Caijun Qin
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3. a. The low deviance of 2.85 suggests that there does exist homogenous association between safety equipment use, ejection, and type of injury. The interaction term coefficients -2.3996, 1.7173, and -2.7978 suggests negative association between seatbelt and ejection, positive association between seatbelt and nonfatal injury, and negative association between ejection and nonfatal injury, which make realistic sense.

R code

```
X <- rep(x = c('Seat belt', 'None'), each = 4)
Y <- rep(x = c('Yes', 'No'), each = 2)
Z <- rep(x = c('Nonfatal', 'Fatal'), times = 4)
count <- c(1105, 14, 411111, 483, 4624, 497, 157342, 1008)

df <- data.frame(
  X = as.factor(x = X),
  Y = as.factor(x = Y),
  Z = as.factor(x = Z),
  count = count
)

stats::glm(formula = count ~ X + Y + Z + X:Y + X:Z + Y:Z, data = df, family = poisson)
```

8. $\log(\mu_{ijk}) = \lambda + \lambda_i^X + \lambda_j^Y + \lambda_k^Z + \lambda_{ik}^{XZ}$

X and Z are conditionally dependent on Y. XY and XZ have marginal association as conditional associations.