Co-Variation in Sexual and Non-Sexual Risk Behaviors Over Time Among U.S. High School Students: 1991- 2005

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Why public health interest in teen sexual behaviors?

New York Times, 3/7/04

Why public health interest in teen sexual behaviors?

Pregnancy

- **In 2005 > 410,000 teen births**

HIV/ other sexually transmitted infections

- **Estimated 50% of new STD cases occur to youth ages 15-24**

Research Background

Trends in many sexual behaviors and outcomes have improved since 1991 for youth

- Birth rate declined 45% from 1991-2005 (15-17 years)
- Sexual experience declined since 1991
- Condom and contraceptive use have increased

Research Background

Problem behavior theory

- Health risk behaviors (smoking, drinking, drug use, aggression, delinquency) commonly are found together (co-vary)
- May reflect underlying risk taking propensity (e.g., sensation seeking)

Research Questions

1. How do trends in four sexual behaviors differ by students' "risk behavior status?"

2. How does prevalence of these four sexual behaviors differ by students' "risk behavior status?"

Data & Methodology

Youth Risk Behavior Survey

- Every two years since 1991
- Cross sectional, self-administered, school-based
- Public and private high schools, grades 9 - 12
- Does not include drop outs/ alternative schools
- Nationally-representative sample

Study focus

- 8 years of data, 1991-2005
- N varied from 93,000 to 40,000 in specific analyses

Sexual Behavior Outcomes

Lifetime measures

1. **Ever had sexual intercourse**
2. **4 or more lifetime sexual partners** (among sexually-experienced students)

Current behavior measures

3. **Sexually active in past 3 months** (among sexually-experienced students)
4. **Condom or birth control use at last sexual intercourse** (among sexually-active students)

Key Predictors

Lifetime nonsexual risk behavior scale

- **Ever: smoking, drinking, marijuana, cocaine**
- **Range: 0-4, scale reliability = 0.67**

Current nonsexual risk behavior scale

- **30 day involvement: smoking (2), drinking, binge drinking, marijuana, cocaine, physical fights, weapon carrying, drunk driving, passenger of drunk**
- **Range: 0-10 items, collapsed into 4 categories**
- **None, low (1-2), medium (3-6), high (7-10) behaviors**
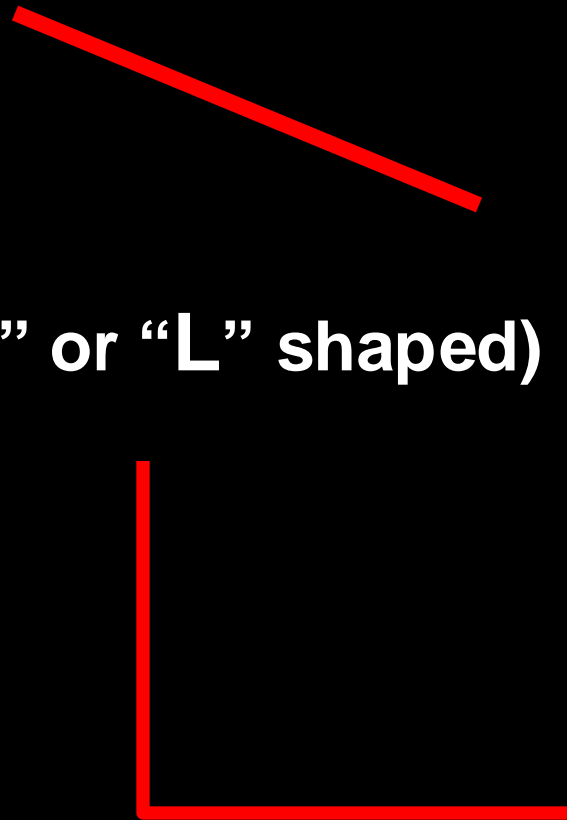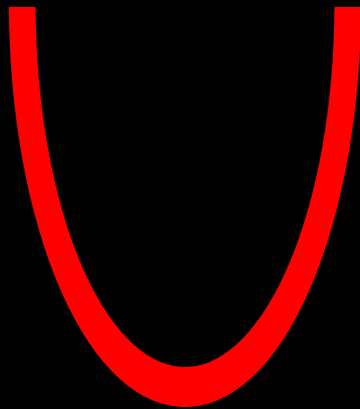- **Scale reliability = 0.81**

Assessing Time Trends

- **Logistic regression used to test trends**
- **Controlled for age, sex, race/ ethnicity**
- **Tested linear and quadratic trends**
- **Interactions between trend variables and risk level = <u>tests of differences among risk groups</u>**
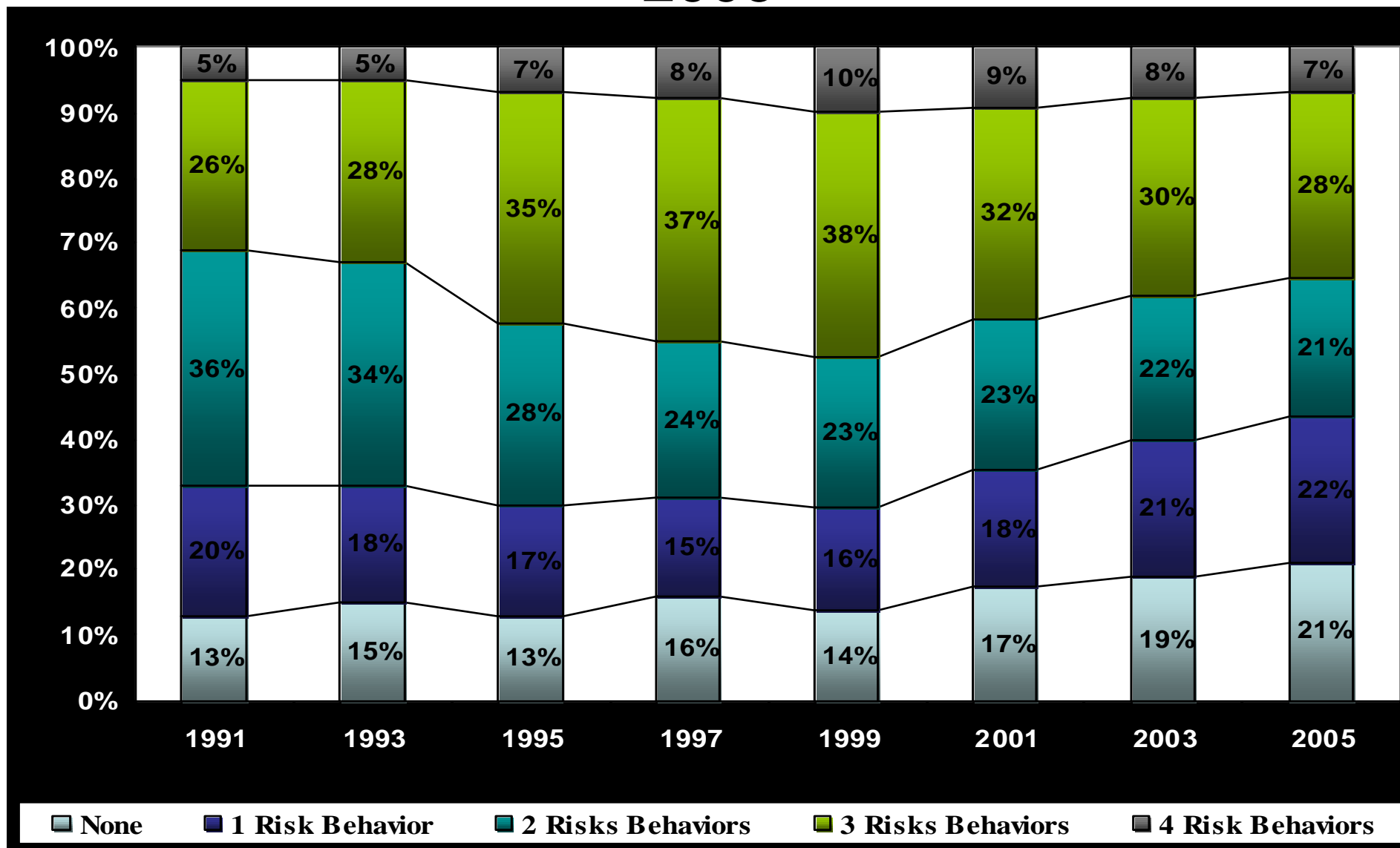- **Stata software: weighted, clustered sample**

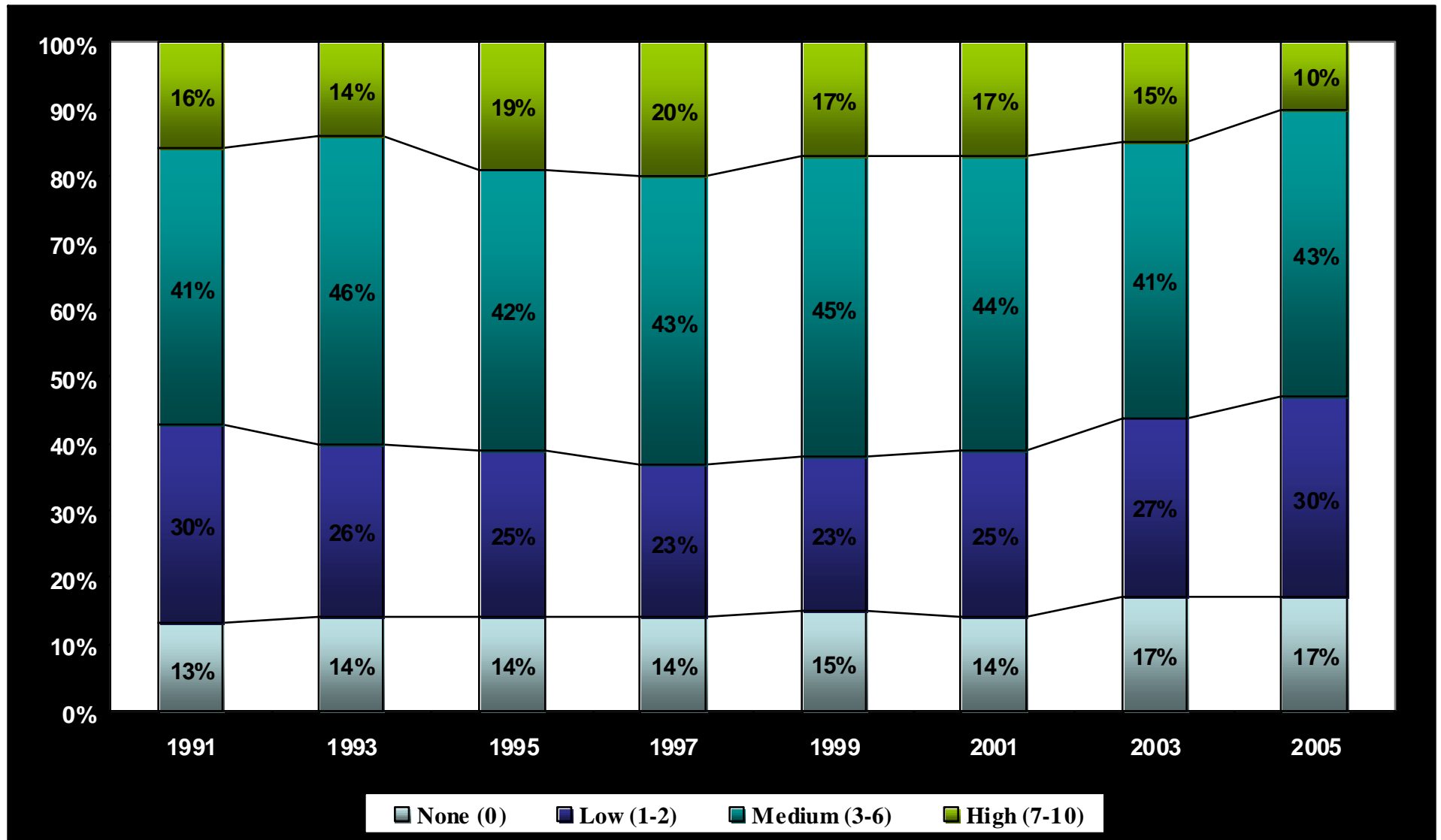# Assessing Time Trends Using Logistic Regression

Trend variables
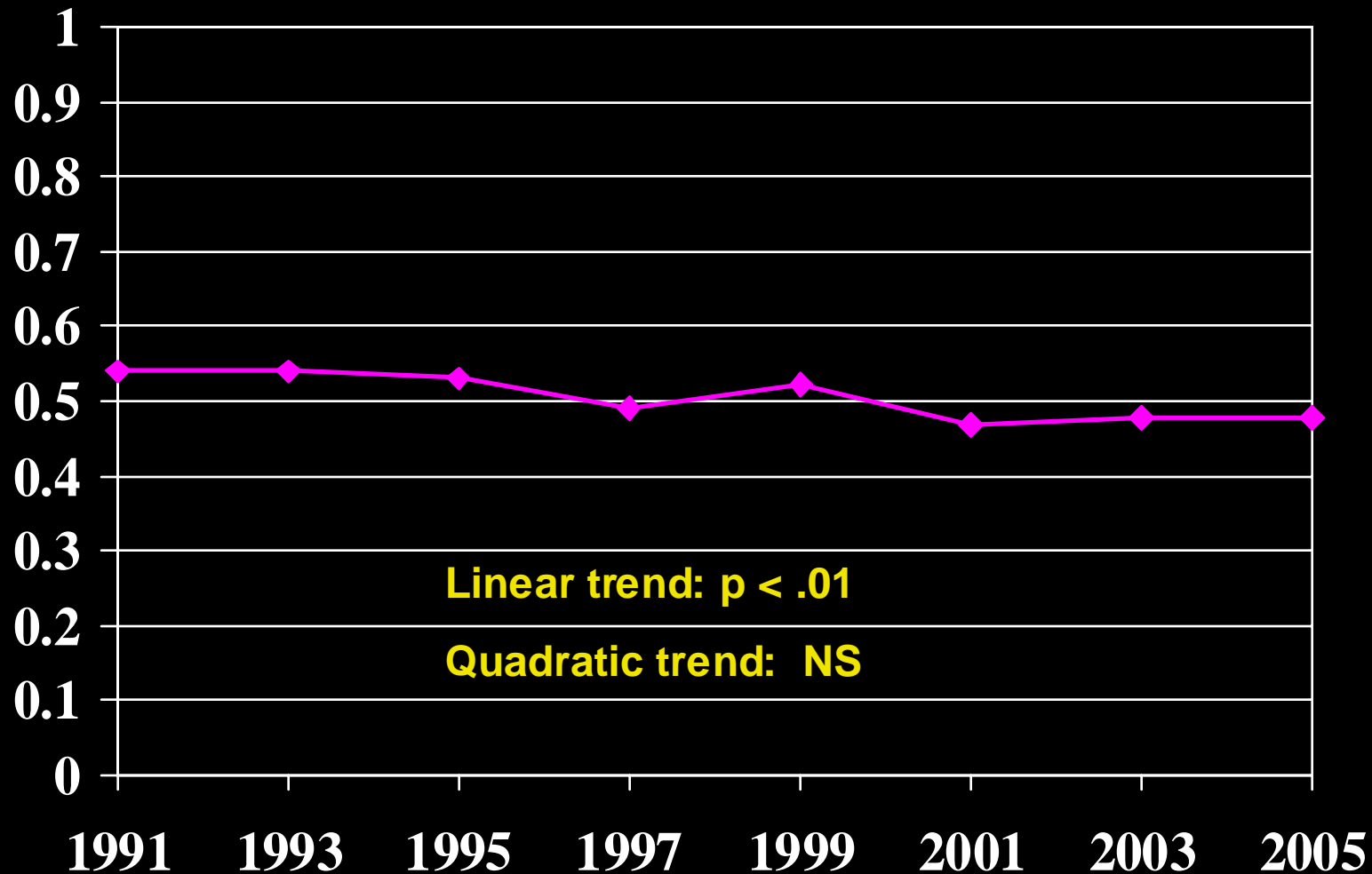
- **Linear trends**

- **Quadratic trends ("U" or "L" shaped)**

Distribution Of Students On "Lifetime" Non-sexual Risk Behavior Scale, YRBS, 1991-2005

Year	None	1 Risk Behavior	2 Risks Behaviors	3 Risks Behaviors	4 Risk Behaviors
1991	13%	20%	36%	26%	5%
1993	15%	18%	34%	28%	5%
1995	13%	17%	28%	35%	7%
1997	16%	15%	24%	37%	8%
1999	14%	16%	23%	38%	10%
2001	17%	18%	23%	32%	9%
2003	19%	21%	22%	30%	8%
2005	21%	22%	21%	28%	7%

Legend: ☐ None ■ 1 Risk Behavior ■ 2 Risks Behaviors ■ 3 Risks Behaviors ■ 4 Risk Behaviors
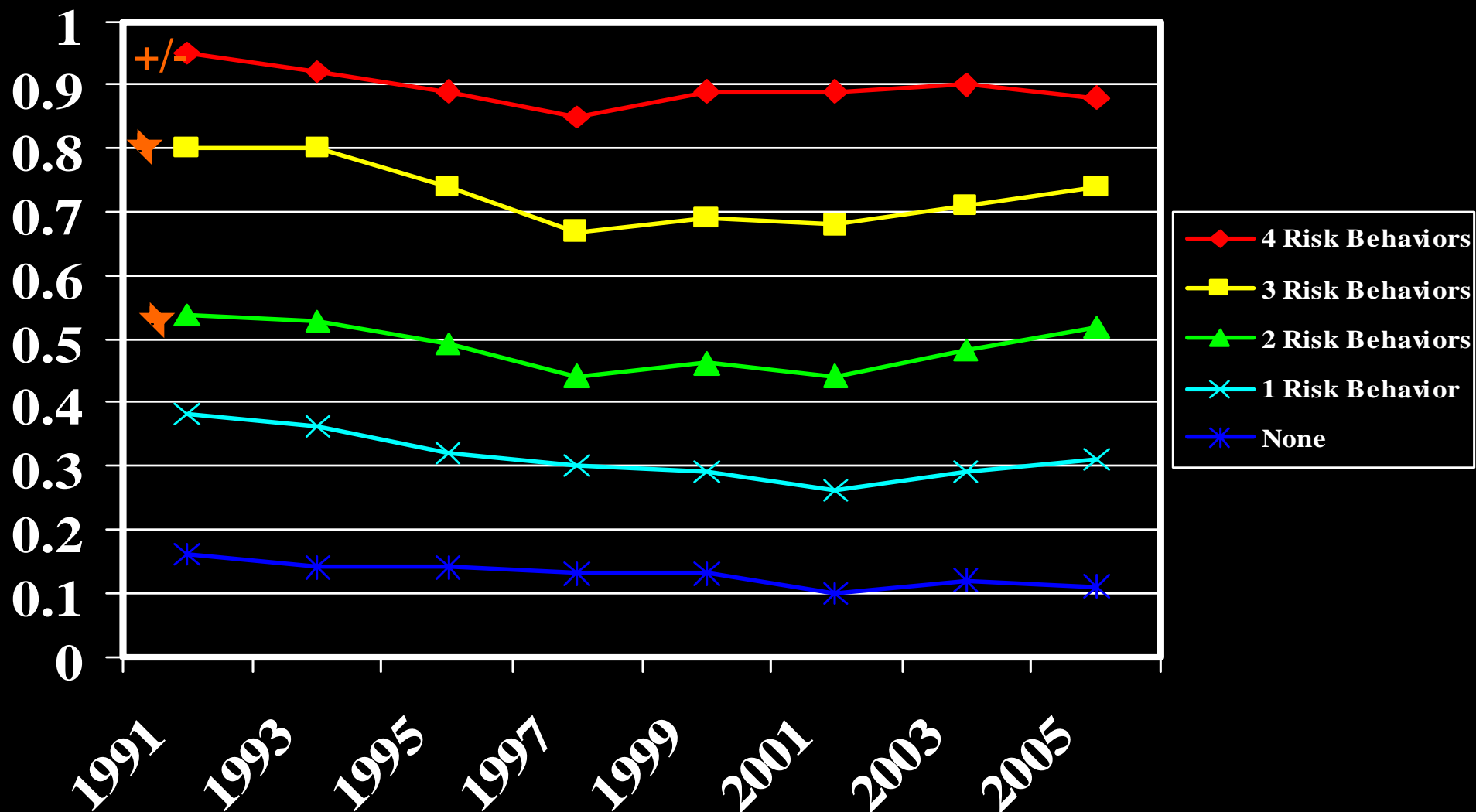
Distribution of "current" non-sexual risk behavior scale, among sexually experienced students, 1991-2005

Ever Had Sexual Intercourse, among All Students, 1991-2005

Linear trend: p < .01

Quadratic trend: NS

Ever Had Sexual Intercourse, by Lifetime Risk Behavior Scale, YRBS 2005

Legend:
- 4 Risk Behaviors
- 3 Risk Behaviors
- 2 Risk Behaviors
- 1 Risk Behavior
- None

Significant Predictors of Ever Had Sexual Intercourse, Multivariate

Demographics

- Age (OR= 1.5)
- Black (OR= 5.2)
- Hispanic (OR= 1.3)

Risk Behavior Score

- 1 Behaviors (OR= 3.3)
- 2 Behaviors (OR= 7.1)
- 3 Behaviors (OR= 20.1)
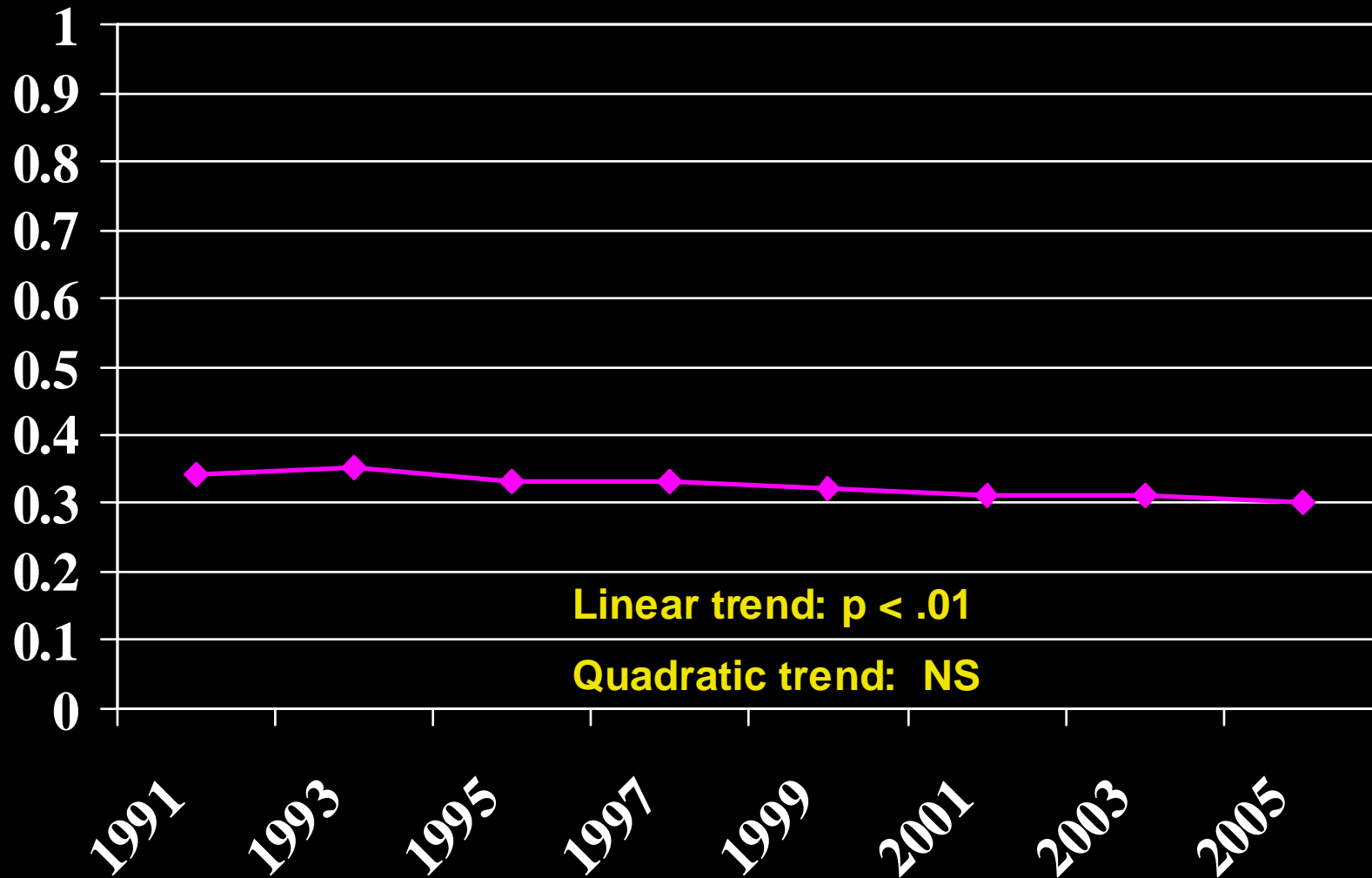- 4 Behaviors (OR= 73.6)

Trends without Interaction
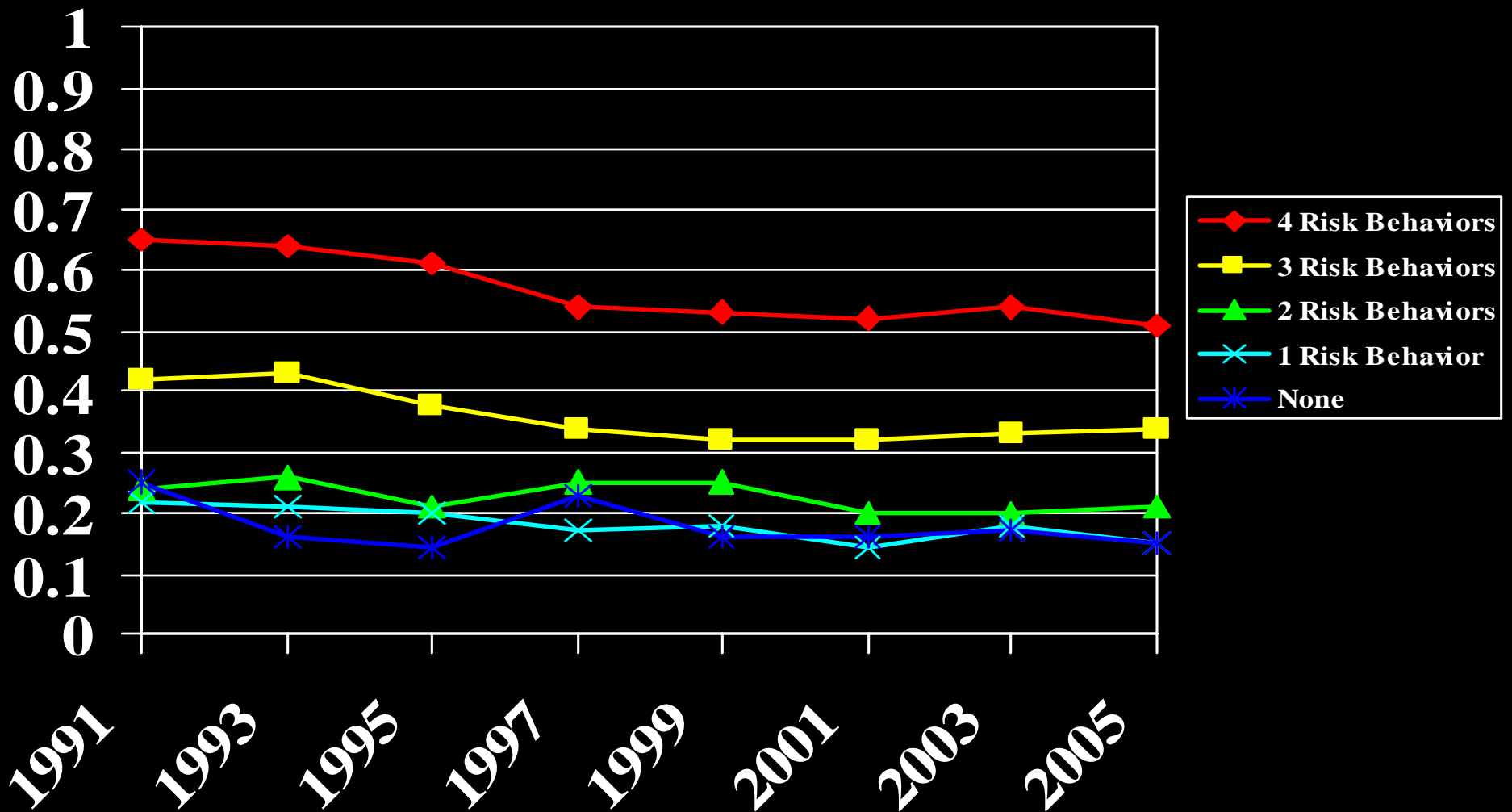
- Linear (OR= .98)

Trends with Interaction

- Linear (OR=.97)
- 2 Risks * Linear (OR= 1.02, p=.05)

- 2 Risks * Quadratic (OR= 1.00, p<.05)
- 3 Risks * Quadratic (OR= 1.01, p<.01)
- 4 Risks * Quadratic (OR= 1.01, p=.07)

4+ Lifetime Sexual Partners, among Sexually-Experienced Students, 1991-2005

Linear trend: p < .01

Quadratic trend: NS

4+ Lifetime Sexual Partners, by Lifetime Risk Behavior Scale, YRBS, 1991-2005

Legend:
- 4 Risk Behaviors
- 3 Risk Behaviors
- 2 Risk Behaviors
- 1 Risk Behavior
- None

Significant Predictors of had 4 + Lifetime Partners , Multivariate

Demographics

- Age (OR=1.2)
- Female (OR= .7)
- Black (OR=4.0)
- Hispanic (OR=1.14)

Risk Behavior Score

- 1 Risk Behaviors (OR= 1.3)
- 2 Risk Behaviors (OR= 2.1)
- 3 Risk Behaviors (OR= 4.2)
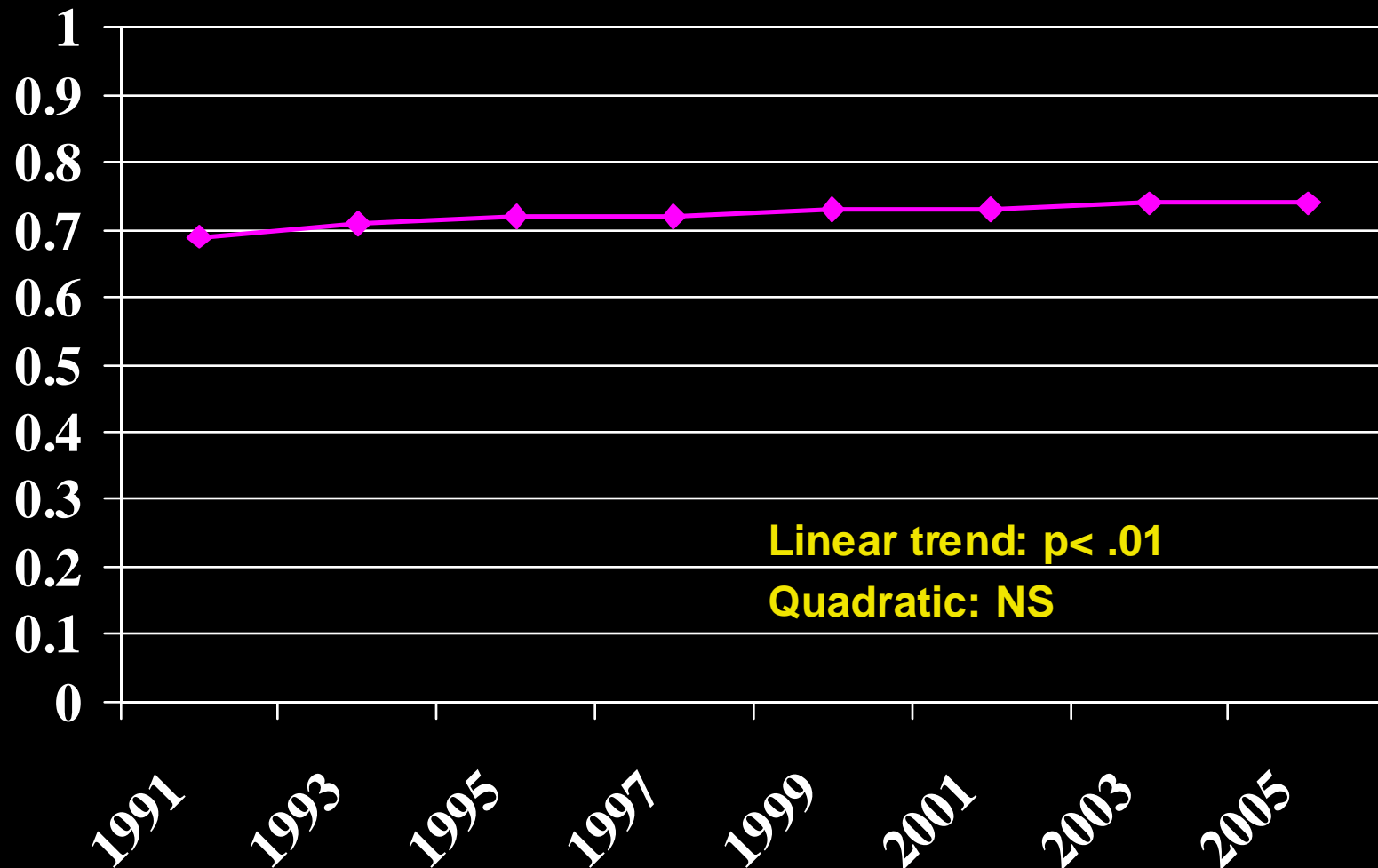- 4 Risk Behaviors (OR= 11.9)

Trends without interaction

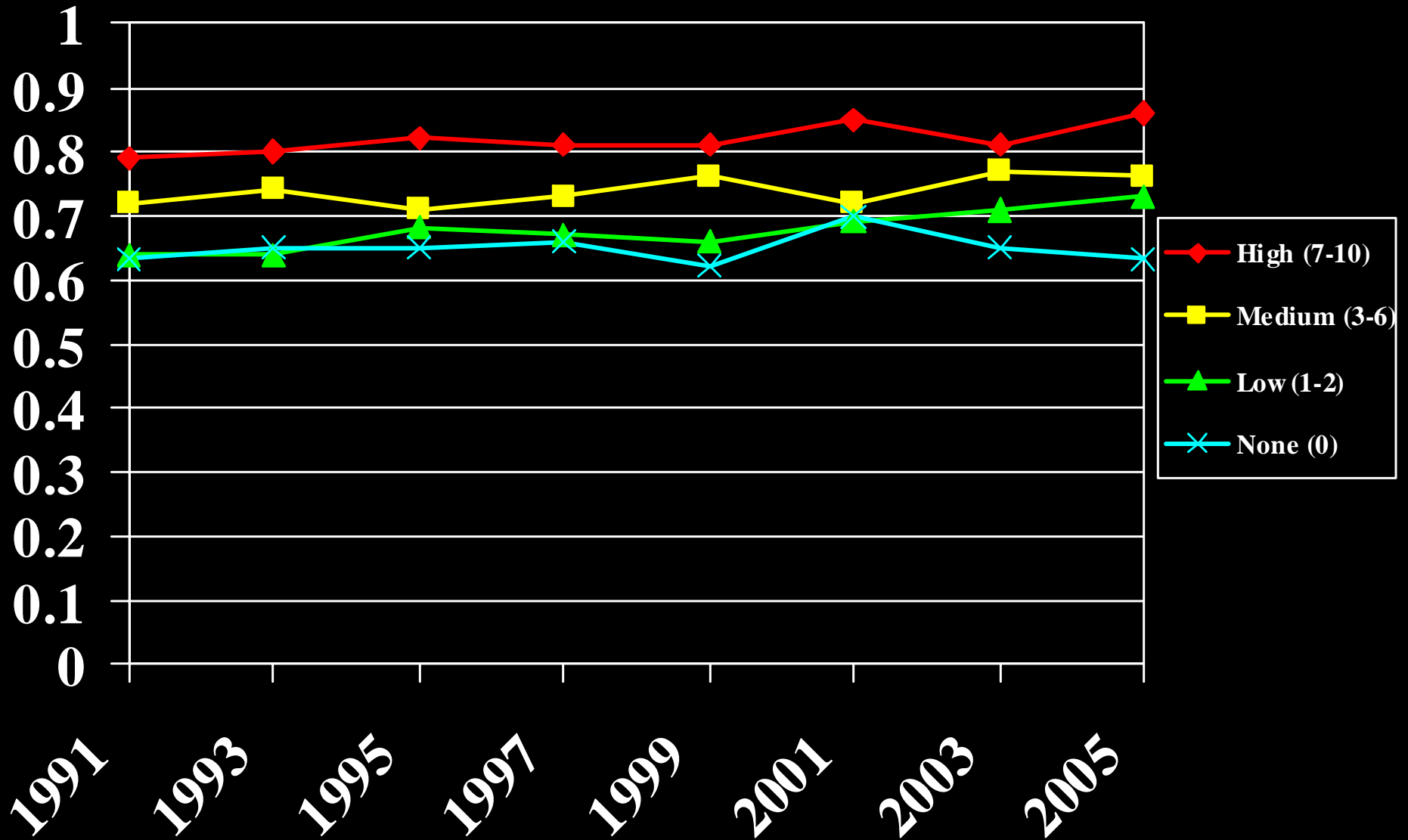- **Linear (OR=.97, p<.01)**
- **Quadratic NS**

Trends with interaction

- **Linear, quadratic terms, and all interactions NS**

Currently Sexually-Active, among Sexually-Experienced Students, 1991-2005

Linear trend: p< .01
Quadratic: NS

Currently Sexually-Active, by Current Risk Behavior Scale, YRBS, 1991-2005

Legend:
- High (7-10)
- Medium (3-6)
- Low (1-2)
- None (0)

Significant Predictors of Currently Sexually Active, Multivariate

Demographics

- Female (OR= 1.7, p<.01)
- Age (OR= 1.2 , p<.01)
- Black (OR= 1.4 , p<.01)

Risk Behavior Score

- Low Risk (OR= 1.2, p<.01)
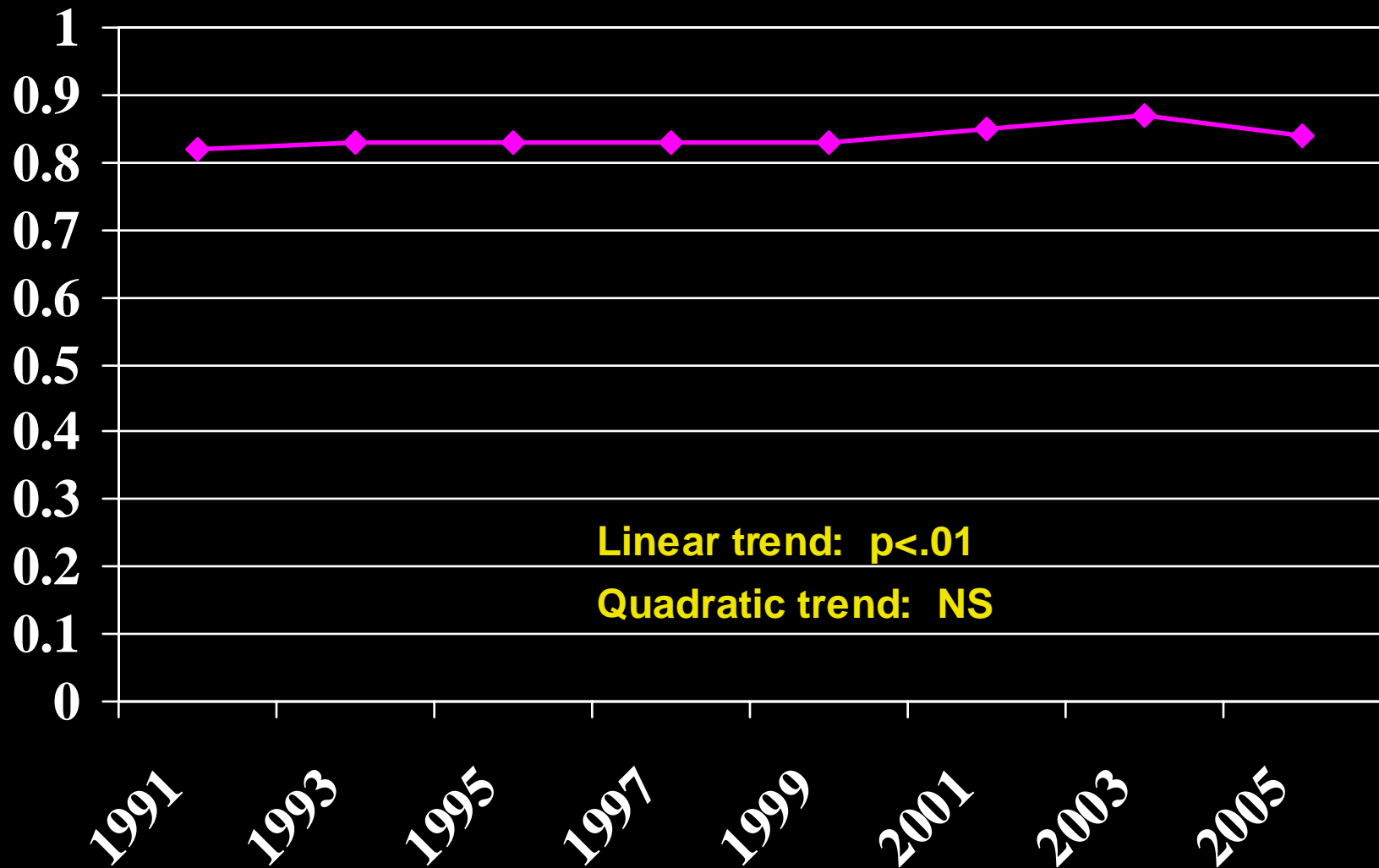- Medium Risk (OR= 1.9, p<.01)
- High Risk (OR= 3.1 , p<.01)

Trends without interaction

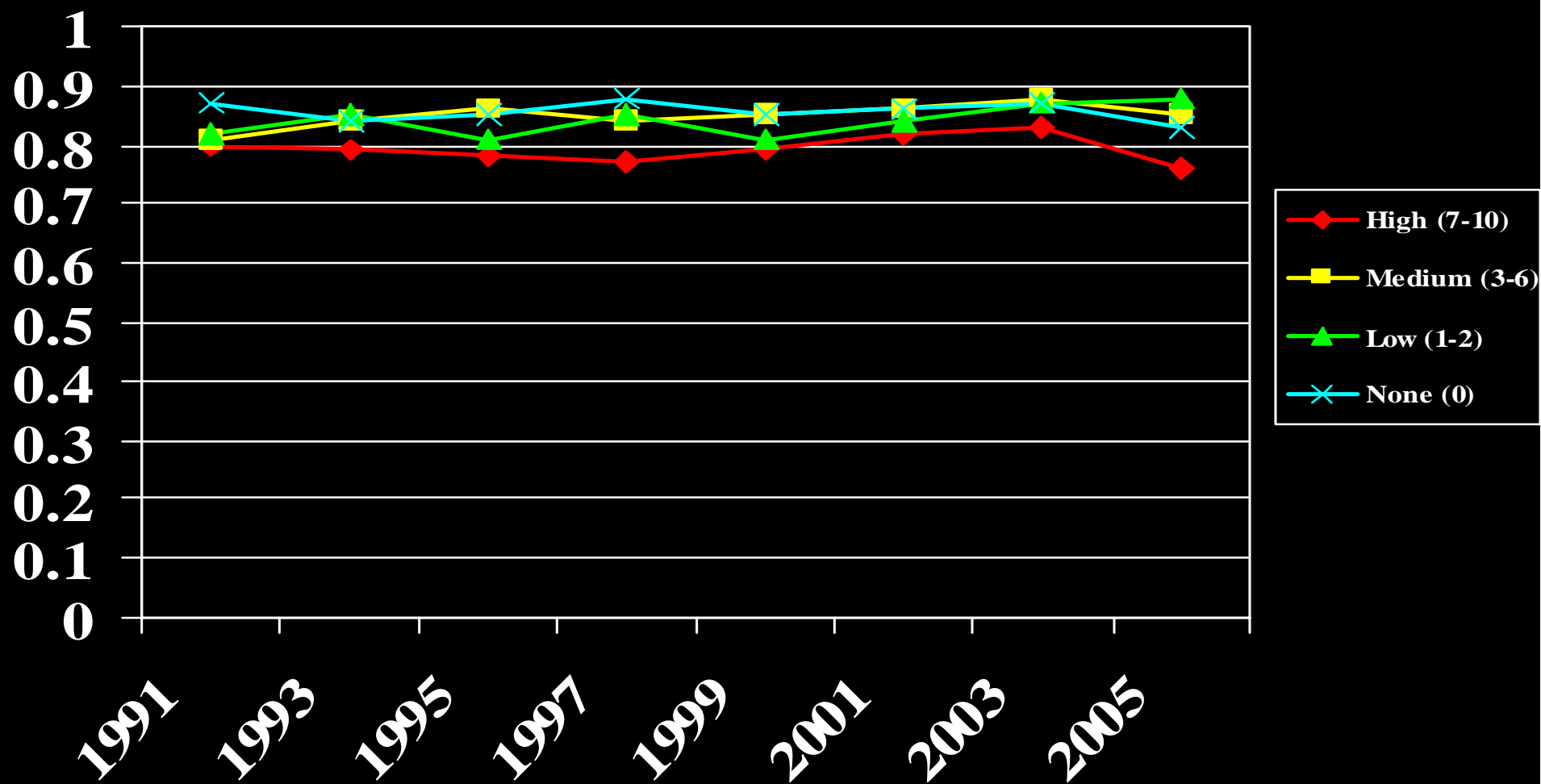- Linear (OR= 1.02 , p<.01)
- Quadratic NS

Trends with interaction

- Linear, quadratic terms, and all interactions NS except
- Linear * 2 behaviors (OR=1.02, p=.03)

Birth Control or Condom Use at Last Sexual Intercourse, among Sexually-Active Students, 1991-2005

Linear trend: p<.01

Quadratic trend: NS

Birth Control Pill or Condom Use at Last Sexual Intercourse, YRBS, 1991-2005

Legend:
- High (7-10) — red diamond
- Medium (3-6) — yellow square
- Low (1-2) — green triangle
- None (0) — cyan X

Y-axis: 0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1

X-axis: 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005

Significant Predictors of Birth Control or Condom Use at Last Sex, Multivariate

Demographics

- Female (OR= .9, p<.01)
- Age (OR= 1.1, p<.01)
- Black (OR= .7 , p<.01)
- Hispanic (OR= .4, p<.01)

Risk Behavior Score

- Medium Risk (OR= .9, p=.02)
- High Risk (OR= .6, p,.01)

Trends without interaction

- Linear (OR= 1.02 , p<.01)
- Quadratic NS

Trends with interaction

- Linear, quadratic terms, and all interactions NS

Results Summary

- **Prevalence of non-sexual risk behaviors showed clear linear and quadratic features**

- **Linear trends in sexual behaviors were common, quadratic were not**

- **Prevalence of each behavior differed widely by non-sexual risk behavior score, especially ever sex and multiple partners**

Results Summary

- **Quadratic trends were seen after stratifying for risk behavior scores for ever had intercourse**
  - **Trends in sexual intercourse opposite to trends in non-sexual risk behaviors!**
- **Importantly, other trends in sexual behaviors were largely similar for the risk behavior groups**

Limitations

- **Self-reported data**

- **Nonsexual health risk behavior scales do not capture all risk behaviors**

- **Good behavioral, but few explanatory social variables in data**

Conclusions

Good news

- **Changes across the outcomes shared across types of students**

Not so good news

- **Large disparities in prevalence of risk behaviors**
- **Not all outcomes improved**

Implications

- **High risk teens amenable to risk reduction, but quadratic trends worrisome**
- **Two models for change in risk taking = Displacement effects or Direct effects:**
  - **Will reducing non-sexual health risk behaviors increase or decrease sexual risk behaviors?**
  - **We provide mixed evidence but perhaps greater evidence of displacement**