

Resolution of Unwanted Pregnancy During Adolescence Through Abortion Versus Childbirth: Individual and Family Predictors and Psychological Consequences

Priscilla K. Coleman

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Abstract Using data from the National Longitudinal Study of Adolescent Health, various demographic, psychological, educational, and family variables were explored as predictors of pregnancy resolution. Only 2 of the 17 variables examined were significantly associated with pregnancy resolution (risk-taking and the desire to leave home). After controlling for these variables, adolescents who aborted an unwanted pregnancy were more inclined than adolescents who delivered to seek psychological counseling and they reported more frequent problems sleeping and more frequent marijuana use. No significant differences were observed for cigarette smoking, frequency of alcohol use, and problems with parents based on alcohol use after the controls were instituted; however without controls, significant associations were observed, underscoring the importance of the use of psychological and situational controls in studies of the consequences of abortion. The information derived from this study is potentially useful to parents and professionals who provide guidance to adolescents regarding pregnancy resolution.

Keywords Unwanted pregnancy · Adolescent parenting · Abortion

The teen pregnancy rate in the United States have steadily dropped over the last few decades, presumably due to a combination of social programs focusing on sex education and abstinence (Santelli *et al.*, 2004). Nevertheless, adolescent pregnancy and childbirth rates are higher in the U. S. than

in all other developed countries across the globe (Singh and Darroch, 2000), with approximately 10% of adolescents becoming pregnant each year and 60–65% choosing to give birth (AGI, 1999; Henshaw, 1998). Adolescents are typically unprepared emotionally, cognitively, and financially to assume the role of parent and as a result both the adolescent and her child are at an enhanced risk for adverse developmental and behavioral outcomes (Dubow and Luster, 1990; Klepinger *et al.*, 1999; Miller and Moore, 1990; Zabin and Cardona, 2002). Rather than take their lives on the difficult path of early parenthood, many adolescents either decide to abort or are pressured by others to terminate their pregnancies (Henshaw and Kost, 1992). More specifically, in 1974, 29% of pregnant adolescents opted to abort (Moore, 1989), in the mid 1980's 42% of adolescent pregnancies ended in abortion (Moore, 1989), and more recently, the rate has been reported to be approximately 35–40% (AGI, 1999; Henshaw, 1998). Because childbirth and abortion are so common among contemporary U.S. adolescents, the purpose of this study is to compare adolescent psychological and behavioral outcomes associated with each choice after controlling for demographic, psychological, educational, and family variables that discriminate between the two options.

Unintended pregnancy delivered

The majority of adolescent pregnancies are unintended (75%–86%; AGI 1994; Henshaw, 1998; Squires, 1995) and unintended pregnancy is widely recognized as a stressful life event for most women regardless of their age (Adler and Dolcini, 1986; Cohen and Roth, 1984; Olson, 1980). Further, based on the available correlational evidence, researchers have tended to conclude that unintended pregnancy carried to term poses a serious risk factor for compromised maternal health (Brown and Eisenberg, 1995; Joyce *et al.*,

P. K. Coleman (✉)
Human Development and Family Studies, Bowling Green State
University, 16D Family and Consumer Sciences Building,
Bowling Green, OH 43403, USA
e-mail: pcolema@bgsu.edu

2000). Unintended pregnancy has specifically been shown to be associated with late prenatal care (Braveman *et al.*, 2000; Hulsey, 2001; Mayer, 1997; Pagnini and Reichman, 2000), substance use (Hellerstedt *et al.*, 1998; Kost *et al.*, 1998), and depression (Leathers and Kelley, 2000). However Joyce *et al.* (2000) challenged the integrity of many of the studies used as the basis for the conclusion that unintendedness produces negative maternal outcomes. In particular, they note that the evidence for a causal model is weak, as many of the previous studies neglected to control for potentially confounding socio-demographic, individual difference, and family factors related to pregnancy intendedness.

Pregnancy resolved through abortion

Previous research indicates that a minimum of 10% of women who opt for an abortion will suffer from serious negative psychological consequences (Adler *et al.*, 1990; Lewis, 1997; Zolse and Blacker, 1992). Among women who are adversely impacted by an abortion, a number of mental health problems have been documented including anxiety (Cogle *et al.*, 2005; Franco *et al.*, 1989), depression (Cogle *et al.*, 2003; Reardon and Cogle, 2002; Thorp *et al.*, 2003), sleep disturbances (Barnard, 1990), and substance use/abuse (Coleman *et al.*, 2002a; Reardon and Ney, 2000; Yamaguchi and Kandel, 1987).

Nearly 25% of U.S. abortions are performed on women under age 20 (AGI, 1996) and younger women may be particularly vulnerable to experiencing post-abortion difficulties (Franz and Reardon, 1992; Osofsky and Osofsky, 1972). One attempt to explain a possible heightened risk for post-abortion emotional difficulties during adolescence focuses on pressure exerted by others. When women are supported in their decisions to abort by significant people in their lives, post-abortion adjustment tends to be more positive (Moseley *et al.*, 1981; Shustermann, 1979). However, when women feel forced into abortion by others or by life circumstances, negative post-abortion outcomes become more common (Lemkau, 1988). Adolescents are generally much less prepared to assume the responsibilities of parenthood and are logically the recipients of pressure to abort. Further, as suggested by Lemkau (1988), the risk for post-abortion adjustment difficulties may be higher for adolescents, since they are more inclined than more mature women to engage in denial of the pregnancy and delay in decision-making, leading to the use of procedures entailing more physical and emotional risk.

Studies comparing resolution of pregnancy through abortion versus delivery

As common as adolescent pregnancy is in our society, it is surprising that few relative risk studies have been con-

ducted to ascertain whether unintended pregnancy resolved through abortion or delivery is associated with greater risk to adolescent psychological well-being. Data from two small-scale investigations, which unfortunately did not include assessments of pregnancy wantedness suggested that abortion and delivery in adolescence were associated with similar levels of psychological distress (Anthanasiou *et al.*, 1973; Zabin *et al.*, 1989). A couple more recent large-scale studies have revealed that abortion when compared to delivery is associated with significantly more mental health problems (Coleman *et al.*, 2002b; Cogle *et al.*, 2003; Reardon *et al.*, 2003) and higher rates of substance use (Coleman *et al.*, 2002a; Hope *et al.*, 2003). However, the age range in these studies was broad and pregnancy wantedness was again not determined.

One analysis of the National Longitudinal Study of Youth (NLSY) (Reardon and Cogle, 2002) revealed that women who aborted a first pregnancy were significantly more likely to be at risk for clinical depression compared to women who carried a first unintended pregnancy to term. This difference was observed even after controlling for age, income level, race, and a psychological measure taken prior to the women's first pregnancies. In a second study using data from the NLSY, Reardon and colleagues recently reported that women who aborted when compared to those who carried to term were twice as likely to use marijuana and reported more frequent use of alcohol after controlling for age, race, marital status, income, education, and prior psychological well-being (Reardon *et al.*, 2004).

Predictors of pregnancy resolution

A significant limitation of the few available relative risk studies is failure to control for a sufficient number of demographic and psychosocial variables associated with the choice to abort. As noted by Coleman and colleagues (2002a), an abortion history is really a package variable defined by numerous personal and situational factors leading up to the decision to abort while also carrying the potential to cause problems. Adolescents who obtain abortions may be more likely to have certain personality traits or they may experience more strained relationships with their parents than adolescents who decide to carry to term. One or more of these variables as opposed to the abortion itself may be the critical element(s) related to differences observed in psychological health among adolescents who choose abortion as opposed to childbirth. Unfortunately, research pertaining to predictors of pregnancy resolution is rather limited for women in general and for adolescents in particular.

A couple small-scale studies have been conducted to identify a profile of women likely to undergo an abortion. For example, Bradley's (1984) Canadian study of women who had recently given birth revealed that those with a history of

abortion were more likely to describe themselves as self-reliant, independent, rebellious, and to enjoy being unattached or unconnected to other people, places, and things. Similarly, two additional studies have shown the choice to abort to be associated with an independent personality (Bailey *et al.*, 2003; Miller, 1992).

Although the above studies involved women of various ages, an association between an outgoing personality type and the choice to abort may logically be expected to emerge in a sample that is exclusively focused on adolescents, because outgoing adolescents, who undoubtedly spend a great deal of time with peers and/or are involved in numerous activities outside the home are unlikely to want to be tied down with an infant. Rebelliousness is another variable that is likely to be a predictor of the choice to abort in an exclusively adolescent sample, because adolescents who are inclined to defy parents, go against conventions, take risks, etc. would seem less inclined to want to assume a traditional female role, requiring responsibility that would hinder their ability to engage in thrill-seeking, possibly unlawful behavior. Within the construct of rebelliousness, an orientation to risk-taking is a particularly important variable to explore as a predictor of the choice to abort, because it is also highly likely to be associated with variables indicative of negative adjustment that have been examined as correlates of abortion (e.g., mental health problems and substance use.) If risk-taking is definitively identified as a predictor of the choice to abort, studies investigating psychological correlates of abortion should control for this potentially powerful third variable. In the current study, an outgoing personality (independent, assertive) and a tendency toward risk-taking were examined as predictors of the choice to abort.

The results of a recently conducted study revealed that women whose parents were critical, demanding, and not very nurturing were more inclined to choose abortion over childbirth (Coleman *et al.*, 2005). The authors speculated that these findings may indicate that on a deeper level the choice to abort in some situations may be grounded in internalized parental criticisms, anxiety associated with close relationships, and/or expectations of failure in parenting. As applied to adolescence, one might expect an association between less close relationships with parents and the choice to abort for more concrete reasons, such as fear that parents will not provide the psychological and practical assistance likely to be needed if the pregnancy is continued. In the current study, several variables related to the level of general emotional support provided by both parents were investigated as predictors of the choice to abort among adolescents.

Studies designed to identify predictors of the decision to abort vs. deliver in adolescence have tended to focus on demographic factors. One recent large scale effort by Zavodny (2001) revealed that abortion was associated with higher educational attainment of the woman's mother and the choice

to abort in adolescence tends to also be associated with academic success and high educational aspirations of the adolescent (Carlson *et al.*, 1984; Eisen *et al.*, 1983; Henshaw and Silverman, 1988). The association between variables suggestive of an individual or family commitment to education and the choice to abort is logical, because the responsibilities inherent in having a child may significantly alter educational plans, or if the plans are retained, render them more difficult to pursue. In the present study, in addition to examining a variable related to educational aspirations (intended college attendance), two additional education variables (one behavioral, whether or not the respondent has ever been suspended and one emotional, whether or not the adolescent is happy at school) were examined.

The choice to carry to term tends to be made more frequently by adolescents who consider themselves highly religious (Henshaw and Silverman, 1988), have mothers who had their first child before age 20 (Evans, 2001), are raised in single parent homes (Tomal, 2001), and experience support from family members for the pregnancy (Bailey *et al.*, 2003). Taken together, the variables previously identified as predictors of the choice to carry to term suggest a profile of an adolescent exposed to values and/or family norms that are supportive of the birth option. In an effort to replicate some of these earlier findings, the present study involved an examination of adolescent religiosity and parental marital status as predictors of pregnancy resolution. Limitations imposed by reliance on secondary data precluded consideration of the level of familial support for carrying the pregnancy to term as a predictor of pregnancy resolution.

This study involved analysis of two waves of data from the National Longitudinal Study of Adolescent Health (Add Health) in pursuit of two objectives. The first objective was to explore numerous demographic, educational, psychological, and family factors as possible correlates of pregnancy resolution. The second objective was to examine psychological and behavioral outcomes among individuals who aborted or delivered during adolescence after the effects of potential confounds were statistically removed. Based on the review of literature above, the following specific hypotheses were tested:

1. Adolescents who view religion as not very important in their lives, have not lived in a single parent home, are more oriented to school (expect to attend college, have never been suspended, and are generally happy in school), have more educated parents, have more outgoing personalities (assertive, independent), take risks, and feel less emotional connectivity to their families will be more likely to abort.
2. Compared to giving birth, abortion during adolescence is expected to be associated with a greater likelihood of needing counseling for psychological or emotional

problems, difficulty sleeping, more frequent use of cigarettes, marijuana, and alcohol, more frequent alcohol-related problems with parents, and more frequent alcohol-related problems at school after controlling for variables related to the form of pregnancy resolution.

Method

Participants

This study involved analysis of Waves I and II of the restricted-user data sets from the National Longitudinal Study of Adolescent Health (Add Health). Add Health is a longitudinal, nationally representative, probability-based survey of adolescents who were in grades 7 through 12 between 1994 and 1996. The participants in the current study included only adolescents in grades 7 through 11 who completed both Wave I in 1995 and Wave II in 1996 in addition to experiencing a pregnancy described as “not wanted” or “probably not wanted” between 1995 and 1996 ($n = 130$) that was resolved through abortion ($n = 65$) or delivery ($n = 65$). The percentages of adolescents who were between the ages of 11 and 14 during the first wave of data collection were equal to 23.6% and 19.6% for those who aborted and delivered respectively; whereas 76.4% of those who aborted and 80.4% of those who gave birth were between the ages of 15 and 19. Additional demographic characteristics of the two segments of the sample are provided in Table 1.

Procedure

During the first wave of data collection in 1995, 12,105 adolescents were interviewed in their homes. The respondents interviewed in 1996 during Wave II consisted of the same Wave I participants with the primary exception of adolescents who were in 12th grade during Wave I not participating in Wave II. The administration time for the interviews was one to two hours, with data recorded on laptop computers to preserve confidentiality. The interviewer read the questions and entered the respondents' answers for the less sensitive topics; whereas for the sensitive topics, respondents listened to pre-recorded questions through earphones and entered their own answers. One parent (usually the resident mother) of each adolescent interviewed in Wave I completed an interviewer-assisted questionnaire designed to tap into a variety of topics relevant to both their own lives and the lives of their adolescents.

Adolescent-report data from the Wave I and Wave II In-Home assessments and the Wave I parent data were incorporated into this study. Statistical analyses were conducted using STATA Statistical software (StataCorp, 2003) in order to effectively control for design effects. The 17 predominantly

Wave I variables examined as predictors of pregnancy resolution used in the analyses designed to test the first hypothesis fell into four general categories: demographic, education, psychological, and family and are described in Table 1. The outcome measures, which were all measured at Wave II and were employed to test for differences in psychological and behavioral outcomes based on pregnancy resolution (second hypothesis) included the following: (1) one single item dichotomous variable that asked the respondent if she had ever received counseling for psychological or emotional problems, (1) a single item measure of the frequency of sleep problems in the past year, and (3) five variables that measured the frequency of substance use behaviors over specified time periods. Details pertaining to these outcome variables are provided in Table 2.

Results

The first hypothesis predicted that adolescents who view religion as not important in their lives, have not lived in a single parent home, are more oriented to school (expect to attend college, have never been suspended, and are generally happy in school), have more educated parents, are inclined to take risks, have more outgoing personalities (assertive, independent), and feel less emotional connectivity to their families would be more inclined to choose abortion. A series of logistic regressions for survey analysis were conducted to test the hypothesized relationships. As indicated by the data presented in Tables 1 and 2 of the 17 variables examined were significantly related to reproductive outcome, providing only minimal support for this hypothesis. Specifically, adolescents who described themselves as not inclined to take risks were more than twice as likely to choose birth compared to adolescents who described themselves as risk-takers. Further, only one adolescent who reported not wanting to leave home chose abortion for every four adolescents who chose childbirth.

The second hypothesis predicted that abortion during adolescence compared to childbirth would be associated with a greater likelihood of needing counseling for psychological or emotional problems, difficulty sleeping, more frequent use of cigarettes, marijuana, and alcohol, more frequent alcohol-related problems with parents, and more frequent alcohol-related problems at school after controlling for variables related to form of pregnancy resolution (risk-taking and the desire to leave home). To test this hypothesis, comparisons from the Wave II data were made between the adolescents who aborted and delivered an unwanted pregnancy using multivariable-ordered logistic regression for survey analysis. Ordered logistic regression is the most appropriate inferential test when the criterion has more than two levels and is measured on an ordinal scale (there is a natural ordering

Table 1 Variables explored as predictors of pregnancy resolution (abortion vs. childbirth)

Variable category	Specific variables	Response Categories	Abortion group	Birth Group	Significant predictors
Demo-graphic	Importance of religion	Very//fairly imp	91.4%	90%	
	Parent’s marital status ^a	Not very imp./not imp:	8.6%	10%	
	Annual household income ^a	Married	51.8%	43.6%	
	Mother’s education	Not married	48.2%	56.4%	
	Father’s education	Under \$40,000	52.8%	63.6%	
		\$40,000 or higher	47.2%	36.4%	
		HS diploma/GED or less	53.2%	60.4%	
		Beyond HS/GED	46.8%	39.6%	
Educa-tion	Perceptions of likelihood of college	HS diploma/GED or less	57.6%	63.6%	
		Beyond high school/GED	42.2%	38.4%	
	Ever suspended	Low, fairly low	28.2%	34.9%	
		Fairly high, high	71.8%	65.1%	
	Happy at School	No	58.5%	63.1%	
		Yes	42.5%	36.9%	
Psych-ological	Prior counseling for psych. or emot. probs	Strongly agree–agree	47.7%	53.8%	
		Neither-disagree-strongly-disagree	52.3%	46.2%	
	Like to take risks ^b	No	78.1%	83.1%	OR = 2.04, <i>p</i> = .005, 95% CI: 1.25–3.33
		Yes	21.5%	16.9%	
	Independent ^b	Strongly agree–agree	66.2%	25%	
		Neither-disagree-strongly disagree	34.8%	75%	
		Strongly agree–agree	86.2%	76.2%	
		Neither-disagree–strongly disagree	13.8%	23.8%	
	Assertive ^b	Strongly agree–agree	69.2%	61.9%	
		Neither-disagree–strongly disagree	20.8%	38.1%	
Family		Strongly agree –agree	79.7%	84.5%	
		Mother is warm and loving	20.3%	15.5%	
Father is warm and loving	Neither-disagree-strongly disagree	20.3%	15.5%		
	Family pays attention to adolescent	Strongly agree-agree	68.6%	74.1%	
Family	Family understands the adolescent	Neither-disagree-strongly disagree	31.4%	25.9%	
		Adolescent would like to leave home	Not at all-very little	40%	44.4%
	Somewhat-very much	Somewhat-very much	60%	55.6%	
		Not at all-very little	72.3%	61.5%	
		Somewhat-very much	27.7%	38.5%	
		Not at all-very little	69.2%	85.2%	
	Somewhat-very much	Somewhat-very much	30.8%	14.8%	
		Not at all-very little	69.2%	85.2%	

^aExtracted from the Wave I Parent In-Home Assessment as opposed to the Adolescent In-Home Assessment.

^bExtracted from Wave II as opposed to Wave I.

among the groups, but the increments between the groups can not be assumed to be equal). Ordered logistic regression models simultaneously estimate multiple equations (number of categories of the dependent variable minus 1) and there is an assumption of parallel regression meaning that the coefficients for the variables in the equations are not expected to vary significantly if estimated separately. This renders the odds ratio of the event independent of any particular dependent variable category. A positive coefficient indicates an

increased likelihood that subjects with a high score on the independent variable will also score in a high category on the dependent variable; whereas a negative coefficient suggests an increased chance that subjects with a high score on the independent variable will fall into a lower category on the dependent variable. In this study, the abortion group was coded as “0” and the birth group was coded as “1.” Two sets of analyses were conducted. In the first set of analyses, only reproductive history served as the independent variable in

Table 2 Psychological and behavioral outcomes associated with pregnancy resolution from Wave II

Outcome variables	Significant effects using ordered logistic regression without controls	Significant effects using ordered logistic regression with controls for risk taking and desire to leave home ^a
Counseling for psychological or emotional problems (1 = no; 2 = yes)	OR: .187, $t = -2.40$, $p = .020$, 95% CI: .046–.758	OR: .194, $t = -2.28$, $p = .026$, 95% CI: .046–.820
Trouble sleeping in past 12 months (0 = never; 1 = few times; 2 = once a week; 3 = almost every day; 4 = every day)	OR: .252, $t = -3.34$, $p = .001$, 95% CI: .110–.576	OR: .268, $t = -2.64$, $p = .011$, 95% CI: .099–.727
Cigarette smoking in past 30 days (0 = none; 1 = 1–5 days; 2 = 6–10 days; 3 = 11–15 days; 4 = 16–20 days; 5 = 21–25 days; 6 = 26–30 days)	OR: .280, $t = -2.71$, $p = .009$, 95% CI: .110–.719	
Marijuana use in past 30 days (0 = none; 1 = 1–5 days; 2 = 6–10 days; 3 = 11–15 days; 4 = 16–20 days; 5 = 21–25 days; 6 = 26–30 days)	OR: .145, $t = -2.11$, $p = .043$, 95% CI: .023–.936	OR: .111, $t = -2.32$, $p = .028$, 95% CI: .016–.772
Frequency of alcohol use in past 12 months. (0 = never; 1 = 1 or 2 days; 2 = 1x per month or less; 3 = 2 or more days per month; 4 = 1 or 2 days per week; 5 = 3 or 5 days per week; 6 = everyday)	OR: .319, $t = -2.33$, $p = .023$, 95% CI: .119–.852	
Problems with parents because of alcohol use (0 = never; 1 = 1x; 2 = 2x; 3 = 3–4x; 4 = 5 or more x)	OR: .143, $t = -2.07$, $p = .043$, 95% CI: .022–.936	OR: .167, $t = -1.86$, $p = .068$, 95% CI: .024–.1.15 (only approached significance)
School problems because of alcohol use (0 = never; 1 = 1x; 2 = 2x; 3 = 3–4x; 4 = 5 or more x)		

^aIn all analyses, the abortion group was the reference group.

each test with different psychological and behavioral variables serving as the outcomes. In the second set of analyses, risk-taking and desire to leave home were entered into each equation first, followed by reproductive outcome in order to examine the effects of reproductive outcome on the same set of psychological and behavioral variables after controlling for the two variables found to be systematically related to the choice to abort vs. deliver.

The results of the analyses conducted to examine the second hypothesis are presented in Table 2 and are summarized below. First, one adolescent with a birth experience for slightly over every five adolescents with an abortion experience was inclined to have sought counseling for psychological or emotional problems. This association remained significant even after controlling for risk-taking and desire to leave home. Second, one adolescent with a birth experience for slightly under every 4 adolescents with an abortion experience reported frequent problems sleeping. This finding also remained significant when risk-taking and desire to leave home were controlled. Third, one adolescent with a birth for in excess of every six adolescents with abortion experience reported frequent marijuana use and this association actually became stronger after controlling for risk-taking and desire to leave home.

Significant associations were observed between reproductive outcome and several additional variables when the analyses were conducted without the two designated control vari-

ables. Specifically, one adolescent with a birth experience for approximately every three adolescents with an abortion experience reported frequent cigarette smoking and alcohol use. Further, one adolescent for more than every six adolescents with an abortion experience reported problems getting along with her parents based on alcohol. None of these last three relationships were observed after controls were introduced for risk-taking and desire to leave home; however, the association between reproductive outcome and alcohol-based problems with parents approached significance.

Discussion

This study was designed to pursue two objectives. First, the study was undertaken in order to identify demographic, psychological, educational, and family variables that discriminate between the options of abortion and delivery among adolescent who experience an unwanted pregnancy. Second, the study was conducted in order to compare negative psychological and behavioral outcomes associated with reproductive outcome after controlling for variables found to be significantly related to the choice to abort vs. deliver during adolescence.

Because most of the previous research pertaining to variables associated with the pregnancy resolution described earlier has tended to narrowly focus on the role of a few

demographic variables in the choice to abort, this study explored a wider range of personal and relationship variables likely to be systematically associated with reproductive outcome. Counter to expectations, none of the demographic or education variables and few of the psychological and family closeness variables were related to the choice to abort. Surprisingly, only 2 out of the 17 variables examined were identified as significant predictors of reproductive outcome. Self-assessments of one personality variable, risk-taking, and the desire to leave home were the only variables found to be significantly related to reproductive choice, with low risk-taking and no desire to leave home associated with a higher probability of opting for childbirth. The large number of nonsignificant predictors in this study contradicts previously cited research and could be due to the fact that unlike the earlier work, this study focused exclusively on unwanted pregnancies and there may simply be more similarities than differences among adolescences choosing to abort and deliver an unwanted pregnancy. Or the results could be a function of the small sample size.

Arriving at a decision regarding whether or not to continue an unwanted pregnancy is difficult at any age and is obviously complexly intertwined with other aspects of women's lives. However, during adolescence the decision difficulty is likely to be exacerbated by challenges introduced by limited experience, current developmental limitations and challenges, and by pressures exerted by others. Unfortunately this study, like most of the existing post-abortion research, used predominantly self-report data and research on this topic may benefit from use of different methodological approaches that are sensitive to the inherent complexity of the topic. With every unwanted pregnancy representing a unique situation defined by the adolescent's personal history, personality characteristics, belief system, relationships, financial situation, and future plans, qualitative studies might help to more effectively illuminate the central predictors of reproductive outcomes. Qualitative studies can be designed to delve deeply into women's thoughts and feelings pertaining to personal, relationship, and contextual factors that influenced their decision. In this study, the predictor variables were assessed separately and it is possible that the individual variables interacted in complex ways to lead to the choice to abort or deliver. Qualitative studies would offer insight regarding possible interactions among various factors. In addition to the need for qualitative studies, more research incorporating information from other sources is needed. Data gathered from a number of significant individuals in women's lives (e.g., partners, peers, and family members) and/or behavioral assessments (possibly from counselors and other abortion provider personnel or conducted by researchers) should likewise enhance efforts to understand who opts for abortion and why. Only limited parent-report data were used in the present study.

The second segment of this study dealt with comparisons between adolescents who aborted and delivered an unwanted pregnancy. After controlling for risk-taking and desire to leave home, childbirth was associated with a lower likelihood of receiving psychological counseling services, less frequent sleep problems, and a lower probability of smoking marijuana when compared to abortion. These results are significant because there has been a tendency in the published literature to dismiss associations between abortion and mental health problems by attributing both the decision to abort and subsequent psychological difficulties to unmeasured third variables such as a propensity for engaging in risk-taking activities (e.g., Major, 2003). As more longitudinal research is conducted using controls for additional plausible third variables, an answer to the causality issue will be more readily ascertained. Interestingly, having received psychological counseling prior to pregnancy did not predict the decision to abort vs. deliver, but the variable assessed one year later was found to be related to pregnancy resolution. These findings provide some support for the notion of a direct causal link between abortion and mental health.

Although a number of studies cited previously have identified associations between abortion experience and a variety of mental health problems, only a handful of studies have identified a link between abortion and sleep problems (Barnard, 1990) and marijuana use (Coleman *et al.*, 2002a; Coleman *et al.*, in press; Reardon *et al.*, 2004). A minority of women who undergo an abortion experience it as a trauma, which may give rise to symptoms of post-traumatic stress disorder (Major *et al.*, 2000) and sleep disorders are a common complaint associated with PTSD. However, more research is needed to examine other, less serious explanations for the association between abortion and sleep problems. For example, women who have had an abortion may be more prone to nightmares than women who have carried to term due to negative experiences during the procedure or unresolved feelings about the abortion, which may not have been dealt with effectively during the day and could intrude upon sleep. The association between abortion and use of marijuana makes sense, because the mind-altering properties of marijuana use render it a logical choice for self-medication among adolescents who may have experienced unpleasant emotions associated with an abortion. However, it is also possible that this relationship is not causal, but is instead due to a third variable that was not measured in this study or in other studies that have detected a similar association. For example, possession of liberal political views represents a logical third variable that could be responsible for the observed statistical relationship between abortion and marijuana use. A similar scenario is possible with the associations detected between abortion and both sleep problems and having received psychological counseling services. For example, partner violence could very well cause women to

choose abortion and partner violence could also logically lead to both sleep difficulties and mental health problems. More research controlling for additional potential third variables is needed.

The strengths of this study include a longitudinal design, the use of data from a carefully selected, nationally representative sample of adolescents, and the use of controls for potentially confounding factors related to the choice to abort vs. deliver as behavioral and psychological outcomes associated with pregnancy resolution were explored. Unfortunately, however, the data were derived primarily through the use of self-report measures and future research should incorporate more information from significant individuals in adolescents' lives as well as behavioral assessments. Another limitation of this study is the relatively brief follow-up period, which renders it difficult to see the range of outcomes that may transpire over time related to childbirth and abortion experiences. Assessments over a longer time interval would have the added benefit of reducing confounding due to family, social, and relationship strife that may simply result from the experience of an unintended pregnancy and the process of decision-making. In addition, data pertaining to reproductive events occurring prior to the target assessment period were not available; therefore it is possible that girls who resolved their pregnancy by giving birth had a prior abortion and those who were in the abortion group may have previously given birth.

A final limitation of this study, which is typical of most post-abortion research, is that the abortion concealment rate tends to be quite high. Jones and Forrest (1992) estimated it to be approximately 60% in a nationally representative sample. Because women who conceal an abortion when compared to those who do not are more likely to suppress thoughts of the abortion, experience intrusive abortion-related cognitions, and feel psychological distress (Major and Gramzow, 1999), the incidence of negative consequences should be lower among women who do not conceal their abortion. With accurate abortion histories, the results detected may have been more pronounced.

Hundreds of thousands of adolescents who experience an unwanted pregnancy in the U.S. each year must decide between two potentially rather stressful alternatives (AGI, 1999; Henshaw, 1998). However, this study is one of only a handful of relative risk studies that have been conducted to examine correlates of pregnancy resolution through abortion vs. childbirth. Limitations of the design obviously preclude definitive assumptions regarding causality from the relationships observed. Nevertheless, the correlational evidence indicates that unwanted pregnancy resolved through abortion, when compared to carrying to term, may be associated with a higher frequency of negative psychological and behavioral outcomes. This information should provide an impetus for researchers to conduct higher constraint research in order to

derive information that will enable professionals to offer sensible advice to adolescents facing an unwanted pregnancy.

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