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3.

a. Marijuana is indicated by 1 = 2 = 0, leaving the logit to be ( ̂) = −0.57 + 0.38 − 0.20 . This value is maximized when = 1, = 0 (race is white, gender is male).

Alcohol is indicated by 1 = 1, 2 = 0, leaving the logit to be ( ̂) = −0.57 + 1.93 + 0.38 + 0.17 . This value is maximized when = 1, = 1 (race is white, gender is female).

Cigarettes is indicated by 1 = 0, 2 = 1, leaving the logit to be ( ̂) = −0.57 + 0.86 + 0.38 + 0.02 . This value is maximized when = 1, = 0 (race is white, gender is female).

b. Disregarding coefficients in logit multiplied by gender indicator variable *g*, the only other explanatory variable left aside from substance indicator is race, *r*. The coefficient for the race term is 0.38 for the log of odds. To get the odds of white using a substance against nonwhites, compute

0.38 = 1.46.

1. Alcohol is indicated by 1 = 1, 2 = 0, leaving the logit to be ( ̂) = −0.57 + 1.93 + 0.38 + 0.17 . The odds ratio of female over male is then 0.17 = 1.19.

Cigarettes is indicated by 1 = 0, 2 = 1, leaving the logit to be ( ̂) = −0.57 + 0.86 + 0.38 + 0.02 . The odds ratio of female over male is then 0.02 = 1.02.

Marijuana is indicated by 1 = 2 = 0, leaving the logit to be ( ̂) = −0.57 + 0.38 − 0.20 . The odds ratio of female over male is then −0.20 = 0.82.

d. The logit for females using alcohol, cigarettes, and marijuana are as follows, respectively:

−0.57 + 1.93 + 0.38 + 0.17

−0.57 + 0.86 + 0.38 + 0.02

−0.57 + 0.38 − 0.20

The difference in logit coefficients between alcohol and marijuana is (1.93 + 0.17) − (−0.20) = 2.30. The odds ratio of alcohol to marijuana use, for females, is 2.30 = 9.97.

The difference in logit coefficients between cigarettes and marijuana is (0.86 + 0.02) − (−0.20) = 1.08. The odds ratio of cigarettes to marijuana use, for females, is 1.08 = 2.94.

e. The logit for males using alcohol, cigarettes, and marijuana are as follows, respectively:

−0.57 + 1.93 + 0.38

−0.57 + 0.86 + 0.38

−0.57 + 0.38

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The difference in logit coefficients between alcohol and marijuana is 1.93. The odds ratio of alcohol to marijuana use, for males, is 1.93 = 6.89.

The difference in logit coefficients between cigarettes and marijuana 0.86. The odds ratio of cigarettes to marijuana use, for males, is 0.86 = 2.36.

15.

True. For repeated measurements, the assumption of independence overstates the within-subject effects but understates the between-subject effects.