Forced Intercourse, Mental Health, and Human Capital[*]

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Abstract

Drawing on data from the National Longitudinal Study of Adolescent Health, this study estimates effects of being the victim of forced intercourse on the mental health, academic performance, and educational attainment of young women while paying careful attention to the role of unobservables at the individual, family, and community levels. Our results suggest that forced intercourse is strongly related to depression and academic performance in the short run. However, after controlling for unobservables, the estimated effect of forced intercourse is substantially reduced in the long run.

1. INTRODUCTION

Previous studies have found that being the victim of sexual abuse as a child or adolescent is associated with depression, low self-esteem, thoughts of suicide, substance use, and problems at school.[1] However, many of these studies used non-representative samples, and only a handful attempted to account for the influence of unobservables at the family or individual levels.

The current study has two goals. The first is to estimate the short-run effects of being the victim of forced intercourse, arguably the most severe form of sexual abuse, on mental health and academic performance using nationally representative data and carefully accounting for the influence of unobservables. The second is to examine the relationship between forced intercourse and longer-run outcomes such as high school graduation and college attendance. To our knowledge, no previous study using nationally representative data has examined the effect of sexual abuse on academic performance or educational attainment.

Drawing on data from the first three waves of the National Longitudinal Study of Adolescent Health (Add Health), we estimate standard regression, propensity score matching, and fixed effects models. Our results suggest that, in the short run, forced intercourse leads to depression and sharply lower grades. In contrast, we find evidence that the long-run relationship between forced intercourse and educational attainment is, to a large extent, driven by unobservables at the family and individual levels.

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[1] Reviews and meta-analyses of the literature in this area include Jumper (1995), Rind et al. (1998), Paolucci et al. (2001), and Maniglio (2009).

2. BACKGROUND

2.1. Prevalence

In part because different surveys have adopted different definitions, it is difficult to accurately assess the prevalence of sexual abuse among American adolescents (Wyatt et al. 1986; Paolucci et al. 2001; Saewyc et al. 2003; Senn et al. 2008). Some surveys have asked only a single, broad question in effect combining various forms of sexual abuse (Saewyc et al. 2003). Other surveys, such as the Add Health and the National Youth Risk Behavior Survey (YRBS), have employed more narrow definitions of sexual abuse.

Kirkpatrick et al. (2003b) used data from the 1995 National Survey of Adolescents to examine the prevalence of sexual abuse. Sexual abuse was defined to include having been touched sexually or having been forced to touch someone sexually. They found that 13.0 percent of adolescent females had experienced sexual abuse at some point in their lives. In contrast, a little over three percent of male adolescents reported being the victim of sexual abuse.

Adopting a similar definition of sexual abuse to that used by Kirkpatrick et al. (2003b), Saewyc et al. (2003) examined data on Minnesota 9th and 12th graders collected in 1998. They found that 9.7 percent of female students and 3.9 percent of male students had been sexually abused by a person outside their family. Earlier surveys of Massachusetts and Minnesota high school students produced roughly similar estimates with regard to the prevalence of sexual abuse (Chandy et al. 1996; Garofalo et al. 1998).[2]

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[2] However, using data on Oregon high school students collected in 1993, Nelson et al. (1994) found substantially higher rates of sexual abuse. Other examples of early attempts to estimate the prevalence of sexual assault include Russell (1983), Baker and Duncan (1985), Wyatt (1985), Koss et al. (1987),

Raghavan et al. (2004) examined data on middle and high school students from the Add Health, the first wave of which was administered in 1995. They found that 6.6 percent of female middle and high school students answered yes to the question, "[w]ere you ever physically forced to have sexual intercourse against your will?"[3] By the second wave, which was administered in 1996, approximately 8 percent of female respondents answered this question in the affirmative (Raghavan et al. 2004).

Starting in 2001, the national YRBS has asked its participants a very similar question to that asked by the Add Health. Specifically, YRBS participants are asked, "[h]ave you ever been physically forced to have sexual intercourse when you did not want to?" Using data from the 2001 national YRBS, Howard and Wang (2005) found that 10.2 percent of female high school students and 5.1 percent of male high school students had experienced forced intercourse. Using data from more recent rounds of the YRBS, Basile et al. (2007), Howard et al. (2007), and others have produced similar estimates of the prevalence of forced intercourse among American high school students. Although the prevalence of forced intercourse appears to higher in the YRBS than in the Add Health, it should be noted that the Add Health sample included middle schoolers, who were presumably at lower risk than their counterparts attending high school. When Raghavan et al. (2004) restricted their sample to female respondents at least 18 years of age, fully 16 percent reported having been forced to have intercourse against their will.

Finkelhor et al. (1989), Erickson and Rapkin (1991), Finkelhor and Dziuba-Leatherman (1994), Lodico et al. (1996), and Goldman and Padayachi (1997).

[3] Male respondents were asked, "[d]id you ever physically force someone to have sexual intercourse against her will?

2.2. Previous estimates of the effects of sexual abuse

The consensus view among psychologists appears to be that sexual abuse leads to long-lasting and substantial harm. This view is supported by the results of numerous studies and meta-analyses.[4]

However, one meta-analysis clearly stands out from the rest. Rind et al. (1998) concluded that being the victim of sexual abuse as a child or adolescent "does not cause intense harm on a pervasive basis" (p. 47).[5] They noted that most researchers had not adequately taken in to account the influence of family-level confounders potentially correlated with both sexual abuse and the outcomes under study.[6] After taking into account their influence, Rind et al. (1998) found only a weak association between sexual abuse and psychological wellbeing.

Despite the Rind et al. (1998) critique and meta-analysis, most recent studies have ignored the potential influence of family-level confounders. For instance, Duncan (2000) examined a sample of 210 college freshman, 20 percent of whom had been sexually abused as a child.[7] She found that freshman who had experienced sexual abuse as a child

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[4] For instance, after meta-analyzing the estimates contained in previous studies, Paolucci et al. (2001, p. 33) concluded that sexual abuse led to

> the development of PTSD [post-traumatic stress disorder] and depression, as well as suicide, sexual promiscuity, the victim-perpetrator cycle, and poor academic performance regardless of victim age, gender, or socioeconomic status.

[5] This conclusion was so controversial that the U.S. House of Representatives passed a resolution condemning the study by Rind et al. (1998).

[6] These confounders included family structure and measures of conflict, support, and bonding. See Rind et al. (1998) and Rind and Tromovitch (1997) for more details.

[7] Other examples of recent studies in this area that have ignored the potential role of family-level unobservables include: Jasinski et al. (2000), Raj et al. (2000), Plunkett et al. (2001), Ackard and Neumark-Sztainer (2002), Kaukinen and DeMaris (2003), Kilpatrick et al. (2003a), Ullman and Brecklin (2003),

or adolescent were much more likely to drop out of college that their counterparts who had not, but did not control for individual characteristics or family background. Macmillan and Hagan (2004) examined a sample of young adults drawn from the National Youth Survey. They found that highest grade completed was negatively associated with whether a respondent had experienced either threats of violence, actual violence or sexual abuse as an adolescent, but could not rule out the possibility that this association was driven by unobservables.[8]

Although most recent empirical studies in this area have essentially ignored Rind et al. (1998), at least three directly addressed their critique. Dinwiddie et al. (2000), Kendler et al. (2000), and Nelson et al. (2002) all analyzed data on twins. One of the advantages of this approach is that, by comparing twins with discordant experiences, one can control for family-level unobservables. Kendler et al. (2000) and Nelson et al. (2002) found evidence that experiencing sexual abuse as a child or adolescent was related to

Bebbington et al. (2004), Champion et al. (2004), Raghavan et al. (2004), DeMaris and Kaukinen (2005), Csoboth et al. (2005), Holms et al. (2005), Howard and Wang (2005), Rich et al. (2005), Raghavan and Kingston (2006), Randolph and Mosack (2006), Ackard et al. (2007), Basile et al. (2007), Clemmons et al. (2007), Gidycz et al. (2007), Howard et al. (2007), Testa et al. (2007), Cullerton-Sen et al. (2008), Gidycz et al. (2008), Feiring et al. (2009), Ulloa et al. (2009), Friesen et al. (2010), and Smith and Ford (forthcoming).

[8] The victimization measure used by Macmillan and Hagan (2004) combined being ''sexually attacked or raped'' with non-sexual attacks and non-sexual threats of violence (Macmillan and Hagan 2004, p. 133). They concluded that there was a "chain-like sequence in which victimization diminishes educational self-efficacy, which subsequently undermines educational performance and attainment" (p. 127).

Aside from Duncan (2000) and Macmillan and Hagan (2004), we were able to identify a handful of other studies examining the relationship between experiencing sexual abuse as a child or adolescent and educational/academic outcomes. Using a sample of 147 6- through 16-year-old females, Trickett et al. (1994) found that sexual abuse was associated with lower scores on the Peabody Picture Vocabulary Test, although there was no evidence that sexual abuse led to lower grades. Einbender and Friedrich (1989) compared the academic performance of 46 girls ages 6 through 14 with the performance of a matched sample who had not been abused. They found that the sexually abused girls scored lower on IQ and vocabulary tests. Using a similar research design, Tong, Oats and McDowell (1987) found that the sexually abused children were more likely to have repeated a grade and were more likely to have had behavioral problems at school.

adult substance use, major depression, and anxiety. In contrast, Dinwiddie et al. (2000) found that, after controlling for family-level unobservables, sexual abuse was not associated with any of these outcomes.

The current study builds upon the work of Dinwiddie et al. (2000), Kendler et al. (2000), and Nelson et al. (2002).   By comparing siblings raised in the same household, and by controlling for mental health prior to victimization, we attempt to gauge the extent to which unobservables contribute to the relationship between sexual abuse and the outcomes under study.

3. DATA AND MEASURES

3.1. The data

The data used in this study come from the National Longitudinal Study of Adolescent Health (Add Health), which was conducted by the Carolina Population Center at the University of North Carolina at Chapel Hill. The Add Health data collection effort began with the identification of more than 26,000 high schools from across the United States. Eighty were selected with probability proportional to enrollment, stratified by region of the country, level of urbanization, type (public vs. private), and racial mix. It was determined that 20 of these 80 high schools enrolled 7th graders. If a high school did not enroll 7th graders, it was matched with a "feeder school" (that is, a junior high or middle school), chosen with a probability proportional to the number of students it contributed to that high school. Fifty-two feeder schools were recruited, bringing the total number of participating schools to 132.

The Wave I (baseline) in-home survey was administered between April and December of 1995 to a core sample composed of 12,105 students who were selected at random from the rosters of the 132 participating schools. The core sample was augmented through a special effort to collect information on siblings, half-siblings, and twins living in the same household as one of the 12,105 students selected at random from the school rosters. In addition, the entire population of students in 16 of the 132 participating schools was administered the Wave I in-home survey, and a number of "supplementary samples" were drawn including 1,038 black students with college-educated parents, 334 Chinese students, 450 Cuban students, and 437 Puerto Rican students. All told, the Wave I in-home survey was administered to 20,745 respondents. When weighted, it can be used to produce nationally representative statistics for 7th to 12th graders living in the United States in 1995 (Harris et al. 2008).

Three follow-ups have been conducted since the initial Add Health data collection effort. The first follow-up, the Wave II in-home survey, was conducted in 1996, approximately one year after the baseline survey; the second follow-up, the Wave III in-home survey, was administered in 2001 and contains information on 15,170 of the original Add Health participants. However, because the analysis below is restricted to female respondents, our sample sizes are considerably smaller than 15,000. Approximately 3,600 respondents, or 13 percent of the original Wave III respondents, were dropped because missing information with regard to key variables used in the analysis.

3.2. The Measures

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The independent variable of interest is *Forced*. At both Waves I and II, female Add Health respondents were asked, "[h]ave you ever had sexual intercourse?" If a respondent answered this question in the affirmative, she was then asked "[w]ere you ever physically forced to have sexual intercourse against your will?" *Forced* is equal to one if the respondent reported being the victim of forced intercourse by Wave II, and equal to zero otherwise.

In the empirical analysis below, we examine the relationship between *Forced* and a variety of outcomes. Our primary short-run mental health outcome is *CES-D*, measured at Wave II. The CES-D Scale was originally developed by Radloff (1977) and is a widely-used measure of depressive symptomatology. The Adolescent Health study administered 18 of the 20 items that typically comprise the CES-D Scale. Respondents were instructed to indicate the frequency with they had experienced certain feelings or emotions during the past week, including how often they felt "too tired to do things," how often they felt "fearful," and how often they "talked less than usual."[9] Possible responses were "rarely or none of the time" (= 0); "some or a little of the time" (= 1); "occasionally or a moderate amount of the time" (= 2); and "most or all of the time" (= 3). Following Sabia and Rees (2008) and Duncan and Rees (2005), responses to the 18 items were summed to produce a score of between 0 and 54, which was adjusted to correspond to the original 20-item CES-D Scale.[10]

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[9] The two missing items from the Adolescent Health questionnaire were "my sleep was restless," and "I had crying spells".

[10] Duncan and Rees (2005) employed the CES-D Scale as a continuous outcome variable, arguing that their focus was "not on depression per se, but on it symptoms" (p. 462). Lehrer et al. (2006) employed the CES-D Scale as a continuous outcome variable "for greater statistical power" (p. 191).

Our second short-run mental health outcome is based on the CES-D Scale, which can be used as a screening instrument for major depression provided that the correct cut-points are employed. Following Roberts et al. (1991), we constructed a dichotomous variable, *Depressed*, equal to 1 if a female respondent scored above 24 on the CES-D Scale, and equal to 0 otherwise. The CES-D Scale is often dichotomized in this fashion by psychologists and medical researchers,[11] and one advantage of using a dichotomized version of the CES-D Scale is that our results can more easily be compared to those appearing in the medical literature. Another advantage is that it focuses attention on the right-hand tail of the CES-D distribution, where medical diagnoses of major depression are made.

Our third, and final, short-run mental health outcome is *RSE*, which was also measured at Wave II. The Rosenberg Self-Esteem (RSE) Scale was developed by Rosenberg (1965), and is a widely-used measure of self-esteem. The Adolescent Health study administered six of the ten questions typically used to derive the full RSE Scale as. For instance, respondents were asked whether they had "good qualities," whether they had "a lot to be proud of," and if they liked "themselves the way they are." Responses available to respondents were: "strongly agree" (= 5), "agree" (= 4), "neither agree nor disagree" (= 3), "disagree" (= 2), or "strongly disagree" (= 1). These responses were summed to produce a score of 6 to 30, with higher scores corresponding to greater self-esteem. Other studies using the abridged RSE Scale include Sabia and Rees (2008), Nelson and Gordon-Larsen (2006), and Shrier et al. (2001). As noted by Baumeister et

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[11] See, for instance, Goodman and Capitman (2000) and Hallfors et al. (2005).

al. (2003, p. 25) self-esteem and depression are viewed by psychologists as "distinct constructs that can be measured separately."

The consensus view among psychologists appears to be that experiencing sexual abuse as a child or adolescent is sufficiently traumatizing so as to impact a wide range of outcomes, including academic performance and educational attainment (see, for instance, Paolucci et al. 2001). We use the respondent's high school grade point average (*GPA*) as our primary measure of academic performance. Betts and Morrell (1999, p. 269) note that "GPA reflects human capital acquisition at a time when young adults are close to permanent entry into the labor force," and, in fact, there is a fair amount of evidence to suggest that high school GPA is an important determinant of earnings and academic performance in college. The respondent's GPA was calculated on a four-point scale based on information provided by the respondent in Wave II. Specifically, respondents were asked about their grades in math, science, history, and English "during the last grading period."[12]

In addition to GPA, we employ three additional short-run academic performance measures: an indicator of whether the respondent at Wave II reported difficulty paying attention in class once a week or more; an indicator of whether the respondent reported difficulty completing homework once a week or more[13]; and an indicator of whether the

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[12]The Add Health survey asked, "[a]t (the most recent grading period/last grading period in the spring), what was your grade in ___?" Possible responses were: A, B, C, and D or lower. We calculated a cumulative GPA and a GPA in math and English by assigning 4.0 for a grade of A, 3.0 for a grade of B, 2.0 for a grade of C, and 0.5 for a grade of D or lower.

[13]Adolescents were asked, "how often have you had trouble paying attention in school?"and "how often have you had trouble completing your homework?" Possible answers to these questions were: "never (0)," "just a few times (1)," "about once a week (2)," "almost every day (3)," and "everyday (4)."

respondent reported a "4" or a "5" on a 5-point scale measuring the likelihood of attending college.[14]

Finally, we constructed two longer-run educational outcomes, both measured at Wave III when the respondents were between the ages 18 and 26. The first is a dichotomous variable equal to 1 if the respondent had reported receiving a high school diploma by Wave III, and equal to 0 otherwise; the second is equal to 1 if the respondent was attending college at the time of the Wave III survey or had completed at least one year of college prior to being surveyed, and equal to 0 otherwise.

4. METHODS

4.1. Ordinary least squares

We begin by using a simple bivariate regression model to explore whether forced sexual intercourse is associated with the outcomes outlined above. Specifically, we estimate:

$$y_i = \alpha + \delta \, Forced_i + \varepsilon_i, \tag{1}$$

where *Forced* is an indicator of whether the respondent had reported forced sexual intercourse by Wave II.

Next we control for individual, family and regional observables by adding a vector X_i to the right-hand side of the estimating equation:

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[14]Adolescents were asked: "On a scale of 1 to 5, where 1 is low and 5 is high, how likely is it that you will go to college?"

$$y_i = \alpha + \delta\,Forced_i + \beta'\mathbf{X}_i + \varepsilon_i. \tag{2}$$

The vector $\boldsymbol{X_i}$ includes age, household income, parental educational attainment, parental marital status, urbanicity, region, religiosity, race, appearance (as judged by the interviewer), number of biological siblings, whether the respondent had an older sibling, height, weight, and an abridged version of the Peabody Picture and Vocabulary Test.

4.2. Within-school propensity score matching

Previous researchers have adopted an empirical strategy similar to that outlined thus far. However, it is possible that respondents who experienced forced intercourse are quite different from non-victims in terms of observable characteristics. If respondents from the two groups lack common support, then propensity score matching should produce more reliable estimates than the standard regression approach (Rosenbaum and Rubin 1983).

In an effort to ensure common support on observables and to control for the influence of school- and community-level unobserved factors that could influence both the probability of forced intercourse and the outcomes under study, we estimate a within-school propensity score matching (WSPSM) model.[15] Specifically, we begin by estimating a probit of the following form:

$$\Pr\{Forced_{isg} = 1\} = 1 - \Phi(-\alpha - u_s - w_g - \beta'\mathbf{X}_{isg} - \gamma'\mathbf{R}_{isg}), \tag{3}$$

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[15] Levine and Painter (2003) utilized within-school propensity score matching to estimate the effect of out-of-wedlock childbearing on educational attainment. Our discussion of within-school propensity matching follows that of Levine and Painter (2003).

where s denotes the respondent's school, g denotes the respondents grade, u_s is a vector of school fixed effects, w_g is a vector of grade fixed effects, and X_i is the vector of controls introduced previously. The vector R_i is composed of additional controls designed to capture risk preferences, peer group behavior, and the quality of the parent-child relationship: whether the respondent acted on "gut feelings," whether the respondent lived her life without much thought for the future, whether the respondent believed she would survive to the age of 35, the smoking behavior of her friends, parental permissiveness with regard her decision-making, closeness of the relationship between the respondent and her mother, familial dinner habits, truthfulness in the respondent's reports of whereabouts, and church attendance.

After estimating equation (3), we use nearest neighbor matching without replacement to assign respondents who experienced forced intercourse to a non-victim whose estimated propensity score was within 0.002. In a further effort to ensure common support, we drop forced intercourse victims whose estimated propensity score was higher than the maximum or less than the minimum estimated propensity score of non-victims, and drop the 15 percent of respondents who experienced forced intercourse and whose propensity score was furthest from the propensity score of their match. The WSPSM estimates are calculated by comparing the outcomes of respondents who experienced forced intercourse with those of their match. Specifically, the WSPSM estimate is equal to the mean difference in outcomes between these two groups.

4.3 Controlling for family fixed effects using a sample of sisters

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Although WSPSM will ensure common support with regard to observables as well as and control for unmeasured school- and community-level characteristics, it will not control for potentially important confounders at the family level. In an effort to address this shortcoming, we restrict the sample to full biological sisters and estimate:

$$y_{ij} = \alpha + \delta\, Forced_{ij} + \beta' \mathbf{X}_i + v_j + \varepsilon_{ij},$$ (4)

where j denotes the respondent's family, and v_j is a sector of family fixed effects. The observables included on the right-hand side of (4) include age, race, appearance, religious affiliation, cognitive ability, height, body weight, and whether the respondent had an older sibling.

4.4. Panel estimates

Our final identification strategy exploits the panel nature of the Add Health data. We restrict our sample to respondents who, as of Wave I, had never been forced to have intercourse, then regress y_i on its lag, *Forced*, and the controls introduced previously (including school and grade fixed effects):

$$y_{it} = \alpha + \pi y_{it-1} + \delta Forced_{it} + \beta' \mathbf{X}_{it} + \varepsilon_{it},$$ (5)

where t corresponds to Wave II and *t-1* corresponds to Wave I. Identification comes from changes in y_i (and *Forced*) between Waves I and II. This approach, like an individual fixed effects model, controls for all fixed individual-level factors potentially

associated with *Forced* and the outcomes under study and is designed ameliorate bias due to pre-existing unobserved individual traits (although it does not rule out reverse causality nor does it rule out bias due to time-varying unobservables).

5. RESULTS

5.1. Short-run effects

Table 2 presents OLS estimates of having been forced to have intercourse by Wave II on the short-run outcomes. The standard errors are corrected for clustering at the school level.

Panel I of Table 2 presents estimates from bivariate regressions. They suggest that forced intercourse is associated with a 4.39-point increase in CES-D scores, a 0.132 increase in the probability of exhibiting the symptoms of major depression, a 0.838-point decrease in RSE scores, and a 0.215 decrease in GPA. Forced intercourse is also associated with trouble completing homework, trouble paying attention in class, and a decrease in the self-assessed likelihood of going to college. After controlling for individual-, family- and regional-observables, these associations remain statistically significant, but often become smaller in magnitude (Panel II).

In Table 3, we examine the extent to which the estimated effects of forced intercourse on mental health measured at Wave II are sensitive to: using propensity score matching (Panel I), restricting the sample to full biological sisters and controlling for family fixed effects (Panel II), and restricting the sample to respondents who had not experienced forced intercourse by Wave I and conditioning on prior mental health (Panel III).

The WSPSM estimates suggest that forced intercourse is associated with a 2.16 increase in CES-D scores, and a 0.078 increase in the probability of exhibiting the symptoms of major depression. However, the estimated relationship between forced intercourse and RSE scores becomes statistically indistinguishable from zero after matching.[16]

Restricting the sample to sisters and controlling for family fixed effects, forced intercourse is associated with a 2.53-point increase in CES-D scores, and a 1.29-point decrease in RSE scores.[17] Although the estimated effect of forced intercourse on the probability of suffering from the symptoms of major depression is not statistically significant, it magnitude is comparable to that obtained using OLS or WSPSM.

Finally, we find some evidence that experiencing forced intercourse between Waves I and II is associated with poorer mental health at Wave II. Specially, forced intercourse is associated with a 0.058 increase in the probability of exhibiting the symptoms of major depression. However, the estimated relationship between forced intercourse and CES-D scores is statistically insignificant and small as compared to the estimates in Table 2, as is the estimated relationship between forced intercourse and self-esteem.

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[16] Appendix Table 1 presents means of explanatory variables for the unmatched and matched samples. It appears that respondents who experienced forced intercourse are quite different with regard to the observables as compared to non-victims. For example, victims were more likely to come from lower-income households, have divorced parents, and be of lower cognitive ability than their non-victim counterparts. They were also more likely to have smoked cigarettes, had friends who smoked cigarettes, had strained relations with parents, and lied about their whereabouts. However, after our matching, respondents who reported forced intercourse appear to be quite similar to non-victims.

[17] There are 128 sisters from 61 families in this sample. Sisters had different experiences with regard to forced intercourse by Wave II.

In Table 4, we turn again to the relationship between forced intercourse and the short-run academic outcomes measured at Wave II. The WSPSM estimates provide little evidence that forced intercourse leads to lower grades, trouble doing homework, trouble paying attention in class, or a reduced self-assessed likelihood of going to college.[18] In contrast, when the sample is restricted to sisters and family fixed effects are introduced as controls, forced intercourse is associated with a 0.251 decrease in GPA. Likewise, when the sample is restricted to respondents who had not experienced forced intercourse by Wave I and we condition on Wave I GPA, forced intercourse is associated with a 0.217 decrease in GPA. Both of these estimates are larger than the OLS estimates reported in Table 2.

The positive associations between forced intercourse and academic performance as measured by trouble completing homework and aspirations of going to college appear to be largely spurious. The WSPSM estimates, although statistically significant, are unexpectedly negative. Forced intercourse is associated with a 0.068 decrease in the probability of having trouble completing homework, and a 0.065 decrease in the probability of being likely to go to college. Similarly, the family fixed effects estimates and the estimates conditioning on Wave I performance are either insignificant or wrong-signed. Forced intercourse is associated with a 0.081 increase in the probability of having trouble paying attention when we control for family-level heterogeneity.

5.2. Long-run effects of forced intercourse

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[18] After matching on the education sample, respondents who reported forced intercourse appear to be quite similar to non-victims.

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Table 5 presents estimates of the effect of having experienced forced sexual intercourse by Wave II on outcomes measured at Wave III, when respondents were between the ages of 18 and 26. Because there was a five-year gap between the second and third waves of the Add Health, we argue that these can be considered long-run effects.

Columns (1) and (2) of Table 5 focus on the relationship between forced intercourse and mental health. Unfortunately, neither CES-D nor RSE scores are available at Wave III; however, we constructed two dichotomous depression measures using the respondent's answers to the following Wave III questionnaire items:

> You were depressed, during the past seven days. (= 1 if "a lot of the time" or "most of the time or all of the time; = 0 if "never or rarely" or "sometimes")

> For which of the following conditions have you taken prescription medication in the past 12 months? (= 1 "depression or stress"; = 0 not for depression or stress)

OLS and WSPSM estimates suggest that forced intercourse by Wave II is associated with a 0.044 to 0.052 increase in the probability of answering the first item in the affirmative. However, the estimated relationship is reduced considerably (and becomes statistically insignificant) after accounting for family-level heterogeneity.[19] Also, when we restrict the sample to those who did not report having experienced forced intercourse at Wave I and condition on prior mental health, we find little evidence that having experienced forced sexual intercourse by Wave II is related to depression at Wave III. There is little evidence of a relationship between forced intercourse and using depression medication.

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[19] There are 90 sisters from 43 families in this sample. Sisters had different experiences with regard to forced intercourse by Wave II.

Columns (3) and (4) of Table 5 present estimates of the effect of experiencing forced intercourse by Wave II on educational attainment measured at Wave III.[20] OLS estimates suggest that forced intercourse is associated with a 0.116 decline in the probability of high school completion and a 0.144 decline in the probability of college attendance. These estimates, however, are considerably reduced in magnitude and become statistically insignificant after accounting for family-level heterogeneity or using WSPSM.

In summary, the estimates in Table 5 provide only limited support for the hypothesis that experiencing forced sexual intercourse as a child or adolescent has negative effects that reach into early adulthood. Unobserved heterogeneity appears to explain most of the estimated effects of forced intercourse on depression, high school graduation, and college attendance, although WSPSM estimates provide evidence that forced intercourse leads to feelings of depression. At a minimum, the findings presented in Table 5 suggest that cross-sectional estimates of the long-run effects of forced intercourse that do not take into account difficult-to-observe individual-, and family-level heterogeneity may be biased upwards.

5.3. Alternate Measure of Sexual Abuse

In this section, we experiment with an alternate measure of sexual abuse using responses to the following Wave III questionnaire item:

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[20] While we estimate linear probability models, probit models produce marginal effects that are qualitatively similar.

"How often had one of your parents or other adult care-givers touched you in a sexual way, forced you to touch him or her in a sexual way, or forced you to have sexual relations?"

If the respondent replied that she had been sexually abused on one or more occasions, we coded *Sex Abuse*= 1. It was set equal to zero if the respondent replied that she had never been abused by a parent or other adult caregiver.

We estimate the effects of *Sex Abuse* on long-run depression, schooling, and substance use in Table 6. OLS estimates suggest that parent or adult sexual abuse is associated with increased risk of depression and taking medication for depression. They also suggest that parent or adult sexual abuse is associated with decreased educational attainment. These associations are generally confirmed when we turn to WSPSM, but restricting the sample to sisters and introducing family fixed effects produces smaller (in absolute magnitude), statistically insignificant estimates. Nonetheless, adopting this alternative measure of sexual violence provides some evidence that parent or adult abuse is positively associated with long-run mental health and college graduation. This evidence is consistent with the hypothesis that sexual abuse during childhood or adolescence at the hand of an adult or parent may have more negative effects on health or human capital than forced intercourse by an unrelated individual.

6. Conclusion

Many previous studies have found that individuals who experienced sexual abuse as a child or adolescent exhibit increases symptoms of depression and anxiety as compared to than individuals who were not victimized. However, as noted by Rind et al. (1998), it is not clear the extent to which these results are driven by unobservables.

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In an effort to address the issue of unobservables, Dinwiddie et al. (2000), Kendler et al. (2000), and Nelson et al. (2002) turned to data on twins. Although Kendler et al. (2000) and Nelson et al. (2002) found that being the victim of sexual abuse was associated with adult depression, anxiety and substance use, the results of Dinwiddie et al. (2000) suggest that family-level confounders can, to a large extent, explain the relationship between sexual abuse and adult mental health.

Using data drawn from the National Longitudinal Study of Adolescent Health and econometric strategies designed to control for unobservables, the current study examines the effects of forced sexual intercourse, arguable the most severe form of sexual abuse, on variety of outcomes including GPA, depression, self-esteem, high school graduation, and college attendance. No previous study has used nationally representative data to estimate the effects of sexual abuse experienced as a child or adolescent on academic performance or educational attainment.

Our results provide evidence that forced intercourse is related to sharply lower grades and an increased risk of depression in the short run. However, they provide only limited evidence that forced sexual intercourse has longer-run effects on depression and educational attainment, a pattern of results that is consistent with those of Dinwiddie et al. (2000). In general, our findings contrast with what appears to be the consensus view among psychologists, namely that sexual abuse leads to substantial and long-lasting harm.

References

Ackard, Diann M. and Dianne Neumark-Sztainer. 2002. "Date Violence and Date Rape among Adolescents: Associations with Disordered Eating Behaviors and Psychological Health." Child Abuse and Neglect, Vol. 26, No. 5, pp. 455-473.

Ackard, Diann M., Marla E. Eisenberg, and Dianne Neumark-Sztainer. 2007. "Long-Term Impact of Adolescent Dating Violence on the Behavioral and Psychological Health of Male and Female Youth." The Journal of Pediatrics, Vol. 151, No. 5, pp. 476-81.

Baker, M.B. Anthony W., and Sylvia P. Duncan. 1985. "Child Sexual Abuse: A Study of Prevalence in Great Britain." Child Abuse & Neglect, Vol. 9, No. 4, pp. 457-67

Basile, Kathleen C., Michele C. Black, Thomas R. Simon, Ileana Arias, Nancy D. Brener, and Linda E. Saltzman. 2006. "The Association between Self-Reported Lifetime History of Forced Sexual Intercourse and Recent Health-Risk Behaviors: Findings from the 2003 National Youth Risk Behavior Survey." Journal of Adolescent Health, Vol. 39, No. 5, pp. 752.–52.

Antonia Bifulco, George W. Brown and Zsuzsanna Adler. 1991. "Early Sexual Abuse and Clinical Depression in Adult Life" The British Journal of Psychiatry, Vol.159, pp. 115-22.

Chandy, Joseph M., Robert W.M. Blum, and Michael D. Resnick 1996. "Gender-Specific Outcomes for Sexually Abused Adolescents." Child Abuse & Neglect Vol. 20, No. 12, pp. 1219-31.

Champion, Heather L. O., Kristie Long Foley, Robert H. Durant, Rebecca Hensberry, David Altman, and Mark Wolfson. 2004. "Adolescent Sexual Victimization, Use of Alcohol and Other Substances, and other Health-Risk Behaviors." Journal of Adolescent Health, Vol. 35, No. 4, pp. 321-28.

Clemmons, John C., Kate Walsh, David DiLillo and Terri L. Messman-Moore. 2007. "Unique and Combined Contributions of Multiple Child Abuse Types and Abuse Severity to Adult Trauma Symptomatology." Child Maltreat, Vol. 12, No. 2, pp.172-81.

Csoboth, Csilla T., Emma Birkás, György Purebl. 2005. "Living in Fear of Experiencing Physical and Sexual Abuse Is Associated with Severe Depressive Symptomatology among Young Women." Journal of Women's Health, Vol. 14, No. 5, pp. 441-48.

Cullerton-Sen, Crystal, Adam, R. Cassidy, Dianna Murray-Close, Dante Cicchetti, Nicki R. Crick, and Fred A. Rogosch. 2008. "Childhood Maltreatment and the Development of Relational and Physical Aggression: The Importance of a Gender-Informed Approach." Child Development Vol. 79, No. 6, pp. 1736-51.

DeMaris, Alfred and Catherine Kaukinen. 2005. "Violent Victimization and Women's Mental and Physical Health: Evidence from a National Sample." <u>Journal of Research in Crime and Delinquency</u>, Vol. 42, No. 4, 384-411.

Duncan, Renae D. 2000. "Childhood Maltreatment and College Drop-Out Rates: Implications for Child Abuse Researchers." <u>Journal of Interpersonal Violence</u>, Vol. 15, No. 9, pp. 987-95.

Einbender Alison J., and William N. Friedrich. 1989. "Psychological Functioning and Behavior of Sexually Abused Girls." <u>Journal of Consulting and Clinical Psychology</u> Vol. 57, No. 1, pp. 155-57.

Erickson, Pamela I., and Andrea J. Rapkin. 1991. "Unwanted Sexual Experiences among Middle and High School Youth." <u>Journal of Adolescent Health</u>, Vol.12, No. 4, pp. 319-25.

Feiring, Candice, Valerie A. Simon, and Charles M. Cleland. 2009. "Childhood Sexual Abuse, Stigmatization, Internalizing Symptoms, and the Development of Sexual Difficulties and Dating Aggression." <u>Journal of Consulting and Clinical Psychology</u>, Vol. 77, No. 1, pp. 127-37.

Fergusson, David M., L. John Horwood and Michael T. Lynskey. 1997. "Childhood Sexual Abuse, Adolescent Sexual Behaviors and Sexual Revictimization." <u>Child Abuse and Neglect</u>, Vol. 21, No. 8, pp. 789-803.

Finkelhor, David, and Jennifer Dziuba-Leatherman. 1994. "Children as Victims of Violence: A National Survey." <u>Pediatrics</u>, Vol. 94, No. 4, pp. 413–20.

Finkelhor, David, Gerald T. Hotaling, I.A. Lewis, and Christine Smith. 1989. "Marital Status, Religion, and Attitudes Sexual Abuse and its Relationship to Later Sexual Satisfaction." <u>Journal of Interpersonal Violence</u>, Vol. 4, No. 4, pp. 379-99.

Friesen, M.D., L.J. Woodword, L.J. Horwood, and D.M. Fergusson. 2010. "Childhood Exposure to Sexual Abuse and Partnership Outcomes at Age 30." <u>Psychological Medicine</u>, Vol. 40, No. 4, pp. 679-88.

Garofalo, Robert, R. Cameron Wolf, Shari Kessel, Judith Palfrey, and Robert H. DuRant. 1998. "The Association between Health Risk Behaviors and Sexual Orientation among a School-Based Sample of Adolescents." <u>Pediatrics</u>, No. 5, Vol. 101, pp. 895-902

Gidycz, Christine A., and Mary P. Koss. 1989. "The Impact of Adolescent Sexual Victimization: Standardized Measures of Anxiety, Depression, and Behavioral Deviancy." <u>Violence and Victims</u>, Vol. 4, No. 2, pp. 139-149.

Gidycz, Christine, Catherine Loh, Traci Lobo, Cindy Rich, Steven Jay Lynn, and Joanna Pashdag. 2007. "Reciprocal Relationships among Alcohol Use, Risk Perception, and

Sexual Victimization: A Prospective Analysis." <u>Journal of American College Health</u>, Vol. 56, No. 1, pp. 5-14.

Gidycz, Christine A., Lindsay M. Orchowski, Carrie R. King, and Cindy L. Rich. 2008. "Sexual Victimization and Health-Risk Behaviors A Prospective Analysis of College Women." <u>Journal of Interpersonal Violence</u> Vol. 23, No. 6, pp. 744-63.

Goldman, Juliette D. G., and Usha K. Padayachi 1997. "The Prevalence and Nature of Child Sexual Abuse in Queensland, Australia." <u>Child Abuse and Neglect</u>, Vol. 21, No. 5, May 1997, pp. 489-98.

Holmes, William C., Edna B. Foa, and Mary D. Sammel. 2005. "Men's Pathways to Risky Sexual Behavior: Role of Co-Occurring Childhood Sexual Abuse, Posttraumatic Stress Disorder, and Depression Histories." <u>Journal of Urban Health</u>, Vol. 82, Supplement 1, pp. i89−i99.

Howard Donna E. and Min Qi Wang 2005. "Psychosocial Correlates of U.S. Adolescents who Report a History of Forced Sexual Intercourse." <u>Journal of Adolescent Health</u>, Vol. 36, No. 5, pp. 372-79.

Howard, D.E., M.Q. Wang, and F. Yan. 2007. "Prevalence and Psychosocial Correlates of Forced Sexual Intercourse among U.S. High School Adolescents." <u>Adolescence</u>, Vol. 42, No. 168, pp. 629-43.

Jasinski, Jana L., Linda M. Williams, and Jane Siegel. 2000. "Childhood Physical and Sexual Abuse as Risk Factors for Heavy Drinking among African-American Women: A Prospective Study." <u>Child Abuse and Neglect</u>, Vol. 24, No. 8, pp. 1061-71.

Jumper, Shan A. 1995. "A Meta-Analysis of the Relationship of Child Sexual Abuse to Adult Psychological Adjustment." <u>Child Abuse and Neglect</u>, Vol. 19, No. 6, pp. 715−28.

Kaukinen, Catherine and Alfred DeMaris. 2005. "Age at First Sexual Assault and Current Substance Use and Depression," <u>Journal of Interpersonal Violence</u> Vol. 20, No. 10, pp. 1244-70.

Kilpatrick, Dean G., Kenneth J. Ruggiero, Ron Acierno, Benjamin E. Saunders, Heidi S. Resnick, Connie L. Best. 2003a. "Violence and Risk of PTSD, Major Depression, Substance Abuse/Dependence, and Comorbidity: Results from the National Survey of Adolescents." <u>Journal of Consulting and Clinical Psychology</u>, Vol. 71, No. 4, pp. 692-700.

Kilpatrick, Dean G., Benjamin E. Saunders, and Daniel W. Smith. 2003b. <u>Youth Victimization: Prevalence and Implications</u>. Washington DC: U.S. Department of Justice Office of Justice Programs. Vol.18, No. 3, pp. 211-7.

Koss, Mary P., Christine A. Gidycz, and Nadnine Wisniewski. 1987. "The Scope of Rape: Incidence and Prevalence of Sexual Aggression and Victimization in a National Sample of Higher Education Students." Journal of Consulting and Clinical Psychology, Vol. 55, No. 2, pp. 162-170.

Lodico, Mark A., Enid Gruber, and Ralph J. DiClemente. 1996. "Childhood Sexual Abuse and Coercive Sex among School-based Adolescents in a Midwestern State." Journal of Adolescent Health, Vol. 18, No. 3, pp. 211-17.

Macmillan, Ross and John Hagan. 2004. "Violence in the Transition to Adulthood: Adolescent Victimization, Education, and Socioeconomic Attainment in Later Life," Journal of Research on Adolescence Vol. 14, No. 2, pp. 127-58.

Maniglio, Roberto. 2009. "The Impact of Child Sexual Abuse on Health: A Systematic Review of Reviews." Clinical Psychology Review, Vol. 29, No. 7, pp. 647-57.

Nelson, David E., Grant K. Higginson, and Joyce A. Grant-Worley. 1994. "Using the Youth Risk Behavior Survey to Estimate Prevalence of Sexual Abuse among Oregon high School Students." Journal of School Health, Vol. 64, No. 10, pp. 413–16.

Neville, H. A., Heppner, M. J., Oh, E., Spanierman, L. B., and Clark, M. 2004. "General and Culturally Specific Factors Influencing Black and White Rape Survivors' Self-Esteem," Psychology of Women Quarterly 28, No. 1, pp. 83-94.

Paolucci, Elizabeth, Mark L. Genuis, and Claudio Violato. 2001. "A Meta-Analysis of the Published Research on the Effects of Child Sexual Abuse." The Journal of Psychology, Vol. 135, No. 1, pp. 17 – 36.

Plunkett, Angela, Brian O'Toole, Heather Swanston, R. Kim Oates, Sandra Shrimpton, and Patrick Parkinson. 2001. "Suicide Risk Following Child Sexual Abuse." Ambulatory Pediatrics, Vol. 1, No. 5, pp. 262-66

Raghavan, Ramesh, Bogart, Laura M., Elliott, Mark N., Vestal, Katherine D., and Schuster, Mark A. 2004. "Sexual Victimization among a National Probability Sample of Adolescent Women." Perspectives on Sexual and Reproductive Health, Vol. 36, pp. 225-32.

Raghavan, Chitra and Sharon Kingston. 2006. "Child Sexual Abuse and Posttraumatic Stress Disorder: The Role of Age at First Use of Substances and Lifetime Traumatic Events." Journal of Traumatic Stress, Vol. 19, No. 2, pp. 269–78.

Randolph, Mary E., and Katie E. Mosack. 2006. "Factors Mediating the Effects of Childhood Sexual Abuse on Risky Sexual Behavior among College Women." Journal of Psychology and Human Sexuality, Vol. 18, No. 1, pp. 23 – 41.

Raj, Anita, Jay G. Silverman, and Hortensia Amaro. 2000. "The Relationship between Sexual Abuse and Sexual Risk among High School Students: Findings from the 1997

Massachusetts Youth Risk Behavior Survey." Maternal and Child Health Journal, Vol. 4, No. 2, pp. 125-34

Rich, C. L., Gidycz, C. A., Warkentin, J. B., & Weiland, P. 2005. "Child and Adolescent Abuse and Subsequent Victimization: A Prospective Study." Child Abuse and Neglect, Vol. 29, No. 12, pp.1373-94.

Rind, Bruce and Philip Tromovitch. 1997. "A Meta-Analytic Review of Findings from National Samples on Psychological Correlates of Child Sexual Abuse." The Journal of Sex Research, Vol. 34, No. 3, pp. 237-55.

Rind, Bruce, Philip Tromovitch, and Robert Bauserman. 1998. "A Meta-Analytic Examination of Assumed Properties of Child Sexual Abuse Using College Samples." Psychological Bulletin, Vol. 124, No. 1, pp. 22−53.

Russell, Diana E.H. 1983. "The Incidence and Prevalence of Intrafamilial and Extrafamilial Sexual Abuse of Female Children." Child Abuse and Neglect, Vol. 7, No. 2, pp. 133-46.

Saewyc, Elizabeth M., Sandra Pettingell, and Lara L. Magee 2003. "The Prevalence of Sexual Abuse among Adolescents in School." The Journal of School Nursing. Vol. 19, No. 5, pp. 266-272.

Senn, Theresa E., Michael P. Carey, and Peter A. Vanable. 2008. "Childhood and Adolescent Sexual Abuse and Subsequent Sexual Risk Behavior: Evidence from Controlled Studies, Methodological Critique, and Suggestions for Research." Clinical Psychology Review, Vol. 28, No. 5, pp. 711–35.

Smith, Laureen H., and Jodi Ford. (Forthcoming.) "History of Forced Sex and Recent Sexual Risk Indicators among Young Adult Males." Perspectives on Sexual and Reproductive Health.

Testa, Maria, Jennifer A. Livingston, and Joseph H. Hoffman. 2007. "Does Sexual Victimization Predict Subsequent Alcohol Consumption? A Prospective Study among a Community Sample of Women." Addictive Behaviors, Vol. 32, No. 12, p. 2926-39.

Tong Liz, Kim Oates, and Michael McDowell. 1987. "Personality Development Following Sexual Abuse." Child Abuse and Neglect, Vol. 11, No. 3, pp. 371-83.

Trickett, Penelope K., Catherine McBride-Changa, and Frank W. Putnama. 1994. "The Classroom Performance and Behavior of Sexually Abused Females." Development and Psychopathology, Vol. 6, No.1, pp.183-94.

Ullman, Sarah, E., & Leanne R. Brecklin. 2003. "Sexual Assault History and Health Related Outcomes in a National Sample of Women." Psychology of Women Quarterly Vol., 27, No. 1, pp. 46-57.

Ulloa, Emilio C., Kimberly Baerresen, and Audrey Hokoda. 2009. "Fear as a Mediator for the Relationship between Child Sexual Abuse and Victimization of Relationship Violence." <u>Journal of Aggression, Maltreatment and Trauma</u>, Vol. 18, No. 8, pp. 872 – 85.

<u>Upchurch</u>, Dawn M. and Yasamin <u>Kusunoki</u>. 2004. "Associations between Forced Sex, Sexual and Protective Practices, and Sexually Transmitted Diseases among a National Sample of Adolescent Girls." <u>Women's Health Issues</u>, Vol. 14, No. 3, pp. 75-84.

Wyatt, Gail E. 1985. "The Sexual Abuse of Afro-American and White-American Women in Childhood." <u>Child Abuse and Neglect</u>, Vol. 9 No. 4, pp. 507-19.

Wyatt, Gail E., and Stefanie D. Peters. 1986. "Issues in the Definition of Child Sexual Abuse in Prevalence Research." <u>Child Abuse and Neglect</u>, Vol. 10, No. 2, pp. 231-40.

Table 1. Means of Dependent, Independent, and Matching Variables[1]

Short-Run Dependent Variables (Wave II)

		Independent Variables			
CES-D Score	13.2 (8.72) [7,429]	Forced	0.089 (0.284)	West	0.237 (0.425)
Depression	0.122 (0.327) [7,429]	Forced Between WI and WII	0.022 (0.146)	Midwest	0.249 (0.432)
RSE Score	24.7 (3.61) [7,442]	Log (HH Income)	10.4 (0.824)	South	0.372 (0.483)
Grade Point Average	2.85 (0.813) [6,559]	Parent Grad HS	0.294 (0.455)	Catholic	0.255 (0.436)
Trouble Paying Attention in Class >= once/week	0.259 (0.438) [6,816]	Parent Trade School	0.095 (0.293)	Baptist or Methodist	0.391 (0.488)
		Parent Some College	0.188 (0.391)	Other Christian	0.199 (0.399)
Trouble Completing Homework >= once/week	0.247 (0.431) [6,815]	Parent College Grad	0.143 (0.351)	Non-Christian Relig	0.044 (0.206)
Likely to Attend College	0.782 (0.413) [7,150]	Parent Post-College	0.095 (0.293)	Black	0.232 (0.422)
		Parent Never Married	0.064 (0.245)	Asian	0.063 (0.243)

Long-Run Dependent Variables (Wave III)

		Parent Separated	0.057 (0.232)	Indian	0.017 (0.129)
Depressed in the Last Week	0.079 (0.269) [6,081]	Parent Widowed	0.037 (0.189)	Hispanic/Other	0.172 (0.378)
Taken Medication for Depression/Stress in Last Year	0.064 (0.245) [6,086]	Older Sibling	0.501 (0.500)	Height (cm)	163.5 (7.31)
		PPVT Score	98.2 (15.1)	Weight (kg)	60.8 (13.8)
High School Graduation	0.839 (0.367) [6,082]	Rural	0.167 (0.373)	Age	16.1 (1.63)
College Attendance	0.630 (0.483) [6,083]	Suburban	0.535 (0.499)	Number of Bio Siblings	1.63 (1.47)

Table 1, Continued

<u>*Independent Variables*</u>

Very attractive	0.196
	(0.397)
Attractive	0.371
	(0.483)
Unattractive	0.036
	(0.155)
Very unattractive	0.019
	(0.136)

<u>*Additional Matching Variables (Wave II)*</u>

One friend smokes	0.205
	(0.404)
Two friends smoke	0.129
	(0.335)
Three friends smoke	0.142
	(0.349)
Parent lets child make own decisions with friends	0.873 (0.333)
Parents let child make own decisions with clothes	0.919 (0.273)
Very close with biological mother	0.516 (0.500)
Eats dinner with family 7 days per week	0.342 (0.474)
Never lies about whereabouts	0.502 (0.500)
Attend church at least once per week	0.452 (0.448)
Very sure will live until age 35	0.535 (0.499)
Strongly agree that act on gut feelings	0.088 (0.283)
Strongly agree that make decisions without thinking about future	0.038 (0.191)
Religion is very important to respondent	0.516 (0.500)

Standard errors are in parentheses and sample sizes are in brackets.

Table 2. OLS Estimates of the Effect of Forced Intercourse on Short-Run Mental Health and Academic Performance

	Mental Health			*Academic Performance*			
	CES-D Score	Depression	RSE Score	GPA	Trouble Paying Attention	Trouble Completing Homework	Likely to Attend College
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel I: No Controls							
Forced	4.39***	0.132***	-0.838***	-0.215***	0.059**	0.039*	-0.170***
	(0.472)	(0.020)	(0.151)	(0.045)	(0.025)	(0.023)	(0.023)
	[7,429]	[7,429]	[7,442]	[6,559]	[6,816]	[6,815]	[7,150]
Panel II: Individual, Family, and Region Controls							
Forced	3.93***	0.125***	-0.731***	-0.144***	0.063**	0.045*	-0.117***
	(0.439)	(0.019)	(0.143)	(0.048)	(0.024)	(0.024)	(0.023)
	[7,429]	[7,429]	[7,442]	[6,559]	[6,816]	[6,815]	[7,150]

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Estimates come from unweighted regressions using data from Waves I and II of the National Longitudinal Study of Adolescent Health. All models include the full set of controls listed in Appendix Table 1. Standard errors corrected for clustering at the school level are in parentheses. Sample sizes are in brackets.

Table 3. Fixed Effects, Propensity Score Matching, and Panel Estimates of Forced Intercourse on Short-Run Mental Health

	CES-D Score	Depression	RSE Score
	(1)	(2)	(3)
Panel I: Within School Propensity Score Matching			
Forced	2.16***	0.078***	-0.300
	(0.466)	(0.020)	(0.185)
	[1,072]	[1,072]	[1,068]
Panel II: Family Fixed Effects			
Forced	2.53*	0.071	-1.29*
	(1.34)	(0.059)	(0.670)
	[1,055]	[1,055]	[1,053]
Panel III: Panel Estimates			
Forced	0.303	0.058*	-0.142
	(0.646)	(0.032)	(0.296)
	[6,903]	[6,903]	[6,910]

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Estimates come from unweighted regressions using data from Waves I and II of the National Longitudinal Study of Adolescent Health. All models include the full set of controls listed in Appendix Table 1. Standard errors corrected for clustering at the school level are in parentheses. Sample sizes are in brackets.

Table 4. Estimated Effect of Forced Intercourse on Short-Run Academic Performance

	GPA	Trouble Paying Attention	Trouble Completing Homework	Likely to Attend College
	(1)	(2)	(3)	(4)
WSPSM	-0.060	0.012	-0.068**	-0.065**
	(0.047)	(0.025)	(0.024)	(0.023)
	[708]	[818]	[820]	[1,013]
FFE	-0.251*	-0.018	-0.048	0.068
	(0.129)	(0.081)	(0.07)	(0.090)
	[815]	[877]	[877]	[847]
Panel	-0.217***	0.081*	0.027	-0.050*
	(0.071)	(0.042)	(0.037)	(0.034)
	[6,127]	[6,392]	[6,392]	[6,655]

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Estimates come from unweighted regressions using data from Waves I and II of the National Longitudinal Study of Adolescent Health. All models include the full set of controls listed in Appendix Table 1. Standard errors corrected for clustering at the school level are in parentheses. Sample sizes are in brackets.

Table 5. Estimated Effect of Forced Intercourse on Long-Run Mental Health and Educational Attainment

	Depressed Last Week	Take Depression Medication	High School Graduation	College Attendance
	(1)	(2)	(3)	(4)
OLS	0.052***	0.016	-0.116***	-0.114***
	(0.013)	(0.014)	(0.023)	(0.032)
	[6,081]	[6,086]	[6,082]	[6,083]
WSPSM	0.044**	0.002	-0.047	-0.054
	(0.018)	(0.014)	(0.029)	(0.041)
	[852]	[843]	[850]	[850]
FFE	0.004	-0.001	-0.002	-0.019
	(0.055)	(0.029)	(0.050)	(0.077)
	[856]	[858]	[856]	[856]
Panel	0.022	-0.003	--	--
	(0.032)	(0.024)		
	[5,709]	[5,714]		

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Estimates come from unweighted regressions using data from Waves I, II, and III of the National Longitudinal Study of Adolescent Health. All models include the full set of controls listed in Appendix Table 1. Standard errors corrected for clustering at the school level are in parentheses. Sample sizes are in brackets.

Table 6. Estimated Effect of Sexual Abuse on Long-Run Mental Health and Educational Attainment

	Depressed Last Week (1)	Take Depression Medication (2)	High School Graduation (3)	College Attendance (4)
OLS	0.068***	0.074***	-0.073***	-0.094***
	(0.023)	(0.020)	(0.028)	(0.032)
	[5,954]	[5,957]	[5,954]	[5,956]
WSPSM	0.057*	0.073**	-0.026	-0.101**
	(0.034)	(0.030)	(0.029)	(0.035)
	[455]	[455]	[455]	[453]
FFE	-0.041	0.058	0.065	-0058
	(0.060)	(0.071)	(0.074)	(0.070)
	[814]	[814]	[814]	[814]

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Estimates come from unweighted regressions using data from Waves I, II, and III of the National Longitudinal Study of Adolescent Health. All models include the full set of controls listed in Appendix Table 1. Standard errors are corrected for clustering at the school level are in parentheses. Sample sizes are in brackets.

Appendix Table 1. Matching on Observables between Forced Intercourse Victims and Non-Victims (Wave II)

	Unmatched Sample			Matched Sample		
	Forced = 1	Forced = 0	Diff	Forced = 1	Forced = 0	Diff
Log (HH Income)	10.3	10.4	-0.1*** (p=0.00)	10.3	10.3	0.00 (p=0.45)
Parent Grad HS	0.294	0.297	-0.003 (p=0.89)	0.311	0.376	-0.065 (p=0.19)
Parent Some College	0.177	0.190	-0.013 (p=0.48)	0.195	0.202	-0.007 (p=0.87)
Parent College Grad	0.145	0.142	0.003 (p=0.83)	0.132	0.101	0.023 (p=0.38)
Parent Post-College	0.070	0.090	0.020 (p=0.11)	0.070	0.045	0.025 (p=0.37)
PPVT Score	96.1	98.7	-2.6*** (p=0.00)	96.6	94.5	2.1 (p=0.12)
Black	0.256	0.223	0.033* (p=0.05)	0.249	0.270	-0.021 (p=0.63)
Hispanic/Other	0.148	0.170	-0.022* (p=0.08)	0.155	0.213	-0.058 (p=0.13)
Age	16.9	16.2	0.7*** (p=0.00)	16.8	16.9	-0.1 (p=0.75)
Height	163.7	163.6	0.1 (p=0.85)	163.6	162.8	0.8 (p=0.32)
Weight	63.4	60.7	2.7*** (p=0.00)	62.2	64.2	-2.0 (p=0.17)
Suburban	0.559	0.535	0.024 (p=0.25)	0.564	0.533	0.031 (p=0.54)
Rural	0.174	0.177	-0.003 (p=0.85)	0.183	0.148	0.035 (p=0.36)
Number Siblings	1.40	1.65	0.25*** (p=0.00)	1.47	1.57	0.10 (p=0.45)
Parent Never Married	0.058	0.063	-0.005 (p=0.64)	0.065	0.037	0.028 (p=0.27)
Parent Divorced	0.197	0.140	0.057*** (p=0.00)	0.177	0.193	-0.016 (p=0.71)
Parent Separated	0.062	0.054	0.008 (p=0.48)	0.069	0.046	0.023 (p=0.38)
Parent Widowed	0.045	0.035	0.010 (p=0.26)	0.044	0.046	-0.002 (p=0.92)
Older Sibling	0.442	0.507	-0.065*** (p=0.00)	0.455	0.475	-0.020 (p=0.68)
Very Attractive	0.160	0.175	-0.015 (p=0.35)	0.179	0.164	0.015 (p=0.69)
Catholic	0.219	0.262	-0.053** (p=0.02)	0.236	0.220	0.016 (p=0.72)
One Friend Smoke	0.199	0.204	-0.005 (p=0.77)	0.209	0.205	0.004 (p=0.92)
Two Friends Smoke	0.191	0.121	0.070*** (p=0.00)	0.189	0.205	-0.006 (p=0.69)
Three Friends Smoke	0.299	0.125	0.174*** (p=0.00)	0.231	0.270	-0.39 (p=0.36)
Make own decisions - friends	0.755	0.847	-0.092*** (p=0.00)	0.799	0.789	0.010 (p=0.62)
Make own decisions - clothes	0.824	0.888	-0.064*** (p=0.00)	0.873	0.869	0.004 (p=0.91)

Appendix Table 1, Continued

	Unmatched Sample			Matched Sample		
	Forced = 1	Forced = 0	Diff	Forced = 1	Forced = 0	Diff
Very close to mother	0.373	0.490	-0.117*** (p=0.00)	0.426	0.434	-0.008 (p=0.87)
Eat dinner with fam 7d/wk	0.130	0.171	-0.041** (p=0.01)	0.108	0.148	-0.040 (p=0.22)
Never lie - whereabouts	0.261	0.318	-0.057*** (p=0.00)	0.291	0.246	0.045 (p=0.32)
Attend church $\geq$ once/wk	0.593	0.654	-0.061*** (p=0.00)	0.615	0.607	0.008 (p=0.86)
Religion very important	0.395	0.452	-0.057*** (p=0.00)	0.415	0.435	-0.020 (p=0.69)
Act on gut feelings	0.133	0.083	0.050*** (p=0.00)	0.108	0.143	-0.035 (p=0.24)
Live without thoughts of future	0.059	0.03	0.029*** (p=0.00)	0.058	0.058	0.000 (p=0.98)
Very sure will live to age 35	0.466	0.541	-0.075*** (p=0.00)	0.480	0.487	-0.007 (p=0.89)

*** Significant at 1% level ** Significant at 5% level * Significant at 1% level
Notes: Estimates come from unweighted means using data from Waves I and II of the National Longitudinal Study of Adolescent Health. The matched sample uses the full set of controls in Table 1 along with the additional matching variables listed in Table 1, as well as school and grade fixed effects. The Matching procedure used was nearest neighbor propensity score matching with estimated propensity scores between each rape victim and matched non-victim less than or equal to 0.002. Treatment observations whose propensity score is higher than the maximum or less than the minimum propensity score of the controls are dropped. A further 15 percent of the treatment observations at which the propensity score density of the control observations is the lowest are dropped. Nearest neighbor matching is conducted without replacement.