI Future scale used their time in the shelter more productively and were more likely to find permanent housing solutions than those lower on the Future scale (Epel et al., in press). Moreover, data from large-sample surveys indicate that people higher on PTP are more likely to take risks driving and engage in other health risk behaviors than are people higher on FTP (Zimbardo et al., 1997). Additionally, Harber et al. (1997) found that participants higher on FTP were more likely to complete their experimental research requirement for introductory psychology a week before participants higher on PTP. Furthermore, future-oriented participants were more likely to show up on time for experiments than were present-oriented participants.

Finally, we must acknowledge that the results of our research and of similar studies are affected by participants' tendency not to accurately report alcohol, tobacco, and drug use. Despite promises of confidentiality by the researchers, respondents may not feel comfortable reporting their true level of substance use, especially if they are under the legal drinking age or are using illegal substances. Also, the frequency scale used in this study was not ideal, in that it can be difficult to interpret the meaning of "often drink hard alcohol," for example. In an ideal world, we would be able to assess actual substance use and abuse behaviors. However, these limitations are not unique to our studies, as most of the literature on individual differences that predict substance use also relies upon self-report methods. Additionally, PTP may be an antecedent to substance use, or PTP may be a concomitant, consequence, or independent contributor of substance use (see Marlatt, Baer, Donovan, & Kivlahan, 1988). Our future research will work to disentangle these alternative roles of time perspective by systematically relating this construct to actual substance use.

On the whole, these limitations do not weaken our argument that time perspective is an important individual difference contributor to any analysis of the social and psychosocial dynamics of substance use and abuse. Although biology plays a role in substance use and abuse, "the psychological, behavioral and social factors involved in the choices to drink or take drugs have to be taken into account" (Leo, 1996, p. 18), as well as in choices about deciding to smoke. The results of these studies, with such large, diverse samples of participants, demonstrate the ability of the psychological construct of time perspective to predict reported use of substances potentially harmful to health. Not only do our results indicate that time perspective is multidimensional, they also illuminate a previously unexamined relation between time perspective and reported substance use. This promising relation should be further explored, so that this knowledge can be successfully applied to the assessment of risk for using and abusing substances. It can also provide valuable information for the development of new substance use treatment programs, which could take account of the very different cognitive orientations of those who are primarily focused on the present behavioral setting in contrast to peers who live more in the abstract future or the past.

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APPENDIX: QUESTIONS FROM THE ZIMBARDO TIME PERSPECTIVE INVENTORY (SHORT FORM)

Future

I believe that a person's day should be planned ahead each morning.

Thinking about the future is pleasant to me.

When I want to achieve something, I set goals and consider specific means of reaching those goals.

Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play.

It seems to me that my future plans are pretty well laid out.

I think that it's useless to plan too far ahead because things hardly ever come out the way you planned anyway. (reverse coded)

It upsets me to be late for appointments.

I tend to lose my temper when I'm provoked.

I get irritated at people who keep me waiting when we've agreed to meet at a given time.

I complete projects on time by making steady progress.

I make lists of things to do.

I keep working at a difficult uninteresting task if it will help me get ahead.

I am able to resist temptations when I know there is work to be done.

Present

I do things impulsively, making decisions on the spur of the moment.

I believe that getting together with friends to party is one of life's important pleasures.

If I don't get done on time, I don't worry about it.

I try to live one day at a time.

It's fun to gamble when I have some extra money.

I feel that it's more important to enjoy what you are doing than to get the work done on time.

I don't do things that will be good for me if they don't feel good now.

I get drunk at parties. (Note: Analyses conducted without this item.)

I take risks to put excitement into my life.