

Patient teens: Comparing the sexual behavior of virginity pledgers with similar non-pledgers.

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Disclaimer

Rosenbaum, JE. Patient teenagers?: A comparison of the sexual behavior of virginity pledgers and matched non-pledgers. In Press.

- Until press embargo ends, I can only present the abstract.
- Results and conclusions will be read verbatim off the slides.

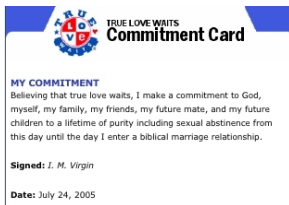
Virginity pledge origins

- First used in 1993 by Southern Baptist Conference.
- Capstone of 6 session abstinence curriculum for churches.
- About half of participants take the pledge.

Abstinence-only sex education

- Abstinence-only sex education.
 - “Exclusive purpose [of] teaching the social, psychological, and health gains [of] abstaining from sexual activity.”
 - Birth control may only be mentioned in terms of failure rates.
 - No federal requirement that medical information be accurate, though some states require accuracy.
- Funded at \$204 mil/year.
- Virginity pledge may be used for AOSE program evaluation, instead of behavior.

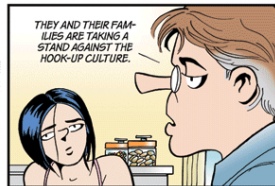
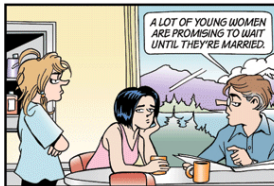
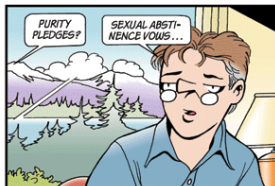
Southern Baptist pledge card



“Believing that true love waits, I make a commitment to God, myself, my family, my friends, my future mate, and my future children to a lifetime of purity including sexual abstinence from this day until marriage.”



210,000 commitment cards at Youth for Christ rally July 1994. (Photo: Jim Veneman)



Catholic pledge cards: religious and secular



PURE LOVE PROMISE

Believing that sex is sacred, I promise to God that I will save the gift of my sexuality from now until marriage. I choose to glorify God with my body and pursue a life of purity, trusting that the Lord is never outdone in generosity.

Signed _____ Date _____

www.catholic.com

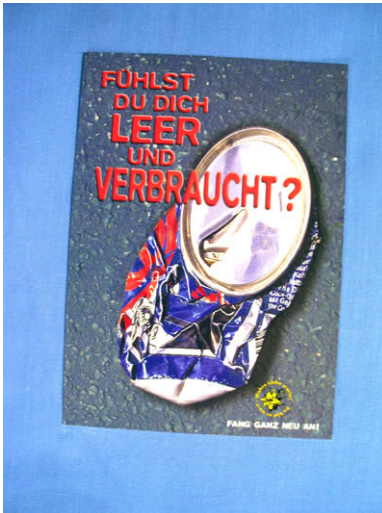


PURE LOVE PROMISE

From this day forward, regardless of any past mistakes, I promise to respect myself and others, pursue a life of purity, and save the gift of sex until marriage.

Signed _____ Date _____

“Do you feel empty and used?”



Virginity pledges: past research

- Prior to pledge, pledgers are more religious, more negative towards sex and birth control, less sexually experienced than non-pledgers.
- Outcomes: Fewer pledgers than non-pledgers have sex after 1 and 5 years; no STD difference. (Bearman and Brückner)
- Formal virginity pledge not associated with less sex; promising self is. (Bersamin et al)
- Pledgers seem to underreport past sexual activity. (Rosenbaum)

Add Health data

- Nationally-representative longitudinal study of 11,000 adolescents age 12–18, interviewed in 1995, 1996, 2001.
- Over 100 potential covariates of virginity pledge and sexual intercourse identified using NIMH integrated health behavior model.
- Subsample of interest: 3440 respondents who in 1995:
 - Never took virginity pledge.
 - Never had sex.
 - At least 15 years old: asked sex and birth control attitude and knowledge.

MATCHED SAMPLING

Motivation for matching

Pledgers and non-pledgers differ pre-pledge: outcome differences may be due to pre-existing differences.

- Standard regression methods may not adjust for these prior differences.
 - Classic example: constructing comparison group when we know the experimental result: LaLonde 1986, Dehejia and Wahba 1999
- We want to find a comparison group of non-pledgers such that there are no observable pre-pledge differences.
 - Adjust pre-pledge, so we know they came before the pledge, rather than being caused by the pledge.

Matching outline

- Control for pre-pledge variables, measured in 1995.
- Incident pledges: new pledge in 1996.
- Outcomes at 2001.

Matching procedure

- Exact: items with biggest pre-pledge difference, thematically-distinct.
 - Attend church/youth group weekly: religious involvement.
 - Feel guilty if had sex.
- Nearest-neighbor: 3 “closest matches” by correlation-adjusted distance measure.
 - Birth control attitudes, religiosity, parent religiosity, pubertal development.
 - “Preferably” within propensity score calipers: i.e., similar predicted probability of pledging.
- Any match that gives balance is a correct match.

Matching implementation

- Write own code — possible, but complicated as add each type of matching.
- Used R MatchIt package (Ho, Stuart, Imai, King).
 - Implements all available matching packages.
 - <http://gking.harvard.edu/matchit/>

Matching results

- Start with 289 pledgers, 3151 non-pledgers.
- Matching finds 645 matched non-pledgers.

Before matching: index variables

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Propensity score	19.0	7.4	20.14		
Religiosity	66.1	46.4	10.72		
Birth control bad	40.2	32.6	6.90		
Sex negative	67.2	59.5	6.12		
Sex positive	37.0	42.4	-4.98		
Birth control quiz	51.3	57.1	-4.43		
Birth control efficacy	54.8	58.3	-3.84		
Romantic experience	26.3	31.3	-3.24		
Parent religiosity	66.9	59.8	3.22		
Friend risk behavior	18.3	22.5	-2.85		
Pubertal development	49.3	46.3	2.53		

All variables are index variables, on scale 0 to 100. Source: Rosenbaum 2009. 

After matching: index variables

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Propensity score	19.0	7.4	20.14	16.3	0.79
Religiosity	66.1	46.4	10.72	65.9	0.03
Birth control bad	40.2	32.6	6.90	38.9	0.33
Sex negative	67.2	59.5	6.12	68.8	-0.63
Sex positive	37.0	42.4	-4.98	37.0	-0.03
Birth control quiz	51.3	57.1	-4.43	50.9	0.26
Birth control efficacy	54.8	58.3	-3.84	54.8	-0.05
Romantic experience	26.3	31.3	-3.24	27.1	-0.24
Parent religiosity	66.9	59.8	3.22	71.4	-0.55
Friend risk behavior	18.3	22.5	-2.85	16.9	0.73
Pubertal development	49.3	46.3	2.53	48.1	0.05

All variables are index variables, on scale 0 to 100. Source: Rosenbaum 2009. 

Before matching: attitudes towards sex and b.c.

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Feel guilty if had sex	64.0	44.0	6.54		
Partner lose respect	29.4	18.0	4.75		
Sex would be relaxing	11.8	21.4	-3.87		
Pleasure if had sex	27.0	38.1	-3.74		
Partner not agree to b.c.	18.0	9.6	4.48		
B.c. is looking for sex	31.5	20.3	4.44		
Plan ahead for b.c.	42.6	54.9	-4.04		
B.c. morally wrong	12.5	6.8	3.52		
Birth control hassle	13.5	8.5	2.87		
Friends know condoms	14.2	21.0	-2.75		
Too much planning	13.1	9.0	2.33		
Use b.c. if aroused	34.9	41.6	-2.21		

After matching: attitudes towards sex and b.c.

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Feel guilty if had sex	64.0	44.0	6.54	64.5	-0.11
Partner lose respect	29.4	18.0	4.75	29.4	0.00
Sex would be relaxing	11.8	21.4	-3.87	12.5	-0.21
Pleasure if had sex	27.0	38.1	-3.74	26.0	0.22
Partner not agree to b.c.	18.0	9.6	4.48	13.7	1.83
B.c. is looking for sex	31.5	20.3	4.44	28.5	1.17
Plan ahead for b.c.	42.6	54.9	-4.04	43.9	-0.40
B.c. morally wrong	12.5	6.8	3.52	10.0	0.81
Birth control hassle	13.5	8.5	2.87	11.0	0.87
Friends know condoms	14.2	21.0	-2.75	16.3	-0.87
Too much planning	13.1	9.0	2.33	12.0	0.56
Use b.c. if aroused	34.9	41.6	-2.21	37.4	-0.74

Source: Rosenbaum 2009.

Before matching: religiosity

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Youth group weekly	40.8	17.6	9.52		
Church weekly	64.0	36.1	9.33		
Religion v impt	62.6	36.2	8.82		
Born Again Christian	40.8	19.0	8.74		
Youth group monthly	56.7	32.4	8.35		
Church monthly	77.9	55.1	7.49		
Pray weekly	78.5	60.3	6.10		
Pray daily	55.7	38.3	5.77		
Scripture divine	75.8	58.9	5.60		
Parent church weekly	46.4	32.1	4.91		

Source: Rosenbaum 2009.

After matching: religiosity

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Youth group weekly	40.8	17.6	9.52	39.1	0.43
Church weekly	64.0	36.1	9.33	62.4	0.51
Religion v impt	62.6	36.2	8.82	61.2	0.44
Born Again Christian	40.8	19.0	8.74	38.9	0.57
Youth group monthly	56.7	32.4	8.35	54.4	0.63
Church monthly	77.9	55.1	7.49	77.3	0.16
Pray weekly	78.5	60.3	6.10	80.2	-0.42
Pray daily	55.7	38.3	5.77	59.2	-0.93
Scripture divine	75.8	58.9	5.60	75.5	0.18
Parent church weekly	46.4	32.1	4.91	49.6	-0.90

Source: Rosenbaum 2009.

Before matching: sexual experience, friend risk behavior, demographics

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Touched, last 18 mos	17.6	27.1	-3.50		
Genitals, last 18 mos	11.4	19.3	-3.28		
Kissed, last 18 mos	40.8	47.4	-2.14		
≥ 1 friend drinks	42.9	52.5	-3.12		
≥ 1 friend, marijuana	21.5	28.4	-2.53		
Vocabulary test score	74.3	78.4	-5.94		
Male	38.8	52.3	-4.42		
Parent born in US	58.8	70.3	-4.03		
Asian	17.3	9.9	3.90		

Source: Rosenbaum 2009.

After matching: sexual experience, friend risk behavior, demographics

	Pledge (n=289)	Before (n=3151)	t-test	After (n=645)	t-test
Touched, last 18 mos	17.6	27.1	-3.50	18.1	-0.12
Genitals, last 18 mos	11.4	19.3	-3.28	11.9	-0.17
Kissed, last 18 mos	40.8	47.4	-2.14	42.1	-0.36
≥ 1 friend drinks	42.9	52.5	-3.12	43.5	-0.18
≥ 1 friend, marijuana	21.5	28.4	-2.53	17.9	0.91
Vocabulary test score	74.3	78.4	-5.94	75.3	-0.19
Male	38.8	52.3	-4.42	39.0	-0.07
Parent born in US	58.8	70.3	-4.03	61.0	-0.69
Asian	17.3	9.9	3.90	15.9	0.51

Source: Rosenbaum 2009.

Other balance tests

- T-test results are easy to present, but balance in central tendency is insufficient.
- No definitive test for balance.
- Quantile-quantile comparisons in Match-it package give visual comparison.

STD, marriage outcomes

	Pledge (n=289)	Non-pl (n=645)	$\bar{\Delta}$	(95% CI)
Partner with STD				
Chlamydia test				
Trichomoniasis test				
Gonorrhea test				
Ever marry				
Ever divorce				
Same-sex attraction				
Gay/bisexual identity				

Birth control outcomes: Past year, last sex.

	Pledge (n=289)	Non-pl (n=645)	$\bar{\Delta}$	(95% CI)
Always condom				
Most of the time				
Half the time				
Never condom				
Always birth control				
Most of the time				
Half the time				
Never birth control				
Last sex condom				
Last sex b.c.				
Condom broke				

Outcomes

- Five years post-pledge, 84% of pledgers denied having ever pledged.
- Pledgers and matched non-pledgers did not differ in premarital sex, STDs, anal, and oral sex.
- Pledgers had 0.1 fewer past year partners but did not differ in lifetime sexual partners and age of first sex.
- Fewer pledgers than matched non-pledgers used birth control and condoms in the past year, and birth control at last sex.

Limitations

- Study group had negative feelings towards birth control prior to pledge, so not reflective of general population.
 - Abstinence programs in the greater population could be associated with less birth control use.
- Virginity pledge is voluntary, so observational data cannot yield causal conclusions.
 - If the pledge decreased sexual activity, we would expect to see an outcome difference in this observational data.
 - The lack of difference suggests that virginity pledges do not affect sexual behavior.

Conclusions

- The sexual behavior of virginity pledgers does not differ from that of closely-matched non-pledgers, but pledgers are less likely to protect themselves from pregnancy and disease before marriage.
- Virginity pledges may not affect sexual behavior, but may decrease the likelihood of taking precautions during sex.
- Clinicians should provide birth control information to all adolescents, especially virginity pledgers.

Comparison with previous work

	Previous studies	This study
Methods	Regression (Parametric)	Matching (Non-parametric)
Comparison group	All non-pledgers	Similar non-pledgers
Pre-pledge controls	Favorable to bc, sex	Same bc, sex attitudes
Post-pledge	Lower sex, b.c. use.	Same sex, less b.c.

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