# Does the Wantedness of a Pregnancy Predict a Child's Educational Attainment?

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*An analysis of the educational attainment of more than 10,000 members of the 1966 cohort of births in Northern Finland found that 25% of the young men born following an unwanted pregnancy failed to attain any more education than the nine years of compulsory schooling, compared with 18% of those born as a result of a mistimed pregnancy and 14% from a wanted one. The comparable proportions for women in the cohort were 19%, 13% and 9%, respectively. A binary regression analysis that controlled for family background variables indicates that unwantedness increased the risk that men would not go on to upper secondary school by 6.0 percentage points and that women would not by 6.3 percentage points. The statistical interaction between large family size and unwantedness showed an increased risk of low educational attainment among the young men; neither large family size nor other family background variables could explain the association between unwantedness at birth and comparatively little schooling among the women.*

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A family's social and economic resources are known to be major predictors of a child's educational attainment, with the most influential factors being the father's education and occupation, and family size.[1] The latter is negatively associated with level of schooling—the greater the number of siblings, the lower the number of years of schooling each sibling receives.[2] According to Blau and Duncan,[3] the educational benefits of a small family are not realized unless that family encourages education; a positive orientation toward education induces parents and children to act on their educational goals and draw on potential resources, which are usually greater in smaller families.

Unwanted pregnancy is associated with less favorable socioeconomic conditions,[4] and the more children a couple have to share scarce resources, the more likely they are to experience an unwanted pregnancy.[5] The experience of being an unwanted child can affect the child's development. Most evidence from studies conducted in Eastern Europe and Scandinavia indicates that children born from unwanted pregnancies perform less well in school than children from wanted pregnancies;[6] this difference was greatest for nine-year elementary school graduation rates and subsequent enrollment in secondary schools.[7] Further evidence indicates that the father-daughter relationship is especially problematic for unwanted daughters, and this too may influence their educational attainment.[8] One study, however, found no difference in academic performance by wantedness.[9]

In this article, we report on the academic progress at adolescence and early adulthood of a 1966 cohort of births in Finland; we assess whether the wantedness of a pregnancy has an independent effect on educational attainment when family background is taken into consideration. This cohort was born when abortion was allowed in Finland for medical reasons only, with women needing the authorization of two physicians to obtain the procedure. (The law was liberalized in 1970 to allow women to request an abortion for economic and social reasons as well.) We also examine gender differences in educational attainment among children born from unwanted pregnancies.

## Methodology

The data come from a survey of 12,068 women who gave birth in 1966 (to 12,231 babies) in the two northernmost provinces of Finland, Oulu and Lapland; these births accounted for 96% of all deliveries occurring in Oulu and Lapland that year. Data were collected during prenatal clinic visits, beginning in the sixth or seventh month of pregnancy.[10] Midwives administered the questionnaire, which included items on the woman's medical and socioeconomic characteristics and those of her family.

The wantedness of the pregnancy was ascertained by responses to the item asking whether it had occurred at a propitious time, whether the pregnancy would have been preferred later, or whether it was not wanted at all. Based on the responses to this item, pregnancies were divided into three groups—wanted, mistimed and unwanted. The wantedness status of the pregnancy was known for 11,943 of the 12,231 children born in the cohort: Sixty-three percent were born from wanted pregnancies, 25% from mistimed pregnancies and the remaining 12% from unwanted pregnancies.[11]

A follow-up of the 1966 birth cohort was conducted in 1980–1981, when the children reached age 14. The follow-up questionnaire, sent to the children and their families, included items about the child's general health and school performance, the number of siblings and the current social and marital status of the parents. The response rate was 97%; for most of the remaining 3%, information was received from school health workers and school social workers, so that only 14 children of the original 12,231 could not be traced at the

**Table 1. Among the 1966 cohort of births, percentage distribution of the number of years of education completed by age 24, by gender and wantedness of the pregnancy, Northern Finland, 1990**

| Gender and education | All | Wanted | Mistimed | Unwanted |
|---|---|---|---|---|
| **Men** | **(N=5,368)** | **(N=3,444)** | **(N=1,290)** | **(N=634)** |
| <9 years | 1 | 1 | 1 | 3 |
| 9 years | 15 | 13 | 17 | 22 |
| 10–11 years | 42 | 39 | 45 | 48 |
| 12 years | 32 | 35 | 28 | 21 |
| 13–14 years | 5 | 6 | 5 | 3 |
| ≥15 years | 5 | 6 | 4 | 3 |
| **Women** | **(N=5,138)** | **(N=3,269)** | **(N=1,268)** | **(N=601)** |
| <9 years | 1 | 1 | 1 | 2 |
| 9 years | 10 | 8 | 12 | 17 |
| 10–11 years | 28 | 26 | 32 | 36 |
| 12 years | 49 | 52 | 45 | 40 |
| 13–14 years | 6 | 6 | 5 | 3 |
| ≥15 years | 6 | 7 | 5 | 2 |
| Total | 100 | 100 | 100 | 100 |

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**Table 2. Among members of 1966 cohort, percentage who did not go beyond compulsory schooling, by gender and pregnancy status, according to parental and family characteristics**

| Characteristic | Men | | | | | Women | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | All | Wanted | Mistimed | Unwanted | N | All | Wanted | Mistimed | Unwanted |
| **Total** | **5,368** | **16** | **14** | **18** | **25** | **5,138** | **11** | **9** | **13** | **19** |
| **Mother's education** | | | | | | | | | | |
| ≥12 years | 826 | 8 | 7 | 7 | 18 | 823 | 6 | 5 | 8 | 4 |
| 9–11 years | 961 | 13 | 12 | 11 | 18 | 960 | 8 | 7 | 10 | 16 |
| ≤8 years | 3,538 | 19 | 17 | 21 | 26 | 3,330 | 13 | 11 | 15 | 20 |
| **Mother's age*** | | | | | | | | | | |
| ≥35 years | 995 | 17 | 14 | 16 | 25 | 936 | 12 | 10 | 13 | 17 |
| 20–34 years | 3,994 | 16 | 13 | 18 | 25 | 3,841 | 10 | 9 | 12 | 20 |
| ≤19 years | 359 | 20 | 22 | 16 | 22 | 337 | 20 | 17 | 21 | 33 |
| **Mother's parity, 1966*** | | | | | | | | | | |
| 0 | 1,701 | 13 | 13 | 13 | 19 | 1,647 | 10 | 8 | 14 | 28 |
| 1–2 | 2,193 | 15 | 13 | 19 | 21 | 2,056 | 9 | 8 | 12 | 16 |
| 3–5 | 1,094 | 20 | 17 | 21 | 24 | 1,019 | 14 | 13 | 15 | 17 |
| ≥6 | 374 | 25 | 21 | 19 | 31 | 412 | 18 | 15 | 15 | 21 |
| **Number of siblings, 1980†** | | | | | | | | | | |
| 0 | 253 | 13 | 12 | 21 | 9 | 258 | 10 | 8 | 13 | 22 |
| 1–2 | 2,670 | 13 | 12 | 14 | 18 | 2,565 | 9 | 8 | 12 | 19 |
| 3–5 | 1,638 | 17 | 14 | 18 | 23 | 1,549 | 11 | 9 | 12 | 17 |
| ≥6 | 621 | 26 | 24 | 24 | 29 | 660 | 18 | 18 | 16 | 19 |
| **Family size‡** | | | | | | | | | | |
| Small/small | 1,618 | 12 | 12 | 14 | 11 | 1,553 | 9 | 8 | 10 | 22 |
| Small/large | 1,299 | 14 | 13 | 14 | 22 | 1,251 | 10 | 8 | 15 | 25 |
| Large/large | 2,258 | 19 | 16 | 20 | 26 | 2,224 | 13 | 11 | 13 | 17 |
| **Family structure†** | | | | | | | | | | |
| Two-parent household | 4,404 | 15 | 13 | 16 | 24 | 4,187 | 10 | 8 | 11 | 17 |
| Single-parent household | 964 | 23 | 21 | 26 | 27 | 951 | 18 | 14 | 20 | 24 |
| **Social class§** | | | | | | | | | | |
| I | 632 | 8 | 7 | 11 | 14 | 574 | 4 | 3 | 8 | 8 |
| II | 964 | 14 | 13 | 13 | 25 | 910 | 7 | 6 | 11 | 16 |
| III | 1,721 | 14 | 13 | 15 | 22 | 1,712 | 11 | 10 | 13 | 21 |
| Farmer | 649 | 17 | 16 | 20 | 17 | 632 | 9 | 8 | 9 | 12 |
| IV | 763 | 20 | 17 | 20 | 27 | 741 | 18 | 15 | 20 | 24 |
| No occupation/unknown | 639 | 27 | 24 | 34 | 30 | 569 | 19 | 18 | 20 | 20 |
| **Mother's employment history** | | | | | | | | | | |
| Employed in 1966 and 1980 | 1,524 | 11 | 10 | 13 | 21 | 1,459 | 8 | 7 | 11 | 13 |
| Employed in 1966 | 469 | 18 | 18 | 14 | 19 | 449 | 13 | 9 | 13 | 35 |
| Employed in 1980 | 1,182 | 15 | 13 | 15 | 23 | 1,210 | 12 | 10 | 14 | 22 |
| Not employed at either time | 1,888 | 18 | 15 | 21 | 26 | 1,816 | 12 | 10 | 12 | 16 |
| Unknown | 305 | 30 | 27 | 34 | 35 | 204 | 25 | 19 | 27 | 44 |

*At the birth of the index child. †When the index child was 14 years old. ‡Family size was classified as small/small if mother's parity in 1966 and number of siblings in 1980 were both two or fewer; small/large if parity in 1966 was two or fewer and number of siblings in 1980 was more than two; and large/large if parity in 1966 and number of siblings in 1980 were both more than two. §Soclal class derived from father's occupation in 1980: I and II require highest level of education, III includes skilled work, IV unskilled work, and farming is classified separately.

age of 14.[12] The academic progress of the cohort through 1990 was ascertained using data from national registries. From the total 1966 birth cohort, 10,735 children were living in Finland in both 1980 and 1989; the pregnancy wantedness status is known for 10,506 of these children.

The present analysis is based on the educational attainment of these 10,506 children when they were 24 years old. In the Finnish education system, instruction is organized into basic education (which is compulsory), consisting of the first nine years of schooling, usually from ages 7–16, which corresponds to primary school (1–6 years of schooling) and lower secondary school (7–9 years). Students need to pass an exam to enroll in upper secondary school (10–12 years). Further tertiary education is separated into a lower level (13–14 years of schooling) and an upper level (≥15 years).

Upon completion of basic education, all students are advised to take part in the national application process for upper secondary schooling. All applications and recommendations for entrance are stored in national registers; we extracted data from these national registers for 1980–1985 for the children in the study cohort (when they were 14–19 years old). For the cohort's further academic progress, we relied on data stored in the education register maintained by Statistics Finland; these data refer to full-time study only, according to the International Standard Classification of Education.[13] One percent of the cohort was not mentioned in the register; this proportion refers to the 72 individuals (0.7% of the total) who were attending a special school at age 14 and the 28 persons (0.3%) who were mentally retarded and not enrolled in school. Statistics Finland also supplied information on the current employment status of the individuals listed.

We used binary regression modeling with an identity link function[14] to analyze the effect of the wantedness of the pregnancy on going beyond compulsory schooling, adjusting for potential confounding family background variables. These variables included the age of the mother in 1966; her educational attainment at that time; her parity in 1966; and the number of siblings in 1980, when the index child was age 14. The latter two characteristics were examined separately and also combined to form a third category measuring family size. Family size was classified as small/small if the mother's parity in 1966 and the number of siblings in 1980 were both two or fewer. It was characterized as small/large if parity in 1966 was

**Table 3. Percentage-point difference in risk of never enrolling in upper secondary school (and 95% confidence intervals), by characteristic and gender**

| Characteristic | Men | Women |
|---|---|---|
| **Pregnancy status** | | |
| Wanted | ref | ref |
| Mistimed | 0.8 (–1.5, 3.0) | 2.3 (0.3, 4.3) |
| Unwanted | 6.0 (2.4, 9.7) | 6.3 (2.9, 9.7) |
| **Mother's education** | | |
| ≥12 years | ref. | ref. |
| 9–11 years | 2.1 (–0.7, 4.9) | 0.2 (–1.7, 2.1) |
| ≤8 years | 6.4 (3.8, 9.0) | 2.7 (0.6, 4.7) |
| **Mother's age** | | |
| ≥35 years | ref | ref |
| 20–34 years | 4.0 (2.2, 5.8) | 1.3 (–0.4, 3.0) |
| ≤19 years | 6.6 (2.0, 11.1) | 8.8 (4.2, 13.4) |
| **Family structure** | | |
| Two-parent | ref | ref |
| Single-parent | 4.4 (1.2, 7.6) | 3.7 (0.9, 6.5) |
| **Social class** | | |
| I | ref | ref |
| II | 2.3 (–0.5, 5.2) | 1.0 (–1.1, 3.1) |
| III | 2.0 (–0.7, 4.7) | 4.0 (1.8, 6.2) |
| Farmer | 4.8 (1.0, 8.6) | 1.7 (–1.2, 4.6) |
| IV | 6.8 (3.1, 10.5) | 9.5 (6.2, 12.9) |
| No occupation/ unknown | 11.9 (7.3, 16.5) | 8.4 (4.3, 12.5) |
| **Family size** | | |
| Small/small | ref | ref |
| Small/large | –0.5 (–2.0, 1.1) | –0.8 (–2.5, 0.9) |
| Large/large | 2.6 (0.4, 4.8) | 0.7 (–1.4, 2.7) |
| **Maternal employment** | | |
| Employed, 1966 & 1980 | ref | ref |
| Other | 2.1 (0.0, 4.2) | 1.8 (0.1, 3.6) |
| *Intercept (%)* | *0.0 (–0.1, 0.1)* | *0.7 (–1.4, 2.7)* |

two or fewer but number of siblings in 1980 was more than two, and as large/large if both measures were more than two.

Other family-related characteristics included maternal employment in 1966 and 1980; family structure at the birth of the index child and at age 14 (a one-parent or a two-parent household[15]); and family's social class. The latter consists of five classes defined by the father's occupation—classes I and II being those with professions requiring the highest levels of education, class III being skilled workers, class IV unskilled workers and a separate classification for farmers.[16]

In this linear probability model, a single regression coefficient can be interpreted as a risk difference—that is, the difference from the expected proportion associated with a unit change in the explanatory variable. We fitted the model and estimated the adjusted risk differences and 95% confidence intervals by the method of maximum likelihood (which is equivalent to the iteratively weighted least squares method, using the GLIM program and the macros of Wacholder[17]). We chose a linear probability model because an increased risk of nonenrollment in upper secondary school could be interpreted more easily in terms of differences in proportions, measured in percentage points, than in terms of odds ratios. After fitting the model to the main effects of the variables, we then added to the regression model statistical interaction terms between the wantedness of the pregnancy and other family background variables.

## Results

The proportions of young men in the cohort who had completed no more than the nine years of compulsory education by age 24 were 14% for those born from wanted pregnancies, 18% for those born from mistimed pregnancies and 25% for those born from unwanted pregnancies (see Table 1, page 116); the corresponding proportions among the young women in the cohort were 9%, 13% and 19%, respectively. On average, children born from unwanted pregnancies received fewer total years of schooling than those born from wanted pregnancies or mistimed pregnancies.

While some members of the cohort were still in school at age 24, only 4% of those still studying had not enrolled in upper secondary school. Table 2 (page 117) presents the proportions who never went on to upper secondary school, by the wantedness status of the pregnancy and by social and demographic variables. Regardless of the wantedness of the pregnancy, the proportion who completed only compulsory schooling was higher among children born to less educated mothers, those who lived in a one-parent household at age 14, those whose father was unemployed or in a low-status profession in 1980, and those whose mother was unemployed in both 1966 and 1980. Individuals who had many siblings were also more likely to go no further than the ninth year (except for women born following an unwanted pregnancy), as were those born to a teenage mother (except for men born following an unwanted pregnancy).

The percentages not continuing were generally higher among the children born from an unwanted pregnancy compared with those born from a mistimed or wanted one, with two exceptions—men born from an unwanted pregnancy who were an only child, and women born from an unwanted pregnancy to a highly educated mother. In both cases, however, the numbers in those categories were small.

According to the separate binary regression models for men and women, the unwantedness of the pregnancy retained its influence on the probability of not enrolling in higher levels of schooling, even after confounding factors were introduced into the model. As Table 3 shows, women born following an unwanted pregnancy were 6.3 percentage points more likely than those born from a wanted pregnancy to have had no more than a compulsory education. Similarly, the adjusted risk difference for nonenrollment in upper secondary school among men born following an unwanted pregnancy relative to a wanted pregnancy was 6.0 percentage points. Women born after a mistimed pregnancy were also at increased risk—a relative risk difference of 2.3 percentage points, compared with those born from a wanted pregnancy.

The model showed that in addition to being born from an unwanted pregnancy, low paternal social status, low maternal education levels and young maternal age were also associated with an increased risk of poor educational attainment, regardless of gender. However, maternal employment in both 1966 and 1980 reduced the risk. Being born into a large family increased the risk of not going beyond the ninth year only among the men in the cohort.

We then analyzed the statistical interactions between wantedness of pregnancy and family size by inserting the corresponding product terms into the models. The results, shown in Table 4, indicate that there are significant interactions between unwantedness and family size. The crosstabulations of wantedness of pregnancy by the mother's parity at the birth of the index child and family structure at age 14 show that among the men, the probability of a shortened educational career is influenced by the combined effects of un-

**Table 4. Percentage of 1966 birth cohort who never enrolled in upper secondary school, by wantedness of the pregnancy, according to gender, family structure and mother's parity at birth of the index child**

| Gender, family structure and parity | Unwanted pregnancy | | Wanted or mistimed | |
|---|---|---|---|---|
| | N | % | N | % |
| MEN | | | | |
| **Two-parent household** | | | | |
| 0–2 children | 34 | 6 | 2,356 | 11 |
| ≥3 children | 380 | 25 | 1,496 | 16 |
| **Single-parent household** | | | | |
| 0–2 children | 77 | 20 | 451 | 21 |
| ≥3 children | 115 | 29 | 267 | 24 |
| WOMEN | | | | |
| **Two-parent houehold** | | | | |
| 0–2 children | 30 | 23 | 2,274 | 8 |
| ≥3 children | 357 | 15 | 1,440 | 10 |
| **Single-parent household** | | | | |
| 0–2 children | 70 | 23 | 430 | 15 |
| ≥3 children | 131 | 23 | 296 | 17 |

**Table 5. Percentage distribution of the 1966 cohort, by employment at age 24, according to gender and wantedness of the pregnancy**

| Gender and employment | All | Wanted | Mistimed | Unwanted |
|---|---|---|---|---|
| **Men** | | | | |
| Employed | 69 | 69 | 72 | 65 |
| Student | 15 | 18 | 12 | 10 |
| Military service | 1 | 1 | 1 | 1 |
| Unemployed | 10 | 9 | 10 | 16 |
| On disability | 2 | 1 | 2 | 4 |
| Other | 3 | 2 | 3 | 4 |
| **Women** | | | | |
| Employed | 64 | 64 | 65 | 61 |
| Student | 19 | 21 | 17 | 16 |
| Unemployed | 6 | 5 | 7 | 8 |
| On disability | 1 | 1 | 1 | 3 |
| Other | 10 | 9 | 10 | 12 |
| Total | 100 | 100 | 100 | 100 |

wantedness and large family size, particularly in two-parent households. Unwantedness does not have much of an effect when family size is small, however. Among the women, the effect of unwantedness is clearer, with the proportions of students who stop at compulsory schooling being larger among those born following an unwanted pregnancy than among those born following a wanted or mistimed pregnancy in each family size and structure category. This difference is particularly pronounced among the women who were born into small, two-parent families, where 23% in the unwanted pregnancy group failed to enroll in upper secondary school, compared with 8% in the mistimed or wanted pregnancy group.

As Table 5 shows, children born following an unwanted pregnancy also had poorer employment status as young adults than those whose births were wanted. Sixteen percent of the men and 8% of the women who were born following unwanted pregnancies were unemployed at age 24, compared with just 9% of men and 5% of women born following wanted pregnancies. Furthermore, 4% of men and 3% of women born following unwanted pregnancies were on disability at age 24, compared with just 1% each of those born following wanted pregnancies.

## Discussion

The Finnish children in this 1966 cohort who were born as a result of unwanted pregnancies had less successful educational careers than those born from wanted or mistimed pregnancies. The unwantedness of the pregnancy predicted an increased risk of not enrolling in upper secondary school among both sexes, even after adjusting for family background.

Some differences by gender in the proportions who went no further than the ninth year emerged when we examined interactions between unwanted pregnancy and multiple family background variables. For example, we found that women born following an unwanted pregnancy into small families had a particularly high risk of stopping at compulsory schooling, which was not characteristic of men who had been born under the same set of circumstances. This finding may have been due to chance, because we evaluated many possible statistical interactions simultaneously, and the groups involved were small.

On the other hand, the finding may be connected with a problematic father-daughter relationship that was hinted at in an earlier study; when we previously examined parents' attitudes toward their children when they were 16 years old, we found that fathers held especially negative attitudes toward daughters born following an unwanted pregnancy.[18] However, fathers' negative attitudes toward female education in general may explain the large proportions who never go on to higher levels among women born following an unwanted pregnancy. The effect of unwantedness on limited educational attainment among men born into a large family could be explained more straightforwardly by a lack of economic and social resources.

These findings suggest that unwantedness has lasting effects on growing up. The association between being born unwanted into a large family and a poor school career among men supports previous findings linking large family size and educational attainment,[19] and suggests that unwantedness might contribute to this phenomenon. The effect of unwantedness on educational attainment among women, however, was more independent and could not be explained by family background variables.

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