Alcohol Risk Management in College Settings
The Safer California Universities Randomized Trial

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Appendix A

Multilevel logistic and linear regression analyses were conducted to examine the effects of intervention condition on outcome slopes for dichotomous and continuous dependent variables, respectively. Student-level models were represented by the following general equation:

$$\text{Prob}(Y_{ij}) \text{ or } Y_{ij} = \beta_{0j} + \beta_{1j}(\text{Time}) + \beta_{Xj}(\text{Covariates}) + r_{ij},$$

where $\text{Prob}(Y_{ij})$ is the conditional probability of intoxication at each setting (logistic regression); Y_{ij} is the proportion of times drunk at each setting (linear regression) for student i at university j; β_{0j} is the mean outcome at university j at baseline; $\beta_{1j}(\text{Time})$ is the slope of the relationship between mean outcome at university j for Time (1=baseline years, 2=intervention years); $\beta_{Xj}(\text{Covariates})$ are slopes of relationships between student-level covariates (e.g., age, gender) and mean outcome at university j; and r_{ij} is the unique (random) effect associated with student i at university j. University-level models were based on the following equations:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Intervention Condition}) + \gamma_{0X}(\text{Covariates}) + \mu_{0j};$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Intervention Condition}) + \mu_{1j}.$$

In the first model, γ_{00} is the mean university-level outcome at baseline; $\gamma_{01}(\text{Intervention Condition})$ is the main effect of Safer intervention condition on the outcome; $\gamma_{0X}(\text{Covariates})$ are slopes of relationships between university covariates and the outcome; and μ_{0j} is the unique (random) effect associated with university j. In the second model, γ_{10} is the mean university-level outcome slope across survey years; γ_{11} (Intervention Condition) is the effect of implementing Safer interventions on outcome slope across survey years (i.e., Time $\times$ Intervention effect); and μ_{1j} is the unique (random) effect on the outcome slope associated with university j (i.e., Time $\times$ University effect). Ancillary analyses also were conducted to examine possible differences in intervention effects based on the level or intensity of intervention implementation (i.e., Time $\times$ Intervention effect).

Hierarchical linear and nonlinear modeling (HLM) software, version 6, provided adjustment for variance in outcomes that is attributable to clustering of student observations within universities. This between-institution variation is measured by the intraclass correlation coefficient, which ranged for the outcomes from 0.01 to 0.05 (mean=0.03).

Multilevel logistic regression models predicting risk of intoxication last time at each setting; OR (95% CI)

Predictor	Greek party	Dorm party	Campus event	Off-campus party	Bar/restaurant	Outdoors	Any setting
Time × condition	0.86 (0.58, 1.26)	0.93 (0.59, 1.47)	0.89 (0.59, 1.34)	0.81 (0.68, 0.97)	0.76 (0.62, 0.94)	1.13 (0.56, 2.27)	0.80 (0.65, 0.97)
Intervention group	1.15 (0.73, 1.82)	0.92 (0.52 (1.65)	0.90 (0.50, 1.64)	1.29 (0.99, 1.69)	1.66 (1.13, 2.46)	0.86 (0.33, 2.23)	1.30 (0.99, 1.72)
Control group (ref)	—	—	—	—	—	—	—
Time (survey years)							
2005–2006 (intervention)	1.27 (0.97, 1.66)	1.24 (0.91, 1.69)	1.46 (1.12, 1.90)	1.28 (1.14, 1.45)	1.17 (1.01, 1.36)	0.50 (0.31, 0.82)	1.24 (1.07, 1.42)
2003–2004 (baseline, ref)	—	—	—	—	—	—	—
Student covariates[a]							
Aged <21 years	1.04 (0.84, 1.28)	0.94 (0.72, 1.22)	0.91 (0.68, 1.21)	0.94 (0.85, 1.06)	0.49 (0.41, 0.58)	0.70 (0.52, 0.94)	0.87 (0.78, 0.97)
Male	1.37 (1.19, 1.59)	1.36 (1.15, 1.62)	1.54 (1.25, 1.90)	1.21 (1.12, 1.32)	1.10 (0.99, 1.23)	1.43 (1.16, 1.76)	1.22 (1.13, 1.32)
White	1.50 (1.10, 2.05)	1.51 (1.04, 2.18)	0.92 (0.60, 1.42)	1.42 (1.19, 1.70)	1.37 (1.07, 1.76)	2.41 (1.54, 3.75)	1.32 (1.11, 1.57)
Hispanic	0.88 (0.66, 1.18)	1.36 (0.96, 1.93)	0.80 (0.53, 1.22)	0.98 (0.82, 1.16)	1.07 (0.84, 1.36)	1.89 (1.27, 2.81)	0.98 (0.83, 1.15)
Black	0.82 (0.50, 1.34)	1.37 (0.77, 2.45)	0.62 (0.31, 1.25)	0.82 (0.61, 1.12)	0.62 (0.40, 0.93)	2.75 (1.23, 6.16)	0.77 (0.58, 1.01)
Asian	0.82 (0.58, 1.15)	0.94 (0.63, 1.42)	0.42 (0.25, 0.69)	0.70 (0.58, 0.86)	0.74 (0.56, 0.98)	1.13 (0.67, 1.94)	0.64 (0.53, 0.78)
Married	0.93 (0.46, 1.88)	1.15 (0.51, 2.57)	0.55 (0.27, 1.10)	0.57 (0.46, 0.70)	0.39 (0.30, 0.51)	0.43 (0.19, 1.00)	0.41 (0.34, 0.49)
Freshman	1.29 (0.92, 1.83)	1.31 (0.88, 1.95)	1.17 (0.70, 1.96)	1.39 (1.13, 1.71)	1.23 (0.83, 1.83)	2.30 (1.38, 3.85)	1.48 (1.22, 1.81)
Sophomore	1.13 (0.89, 1.45)	1.29 (0.95, 1.75)	0.89 (0.63, 1.28)	1.08 (0.94, 1.29)	1.02 (0.81, 1.29)	1.23 (0.85, 1.78)	1.13 (0.99, 1.29)
Junior	1.11 (0.91, 1.37)	1.13 (0.87, 1.47)	0.86 (0.65, 1.12)	1.03 (0.93, 1.14)	1.15 (1.03, 1.29)	1.25 (0.96, 1.64)	1.06 (0.97, 1.17)
House/apartment	0.89 (0.73, 1.09)	0.76 (0.63, 0.93)	1.11 (0.82, 1.52)	1.09 (0.96, 1.24)	1.04 (0.84, 1.30)	0.84 (0.62, 1.15)	0.85 (0.76, 0.97)
Greek house	1.29 (0.93, 1.78)	1.45 (0.93, 2.28)	1.39 (0.87, 2.22)	1.44 (1.10, 1.89)	1.78 (1.25, 2.54)	1.38 (0.77, 2.48)	1.61 (1.18, 2.20)
Co-op/other housing	0.79 (0.43, 1.46)	0.65 (0.32, 1.31)	3.17 (1.25, 8.08)	1.01 (0.72, 1.41)	1.04 (0.67, 1.61)	0.59 (0.24, 1.43)	0.87 (0.64, 1.19)
Employed	1.00 (0.89, 1.13)	1.06 (0.92, 1.22)	0.99 (0.83, 1.18)	1.12 (1.04, 1.20)	0.96 (0.87, 1.06)	1.07 (0.89, 1.29)	1.08 (1.01, 1.16)
Greek member	1.33 (1.15, 1.54)	0.81 (0.66, 1.00)	1.79 (1.43, 2.24)	1.07 (0.95, 1.19)	1.67 (1.45, 1.93)	1.30 (0.99, 1.71)	1.70 (1.52, 1.91)
Athlete	1.16 (1.02, 1.32)	0.92 (0.78, 1.08)	1.06 (0.88, 1.28)	1.25 (1.15, 1.37)	1.31 (1.16, 1.48)	1.21 (0.98, 1.48)	1.49 (1.36, 1.63)
Have car/vehicle	0.96 (0.95, 0.97)	1.04 (0.88, 1.23)	1.18 (0.95, 1.46)	0.99 (0.91, 1.09)	1.21 (1.06, 1.39)	0.79 (0.63, 1.00)	1.09 (0.99, 1.19)
Weekends at campus	1.11 (0.96, 1.29)	1.25 (1.07, 1.46)	1.05 (0.86, 1.27)	1.18 (1.09, 1.27)	1.06 (0.96, 1.17)	0.93 (0.77, 1.13)	1.20 (1.12, 1.42)
Grade point average	0.88 (0.78, 0.98)	1.05 (0.93, 1.19)	0.91 (0.78, 1.07)	0.88 (0.83, 0.94)	0.79 (0.72, 0.86)	0.76 (0.66, 0.89)	0.83 (0.78, 0.88)
Positive expectancies	1.05 (1.04, 1.06)	1.05 (1.04, 1.06)	1.04 (1.03, 1.05)	1.06 (1.05, 1.07)	1.05 (1.04, 1.06)	1.04 (1.02, 1.05)	1.07 (1.06, 1.08)
Negative expectancies	0.96 (0.95, 0.97)	0.96 (0.95, 0.97)	0.95 (0.94, 0.97)	0.95 (0.94, 0.96)	0.97 (0.96, 0.98)	0.95 (0.94, 0.97)	0.94 (0.93, 0.95)
Religiosity	0.88 (0.83, 0.94)	0.89 (0.83, 0.96)	0.85 (0.78, 0.93)	0.85 (0.82, 0.88)	0.84 (0.80, 0.88)	0.80 (0.73, 0.88)	0.83 (0.80, 0.86)
General health	0.89 (0.81, 0.99)	0.97 (0.87, 1.09)	0.83 (0.72, 0.96)	0.82 (0.87, 0.97)	0.91 (0.85, 0.98)	0.91 (0.79, 1.05)	0.89 (0.85, 0.95)
Body weight	1.00 (0.99, 1.01)	1.00 (0.99, 1.00)	1.00 (0.99, 1.00)	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
Past-year drinker	45.4 (20.6, 100.1)	58.7 (24, 143.4)	66.3 (19.6, 225)	84.8 (45.9, 156.2)	45.8 (20.5, 102.7)	52.9 (16.4, 171)	66.5 (44.5, 99.4)
University covariates							
UC vs CSU system	0.84 (0.59, 1.18)	1.25 (0.85, 1.84)	0.72 (0.48, 1.10)	1.00 (0.84, 1.19)	0.63 (0.40, 0.99)	0.74 (0.39, 1.40)	0.89 (0.76, 1.05)
White (%)	1.00 (0.99, 1.02)	1.01 (0.99, 1.03)	0.99 (0.97, 1.01)	1.00 (0.99, 1.01)	1.00 (0.99, 1.02)	1.01 (0.99, 1.04)	1.00 (0.99, 1.01)
Living on campus (%)	0.99 (0.97, 1.00)	0.99 (0.97, 1.00)	1.01 (0.99, 1.02)	1.00 (0.99, 1.01)	1.02 (1.00, 1.04)	1.00 (0.98, 1.03)	1.00 (0.99, 1.01)
Greek members (%)	1.08 (1.03, 1.12)	0.99 (0.95, 1.03)	1.01 (0.96, 1.06)	1.00 (0.98, 1.02)	1.00 (0.95 (1.06)	0.98 (0.91, 1.05)	1.01 (0.99, 1.03)
Heavy episodic drinking (%)	5.39 (1.77, 16.43)	3.29 (0.83, 12.9)	6.10 (1.59, 23.4)	3.24 (1.83, 5.74)	2.71 (0.58, 12.69)	3.36 (0.42, 26.8)	4.06 (2.34, 6.94)
≥80 miles from large city	0.35 (0.18, 0.67)	0.45 (0.23, 0.88)	0.60 (0.29, 1.24)	0.64 (0.46, 0.89)	0.90 (0.36, 2.25)	0.60 (0.18, 2.00)	0.60 (0.44, 0.81)

[a]Referent groups for student covariates are students aged ≥21 years, women, students of other ethnic or multi-ethnic groups, seniors, students living in residence halls, unemployed students, nonmembers of Greek organizations, students not involved in organized athletics, students without a motorized vehicle, students who do not spend most weekends on or near campus, and nondrinkers, respectively.

CSU, California State University; UC, University of California