The Association between Sexual Activity and School Violence by Gender among US High School Students: Youth Risk Behavior Survey 2009-2015

NANCY M. H. PONTES, PHD, RN, FNP-BC, FNAP

ASSISTANT PROFESSOR, RUTGERS UNIVERSITY, SCHOOL OF NURSING - CAMDEN

MANUEL PONTES, PHD,

PROFESSOR, ROWAN UNIVERSITY, WILLIAM G. ROHRER COLLEGE OF BUSINESS

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Sexual Activity among Adolescents

Early initiation of sexual activity (Sexual Debut) is associated with negative outcomes:

- Greater number of sexual partners

  Olesen et al., 2012

- Sexually transmitted infections

  Olesen et al., 2012; Pflieger, Cook, Niccolai, & Connell, 2013

- Cannabis use

  Chaa, Saba, Mashoa, & Mezuka, 2016

- Depressive symptoms

  Jamieson & Wade, 2011

CDC's Healthy People 2020 (HP2020) goal:

Increase the number of adolescents who delay initiation of sexual activity till adulthood by 10%

Office of Disease Prevention and Health Promotion (ODPHP), 2017

CDC's HP2020 Goal's to ↓School Violence:

Reduce by 10% over 10 years:

- Bullying Victimization (19.9% → 17.9%)
- Weapon carrying (5.6% → 4.6%)
- Physical fighting (31.5% → 28.4%)

Kann et al., 2016; ODPHP, 2016, 2017

Adolescent Sexual Activity & School Violence

Regional Studies

- Electronic and physical bullying was predictive of sexual activity. *Litwiller & Braush, 2013*
- Sexually active females were more likely than males to experience both forms of bullying victimization. *Dunn et al., 2014*

Youth Risk Behavior Survey (YRBS) Nationally Representative Study

- Peer victimization was related to "risky sexual behavior," (including sexual debut by 8th grade). *Moon & Karlson, 2015*
- Electronic and school bullying associated with sexual risk taking. *Hertz, Everett Jones, Barrios & David-Ferdon, 2015*

“Sexual Double Standard”

Male sexual activity is rewarded but female sexual activity is regarded negatively (“punished”).

Dunn, Gjelsvik, Pearlman, & Clark, 2014

Gaps in Literature

Additive Effect

- Early initiation of sexual intercourse with bullying victimization among high school students associated with depression and suicidal ideation for both male and female students (N = 706).
  Dunn, Gjelsvik, Pearlman & Clark, 2014
- Directionality of the relationship between violence and sexual activity is not clear.

Research is lacking about adolescent sexual activity and violence.

Purpose

1. Extend the research of Dunn et al., (2014) to explore the association between early sexual initiation and school violence measures by gender with more recent data from YRBS.
2. Examine whether the effects of early sexual debut on violence are moderated by gender
3. Demonstrate why adjusted risk differences are a superior measure of effect size compared to adjusted odds ratios, especially for interactive effects.

Dataset: Youth Risk Behavior Survey (YRBS)

- Large nationally representative survey of U.S. high schools students done every two years since 1991.
- Over 80 questions are included in the survey, including sexual activity, victimization and violence measures.
- CDC uses these data to measure National health goals of HP2020.

Multiplicative Interaction or Additive Interaction?

Logistic Regression estimates Multiplicative Interaction

- Logistic Regression → Effect Size Measure: Adjusted Odds Ratio
  - Ex. OR 3.0 = Three times more likely (multiplicative)
- Widely used method for analysis of binary data
  - Ex. *Applied Logistic Regression* (2013) has 52,883 citations (5/2018)!
- Other Methods Used to estimate Interaction effects: Additive Interactions
  - Effect Size Measure: Adjusted Risk Difference

Example of Multiplicative Interaction vs. Additive Interaction

Previous YRBS research

- Reported that gender did not moderate the relationship between peer victimization and suicide attempts. *Holt et al., 2015; Van Geel et al., 2014*
- Effect size used: odds ratio

Recent analysis of YRBS Data (2011, 2013, 2015).

- Using odds ratio as the effect size – no moderating effect of gender.
- Risk Difference showed that the effect of peer victimization on suicidality was significantly greater among female students. *Pontes, Ayres & Pontes, Forthcoming in Nursing Research*

Simulated Example of Risk Difference

		School Bullying		Gender Effects of ACE	
	Depressive Symptoms	Yes	No	Odds Ratio	Risk Difference
Male Students	Yes	200 **(20%)**	100 (**10%**)	2.25	**100 males (10%)**
	No	800 (80%)	900 (90%)		
Female Students	Yes	360 **(36%)**	200 **(20%)**	2.25	**160 females (16%)**
	No	640 (64%)	800 (80%)		

So what? Odd ratios have no clinical significance.
Risk Difference shows the increased number of students affected so there is a direct clinical significance.

Multiplicative Interaction VS. Additive Interaction

- *American Journal of Epidemiology* requires additive interaction measures
  - Odds Ratios alone are not acceptable because results can be misleading.

- This practice has not been universally adopted by other health journals; they still publish papers that report odds ratios.

- This research compares and contrasts the odds ratio and the risk difference as measures for effect size using YRBS.

Study Details

- *N* = 61,042
- *Four waves of YRBS data (2009, 2011, 2013, 2015)*
- Electronic bullying was not collected before 2011

Data Analyses: R survey package used

R is open source (free)

Other R packages used

- haven = Convert SPSS data set to R data set
- dplyr = Data wrangling
- fst= Read and write data sets (write with compression).

Functions used with survey package

- svymean, svyby
- svyglm
- svypredmeans
- svycontrast

Study Variables

INDEPENDENT VARIABLE

Have you ever had sexual intercourse?

DEPENDENT VARIABLES

During the past 12 months:

1. Electronic Bullying Victimization
2. School Bullying Victimization
3. Someone threatened or injured you with a weapon such as a gun, knife, or club on school property
4. In a physical fight on school property

During the past 30 days:

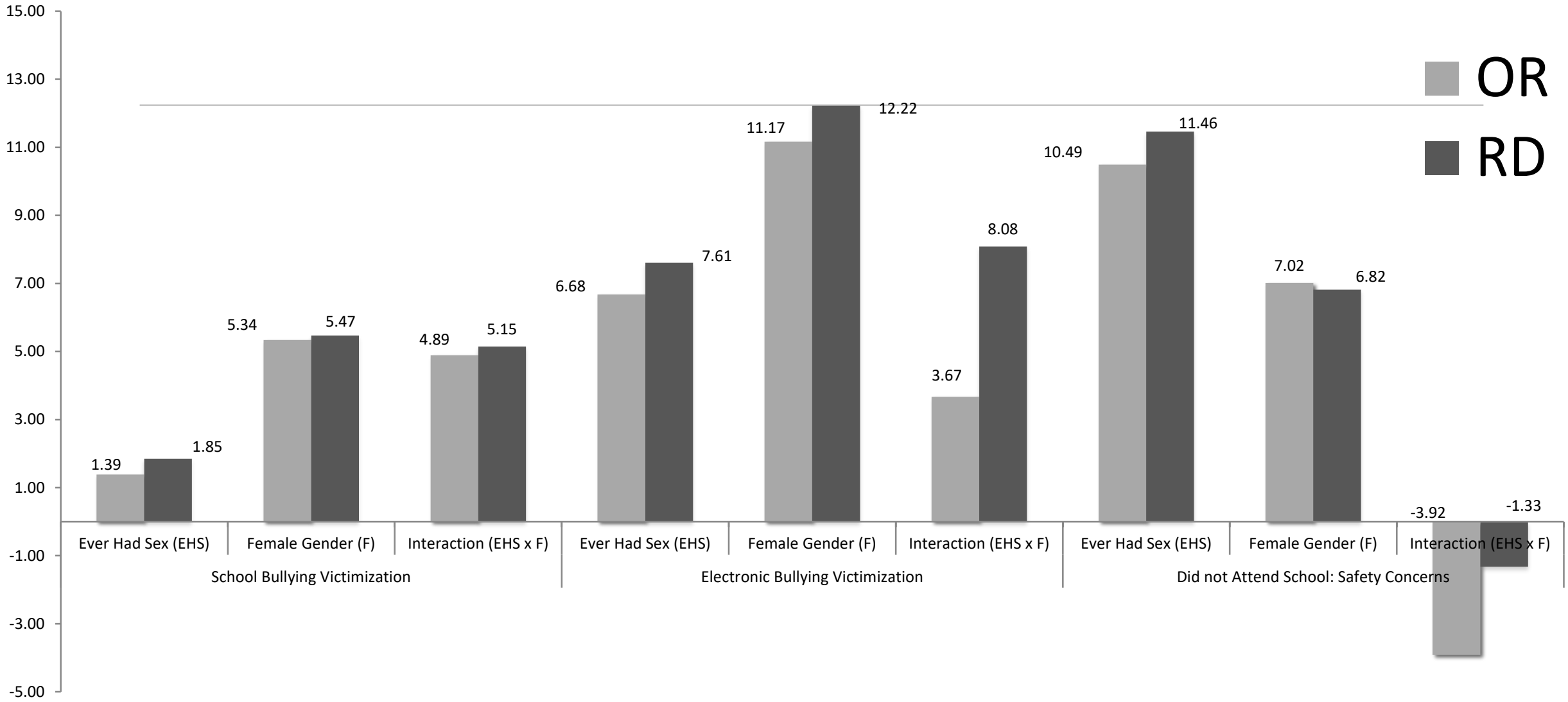
1. Carried a weapon such as a gun, knife, or club on school property

Relationship between “Ever Had Sex” and School Violence

	Male Ever Had Sex		Female Ever Had Sex	
	Yes	No	Yes	No
School Bullying Victimization **(SBV)**	17.1%	15.9%	28.0%	20.3%
Electronic Bullying Victimization **(EBV)**	12.0%	7.5%	30.0%	15.6%
Threatened/Injured with Weapon at School **(STV)**	11.6%	4.0%	7.4%	3.2%
Involved in a Physical Fight at School **(SF)**	18.4%	6.6%	10.9%	2.7%
Carried Weapons at School **(SW)**	10.7%	3.7%	3.7%	1.2%
Did not Attend School Because Felt Unsafe at School **(UNSAFE_S)**	6.9%	2.5%	8.7%	4.8%

Adjusted % - Obtained with R survey functions svyglm and svypredmeans

T-Statistics for Main Effects & Interactions: Odds Ratios Vs. Risk Difference



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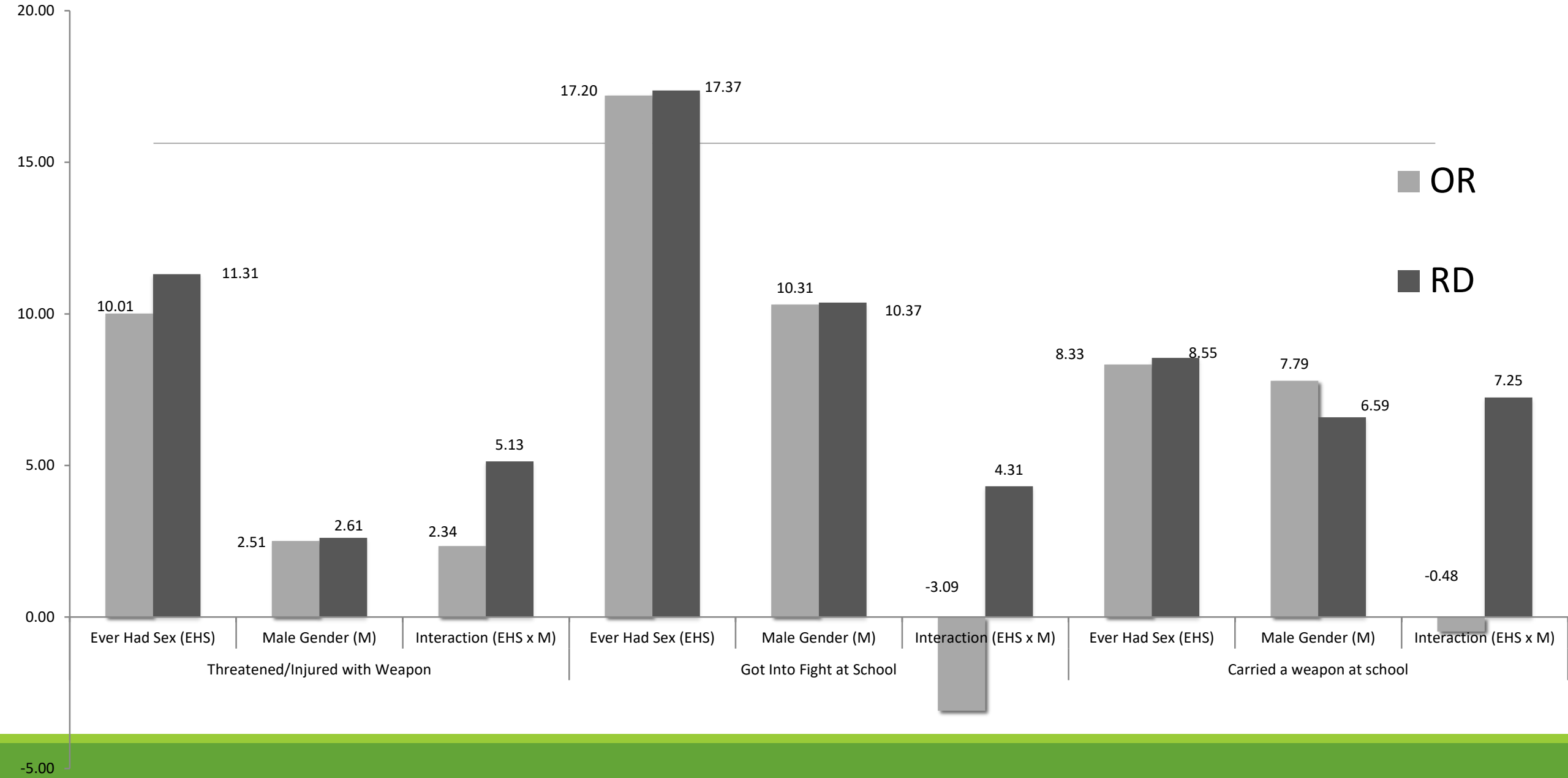
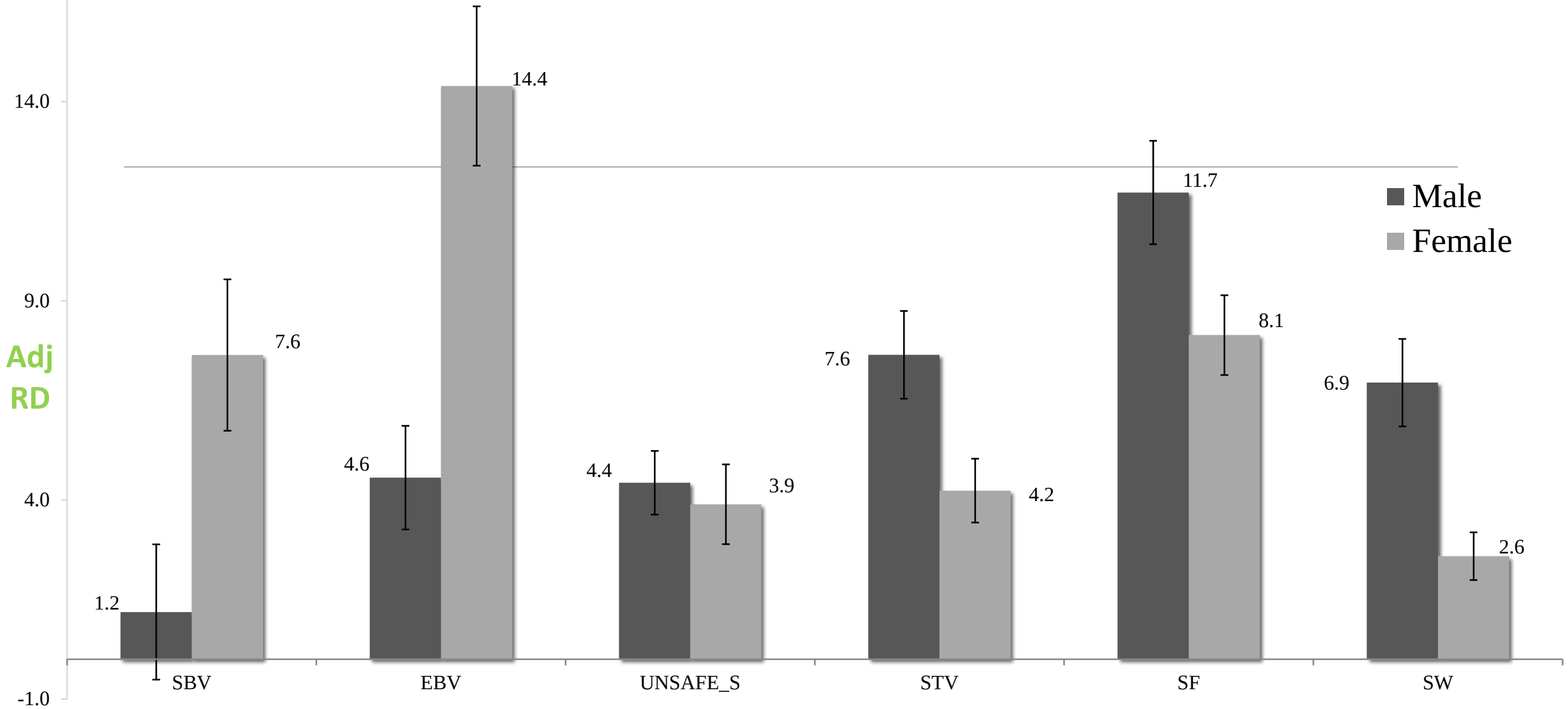


Effect of Ever Had Sex on School Violence by Gender Adjusted Odds Ratio (OR)

School Violence Measures

Effect of Ever Had Sex on School Violence by Gender: Adjusted Risk Difference (RD)



School Violence Measures

Discussion (1/2)

Results provide limited support for the sexual double standard:

- The association between sexual initiation and school bullying or electronic bullying was significantly greater among females than among males
  - Consistent with the sexual double standard

- The association between sexual initiation and receipt of threats or injuries with a weapon was significantly greater among males than among females.
  - Inconsistent with the sexual double standard

- Significant associations among males between sexual initiation and electronic bullying victimization and the receipts of threats or injuries with a weapon.
  - Inconsistent support for the hypothesis that sexual initiation was not a risk factor for violence victimization among males.

Discussion (2/2)

Both Multiplicative and Additive Interaction Measures should be used for analyses

- Odds ratios should not be solely reported, especially for interactive effects (comparisons of effect sizes between groups).
- Instead risk differences should also be reported.

Implications for Nursing and Future Research

- Future research needed to further investigate the relationship between sexual activity and school violence.
- Current violence prevention programs have seen some success, but further research is needed to explore social determinants of violence.
- School violence prevention programs with broad, “upstream.” approaches to prevention are needed.

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Thank you! Questions?