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Education and Unintended Pregnancies in Australia: Do Differences in Relationship Status and Age at Birth Explain the Education Gradient?

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Abstract

We investigated the extent to which relationship status and age at birth explain the education gradient in whether a woman's pregnancy leading to her most recent birth was intended or not. Our data came from wave 5 (2005) of the Household Income and Labour Dynamics in Australia survey (HILDA) (n = 1,751). We found an education gradient in intended births, where less educated women were more likely to report an unintended most recent birth. Part of this was explained by the fact that less educated women were younger when they give birth and less likely to be married—characteristics predictive of unplanned births. To better understand education differences in having unintended births further research needs to focus on the role played by education differences in abortion and contraceptive behaviour.

Keywords

Fertility, fertility intentions, education, opportunity costs, marital status, age at birth

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Overview

It is well-known that in Australia and other developed countries less educated women have higher fertility than more educated women (Carmichael and McDonald 2003; Parr 2007; Tesfaghorghis 2004; Yang and Morgan 2003). A recent US study shows that this is largely due to women with lower levels of education having higher levels of unintended fertility (Musick, England, Edgington, and Kangas 2009). Research from the U.S. indicates that a much higher proportion of less educated women have unintended pregnancies than more highly educated women and that approximately half of all pregnancies may be unintended; but we know little about these patterns in other countries (Finer and Henshaw 2006). Given that unintended births have potentially serious consequences for the lives of the women and children involved and may also place stress on social and health services it is important that we better understand the association between education and unintended pregnancies (Barber, Axinn, and Thornton 1999; Bayder 1995; Brown and Eisenberg 1995).

Most explanations for the education gradient in fertility rely on an opportunity costs framework (Hotz, Klerman, and Willis 1997; Pollack and Watkins 1993). From this perspective more highly educated women have fewer children than women with lower education because they can earn more, and thus would forego more income if they cut back on paid work after the birth of a child. If we apply this framework to pregnancy intentions we would expect that more educated women would have more intended than unintended pregnancies compared to less educated women. But we might also expect they would have fewer intended and unintended pregnancies overall. Recent evidence provides limited support for this expectation. The findings of Musick et al. (2009) indicated that in the US higher educated women have more intended births than less educated women, both in absolute numbers and as a proportion of their births. Compared to women with low levels of education, more educated women have fewer births, mostly due to the higher unintended births of low educated women. But challenging the opportunity cost framework, they report that before starting family-building, more educated women aspired to have the same number of children, at the average or median, as less educated women.

In this paper we investigate the extent to which two particular factors, age and relationship status at pregnancy leading to most recent birth, may account for education differences in intended versus unintended births in Australia. While the interpretation of our models is open to theoretical debate, we suggest an interpretation in which these factors are important for reasons other than opportunity costs. We use recent data from Australia to examine education differences in whether the pregnancy leading to an individuals' most recent birth was intended or unintended and the extent to which relationship status and age at most recent birth explain this association.

Education and intended versus unintended pregnancies

Opportunity costs

An opportunity costs framework has been used by many researchers to explain why more educated women have fewer births than less educated women (Hotz, Klerman, and Willis 1997; McDonald 2000b; Pollack and Watkins 1993). This perspective assumes that women decide between alternative uses of their time in childrearing or market work. The higher a woman's potential wage the higher the opportunity cost of having a first or higher order birth, because most women either stop paid work for a period of time or at least reduce their paid work hours for child

rearing (Craig 2006; Gjerdingen and Center 2005; Nomaguchi and Milkie 2003). Although women with higher wages may better afford child care than their lower earning counterparts—thereby reducing the opportunity costs of having children—Australian research indicates that even though higher educated women return to work sooner after the birth of a child than their less educated counterparts, they still reduce paid work hours and perform the majority of childcare relative to fathers (Baxter 2005; Craig 2007). Therefore, we expect that women with higher potential wages will have fewer children because the loss of earnings due to time out of the labour force and/or reduced working hours is greater for those with higher earnings potential.

Of course, well educated women typically marry better educated husbands (Schwartz and Mare 2005). From an economic point of view, men's income increases fertility just as it increases the purchase of many consumer durables; it makes having children more affordable (Becker 1960). In theory, either men's or women's earning power could have a negative opportunity cost effect (present for men only if they give up some employment for child rearing) or a positive "income effect" on fertility (Macunovich 1996). However, to the extent that women do most of the child rearing work that involves a reduction of market labor supply, the income effect of men's and the opportunity cost effect of women's earnings are expected to dominate.

McDonald's (McDonald 2000a; McDonald 2000b) theory of gender equity and fertility transitions also relies on an opportunity cost framework. He posits that when the gains made by women in individual-oriented institutions, such as market employment and formal education, are not matched by similar levels of gender equity in family-oriented institutions, fertility will fall to very low levels (McDonald 2000a: 437). During the twentieth century a revolution occurred in gender equity in individual-oriented institutions in advanced countries, but change in gender equity within the institution of the family has been much slower. McDonald argues that this results in low levels of fertility because women in advanced countries have more opportunities to lose from having children, or having large numbers of children, because typically men contribute only a small share of child rearing. Women therefore decide to have fewer children.

Despite the dominance of the opportunity cost perspective, there is surprisingly little direct empirical evidence to support it. Schultz (1994) using 1980 U.S. Census data showed that women's predicted wage (based on education, demographic, and state policy variables) had a negative association with number of children. An earlier time series analysis for 1948-1975 showed that net effects of U.S. women's average wages on fertility were negative, an effect that was stronger when the female employment rate was higher, while men's average wages had a net positive effect on fertility (Butz and Ward 1979). Using a similar method with data from 1964-1994, Macunovich (1996) found a negative effect of U.S. average female wage on fertility for older cohorts, but the effect turned positive in more recent years. She concludes that income effects (the idea that you have more children if you have higher income because you can afford them) may now dominate the opportunity cost (price of time) effects of women's earnings.

In Australia, a recent study investigated the foregone life time earnings of women who have children relative to those who remain childless (Breusch and Gray 2004). The findings of that study provided mixed support for the opportunity costs argument. The study suggests that, while more educated women forego a greater dollar amount in life time earnings when they have children, the amount is proportionately smaller than it is for less educated women (Breusch and Gray 2004). For example, women with a bachelor degree who had one child retained 72% of their life time earnings relative to having no children, but women with only a high school diploma

retained 69%, and women without a high school diploma retained 60%. This indicates that, relative to women who remain childless, more educated women who have children face greater opportunity costs in foregone earnings in total dollar amounts lost, but they lose a smaller proportion of their total life time earnings than less educated women who have children.

An opportunity costs framework also has limited capacity to accurately predict educational differences when we consider intended and unintended pregnancies. For example, we might expect that among more educated women, opportunity costs would decrease unintended as well as intended pregnancies because the amount of earnings foregone for any time out of employment for child rearing is on average higher for educated women, regardless of birth intention. Musick et al. (2009) found an elevated hazard of intended fertility (relative to no birth) among women with more education and higher wages, the opposite of what the perspective would predict. They also showed that women with low education did not start out with higher fertility aspirations than women with high education. Rather, women of all educational levels wanted two children at the median. We argue, therefore, that there may be alternative explanations involving educational differences in partnering and the timing of births.

Education, relationship status and age at birth

Relationship formation and dissolution patterns differ across education groups. These differences in relationship patterns have implications for intended and unintended births because previous research finds that married women are more likely to have intended pregnancies than single or cohabiting women (Wilson and Koo 2006). Overall, there is a retreat from marriage for women of all education groups, although this retreat is more advanced amongst those with less education (Heard 2008). For the better educated the trends suggest a delay in marriage rather than an avoidance of marriage altogether (Goldstein and Kenney 2001; Heard 2008). Even though the stigma of having a nonmarital birth has declined and in some countries cohabiting relationships may be considered more suitable for having children than singlehood (Kiernan 2002), the majority of intended births occur within marriage (Wilson and Koo 2006). Furthermore, U.S. research indicates that women with less education have higher divorce rates (Martin 2006). Together this body of evidence suggests that women with lower education spend less time in marital unions. And since most intended births occur within marriage, they also spend more time exposed to a higher 'risk' of an unintended pregnancy. We would, therefore, expect more unintended pregnancies among the less educated because more educated women are more likely to be in a stable marital union.

In Australia and other developed countries, there is a general trend towards having children at older ages (Carmichael and McDonald 2003; Rindfuss, Morgan, and Offutt 1996). However, the increase in age at birth is not equally distributed among all educational groups. Highly educated women in both Australia and the U.S. have their children later on average than those with lower levels of education (Carmichael and McDonald 2003; Martin 2006). This may also have implications for whether or not a pregnancy is planned. Prior research suggests that younger mothers, particularly those aged under 24, have a higher than average rate of unintended births (Finer and Henshaw 2006). We would therefore expect that more highly educated women would delay pregnancy longer than less educated women leading to more planned pregnancies in older age groups than younger age groups.

It should be noted that underpinning all of these explanations for the education gradient in intended and unintended births are education differences in access to and effective use of contraception or abortion (Rainwater 1960; Silverman, Torres, and Forrest 1987). The most proximate determinant of whether a woman has an unintended pregnancy is effective use of contraception. It is possible that more educated women exercise greater control over whether they have children, or the number of children born, because they have the resources to obtain effective contraception and have more incentive to be vigilant with contraception. Further, once an unintended conception has occurred, that pregnancy is not necessarily carried through to full term. Australian evidence on teenage pregnancy suggested that girls with higher attachment to school were more likely to terminate their pregnancies (Evans 2004). Even though this evidence is for teenage pregnancies, it does provides some indication that there may be an education gradient to abortion in Australia, where women with more education are more likely to terminate than continue with an unintended pregnancy. While these are possible alternative explanations to the education gradient in pregnancy, consideration of these factors is outside the scope of this study. In this paper we investigate the relationship between education and intended versus unintended births and the extent to which relationship status and age at most recent birth explain education differences in fertility intentions. As explained below, we divide unintended births into mistimed and unwanted.

Data description and modelling approach

Data source and analytic sample

The data come from wave 5 of the Household, Income and Labour Dynamics in Australia (HILDA) survey. Wave 1 was collected in 2001 comprising 7,682 households and 13,969 individuals (Watson and Wooden 2002). Households were selected using a multi-stage sampling approach, and a 66% household response rate was achieved. Within households, data were collected from each person aged over 15 years (where available) using face-to-face interviews and self-completed questionnaires and 92% of in range individuals within households were surveyed (Melbourne Institute of Applied Economic and Social Research 2007). Respondents were re-interviewed on an annual basis, but we are restricted to using wave 5 of the survey, collected in 2005, as the special module for the United Nations fertility study *Generations and Gender Survey* used in the current analysis was only included in that wave (although information from previous waves was used to construct some of the measures). This module collected detailed information from female respondents aged 18 to 44 about their most recent pregnancy regardless of whether the pregnancy occurred during or before the survey. The response rate for wave 5 was 94.4% of wave 4 respondents[1]. Our final analytic sample comprised 1,751 women.

[1] Wave 2 was collected in 2002 with a response rate of 86.8% for individuals from wave 1, and wave 3 was collected in 2003 with a response rate of 90.4% for individuals from wave 2. Wave 4 was collected in 2004 with a response rate of 91.6% of wave 3 respondents, and wave 5 was collected in 2005 with a response rate of 94.4% of wave 4 respondents. This is the most conservative response rate, including persons who died and who moved out of scope of the survey (i.e. moved overseas). For more detailed information on the longitudinal response rates for the HILDA survey please refer to: Watson, N. and M. Wooden. 2006. "Modelling Longitudinal Survey Response: The Experience of the HILDA Survey." The University of Melbourne, Melbourne.

Measure of intended and unintended pregnancy

The dependent variable indicated whether the respondents' most recent pregnancy leading to a birth was intended or unintended. For unintended pregnancies we further differentiated between mistimed and unwanted pregnancies. While we acknowledge it would be preferable to use all births during the panel and to perform an event history analysis predicting intended and unintended births relative to no birth, this approach is not possible with the data available in HILDA. The questions in relation to intended fertility in HILDA were not asked in every wave of the panel and were only asked in relation to the most recent pregnancy.

Our dependent measure indicated the "intendedness" of the pregnancy leading to a woman's most recent birth and is coded, 1 = Intended, 2 = Unintended – mistimed, and 3 = Unintended - unwanted. This measure was derived from two questions in wave 5 of the HILDA survey. The first question asked respondents to "*Think now about the time just before your most recent pregnancy began. Did you yourself want to have a/another baby sometime in the future?*" Fixed responses were "yes", "no", and "not sure".[2] Those who answered "no" were coded 3 = Unintended – unwanted, indicating that they had a child despite the fact they had concluded they wanted no more. Those who answered "yes" or "not sure" we asked a second question: "*Did the pregnancy occur sooner than you wanted, later than you wanted, or at about the right time?*" Response categories included "sooner than wanted", "later than wanted", or "about the right time". We coded a pregnancy as 2 = Unintended – mistimed, if the woman did want another child sometime, but the pregnancy came earlier than wanted. That is she did not intend to get pregnant at the time (possibly not even with this partner) although she may have wanted a child or another child someday. We coded a pregnancy as 1 = Intended if the pregnancy was wanted and came either about the right time or later than wanted. Using this measure we found that 65% of pregnancies leading to a woman's most recent birth were intended, that 18% were unintended – mistimed and 17% were unintended – unwanted (see Table 1). We were unable to find a previous Australian study examining unintended compared to intended births, but these figures are similar to those found by Musick et al (2009).

Similar measures of unintended pregnancy have been used in numerous fertility surveys over many decades (Campbell and Mosher 2000), however over the last decade or so considerable debate has emerged about the accuracy of such measurements of unwanted fertility and what they actually indicate (Casterline and El-Zeini 2007; Klerman 2000; Santelli, Lindberg, Orr, Finer, and Speizer 2009). The core problem with the measure above is that the questions are asked of women retrospectively to capture fertility preferences at the time of conception and it is likely that many women will change their opinion from conception, pregnancy and birth (Klerman 2000). Research indicates that a common source of bias is that women are reluctant to report a birth as "unwanted" as typically women are living with those children at the time of the survey (Casterline and El-Zeini 2007). Another issue that is perhaps more easily dealt with is the need to be clear about what the measure indicates, whether it is a preference or a behaviour (Klerman 2000). Given that the foundation questions for our measure of unintended births refer to the extent that a pregnancy was wanted or not, our measure indicated a preference as opposed to a

[2] There was another category in this variable for adopted children; we dropped these from the analysis.

behaviour, such as using contraception (Santelli et al. 2009). The implications of these measurement issues for our results are raised in the discussion.

Independent variables and controls

Education. Our primary independent variable was education, indicating the highest level of education achieved before the most recent pregnancy. To avoid endogeneity of education to pregnancy we lagged education to 2 years prior to the most recent birth, so the measure indicates completed education the year prior to the woman's most recent pregnancy. The categories are: 1 = less than high school; 2 = trade qualifications (which incorporates some persons who did not complete high school but went on to trade school); 3 = completed high school; and 4 = university graduate. It is worth noting that the trade qualifications category is often a vocational or working class choice for those who do not complete 12 years of high school. It is somewhat distinctive to the Australian system, and its rank order vis-a-vis those who finished high school is ambiguous. In our analysis, we included it in a category lower than "completed high school" as preliminary analysis indicated that respondents in this category have fertility intentions similar to the individuals who have "less than high school" levels of education.

Relationship status**.** To avoid endogeneity of relationship status to fertility our measure indicated relationship status one year prior to the most recent birth; this measure therefore indicated relationship status the year prior to the woman's most recent birth, which is also likely to be the year the woman became pregnant. All individuals were coded as either 1 = married, 2 = cohabiting, or 3 = single (neither married nor cohabiting). This data is obtained retrospectively from a detailed relationship history grid for births prior to 2003, and for births after 2003 longitudinal data is available.

Age at most recent birth**.** Age at most recent birth was a continuous measure. In results not shown we experimented with adding the square and cube of age at most recent birth. The cube was never significant, but age squared was significant so we included that term in the models. Irrespective of whether age was added as a linear or squared term it consistently affected the magnitude of the education coefficients of interest.

Controls**.** We included controls for year of most recent birth, parity at most recent birth and ethnic background. Year of most recent birth is a continuous measure. Parity is the number of children in the year prior to the most recent birth and we differentiated between women with: 1 = none; 2 = one; 3 = two; and 4 = three or more children, because opportunity costs are likely to be higher for the first birth, and, in any event parity should affect whether a woman wants more children. Ethnicity is coded 1 = Australian born, 2 = Immigrant from English speaking country, and 3 = Immigrant from non-English speaking country. Australian born was the reference category. Table 1 provides descriptive statistics for all variables.

Table 1: Means (Percentages for Categorical) and Standard Deviations[a] of Variables in Models

	Mean / %	SD
Pregnancy Intentions:		
Intended	65	
Unintended (total):	35	
Mistimed	*18*	
Unwanted	*17*	
Education (lagged 2 years before most recent birth)		
Less than high school	31	
Trade qualification	18	
Completed high school	17	
University degree	34	
Relationship status at most recent birth (lagged 1 year)		
Single	29	
Cohabiting	11	
Married	60	
Age at most recent birth	29.44	5.2
Age at most recent birth (squared)	893.78	300.1
Year of most recent birth	1999.00	2.5
Number of children prior to most recent pregnancy:		
None	23	
One	43	
Two	22	
Three or more	12	
Ethnic background:		
Australian	80	
Overseas born – English speaking	07	
Overseas born – non-English speaking	13	
N	1,751	

[a] standard deviations only reported for continuous measures

Analytic approach

Given that the dependent variable had three outcomes we use a multinomial logistic regression predicting whether the most recent pregnancy that ended in a birth was 1 = intended (the reference), 2 = unintended - mistimed, or 3 = unintended - unwanted. We estimated three models. We were interested in whether having less education elevates the odds of either type of unintended birth (relative to intended). Therefore the first model was a baseline model with education and the controls for year of birth, ethnicity, and parity. We were also interested in examining whether this association was attenuated when we controlled for marital status and age at most recent birth. In the second model we added relationship status to investigate the extent to which being in a relationship (or not) explained the association between education and intendedness of the most recent birth. In the third model we included age and age squared at most recent birth to the second model to assess whether and to what extent age at birth moderated the association between education and intendedness of the most recent birth.

The education gradient in intended versus unintended births

Table 2 shows bivariate descriptive statistics on whether the most recent pregnancy was intended or unintended by educational level. The table shows that a much higher proportion of women who were university graduates reported that their most recent pregnancy was intended than those with trade qualifications or less than Year 12 of schooling. Women who had completed high school were in the middle. This patterning is reversed for unintended pregnancies, both mistimed and unwanted, with the largest education differences for unwanted pregnancies. For women with less than high school level of education and with trade qualifications, just over 23% reported that their most recent pregnancy was unwanted, in contrast to only 13.6% of high school graduates and 9.7% of university graduates reported the same.

Table 2: Percent of women with intended and unintended pregnancies in each educational group (column %)

	Less than high school	Trade qualifications	Completed high school	University graduate
Intended	56.3	56.8	68.0	74.5
Unintended (total):	43.7	43.1	32.0	25.5
Mistimed	*20.1*	*19.9*	*18.7*	*15.9*
Unwanted	*23.6*	*23.2*	*13.3*	*9.7*
N	552	306	294	599
Pearson Chi2(6)	63.68***			

Table 3 (see Appendix 1) shows the results of the multinomial logistic regression models predicting whether their most recent pregnancy was unintended-mistimed, or unintended-unwanted, compared to intended. The results are presented as risk ratios, where a value greater than one indicates a multiplicative increase in the risk of reporting an unintended- mistimed or -unwanted pregnancy and a value less than one indicates a multiplicative decrease in the risk of reporting an unintended-mistimed or -unwanted pregnancy relative to an intended pregnancy. The results for unintended mistimed pregnancies (henceforth mistimed) are presented in the first three columns. Model 1, with the controls indicates that relative to an intended pregnancy, women with a university degree or higher qualification were significantly less likely to report a mistimed pregnancy than women with less than high school. In Model 2, the addition of relationship status reduced the difference between university educated women and those with no high school by half and the association became nonsignificant. The results for relationship status indicated that women who were cohabiting or single were significantly more likely to report a mistimed pregnancy than married women, and the magnitude of the association was much greater for single women. In Model 3, with the addition of age at most recent birth the risk ratios were all around 1, indicating no differences between the groups. Age at most recent birth was significantly associated with a mistimed pregnancy, where a younger age at most recent birth increased the likelihood of reporting a mistimed pregnancy. The coefficient for age squared was not significant. The inclusion of these measures also attenuated the association between relationship status and reporting a mistimed pregnancy, particularly the effect of being single; thus, apparently some—but not all—of the tendency of single women not to intend pregnancies was simply because they are more likely to be younger. Thus union status and age at most recent birth fully accounted for the lower risk of women with a university degree or higher qualification reporting a mistimed (relative to intended) birth than women who had not completed high school.

The last three columns of Table 3 contain the results for unintended-unwanted pregnancies (henceforth unwanted). In Model 1, women with completed high school and university degree level of education had a significantly lower risk of reporting an unwanted pregnancy than women with less than high school. While the magnitude of this association was reduced with the inclusion of relationship status in Model 2, the differences between the education groups remained significant. In contrast to the results for mistimed births, cohabiting women were not significantly more likely to report an unwanted birth compared to married women. Only single women were significantly more likely to report an unwanted birth relative to married women. The results of Model 3 indicated that the magnitude of the association between education and unwanted pregnancy was further reduced by the inclusion of age and age squared at most recent birth into the models, but education remained significant. Similar to the results for mistimed pregnancy, younger women were more likely to report their most recent birth was unwanted and this association was stronger than for mistimed. Overall, while relationship status and age at most recent birth entirely explained the education gradient in mistimed births, they only partially account for the educational gradient in unwanted births for Australian women.

Some of the other controls in the models also showed some interesting results. In particular the number of children a woman had the year prior to her most recent birth decreased the likelihood of reporting a mistimed pregnancy leading to the most recent birth, but increased the likelihood of reporting an unwanted birth relative to an intended birth. The more children a woman had the greater the likelihood of reporting that the pregnancy leading to the most recent birth was unwanted, which we would expect if women have a target number of children they want or find they can manage. A second interesting trend was that women from non-English speaking

backgrounds were consistently more likely to report that their pregnancy leading to their most recent birth was unwanted.

Discussion and conclusion

Over the last several decades with the increase in the level of education of women we have concurrently witnessed an overall decline in fertility and an increase in age at marriage and age at birth (McDonald 2000a; Rindfuss, Morgan, and Offutt 1996). In this paper we investigated the extent to which these three inter-related factors are associated with education differences in intended and unintended pregnancies. We found an education gradient in women's reports of intended and unintended pregnancies where less educated women were more likely to have an unintended pregnancy, either mistimed or unwanted, although this gradient was much stronger for unwanted pregnancies. We do not believe that education is endogenous to the births, as education is measured in the year preceding pregnancy. Relationship status and age at most recent birth attenuated the education gradient of reporting that the pregnancy leading to that birth was unintended (both mistimed and unwanted) relative to intended births for Australian women.

The strength of the association between education and unintended (versus intended) births weakened with the inclusion of relationship status in the models, indicating that one factor contributing to the higher unintended births amongst less educated women was that they are less likely to be married. The analysis showed that cohabiting and single women were more likely to report a mistimed pregnancy than married women. Women who are cohabiting were not significantly more likely than married women to report their most recent pregnancy was unwanted. This may indicate that cohabitation is seen as an acceptable venue for childbearing in Australia, although there is obviously some ambivalence about this given that for mistimed births there were no significant differences between those who were cohabiting compared to single. Nevertheless, only a small proportion of most recent pregnancies (11%) occurred within cohabiting unions (see Table 1). Therefore, the main way that union status mediated the education relationship with birth intentions was through the less educated being less likely to marry or stay married, combined with the births of unmarried women being more likely to be unintended. We found that marital status differences between high and low educated women, where less educated women are less likely to be married, explained about half the differences in intended versus unintended births.

Age was significantly associated with both mistimed and unwanted pregnancies and younger women were much more likely to have births that they believed came at the wrong time. In our sample less educated women also had a lower age for most recent birth. In the models, after controlling for union status, age at birth "explains" all of the remaining education differences in unintended-mistimed versus intended births. Our interpretation of this is not that increasing age "causes" births to become more intended, but that education effects the propensity to have unintended births, which in turn results in earlier births.

Overall, we demonstrated that education decreased unintended births because the more educated were more likely to be married, and because it decreased the propensity to have unintended pregnancies—a propensity which led to births at early ages. But this simply returns us to the question of why having more education reduces the odds of an unintended pregnancy. Perhaps, as economists have argued, this reflects differences in opportunity costs for the less educated. But we think other explanations may also account for some of the differences. Arguably, the most

proximate cause of an unintended pregnancy or birth is not using contraception while in a sexual union. A recent Australian study by Gray and McDonald (2010) finds that a lower proportion of women with less than Year 12 education were using contraceptives compared to highly educated women. But why are contraceptives less consistently used among the less educated, even in situations that they deem unsuitable for childbearing? It is possible that unintended pregnancies are higher among the poor and less educated because they do not know about, or cannot afford or access, contraception or abortion. But this seems implausible in Australia, where contraception, including the contraceptive pill, is cheaply available through universal health care. In fact, even in the US, where health care is not provided by the state except to the elderly and the very poor, the evidence suggests that contraception is generally affordable. For example, Silverman, et al. (1987) using a survey of low income, fertile, sexually active women in the U.S. found about a quarter of those not wanting to get pregnant were not contracepting, but only a small proportion indicated that this was due to an inability to access services. In a recent qualitative study unmarried low-income parents were asked if they had ever wanted to use birth control but been unable to afford it; none of those with unintended pregnancies said "yes" (Edin, England, Shafer, and Reed 2007). These studies suggest that access to contraception is unlikely to be a large factor contributing to higher levels of unintended births for women with lower levels of education.

Alternatively, there may be educational differences in abortion. In Australia, while abortion is illegal in most States, about a quarter of pregnancies are aborted, and it is one of the most commonly performed medical procedures (Crespigny and Savalescu 2004). While on the one hand this suggests that access to abortion may not discriminate between education groups, on the other hand research on teenage pregnancies does indicate an education gradient of abortion may exist in Australia. Evans (2004) found that girls with higher attachment to school were more likely to terminate a pregnancy. If the same patterns were found for adult pregnancies, this could explain some of the education gradient we found because unwanted pregnancies for more highly educated women may be more likely to be terminated and thus not result in a birth. A key limitation of our study is that the question in relation to the most recent pregnancy did not incorporate pregnancies that were terminated. We, therefore, cannot ascertain the extent to which more or less educated women aborted their unwanted pregnancies which is likely to put downward pressure on the overall numbers of unwanted pregnancies leading to most recent births reported in this study.

Another possible explanation for educational disparities in unintended pregnancies is that individuals with higher levels of education may be more likely to develop the skills and habits of organizing their behavior into sequences of action that further their long-term goals, even when the behavior is onerous in the short run. Rainwater (1960), using qualitative interviews conducted in the 1950s (before the introduction of the contraceptive pill), found that large portions of working class and poor couples ended up with more children than they wanted and found that SES predicted consistency in the use of contraceptives other than the pill. Somewhat speculatively, Rainwater argued that the lower one's social class, the less life teaches one a sense that the future can be trusted and the less one develops the sense of efficacy needed to affect one's future. Although their study did not deal with contraceptive behaviour, this is consistent with Ross and Mirowsky's (2003) findings that education differentials in health-promoting behaviours (e.g., exercising and not smoking) contribute to class differentials in health. Perhaps education differentials in unplanned pregnancies arise from class differences in ability to self regulate and be consistent with contraception.

Finally, our results should be viewed with some circumspection. As indicated in the methods section, there may be a response bias built into the dependent variable or whether or not the pregnancy leading to the most recent birth was intended or unintended, because of the retrospective nature of questions. It has been found in previous studies that women are less inclined to report a past birth as unwanted, particularly if they are living with that child (Klerman 2000; Santelli et al. 2009). This measurement slippage has no implications for our results if we can safely assume that there is no difference in the reporting bias between women of different education levels. However, if, for example, women who are more highly educated are more affected by social desirability bias, and thus more apt to report that their child was wanted – even though at the time of pregnancy it may have been unwanted—this reporting bias may account for any observed education gradient in unwanted births. Unfortunately, we have no way of evaluating whether or not any such bias exists.

In sum, while we find that union status and age at most recent birth are important contributors to the education gradient in intended and unintended pregnancy, they do not explain all of the differences (with the exception of mistimed births). Our interpretation of the findings can be summarized by two points. First, education affects marriage and age at birth, and thereby whether women are in situations conducive to intended pregnancies. Second, education is also associated with consistency of contraception after sexual debut, which in turn affects whether pregnancies occur at times when women had not intended to have children. This leads back to the question of why education affects whether individuals who do not want a child at present contracept consistently or not. This is the question that is central to the development of effective policy on the issue and is one which still requires further research.

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Appendix 1.

Table 3: Relative Risk Ratios from Multinomial Logistic Regressions predicting Unintended-mistimed or -unwanted pregnancy (relative to intended) leading to Most Recent Birth

	Unintended – Mistimed			Unintended – Unwanted		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Key independent variables:						
Education (lagged 2 years before most recent birth)						
Less than high school (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Trade qualification	1.00	1.04	1.04	1.09	1.12	1.15
Completed high school	0.76	0.88	0.96	0.48**	0.54**	0.57**
University degree	0.60**	0.78	1.08	0.35***	0.41***	0.47***
Relationship status at most recent birth (lagged 1 year)						
Married (ref)		1.00	1.00		1.00	1.00
Cohabiting		2.58***	2.00***		1.17	1.02
Single		4.38***	2.90***		3.32***	2.64***
Age at most recent birth			0.74*			0.69**
Age at most recent birth (squared)			1.00			1.01
Controls:						
Year of most recent birth	1.00	1.01	1.03*	0.99	1.00	1.01
Number of children:						
None (ref)	1.00	1.00	1.00	1.00	1.00	1.00
One	0.47***	0.68*	0.86	0.91	1.19	1.40
Two	0.47***	0.75	1.11	1.64*	2.28***	2.91***
Three or more	0.62*	0.94	1.56	3.14***	4.28***	5.65***
Ethnic background:						
Australian (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Overseas born – English speaking	0.57	0.57	0.68	0.95	0.91	0.97
Overseas born – non-English speaking	0.82	0.95	1.06	2.14***	2.35***	2.45***
N	322	322	322	298	298	298

*p<.05, **p<.01, ***p<.001