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The Overlap in Predicting Alcohol Outcome for Two Measures of the Level of Response to Alcohol

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Abstract

Background—Two different measures have been used to establish a person's level of response (LR) to alcohol as a risk factor for alcohol use disorders. LR values established by the alcohol challenge protocol and the Self-Report of the Effects of Ethanol (SRE) questionnaire usually correlate at 0.3 to 0.4, up to 0.6. However, it is not clear how this correlation relates to the ability of each measure to predict alcohol outcomes. This paper evaluates that overlap.

Methods—Sixty-six Caucasian males (0 age 22) from two protocols participated in alcohol challenges with 0.75 ml/kg of ethanol, filled out the SRE, and were followed with a structured interview ~ 5 years later. The relationship between the subjective feelings of intoxication at the time of peak breath alcohol levels from the alcohol challenge and the SRE score for a time early in the drinking career were evaluated regarding predicting the drinks per occasion in the six months prior to follow-up.

Results—Cross-sectional correlations between alcohol challenge and SRE LR's ranged from -.25 ($p<.05$) to -.32 ($p=.02$) for the full sample, and the two LR measures correlated with drinking at follow-up (-.26 and .41, respectively). The SRE measure was more robust than the challenge in a regression analysis predicting the outcome in the context of other baseline predictors (e.g., drinking at baseline). As much as 60% of the ability of the more well established (gold standard) alcohol challenge LR to predict outcome was shared with the SRE. The alcohol challenge accounted for as much as 44% of the ability of the SRE to predict outcome.

Conclusions—The SRE-generated LR overlapped considerably with the alcohol challenge LR in the ability to predict future heavier drinking.

Keywords

Alcoholism; Level of Response; Prediction

I. Introduction

The low level of response (LR) to alcohol is an endophenotype related to the future risk for heavy drinking, alcohol problems, and alcohol use disorders (AUDs) (Hu et al., 2005; Schuckit, 2002). The need to ingest more drinks to get the desired effects from early in life is hypothesized to increase the drinks consumed per occasion, which subsequently encourages selecting heavy-drinking peers and alters alcohol expectancies (Schuckit, 2002; Schuckit et al., in press, a). Following the guidelines for an endophenotype presented by Gottesman and Gould (2003), the less intense response to alcohol can be documented early in life (as young as age 12), predicts future alcohol-related problems, and has a heritability

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(or proportion of the variance explained by genes) of between 40% and 60% (Heath et al., 1999; Schuckit et al., 2006, 2007, in press, c). Several genes likely to contribute to the LR to alcohol in both animals and humans have been identified (Barr et al., 2003; Davies et al., 2003; Schuckit et al., 2005a), and structural equation as well as latent trajectory models have identified environmental components that partially mediate how a low LR early in life contributes to later heavy drinking and associated problems (Schuckit et al., in press, a, b, 2004, 2005d; Trim et al., 2008).

The classical approach to measuring LR in humans has used an alcohol challenge where groups at higher and lower risk for later alcoholism (e.g., children of alcoholics and controls) are matched on recent drinking and drug use histories and on demography, after which the two groups' alcohol-related changes in a variety of measures are compared at rising, peak, and falling blood alcohol concentrations (BACs) (Schuckit and Gold, 1988; Schuckit and Smith, 2000). Prominent among these measures is the Subjective High Assessment Scale, or SHAS, the most recent version of which asks subjects to report on changes in seven subjective feelings of intoxication every half hour after consuming the beverage using a 36-point scale (Eng et al., 2005; Schuckit and Gould, 1988). All four follow-up studies of subjects studied earlier in life with alcohol challenges have reported higher risks for heavy drinking and problems among subjects with lower LR's (Heath et al., 1999; Rodriguez et al., 1993; Schuckit and Smith, 2000; Volavka et al., 1996), even after controlling for the usual drinking pattern prior to the alcohol challenge (Schuckit, 2002; Trim et al., submitted). However, alcohol challenges can only be used with individuals old enough to give informed consent (i.e., ∃ age 18), and, therefore, are often carried out five or more years after the onset of drinking. Despite matching higher and lower risk subjects on drinking histories, this delay raises the question of whether the observed LR reflects early sensitivity to alcohol or differences among groups regarding the development of acquired tolerance. Another problem with these challenges is their high cost which limits the number of subjects who can be incorporated into a research protocol.

Therefore, a less expensive and easier to use LR measure was developed as the Self-Report of the Effects of Ethanol (SRE) questionnaire (Schuckit et al., 1997 a, b). Here, subjects are asked to think back to a point early in their drinking careers (the approximately first five times of drinking, or the First 5), and to list the number of standard (10-12 grams of ethanol) drinks required for up to four effects of this drug. These include the drinks needed for the onset of feelings of intoxication, the production of slurred speech, feeling unsteady or developing a stumbling gait, and the amount of alcohol needed to produce an unwanted falling asleep, with instructions to only list the alcohol experiences they had actually had during the early drinking time frame (Schuckit et al., 1997 a, b). This instrument requires less than 5 minutes to fill out, and can be used with all drinkers, including those in their early to mid teens, the usual times of experiencing the first drinking effects (Faden and Fay, 2004). The SRE was constructed to ask questions that parallel four of the items used to report changes in subjective feelings of intoxication during alcohol challenges on the SHAS. The questionnaire has a Cronbach alpha >0.90, and a one-year retest reliability between 0.72 and 0.82, and a five-year retest kappa of .66 (Schuckit et al., 1997b, 2004). The external validity of this measure includes lower LR scores (or a greater number of drinks required for effects on the SRE) for subjects at high alcoholism risk including children of alcoholics, Koreans, and American Indians (Ehlers et al., 1999; Schuckit et al., 1997b; Wall et al., 1999). Lower LR values, as measured by a higher number of drinks for effects on the SRE, correlated as high as 0.5 with the maximum drinks ever consumed in 24 hours in 12-to-14 year olds, and ~0.25 at this early age with the number of relatively minor alcohol-related problems ever experienced (Schuckit et al. 2005b, 2006).

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LR scores from the SRE are familial, with correlations in first-degree relatives of 0.2 to 0.3 vs. ~ zero among unrelated individuals (Schuckit et al., 2001, 2005c), and genetic analyses have identified at least one genetic locus potentially linked to both alcohol challenge and SRE LR's (Schuckit et al., 2001, 2005a). Both measures of LR have also been demonstrated to predict future heavier drinking and alcohol problems (Schuckit et al., 2007, in press, c). The ability of the SRE First 5 score to predict drinking quantities and alcohol problems remained significant after covarying for sex, weight, and for alcohol quantity and problems at the time the SRE was filled out.

However, there are important differences between the alcohol challenges and the First 5 SRE score as measures of LR. The SRE reflects global recollections of subjective feelings of intoxication during earlier drinking sessions, while the alcohol challenge measures specific aspects of LR across rising, peak, and falling BACs in a laboratory session and often takes place several years after the onset of drinking. Thus, there are trade offs between the two measures, with the SRE capturing the overall reaction to alcohol in the past, but suffering from errors of retrospection, while the laboratory challenge avoids that problem but results could be impacted by developing tolerance to alcohol. Therefore, while both alcohol challenges and SRE-based LR scores record aspects of reactions to alcohol, they would not be expected to overlap perfectly. Comparisons between SRE measures and alcohol challenges demonstrate correlations that are usually between 0.3 and 0.4, although figures can approach 0.6 when only individuals who are clearly high and low on LR are considered (Schuckit et al., 1997 a, b). Thus, while the correlations between alcohol challenge and SRE-based LR scores are significant, it is not clear what the less than perfect concordance means. An important question is whether the correlation indicates that these measures overlap in their ability to predict future heavy drinking and alcohol-related problems. Therefore, this paper presents the first report of the concordance in prediction of future heavy drinking in subjects who received both alcohol challenges and filled out the SRE at a similar age and participated in a subsequent follow-up.

II. Methods

The subjects for this study were extracted from two protocols where subgroups had received both alcohol challenges and filled out the SRE in close contiguity. The first group included 55 male offspring aged 18-to-29 from the Collaborative Study on the Genetics of Alcoholism (COGA) who had been recruited for alcohol challenges at the San Diego site (Schuckit et al., 1996). COGA is a six-center wide collaborative effort where each site recruited families of alcohol-dependent men who entered alcohol and drug treatment programs in the early-to-mid-1990's. The original subjects were chosen based on meeting alcohol dependence criteria of the Third Revised Statistical Manual of Mental Disorders (DSM-III-R) (American Psychiatric Assn., 1987), and who fulfilled criteria for definite alcoholism as presented in the Feighner criteria (Feighner et al., 1972). Each center also recruited comparison subjects using a variety of methods including random mailings, drivers license records, as well as the random selection among participants in medical or dental clinics (Bucholz et al., 1994; Schuckit et al., 1996). All original probands, available first and second degree relatives including these offspring, and members of control families were interviewed by personnel trained on the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA) instrument (Bucholz et al., 1994; Hesselbrock et al., 1999). The SSAGA has good to excellent reliability for alcohol and drug use disorders, and good validity regarding these diagnoses when compared to an additional structured research instrument. The 55 offspring included here were all followed-up five years later with a SSAGA interview focusing on the interval period.

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The second set of subjects included 11 sons of probands from the San Diego Prospective Study (SDPS) (Schuckit et al., 2005e). Their fathers had originally been selected between 1978 and 1988 as 18-to-25-year-old drinking but not alcohol-dependent sons of alcoholics and controls who were students or nonacademic staff at the University of California San Diego (Schuckit and Gold, 1988; Schuckit et al., 2005e). As part of the San Diego protocol, the original probands, their spouses, and all offspring age 12 and above have been followed every five years using interviews based on the SSAGA from the COGA protocol (Schuckit and Smith, 2000). During the 20-year-follow-up phase of the SDPS, drinking but not alcohol dependent offspring aged 18- to-29 years who lived in the San Diego area were identified and invited for a full SSAGA interview and to visit the alcohol challenge laboratory to participate in the same protocol used for their fathers 20 years previously. The 11 men reported on here were themselves subsequently followed-up during the next five-year family evaluation, and, thus, have data on the baseline drinking characteristics and alcohol challenges, and filled out the retrospective self-report SRE measure. Additional offspring are scheduled for follow-up in the next five years. For both sets, the outcome measure was drawn from the follow-up SSAGA interviews, and consisted of the alcohol intake in the prior six months.

All subjects in these analyses took part in an alcohol challenge using 0.75 ml/kg of ethanol (0.61 gram/kg) incorporating the methods used in the San Diego laboratory (Schuckit and Gold, 1988; Schuckit et al., 1996). Thus, subjects consumed the alcohol as a 20% by volume solution mixed with a carbonated sugar-free beverage using the apparatus described by Mendelson et al. (1984). At baseline (before the drink), and the 15 minutes, 30 minutes, and each half hour thereafter over the 210 minute observation, participants were evaluated for their breath alcohol concentration using the Alko-Intoximeter (St. Louis, Missouri), and filled out the Subjective High Assessment Scale (SHAS), reporting their change from baseline to each measurement point regarding their self-rating of items scored on a 36-point scale (from no alcohol impact to extreme effects) (Judd et al., 1977, Schuckit and Gold, 1988). The SHAS score used here focuses on the 7 items (SHAS 7) with the greatest sensitivity to alcohol effects and the greatest similarity to the items used on the SRE (Eng et al., 2005). These items included ratings of feeling the effects of alcohol overall, feeling drunk, high, clumsy, confused, dizzy, or having difficulty concentrating.

All subjects also filled out the SRE, including scores regarding the approximately first five times of drinking. The SRE First 5 score was produced by summing the number of standard (10-12 gm ethanol) drinks required across the up to four effects, and dividing that figure by the number of effects (or boxes) endorsed. The second SRE value used here is the number of effects reported, ranging from one to four, with subjects requested to only list those effects actually experienced early in their drinking careers.

The analyses began with Pearson Product-Moment (for continuous measures) and Point Biserial (for categorical) correlations across the SRE First 5 score, the SRE number of items endorsed for the First 5 experiences, the usual number of standard drinks (10-12 grams of ethanol) consumed per drinking occasion in the six months prior to the alcohol challenge and in the six months prior to the follow-up interview, each subjects' weight at alcohol challenge (to control for any effect on the LR to alcohol), the SHAS 7 score at 60 minutes after consuming the alcoholic beverage, the age at challenge, and their race (Caucasian versus other). Comparisons of Time 1 with Time 2 data are paired t-tests, and comparisons of the two subject groups used independent (two sample) t-tests. Initial regression analyses used simultaneous entry of items from the time of the alcohol challenge and SRE LR scores predicting the usual drinks per occasion during the six-month period prior to follow-up (or Time 2 or T2). These were followed by five regressions using only SHAS and SRE LR as predictors. The first regression entered only SRE LR; the second only SHAS; the third

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entered both SHAS and SRE LR simultaneously; the fourth entered SHAS first followed by SRE LR; and the fifth entered SRE LR first followed by SHAS. These regressions allowed for the computation of a set of R^2's that represented the unique variance of T2 drinking predicted by SRE LR when SHAS was also in the equation; the unique variance of T2 drinking predicted by SHAS when SRE LR was also in the equation; and the variance of T2 drinking that was mutually predicted by both SRE LR and SHAS. Multilevel modeling was used to evaluate the role of sibships on the results (Muthén and Satorra, 1995).

III. Results

The 66 men included in this report were primarily White (including White Hispanic) (65.2%), with an additional 28.8% Black and 6.1% other racial backgrounds. At the time of alcohol challenges the group had an average age of 22.2 years (standard deviation 3.93), they weighed 80.5 (12.42) kilograms, and their Subjective High Assessment Score (SHAS) focusing on the seven most informative items at 60 minutes was 66.1 (58.52). All subjects had a first- or second-degree relative with an AUD. The average quantity of drinking per drinking day as determined from questions extracted from the SSAGA was 2.8 (2.80) at T1 alcohol challenge, with a quantity of 3.4 (2.73) at follow-up ($t = 1.56$, $p = .12$ across the measures). The time between alcohol challenge and SRE was 0.91 (1.41) years, the period between alcohol challenge and follow-up was 4.9 (1.71) years, while time between SRE and follow-up was 3.9 (1.77) years. Regarding potential non-independence, for 85.2% of families only one offspring had been included per family, 9.3% had two, and 5.6% three or four.

The men from the SDPS and COGA subsamples were similar on weight (77.7 (11.9) vs 81.0 (12.57) kg, $t = 0.80$, $p = .43$), T1 usual drinks (2.6 (2.50) vs 2.8 (2.897), $t = 0.22$, $p = .83$), and T2 drinks (3.7 (2.62) vs 3.4 (2.78), $t = 0.36$, $p = .72$), but SDPS men were younger (19.1(1.92) vs 22.8 (3.94), $t = 3.08$, $p = .01$). SRE values were similar across the two groups (3.3 (1.94) vs 3.6 (1.36), $t = 0.80$, $p = .43$), as were the number of items endorsed (2.6 (0.81) vs 2.9 (0.75), $t = 1.08$, $p = .29$) and the SHAS 7 60 min scores (69.6 (40.72) vs 65.3 (61.74), $t = 0.22$, $p = .83$).

Table 1 presents the correlations among the variables used in these analyses. Here, the SRE-based LR correlated significantly with the number of SRE items endorsed, the Subjective High Assessment Score from the alcohol challenge (i.e., a lower subjective high at a given BAC related to a higher number of drinks needed for effects in the SRE), race (lower LR's in Caucasians), as well as the usual drinks at both baseline and follow-up. The difference between SRE-based LR correlations with T1 and T2 drinkers was not significant ($z = -1.16$, $p = .25$). The SHAS 7 at 60 minutes during the alcohol challenge also correlated with race (a lower LR for Caucasians), approached significance regarding Time 1 drinks ($r = -.23$, $p <= .063$), and was significantly related to Time 2 drinks ($r = -.26$, $p < .05$). Neither age nor weight had significant relationships with outcomes or with SRE or alcohol challenge scores, although weight to T1 drinks was a trend ($r = .24$, $p = .058$). As expected, drinking at Time 1 and at Time 2 were significantly related to each other ($r = .35$, $p < .01$).

Table 2 describes the results of a simultaneous entry linear regression analyses where all items in Table 1 were incorporated as potential predictors of the usual number of drinks at Time 2. The equation explained 27% of the variance ($R^2 = .27$, $p < .01$), with only the SRE LR significantly contributing. Thus, the results indicate that while there were significant zero order correlations between SRE scores, SHAS values, the number of SRE items endorsed, race, and T1 drinking, the LR from the SRE captured much of the predictive ability associated with the additional measures.

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To further explore this finding, Table 3 focuses only on the three potential predictors of drinking outcome from Table 1, the SRE score, the alcohol challenge SHAS score, and T1 drinks. The simultaneous entry regression analysis produced an R^2 of .25 ($p<.01$), with both SRE ($p<.01$) and Time 1 drinks ($p<.05$) contributing to the prediction, although the SHAS from the alcohol challenge did not.

As shown in Table 1, the ability of the SRE to predict alcohol outcomes overlaps with the predictive value of the alcohol challenge. Running regressions where only SRE LR or SHAS was entered predicting T2 drinking, then a regression where SRE LR and SHAS were simultaneously entered predicting T2 drinking, then running a regression where SRE LR was entered first followed by SHAS, and finally a regression where SHAS was entered first followed by SRE LR generated a series of R^2's. These allowed for the calculation of the unique variance that SRE LR shared with T2 drinks ($R^2 = .126$), the unique variance that SHAS shared with T2 drinks ($R^2 = .027$), and the T2 drinks variance mutually shared by SRE LR and SHAS ($R^2 = .041$). These relationships are demonstrated graphically in Figure 1 in a Venn diagram. Overall, as shown by the squares of the correlation in Table 1, the SRE-based LR explained 16.7% of the variance in predicting T2 drinks, with, as shown in Figure 1, 12.6% explained by the SRE independent of the alcohol challenge LR. At the same time, the percent of the variance of T2 outcome explained by the alcohol challenge overall was 6.8% (from Table 1), with 2.7% independent of the SRE. In other words, 60.3% of the ability of the alcohol-challenge-based LR to predict alcohol outcome overlapped with the SRE, while 24.6% of the ability of the SRE to predict outcome was explained by the alcohol challenge.

The nested structure of these data (individuals within families) presents a potential analytic challenge because related individuals share common family influences. As a result, there is potential for interdependence among observations. Researchers traditionally measure the degree of interdependence by intraclass correlations (ICCs) among the observed variables. However, statisticians have argued that the "design effect," which takes into account the average cluster size, is more important in determining the extent of interdependence in the data (Muthén and Satorra, 1995). A design effect of ∃2.0 is generally considered to be a meaningful threshold, and the average cluster size (1.22) and small ICC (0.07) of this sample yield a small design effect of 1.015 due to the fact that 46 of 54 families included in the analyses have only one individual. Thus, only 7% of the variance in future drinking quantity in this sample is at the between-family level, suggesting that clustering does not pose a problem for single-level analyses. An exploratory multilevel model found that residual variance at the between-family level was not significant, supporting the decision not to utilize a hierarchical approach for this sample. Furthermore, the model results remained unchanged even after adjusting the standard errors to account for clustered data.

IV. Discussion

These analyses addressed the question of the degree to which the LR scores generated by the self-report retrospective SRE measure overlapped with the alcohol challenge-based LR scores in predicting the key alcohol outcome in LR-based models, drinking quantity. This question is important because the original work carried out regarding cross-sectional and predictive validities for LR were based on the more expensive and time-consuming alcohol challenges (Schuckit, 2002; Schuckit and Gold, 1988; Trim et al., 2008). The modest cross-sectional correlations between SRE and alcohol-challenge-based LR's raised the question of whether the relationship between the two LR scores was meaningful regarding the most important attribute of LR, the prediction of future drinking.

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The current results indicate that the SRE LR value accounted for up to 60% of the ability of alcohol challenge LR's to predict future heavier drinking. These data suggest that the less expensive and more widely applicable SRE may function as an acceptable proxy for alcohol challenges in both the search for genes contributing to LR, as well as the manner in which LR relates to additional life characteristics in structural equation models. As expected based on the differences in methods used, the overlap between these two LR measures was substantial, but not perfect, and additional study will be needed to explore the meaning of the remaining ∃40% of the variance of outcome.

The higher correlation between SRE-based LR scores and future heavy drinking compared to alcohol challenge and future heavy drinking in Table 2 is worth comment. While this was not seen once a single offspring per family was chosen (where both LR measures correlated with T2 drinking at ~.37), it is also noteworthy that across the full sample and more restricted group, the alcohol challenge explained less of the SRE's predictive ability. There are at least three potential explanations for the better performance of the SRE. First, it is possible that the more global evaluation of LR through the retrospective measure of what one experienced early in the drinking career might actually better capture the predictive ability of a low LR to alcohol early in life. Second, it is possible that the SRE-based measure taps into additional life attributes not picked up by the challenge, such as personality characteristics, emotional reactivity, or accuracy of recollection, and these might themselves reflect a higher risk for heavier drinking. Third, in this study the LR from the SRE is meant to capture LR very early in the drinking career and was measured at a time ~ one year closer to follow-up, and the combination of testing very early LR and the shorter delay between measure and follow-up could have contributed to a higher correlation with outcome. Further study regarding these and other possible explanations for the relative performance of the two LR measures is required before conclusions can be drawn.

The regression analyses in Tables 2 and 3 agree with other reports regarding the ability of a low LR to predict alcohol outcomes independently of the drinking practices at the time that alcohol challenges or SRE evaluations were determined (Schuckit et al., 2007, submitted; Trim et al., submitted). Thus, LR contributed additional predictive power beyond that expected from autocorrelations of the same behavior over time (e.g., the relationship between T1 and T2 drinking) (Malone et al., 2004).

It is important to note the reasons why the number of subjects reported here is relatively small. The analyses required that the subjects have both SRE and alcohol challenge values, these scores needed to be determined at about the same time to adequately compare their predictive values, and a follow-up was required. As a result, the original San Diego Prospective Study probands could not be used because the SRE had not been developed until more than a decade after the alcohol challenges. As for the broader COGA sample, while the SRE was added to the overall protocol about 8 years ago, only a small subgroup were given alcohol challenges.

Thus, the current results must be viewed in light of the methods used. First, the sample was relatively small and it is possible some of the results regarding cross correlations and predictors of T2 drinking may have been significant if more subjects had been available. Second, data are offered only on males as they were the largest group available for these prospective analyses, and the outcome may be different for women. Third, subjects were all from Southern California, were predominantly White, and were recruited from a narrow age range. In addition, these men had alcoholic relatives, and it is difficult to know whether the same results would be seen for a family history negative group. These issues combine to raise questions about both the robustness and generalizability of the findings, and additional studies are needed. A fourth caveat reflects our choice of using oral (as opposed to

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intravenous alcohol challenges [Ramchandani et al., 2002]), because the oral route adds variability to the BAC. While that point is worth noting, our procedure of giving alcohol based on both weight and percent body water has resulted in a fairly narrow range of BACs, particularly at and around peak blood alcohol, a key time for our evaluations (Eng et al., 2005; Schuckit and Gold, 1988). Finally, the outcomes in these relatively young men focused on the most salient outcomes for LR, alcohol quantities, as other outcomes such as AUDs, that were less common for this modest sized group of young men were not tested.

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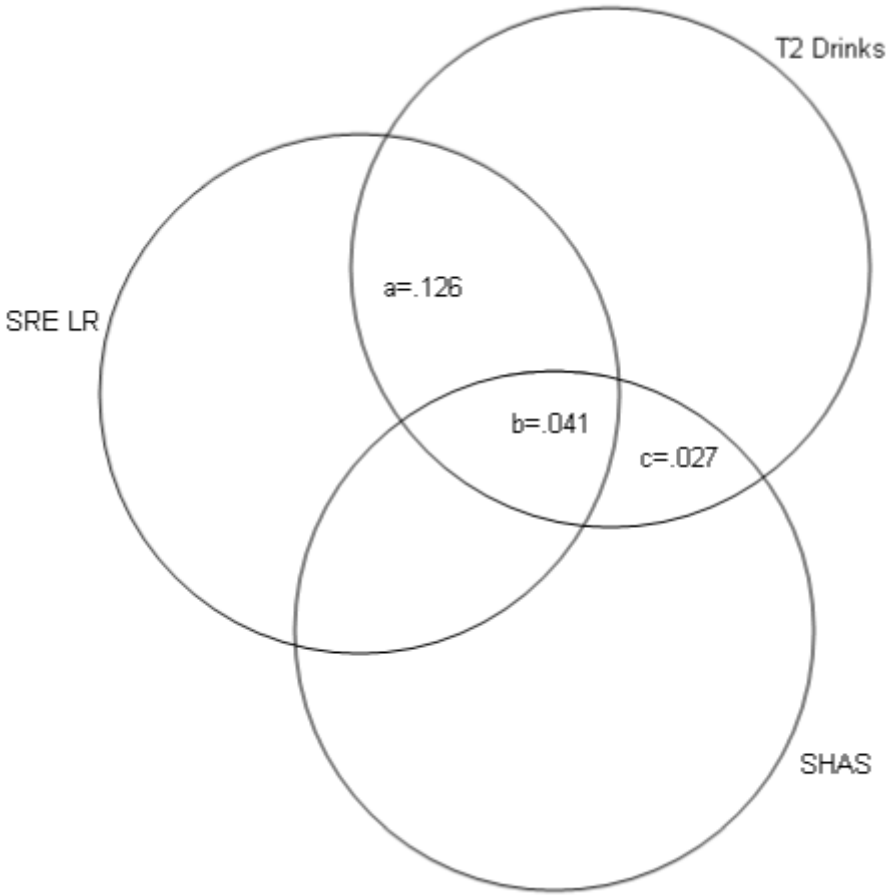

Fig. 1.

In Figure 1, SRE LR is the level of response to alcohol assessed by the Self-Report of the Effects of Ethanol. SHAS is the Subjective High Assessment Score from the alcohol challenge. T2 drinks is the average quantity of drinking per drinking day at Time 2. The three numbers are R^2's, where b is $R^2 = .041$, the proportion of the variance of T2 drinks mutually predicted by SRE LR and SHAS; a is $R^2 = .126$, the proportion of the variance of T2 drinks predicted by SRE LR, but not SHAS; and c is $R^2 = .027$, the proportion of the variance of T2 drinks predicted by SHAS, but not by SRE LR. Note that these are not proportionally represented.

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Table 1

Correlations Among Study Variables for 66 Males

	SRE LR	SRE # items	SHAS	T1 Age	T1 Weight	Race	T1 Drinks
SRE # items	.56 *c*						
SHAS	-.25 *a*	-.08					
T1 Age	-.09	-.01	-.03				
T1 Weight	-.14	-.15	-.12	.18			
Race	.32 *b*	.22	-.36 *b*	.05	.08		
T1 Drinks*	.26 *a*	.10	-.23	-.08	.24	.28 *a*	
T2 Drinks*	.41 *c*	.19	-.26 *a*	-.16	.10	.22	.35 *b*

In Table 1, SRE LR is the level of response to alcohol assessed by the Self-Report of the Effects of Ethanol. SRE # items is the number of the 4 items endorsed on the SRE. SHAS is the Subjective High Assessment Score from the alcohol challenge. T1 Age is the age of the subjects at Time 1. T1 Weight is the weight of the subjects at Time 1. Race is whether the subject is Caucasian. T1 Drinks is average quantity of drinking per drinking day at Time 1. T2 Drinks is the average quantity of drinking per drinking day at Time 2.

* Drinks = Prior 6 mos usual drinks per drinking day

a = p < .05

b = p < .01

c = p < .001

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Table 2

Regression, All Variables Predicting Time 2 (T2) Usual Drinks*

Predictor	Beta	p-value
SRE LR	.34	.03
SRE # items	-.02	.88
SHAS	-.12	.35
T1 Age	-.13	.26
T1 Weight	.11	.38
Race	.02	.84
T1 Drinks*	.20	.12

(R^2 = .27, p < .01)

In Table 2, SRE LR is the level of response to alcohol assessed by the Self-Report of the Effects of Ethanol. SRE # items is the number of the 4 items endorsed on the SRE. SHAS is the Subjective High Assessment Score from the alcohol challenge. T1 Age is the age of the subjects at Time 1. T1 Weight is the weight of the subjects at Time 1. Race is whether the subject is Caucasian. T1 Drinks is average quantity of drinking per drinking day at Time 1. T2 Drinks is the average quantity of drinking per drinking day at Time 2.

* Drinks = Prior 6 mos usual drinks per drinking day

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Table 3

Regression, 3 Predictors Predicting Time 2 (T2) Usual Drinks*

Predictor	Beta	p-value
SRE LR	.31	.01
SHAS	-.13	.28
T1 Drinks*	.24	.05

(R^2 = .25, p < .01)

In Table 3, SRE LR is the level of response to alcohol assessed by the Self-Report of the Effects of Ethanol. SHAS is the Subjective High Assessment Score from the alcohol challenge. T1 Drinks is average quantity of drinking per drinking day at Time 1. T2 Drinks is the average quantity of drinking per drinking day at Time 2.

* Drinks = Prior 6 mos usual drinks per drinking day