

## Summary of Log-Linear Analysis

Using data from 13,419 participants with complete data from the 2013 Youth Risk Behavior Surveillance System, we examined four variables of interest: SEX (biological sex; 0 = female, 1 = male), E\_BULLIED (Q25, "During the past 12 months, have you ever been electronically bullied? [include being bullied through e-mail, chat rooms, instant messaging, Web sites, or texting]," 0 = no, 1 = yes), HOPELESS12 (Q26, "During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?," 0 = no, 1 = yes), and SUICIDE ("During the past 12 months, did you ever **seriously** consider attempting suicide?," 0 = no, 1 = yes). There were 164 cases with incomplete data and these cases were eliminated from the analysis. Because all variables were binary in nature, log-linear analysis was appropriate for examining relationships among these variables.

An initial saturated model (all main effects and all interactions) was estimated and then, following typical hierarchical modeling procedures, model fit was examined when more complex effects were removed from the model. As you can see in Table 12.5a, removing the four-way interaction does not significantly degrade the model ( $\chi^2_{(1)} = 2.64, p < .104$ ). Removing all three-way interactions does ( $\chi^2_{(5)} = 20.03, p < .001$ ); in particular, two three-way interactions have significant effects (SEX\*E\_BULLIED\*HOPELESS12 and SEX\*HOPELESS12\*SUICIDE were both  $p < .05$ ). Thus, it would be advisable to revisit Model 3 and add those two interactions back into the equation. Removal of all two-way interactions led to a devastating loss of model fit and would not be advisable. In the final analysis, as you can see in Table 12.5b, HOPELESS12\*SUICIDE was not significant as a two-way interaction; however, because that effect is part of the SEX\*HOPELESS12\*SUICIDE interaction that is significant, we cannot remove it.

If you examine Table 12.5c, you can see some interesting patterns. For example, more females report being the victim of bullying than males (1,297 versus 577). Of those who report being victims of bullying, females are much more likely to feel hopeless (801 females [61.8%] reporting bullying versus 287 males [49.7%]). Converted to RRs, of those students reporting being the victims of electronic bullying, females are about 24% more likely to report feeling hopeless. Thus, females are either disproportionately impacted by e-bullying or are more likely to report negative effects of it.

Table 12.5d is equally concerning. Females seem much more likely to report feeling hopeless than males (2,582 of 6,571 [39.3%] versus 1,486 of 6,878 [21.6%]). This is not new to the psychological literature, by the way. What is concerning to me is that of those who report feeling hopeless, females seem more likely to have suicidal thoughts than boys (1,174 [45.5%] versus 559 [37.6%]). In other words, for those who feel hopeless, the RR for females reporting suicidal thoughts is 1.21 compared with males (i.e., females are about 21% more likely to have suicidal thoughts if they reported feeling hopeless).