Carlsson and Kim *Genus* (2026) 82:3
https://doi.org/10.1186/s41118-026-00283-6

Genus

ORIGINAL ARTICLE Open Access

Does depression matter for fertility intentions and their realisation? An analysis of Norwegian and Swedish men and women in coresidential unions

Erik Carlsson[1,2*] and Wooseong Kim[1,3]

*Correspondence:
Erik Carlsson
erik.carlsson@sociology.su.se
[1]Demography Unit, Department of Sociology, Stockholm University, Stockholm, Sweden
[2]INVEST Research Flagship Centre, University of Turku, Turku, Finland
[3]Unit of Occupational Medicine, Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden

Abstract
Many high-income societies have seen two parallel trends in recent decades: falling fertility rates and an increasing prevalence of mental health issues among young adults. Yet, the association between mental health and fertility remains underexplored, especially with respect to fertility preferences and their realisation. This study examines how depression, one of the most common mental disorders, relates to two fertility outcomes: (1) reporting a positive short-term fertility intention, and (2) realising such an intention. The study uses data from the Norwegian and Swedish Generations and Gender Surveys from 2007/2008 to 2012/2013, together with their register-based follow-ups. To measure depression, we use the 7-item, shortened version of the Centre for Epidemiologic Studies Depression Scale (CES-D Scale). Results show that depression is negatively associated with the propensity to report a positive fertility intention among Norwegian women and the propensity to realise a positive fertility intention within three years among Swedish women. Among men, depression is not significantly associated with either of the two outcomes. This study contributes new evidence on how depression may influence fertility, advancing the understanding of the determinants of fertility behaviour as well as the consequences of a widespread mental disorder.

Keywords Mental health, Fertility preferences, Generations and Gender Survey, Wellbeing, Nordic

Introduction

Fertility rates have fallen steeply in many high-income countries over the last 10–15 years (OECD, 2024). The decline has puzzled demographers since it cannot easily be attributed to factors that have historically explained fertility patterns in developed societies, such as economic cycles and family policy (Comolli et al., 2021; Hiilamo, 2020; Ohlsson-Wijk & Andersson, 2022). Concurrently with the fertility decline, there has been a pronounced rise in mental health disorders among young adults (Goodwin et al., 2022; Gyllenberg et al., 2018; Krokstad et al., 2022; Mojtabai et al., 2016). Although there

are several plausible pathways through which poor mental health could negatively affect fertility behaviour, mental health has long been underexplored as an explanatory factor in fertility research. However, scholarly attention to the topic has increased markedly in the most recent years (Golovina et al., 2023; Kailaheimo-Lönnqvist et al., 2024, 2025; Kravdal et al., 2025; Liu et al., 2024; Power et al., 2013).

This paper examines how depression – one of the most common mental disorders worldwide (Liu et al., 2020)—relates to two fertility outcomes: (1) reporting a positive fertility intention for the upcoming three years, and (2) realising such an intention within three years. Recent register-based studies have shown that depression – measured as diagnosis, consultation, or antidepressant prescription – negatively predicts fertility behaviour among both men and women (Golovina et al., 2023; Kailaheimo-Lönnqvist et al., 2024; Kravdal et al., 2025). However, to the best of our knowledge, no previous studies have examined how depression relates to fertility preferences and their realisation. This research gap exists although one possible mechanism through which depression may influence fertility is through the modification of childbearing plans. One of the defining characteristics of depression is a loss of interest in and pleasure derived from previously enjoyable activities (American Psychiatric Association 2020), which may include planning for future children. Depressed individuals may also choose to postpone childbearing until their mental health status improves. Thus, depression may have negative effects both on the propensity to state a positive fertility intention and the propensity to follow through on such intentions. By focusing on fertility preferences and their realisation, rather than fertility behaviour alone, this study offers new insights into the mechanisms through which depression may influence childbearing outcomes.

Our analyses are based on data from the Norwegian and Swedish Generations and Gender Surveys (GGS) from 2007/2008 to 2012/2013, together with their respective register-based follow-ups. The Norwegian and Swedish GGS data are uniquely well-suited for studying the realisation of fertility intentions, as the register-based follow-ups result in minimal attrition between the initial interview and follow-up. In contrast, other countries participating in round 1 of the GGS relied on re-interviewing Wave 1 respondents for the Wave 2 follow-up, which led to substantially higher attrition and, consequently, reduced sample size and representativeness (Buber-Ennser, 2014). Focusing on Norway and Sweden thus enables analyses based on high-quality, population-representative data that are not available for other GGS countries.

In addition to the strength of the data, examining Norway and Sweden together is also substantively important. Although the two countries share many cultural, institutional, and policy similarities, findings from earlier register-based studies on depression and fertility have not always been consistent across the Nordic region. In particular, the association between depression and fertility has been found to be stronger among men in Norway and Sweden (Kravdal et al., 2025; Power et al., 2013), but stronger among women (Kailaheimo-Lönnqvist et al., 2024) or similar across genders (Golovina et al., 2023) in Finland. However, it remains unclear whether such discrepancies reflect true country differences or arise because the studies used different indicators of depression. By comparing two Nordic countries using the same measure of depression and harmonised data collection procedures, the present study helps to disentangle genuine contextual differences from methodological variation, thereby contributing to a clearer

understanding of cross-country similarities and differences in the association between depression and fertility.

To measure depression, we use the 7-item, shortened version of the Centre for Epidemiologic Studies Depression Scale (CES-D Scale, Radloff, 1977), a validated instrument for identifying suspected cases of depression (Levine, 2013). Survey-based measures of depression have important advantages that complement register-based measures. Specifically, measures based on inpatient or outpatient registers, such as diagnosis, consultation, or antidepressant prescription, may overrepresent severe cases and groups with more healthcare seeking behaviours (Magaard et al., 2017), while such biases are likely smaller in survey-based measures. For instance, a Danish study comparing register- and survey-based measures of depression found that register-derived measures based on hospital diagnoses and antidepressant prescription missed 85% and 49%, respectively, of depression cases detected by the survey-based measure (Weye et al., 2023). Since a large share of the earlier studies on the association between depression and fertility have relied on register-based depression measures, our use of a survey-based measure represents an important contribution to the literature.

The study focuses on men and women who were in coresidential unions at interview (i.e., either married or in non-married cohabitation) since most childbearing takes place within this context. Short-term fertility intentions stated outside coresidential unions are both relatively uncommon and unrealistic (Carlsson, 2023; Dommermuth et al., 2015; Kapitány & Spéder, 2012). To explore gender and country differences in the association between depression and fertility intentions/realisation, we conduct all analyses separately for Norwegian men, Norwegian women, Swedish men, and Swedish women.

Finally, it should be underlined that depression is a common mental disorder that affects a large share of the population in high-income countries (Arias-de la Torre et al., 2021). In Norway, survey data indicate that the prevalence of current depression is about 9–12% among adults aged 20–49 (i.e., childbearing ages) (Krokstad et al., 2022). Data from administrative registers in Finland show that almost one-third of individuals born in 1977–1980 had used antidepressant medication by age 39 (Kailaheimo-Lönnqvist et al., 2024). Therefore, exploring how depression shapes childbearing is important not only because it can improve the understanding of the reasons for low fertility, but also because it sheds light on the consequences of a widespread mental health problem.

Background

Earlier research

Although depression and other mental disorders are common in many low-fertility countries, previous research on the association between depression and fertility has largely focused on the Nordic countries, often employing data from administrative registers. In Norway, having had at least one consultation for depression in primary or specialised health care was associated with lower transition rates to first, second, and third births. The association existed for both sexes but was more pronounced among men. Whereas the overall association between depression and fertility was negative, patterns varied by age. Depression had a positive association with first-birth transition rates among women aged 23 or younger, a null association at ages 24–26 for women and ages 25 or younger among men, and a negative association among women aged 27 or older and among men aged 26 or older (Kravdal et al., 2025).

In Finland, purchases of antidepressant medication was associated with lower first-birth transition rates for both men and women, but with a stronger effect among women (Kailaheimo-Lönnqvist et al., 2024). Also in Finland, men and women who had either been hospitalised with depression or had visited a specialist about their depression were less likely to have children and had fewer children on average than individuals without a depression hospitalisation/diagnosis (Golovina et al., 2023). In this study, effect sizes were similar for men and women.

In Sweden, having been either hospitalised with depression or diagnosed with depression by a specialist was associated with a lower number of children for men but not for women (Power et al., 2013). Compared to the first three studies, Power et al. (2013) employed a weaker analytical setup that did not consider the time ordering between the depression measure and childbearing.

Golovina et al. (2023) examined the role of depression severity (mild, moderate, severe, severe with psychosis) for the likelihood of having a child and the number of children in Finland. The analysis did not consider the time ordering between depression and childbearing. The association between depression severity and the fertility outcomes varied by sex. For men, the negative association was most pronounced among individuals with severe depression coupled with psychosis. The association was also negative for the other severity levels but did not vary across levels. For women, on the other hand, there was a clear gradation in the effect, with lower fertility outcomes for each step up on the depression severity scale. Interestingly, negative fertility outcomes were only found among women whose depression was severe or severe coupled with psychosis while women with moderate depression were similar to non-depressed individuals and women with mild depression were more likely than non-depressed individuals to have a child and had a higher average number of children.

Some survey-based studies have examined the association between adolescent depression and childbearing later in life. These studies have found mixed results. Grundström et al. (2024) found a positive association between depressive symptoms at age 16 and the propensity to be a parent by age 52 among women in Finland, whereas the association was negative among men. Jonsson et al. (2011) found no association between depression at age 16 or 17 and the propensity to be a parent 15 years later among men and women in Sweden. Similarly, depression at age 14–18 was not associated with a higher propensity to have children at age 21–24 among women in Australia (Nilsen et al., 2012).

Possible mechanisms

There are several plausible and potentially interlinked mechanisms through which depression may influence fertility intentions and their realisation. First, depression can profoundly affect cognitive and affective processes. Depression is linked to pessimism about the future (Karhu et al., 2024), low self-esteem (Aebi & Orth, 2025), lack of motivation (Grahek et al., 2019), and cognitive impairment (Marazziti et al., 2010). These features may hinder depressed individuals from developing positive fertility intentions and may prompt them to abandon already existing intentions.

Second, depressed individuals may struggle to form and maintain romantic relationships and social networks. Depression is associated with social isolation (Elmer & Stadtfeld, 2020) and lower perceived quality of social relationships (Oppenheimer & Hankin, 2011), thereby potentially reducing the availability of social support from family and

friends, which could otherwise encourage and facilitate childbearing. Moreover, depression is linked to lower rates of union formation and higher rates of union dissolution (Breslau et al., 2011), as well as lower perceived quality of romantic relationships (Gustavson et al., 2012; Joosten et al., 2022). Empirical evidence shows that partnership status accounts for much of the lower first-birth transition rates among depressed individuals in Finland, especially among men (Kailaheimo-Lönnqvist et al., 2024). However, controlling for partnership status explains less of the association between depression and fertility in Norway (Kravdal et al., 2025).

Third, depression may have negative socioeconomic consequences that make childbearing less viable. Depression predicts unemployment and income loss (Whooley et al., 2002). In Norway, controlling for educational attainment, school enrolment, and income explains a large portion of the gap in first- and second-birth transition rates between depressed and non-depressed individuals (Kravdal et al., 2025). In contrast, controlling for educational attainment does not explain differences in first-birth transition rates between depressed and non-depressed individuals in Finland (Kailaheimo-Lönnqvist et al., 2024).

Fourth, depression may affect fertility through biological or physical-health mechanisms. Depression is associated with a wide range of physical conditions, including endocrine, musculoskeletal, and vascular diseases (Frank et al., 2023; Hare et al., 2014). Physical health problems may cause individuals to abandon or postpone childbearing plans. Severe depression is also associated with reduced fecundity (Nillni et al., 2016). Moreover, antidepressant use is associated with an increased risk of miscarriage (Almeida et al., 2016; Evans-Hoeker et al., 2018; Nakhai-Pour et al., 2010).

Hypotheses

Based on the discussion of possible mechanisms and previous research, we formulate the following hypotheses. First, we expect that depressed individuals are less likely than non-depressed individuals to state a positive short-term fertility intention (H1) and to realise such an intention (H2).

We also examine whether these associations differ by country and gender. Given cultural and institutional similarities between Norway and Sweden, there is reason to expect that the associations are similar across the two countries (H3a). Based on previous research in Norway and Sweden, we expect that the negative associations between depression and the fertility outcomes is stronger among men than women (H3b). However, previous research suggests that gender differences in the associations between depression and fertility may vary across Nordic countries. Therefore, we also state H3c, which competes with H3a: Differences between men and women in the associations between depression and the fertility outcomes vary between Norway and Sweden.

Finally, we expect that controlling for socioeconomic characteristics (H4a), relationship satisfaction (H4b), and general health (H4c) will attenuate the associations between depression and the fertility outcomes.

Research design

Data and sample

The study uses data from round I of the Generations and Gender Surveys (GGS-I) in Norway and Sweden together with their respective population register-based

follow-ups. Initial data collection (Wave 1) took place through telephone interviews and a self-administered questionnaire in 2007–2008 in Norway and 2012–2013 in Sweden. Since this study uses items collected through both the interview and the questionnaire, only respondents who participated in both parts of Wave 1 data collection are included in the study population. The response rates for the full Wave 1 (i.e., interview + questionnaire) were 43% in Norway and 39% in Sweden.

Among the 19 countries where the GGS-I was conducted, Norway and Sweden were unique in collecting follow-up data entirely from population registers. The follow-up data stretches to 2011 in Norway and 2021 in Sweden (including both Wave 2 and 3 of the Swedish GGS-I). The register-based follow-ups ensure that all respondents who did not die or emigrate can be followed until the end year of the respective follow-ups. This minimal attrition from Wave 1 to follow-ups make the Norwegian and Swedish GGSs uniquely well-suited to study the realisation of short-term fertility intentions (Carlsson, 2023). Most previous research on the realisation of fertility intentions has relied on data where Wave 1 respondents were re-interviewed at follow-ups, an approach that is associated with considerably higher attrition (Buber-Ennser, 2014; Kapitány & Spéder, 2012).

The study population includes men and women who were in heterosexual coresidential unions (i.e., either married or in non-married cohabitation) at the Wave 1 interview. Female respondents were included if they were 18–44 years and not pregnant at the Wave 1 interview. Male respondents were included if they were 18–49 years and had a female partner who was 18–44 years old and not pregnant at the Wave 1 interview. Respondents who reported not being physically able to have a child, as well as those who reported that their partner was not physically able to have a child, were excluded from the study population. We excluded individuals in same-sex relationships because their process of intention realisation is not easily comparable to that of individuals in heterosexual relationships. We excluded individuals who intended to adopt a child within the next three years because the GGS-I does not allow intentions to adopt to be separated from intentions to take a foster child, which is not comparable to biological and adopted children. We also excluded individuals in non-coresidential unions because information on relationship satisfaction was only available among those who were living with their partner at the Wave 1 interview. The sample size varied at different steps of the analysis. Appendix Tables A1 and A2 present the sample sizes for each analytic step.

Variables

Fertility intentions and their realisation

The study uses two main fertility outcome variables. First, short-term fertility intentions were measured by asking respondents whether they wanted a/another child within the upcoming three years. Second, the realisation of fertility intentions was measured using population register data on children born to the respondent within the 36 months that follow the Wave 1 interview.

Long-term realisation

As an additional, exploratory analysis, we also examined the association between depression and realisation beyond the initial three years after interview. The motivation for exploring delayed realisation is to assess whether depressed individuals are more likely to abandon, rather than postpone, intentions that were not realised within the initial

three-year timeframe. Thus, the study population for this additional analysis consists of respondents who reported a positive short-term intention but did not have a child within the initial three years. Those who had a child during the subsequent five years (months 37–96 after interview) were considered to have realised their intention in the long term, while those who did not were classified as not having realised their intention. The long-term realisation analysis is restricted to Swedish women because extended follow-up is only available in the Swedish GGS-I, and the sample of Swedish men is too small for reliable analysis.

Depression variable

Our main independent variable is depression, measured through the shortened version of the Centre for Epidemiologic Studies Depression Scale (CES-D Scale, Radloff, 1977). The original CES-D scale contains 20 items, while the shortened version included in the GGS-I contains 7 items. The shortened version has been validated as suitable for screening for suspected major depression disorder (Levine, 2013). Respondents were asked how frequently they experienced the following feelings during the previous week: "had difficulty shaking off the blues", "felt depressed", "thought that your life has been a failure", "felt fearful", "felt lonely", "had crying spells", and "felt sad." There were four response alternatives: "seldom or never", "sometimes", "often" and "most or all of the time."

We used the CES-D scale in line with Levine (2013). Thus, we assigned 0, 1, 2, and 3 points to the different response alternatives, where higher points represent a more negative response. The total score ranges between 0 and 21 points (7 items * 0–3 points per item). We created a dichotomous variable based on this total score and set 8 as the cut-off for indicating depression. Thus, individuals who score 8 or above on the total score are considered to be depressed while individuals who score 7 or lower on the total score are considered to be non-depressed. This way of dichotomising the CES-D scale is suggested and validated by Levine (2013).

In our sample, 7.5% of Swedish respondents and 5.4% of Norwegian respondents are considered depressed (see Appendix Tables 1 and 2). The bivariate associations between depression and the different fertility outcomes are displayed in Appendix Table 3.

Control variables

We controlled for a set of covariates that were likely to be associated with depression and the fertility outcomes. All control variables were measured at interview. For descriptive statistics, see Appendix Tables 1 (Norwegian respondents) and A2 (Swedish respondents).

- *Age* and *age squared*, to capture potential non-linearity in the associations between age and the dependent variables.
- *Parity*: "0 children", "1 child", "2 or more children".
- *Educational attainment*: with/without university education degree.
- *Economic activity status*: "employed", "other".
- *Financial hardship*: based on a survey item asking respondents: "How easy or difficult is it for your household to make ends meet every month?" The six response options were: "very difficult," "difficult," "fairly difficult," "fairly easy," "easy," and "very easy." Respondents selecting any of the first three categories were classified as being

in financial hardship, while those selecting any of the latter three categories were classified as not being in financial hardship.

- *Relationship satisfaction*: based on a survey item asking respondents: "How satisfied are you with the relationship between you and your partner?" Responses were provided on a scale from 0 to 10 where 0 represented "not at all satisfied" and 10 represented "completely satisfied." We dichotomised the variable into satisfied (responses 8–10) vs. unsatisfied (responses 0–7).
- *General health*: measured through the item "Are you limited in carrying out normal everyday activities because of physical or psychological health problems or disabilities?" with two response alternatives: "yes" and "no". Unfortunately, there were no items asking specifically about the respondent's physical health in the Swedish GGS-I.

Statistical analysis

We used multiple logistic regression to estimate the associations between depression and the fertility outcomes. For the main analyses, i.e., the associations between depression and the propensities to report and realise (within three years) a positive fertility intention, we stratified the full sample by sex and survey country, and estimated separate logistic regressions for Norwegian women, Norwegian men, Sweden women, and Swedish men. This approach allows us to test hypotheses 3a-c, which concern cross-country and gender differences. As mentioned earlier, the exploratory analysis of the propensity to realise a positive fertility intention in the long term only includes Swedish women.

To test hypotheses 4a-c, we employed a stepwise modelling approach to examine whether the associations between depression and the fertility outcomes are attenuated when accounting for differences in socioeconomic characteristics, relationship satisfaction, and general health between depressed and non-depressed individuals. In the baseline model (1A, 2A, and 3A), we controlled for age, age squared, parity, and educational attainment. We then expand the model by adding variables stepwise, first economic activity status and financial hardship (model 1B, 2B, and 3B, to test H4a), then relationship satisfaction (model 1C, 2C, and 3C, to test H4b), and finally general health (model 1D, 2D, and 3D, to test H4c).

The purpose of including educational attainment in the baseline model instead of adding it together with the other socioeconomic variables in models 1B, 2B, and 3B is that educational attainment is less time-varying than the other socioeconomic variables. Whereas depression can cause and be caused by unemployment and financial hardship, once a certain educational attainment has been reached, depression cannot cause it to decrease, and a negative change in educational attainment that could trigger depression, analogous to the employment status and financial hardship variables, is impossible. Given the age range of the study sample (mean age varies between 29 and 37 years in the different subsamples, see Appendix Tables 1 and 2), most respondents can be assumed to have already reached their final educational attainment at the time of interview.

Results are presented as average marginal effects (AMEs) with 95% confidence intervals to facilitate comparisons between subgroups and models. The results section only shows results for the association between depression and the fertility outcomes. For the full results, see Appendix Tables 4, 5, 6, 7, 8, 9, 10, 11 and 12.

Results

Fertility intentions

We expected a negative association between depression and the propensity to report a positive short-term fertility intention (H1). We find support for H1 among Norwegian women, among whom depressed individuals were 10% points less likely than the non-depressed to report a positive intention in Model 1 A ($p < 0.01$). However, results for the other three groups do not align with H1, as the AMEs are smaller and not statistically significant at the 5% level (Fig. 1).

There is no support for H3a or H3b, which predicted similar patterns in Norway and Sweden and that the negative association should be more pronounced among men. In Norway, the association between depression and positive fertility intentions is negative among women but non-significant among men. In Sweden, results are non-significant for both genders. However, these findings align with H3c, which proposed that gender differences would vary between Norway and Sweden.

Adding controls for economic situation (Model 1B), relationship satisfaction (Model 1 C), and general health (Model 1D) leads to relatively small changes in the AMEs for depression. Among Norwegian women, the AME moves toward zero, in line with H4a-c (which suggested attenuation when adding controls). Still, the difference between depressed and non-depressed Norwegian women remains significant ($p < 0.05$) in all models, suggesting that these factors explain part, but not all, of the negative association between depression and positive fertility intentions. Among Swedish women, patterns run counter to H4a-c, as the difference between depressed and non-depressed individuals increases when controls are added, becoming marginally significant in Model 1D ($p < 0.10$). None of the added sets of control variables appears to have a notably stronger impact than the others.

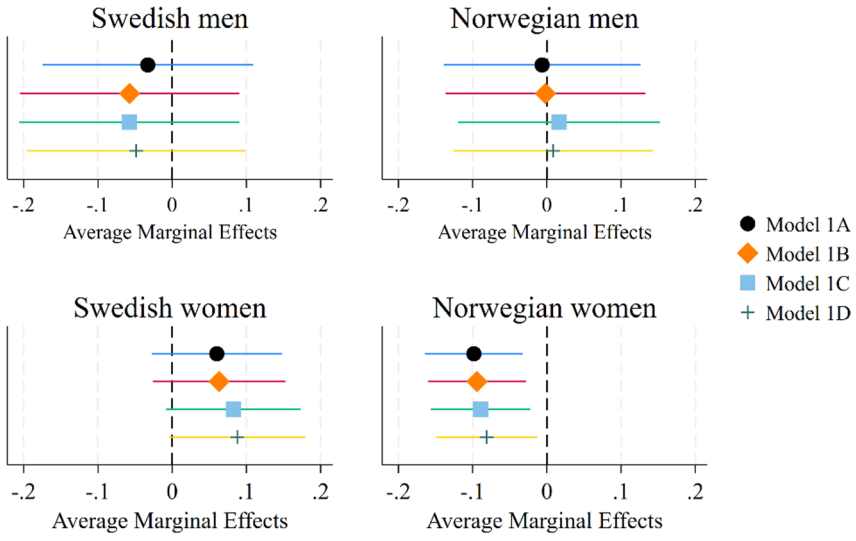

Fig. 1 Propensity to report a positive short-term fertility intention by depression status. AMEs (95% CIs). *Note*: Covariates in Model 1 A: age, age squared, parity, educational attainment. Model 1B adds economic activity status and financial hardship. Model 1 C adds relationship satisfaction. Model 1D adds general health. Reference group = non-depressed individuals. Sample sizes: Swedish men (565), Norwegian men (995), Swedish women (733), Norwegian women (1228). *Source*: Norwegian and Swedish GGSs, round 1, Wave 1

The realisation of positive fertility intentions within three years

Similar to the results regarding fertility intentions, there is partial support for the hypothesis that depression is associated with a lower propensity to realise a positive short-term fertility intention within the stipulated three years (H2). In line with H2, the probability of realising a positive intention is 22% points lower among depressed than non-depressed Swedish women (Model 2 A; $p < 0.01$). A negative association also exists among Norwegian men (-30% points in Model 2 A), though this result is only statistically significant at the 10% level. Among Norwegian women and Swedish men, AMEs are smaller and not statistically significant (Fig. 2).

There is no support for H3a (similarity across countries), partial support for H3b (stronger association among men), and support for H3c (gender patterns vary between the two countries), as the association is stronger among men in Norway but stronger among women in Sweden.

Controlling for economic situation and relationship satisfaction in Models 2B and 2 C shifts the AMEs closer to zero among Norwegian men, Norwegian women, and Swedish women. This indicates that the association between depression and intention realisation is partly explained by differences in economic situation and relationship satisfaction between depressed and non-depressed individuals, in line with H4a and H4b. The AME for Norwegian men is no longer significant even at the 10% level when adjusting for economic situation in Model 2B, while the AME for Swedish women remains significant at the 5% level in Model 2B but becomes non-significant ($p > 0.10$) when relationship satisfaction is added in Model 2 C. Although the AMEs for Norwegian men and Swedish women are attenuated in Model 2 C, they retain the same sign as in Model 2 A. There is no support for H4c, as adjusting for general health in Model 2D does not change the AMEs for depression.

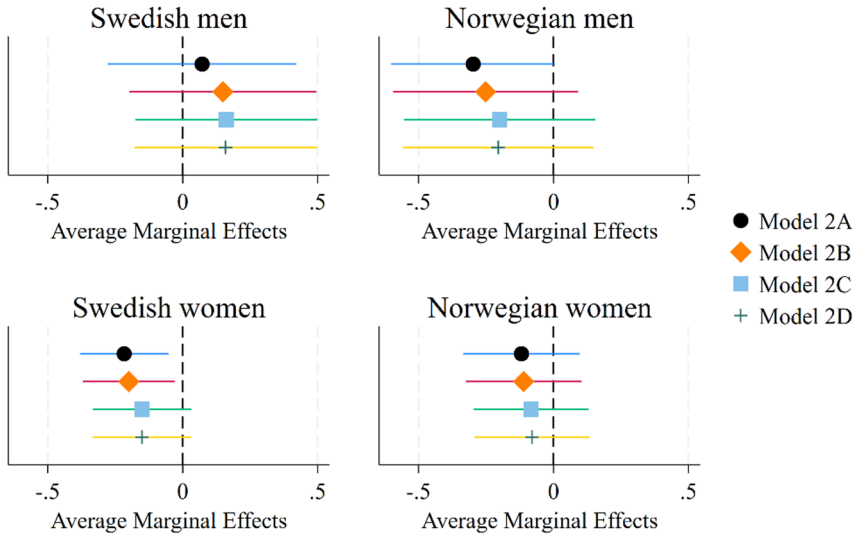

Fig. 2 Propensity to realise a positive short-term fertility intention within three years by depression status. AMEs (95% CIs). *Note*: Covariates in Model 2 A: age, age squared, parity, educational attainment. Model 2B adds economic activity status and financial hardship. Model 2 C adds relationship satisfaction. Model 2D adds general health. Reference group = non-depressed individuals. Sample size: Swedish men (180), Norwegian men (270), Swedish women (261), Norwegian women (377). *Source*: Norwegian and Swedish GGSs, round 1, Wave 1 + follow-ups

The realisation of positive fertility intentions 3–8 years after interview

Results of these additional, exploratory analyses among Swedish women show that depressed and non-depressed individuals who failed to realise their positive fertility intention within the stipulated three years did not differ in the propensity of having a child 3–8 years after interview (Fig. 3). Controlling for economic situation, relationship satisfaction, and general health did not substantially change the AMEs for depression. Note that the sample size for this additional analysis is small, consisting of 129 women, among whom 24 were depressed. Results should be interpreted with caution.

Discussion and conclusion

This study used data from the Norwegian and Swedish Generations and Gender Surveys (round 1) to examine how depression relates to two fertility outcomes: (1) reporting a positive fertility intention for the upcoming three years, and (2) realising a positive intention within three years of interview. Results show that depression is significantly negatively associated with the propensity to report a positive fertility intention among Norwegian women and the propensity to realise a positive fertility intention among Swedish women. None of the results for men are statistically significant.

The negative association between depression and intention realisation among Swedish women is partly explained by controlling for economic situation and becomes non-significant when controlling for relationship satisfaction. These results suggest that economic and relationship constraints that may either cause or be caused by the depression constitute an important explanation for the observed association between depression and realisation rates among Swedish women. In contrast, the negative association between depression and fertility intentions among Norwegian women is reduced but remains significant when controlling for economic situation, relationship satisfaction, and general health. This suggests that the association is not fully explained by external

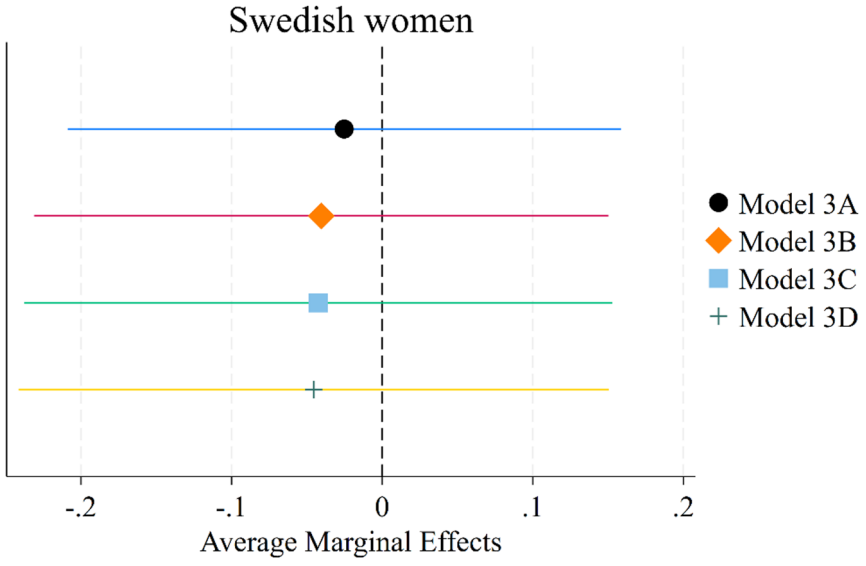

Fig. 3 Propensity to realise a positive short-term fertility intention 3–8 years after interview, by depression status. AMEs (95% CIs). *Note*: Covariates in Model 3 A: age, age squared, parity, educational attainment. Model 3B adds economic activity status and financial hardship. Model 3 C adds relationship satisfaction. Model 3D adds general health. Reference group = non-depressed individuals. Sample size: 129. *Source*: Swedish GGS, round 1, Wave 1 + follow-up

constraints. The remaining association in the fully adjusted model may instead be attributed to cognitive and affective traits connected to depression, such as pessimism about the future, lack of motivation, and low self-esteem, which may lead depressed individuals to avoid forming a positive fertility intention.

The finding that depression has a statistically significant negative association with intention formation among Norwegian women while the association is non-significant with a positive point estimate among Swedish women is intriguing and surprising given the far-reaching cultural and institutional similarities between Norway and Sweden. Whereas previous research has indicated that the association between depression and fertility may differ across the Nordic countries, it was unclear whether those findings reflect "true" cross-country differences or arise due to variation in the measurement of depression. The fact that we employ the same depression measure and survey design in both countries and still find country differences indicates that they are not just an artefact of measurement differences in earlier research. Future research should conduct wider cross-country comparisons, which could provide explanations for contextual differences in the association between depression and fertility.

One possible explanation for the observed country differences is that data collection for wave 1 occurred at different time points in Norway and Sweden. In Norway, interviews were conducted during the early phases of the 2007–2009 Great recession, whereas they took place in 2012–2013 in Sweden. The uncertainty associated with the recession may have had an especially negative effect on the childbearing plans of depressed women.

We find support for an association between depression and intention formation or realisation primarily among women. These results do not align with earlier register-based studies in Norway and Sweden, which found that the association between depression and fertility behaviour is stronger among men (Kravdal et al., 2025; Power et al., 2013). However, results from Finland show a stronger association among women (Kailaheimo-Lönnqvist et al., 2024). Two factors may contribute to the apparent inconsistencies between the present study and previous research in Norway and Sweden.

First, our depression measure (the 7-item version of the CES-D Scale) is based on self-reported survey responses whereas most earlier studies have used register-based indicators, such as diagnosis, antidepressant prescriptions, or specialist visits (Golovina et al., 2023; Kailaheimo-Lönnqvist et al., 2024, 2025; Kravdal et al., 2025; Liu et al., 2024; Power et al., 2013). Both survey- and register-based depression measures have strengths and limitations. Register data cover the full population and include depression measures that were screened by healthcare professionals, and therefore more validated than self-reported measures. However, register-based depression measures tend to overrepresent severe cases and groups with more healthcare-seeking behaviours (Magaard et al., 2017). Survey-based measures, on the other hand, may capture a higher share of milder cases and groups that are less likely to seek healthcare (Weye et al., 2023), but are negatively affected by self-report bias and smaller, less representative samples.

Such differences may explain why this and earlier research obtain partly different results. For example, since depressed men are less likely than depressed women to seek treatment (Magaard et al., 2017), men captured by register-based depression measures may have more severe depressive symptoms than the corresponding women, which may explain why previous register-based research in Norway and Sweden has found a stronger association between depression and fertility among men. Thus, our survey-based approach complements earlier register-based studies and contributes to a more comprehensive understanding of the association between depression and fertility. Future research should employ both register- and survey-based approaches, to utilise their respective strengths.

A second factor to consider when comparing this study to previous research is that we only include individuals in coresidential unions whereas earlier research has not made this delimitation (Golovina et al., 2023; Kailaheimo-Lönnqvist et al., 2024, 2025; Kravdal et al., 2025; Liu et al., 2024; Power et al., 2013). Mental health problems are likely to negatively impact individuals' ability to form and maintain stable unions. Previous research indicates that partnership status explains a large part of the negative association between depression and fertility in Finland (Kailaheimo-Lönnqvist et al., 2024), but seems less important in Norway (Kravdal et al., 2025).

There are some limitations to the study. First, the relatively small sample size reduced statistical power for the analyses of intention realisation, especially delayed realisation. It also limited our ability to examine age-related differences in the association between depression and fertility, despite earlier research in Norway showing that such differences exist (Kravdal et al., 2025). Yet, the Norwegian and Swedish GGS-I are better suited for the analysis of fertility intention realisation than other survey data since the register-based follow-ups ensured minimal attrition between interview and follow-up, thus retaining a higher number of respondents while also eliminating non-response bias.

Second, since depression is only measured at a single time point in the GGS-I, our estimates of its association with intention realisation are likely conservative. Current depression should have a stronger impact on intention realisation than depression at interview. Similarly, all control variables are measured at interview, whereas their associations with depression and fertility may be of greater relevance at later time points. To better establish the temporal sequences, future research would benefit from data with longitudinal measurements of both mental health status and fertility preferences.

Moreover, the abbreviated version of the CES Depression Scale is not an ideal measure for categorising the severity of depressive symptoms. Therefore, our study could not further investigate how depression severity matters for fertility outcomes, as in Golovina et al. (2023). Future research could seek to capture severity by combining different measures of depression from multiple data sources (Heshmati et al., 2025).

To conclude, this study adds to a growing body of research showing that depression and other mental health issues are often negatively associated with fertility (Golovina et al., 2023; Kailaheimo-Lönnqvist et al., 2024, 2025; Kravdal et al., 2025; Liu et al., 2024; Power et al., 2013). The study makes three important contributions to this emerging

field. First, to our knowledge, this is the first study to analyse the association between depression and fertility preferences and their realisation. Second, the study adds a cross-country comparative perspective, demonstrating the need to consider contextual variation in the association between depression and fertility. Third, our use of a survey-based measure of depression complements previous research, which has largely relied on register-based depression measures.

Taken together, this and previous studies suggest that mental health can be an important factor in shaping fertility patterns, which deserves greater attention in fertility research. The causes behind the steep fertility decline experienced by Norway, Sweden, and other high-income countries since about 2010 remain poorly understood (Comolli et al., 2021; Hiilamo, 2020; Ohlsson-Wijk & Andersson, 2022). Although rising levels of mental health problems among young adults do not fully explain the recent fertility decline (Kravdal et al., 2025), growing evidence suggests that they constitute a contributing factor. Recognising the connection between mental health and childbearing should inform policy initiatives aimed at supporting sustainable fertility levels.

Appendix

See Tables 1, 2, 3.

Table 1 Descriptive statistics of the respective samples, Norway. Values for categorical variables represent percentages

	Intention sample		Short-term realisation sample	
	Women	**Men**	**Women**	**Men**
Depression				
No	93.16	96.48	94.69	96.67
Yes	6.84	3.52	5.31	3.33
Parity				
Childless	22.39	18.99	45.62	40.37
1 child	18.08	17.29	40.58	35.93
2 or more children	59.53	63.72	13.79	23.70
Age				
Mean (s.d.)	34.06 (6.20)	36.60 (6.40)	29.44 (4.59)	32.17 (4.97)
Education level				
Without university education	42.92	60.10	33.95	53.33
University education	57.08	39.90	66.05	46.67
Employment status				
Employed	82.90	93.67	81.17	94.44
Other	17.10	6.33	18.57	5.19
Missing			0.27	0.37
Financial hardship				
No	81.19	84.02	79.84	82.22
Yes	18.73	15.98	19.89	17.41
Missing	0.08	0.00	0.27	0.37
Relationship satisfaction				
Satisfied	64.58	66.03	73.47	75.56
Not satisfied	35.42	33.97	26.53	24.44
Health issues				
No	88.76	92.36	93.90	92.96
Yes	11.24	7.64	6.10	7.04
N	1228	995	377	270

Table 2 Descriptive statistics of the respective samples, Sweden. Values for categorical variables represent percentages

	Intention sample		Short-term realisation sample		Long-term realisation sample	
	Women	**Men**	**Women**	**Men**	**Women**	**Men**
Depression						
No	90.45	95.22	86.97	96.11	81.40	96.20
Yes	9.55	4.78	13.03	3.89	18.60	3.80
Parity						
Childless	28.10	25.66	49.43	46.67	55.04	54.43
1 child	16.51	17.52	32.57	36.67	20.93	26.58
2 or more children	55.39	56.81	18.01	16.67	24.03	18.99
Age						
Mean (s.d.)	34.02 (6.62)	36.32 (7.00)	29.76 (5.06)	32.39 (6.20)	30.19 (5.88)	32.99 (6.91)
Education level						
Without university education	46.66	55.04	44.44	48.89	46.51	50.63
University education	53.34	44.96	55.56	51.11	53.49	49.37
Employment status						
Employed	73.67	90.27	64.75	87.78	64.34	88.61
Other	26.33	9.73	35.25	12.22	35.66	11.39
Financial hardship						
No	82.54	82.65	81.99	81.67	80.62	84.81
Yes	16.64	16.99	17.62	17.78	18.60	13.92
Missing	0.82	0.35	0.38	0.56	0.78	1.27
Satisfaction with relationship to partner						
Satisfied	54.02	60.00	60.92	56.67	53.49	51.90
Not satisfied	45.98	40.00	39.08	43.33	46.51	48.10
Health issues						
No	94.00	97.17	95.40	98.89	95.35	98.73
Yes	6.00	2.83	4.60	1.11	4.65	1.27
N	733	565	261	180	129	79

Table 3 Share reporting a positive fertility intention, realising a positive fertility intention within 3 years, and realising a positive fertility intention 3–8 years after interview separately, by depression status, sex, and country

Men				
	Norway		**Sweden**	
	Non-depressed	**Depressed**	**Non-depressed**	**Depressed**
Reporting a positive intention (%)	27.2	22.9	32.2	25.9
Realising a positive intention within 3 years (%)	62.1	33.3	56.1	57.1
Realising a positive intention 3–8 years after interview (%)			51.3	0.0
Women				
	Norway		**Sweden**	
	Non-depressed	**Depressed**	**Non-depressed**	**Depressed**
Reporting a positive intention (%)	31.4	23.8	34.5	50.0
Realising a positive intention within 3 years (%)	57.1	40.0	53.7	29.4
Realising a positive intention 3–8 years after interview (%)			48.6	50.0

Multiple logistic regression results for propensity to state a positive fertility intention by depression status. Exponentiated coefficients (odds ratios) with standard errors in parentheses. Separate analysis for Swedish men (Table 4), Norwegian men (Table 5), Swedish women (Table 6), and Norwegian women (Table 7).

Table 4 Swedish men

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
No	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
Yes	0.788	0.650	0.649	0.696
	(0.419)	(0.380)	(0.380)	(0.402)
Age	1.625**	1.535*	1.534*	1.543*
	(0.273)	(0.265)	(0.266)	(0.269)
Age squared	0.992**	0.993**	0.993**	0.993**
	(0.002)	(0.002)	(0.002)	(0.002)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	2.181*	2.108*	2.105*	2.130*
	(0.728)	(0.711)	(0.711)	(0.725)
2+	0.115**	0.100**	0.100**	0.101**
	(0.037)	(0.033)	(0.033)	(0.034)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.555+	1.698*	1.697*	1.640*
	(0.370)	(0.412)	(0.412)	(0.401)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		0.439*	0.439*	0.440*
		(0.163)	(0.163)	(0.165)
Financial hardship				
No		1.000	1.000	1.000
		(.)	(.)	(.)
Yes		2.131*	2.129*	2.082*
		(0.675)	(0.675)	(0.662)
Missing		4.973	4.942	4.483
		(8.211)	(8.177)	(7.377)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			1.014	1.015
			(0.239)	(0.241)
General Health issue				
No				1.000
				(.)
Yes				0.288
				(0.254)
Observations	565	565	565	565
Pseudo R^2	0.307	0.321	0.321	0.324
AIC	503.84	500.24	502.24	501.94
BIC	534.20	543.61	549.94	553.99

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 5 Norwegian men

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
No	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
Yes	0.952	0.986	1.136	1.068
	(0.495)	(0.528)	(0.606)	(0.569)
Age	2.519**	2.100**	2.051**	2.015**
	(0.448)	(0.395)	(0.389)	(0.383)
Age squared	0.985**	0.987**	0.988**	0.988**
	(0.003)	(0.003)	(0.003)	(0.003)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	0.958	0.888	0.889	0.892
	(0.234)	(0.220)	(0.221)	(0.222)
2+	0.119**	0.107**	0.109**	0.109**
	(0.028)	(0.026)	(0.026)	(0.026)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.163	1.247	1.253	1.272
	(0.208)	(0.227)	(0.230)	(0.234)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		0.319**	0.297**	0.273**
		(0.130)	(0.122)	(0.114)
Financial hardship				
No		1.000	1.000	1.000
		(.)	(.)	(.)
Yes		1.647*	1.698*	1.630*
		(0.403)	(0.417)	(0.406)
Missing	N.A	N.A	N.A	N.A
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			0.606*	0.604*
			(0.121)	(0.121)
General Health issue				
No				1.000
				(.)
Yes				1.445
				(0.537)
Observations	995	995	995	995
Pseudo R^2	0.303	0.312	0.318	0.319
AIC	823.43	816.58	812.14	813.17
BIC	857.75	860.71	861.17	867.10

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 6 Swedish women

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
No	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
Yes	1.554	1.589	1.834+	1.907+
	(0.505)	(0.523)	(0.617)	(0.650)
Age	3.116**	3.077**	3.142**	3.171**
	(0.575)	(0.574)	(0.592)	(0.600)
Age squared	0.981**	0.981**	0.980**	0.980**
	(0.003)	(0.003)	(0.003)	(0.003)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	2.023*	2.090*	2.096*	2.047*
	(0.626)	(0.659)	(0.663)	(0.648)
2+	0.157**	0.160**	0.157**	0.153**
	(0.043)	(0.044)	(0.043)	(0.042)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.131	1.127	1.098	1.060
	(0.247)	(0.247)	(0.241)	(0.235)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		0.897	0.890	0.914
		(0.212)	(0.210)	(0.218)
Financial hardship				
No		1.000	1.000	1.000
		(.)	(.)	(.)
Yes		0.932	0.993	1.011
		(0.255)	(0.272)	(0.277)
Missing		0.858	0.866	0.857
		(1.346)	(1.309)	(1.318)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			0.636*	0.639*
			(0.135)	(0.136)
General Health issue				
No				1.000
				(.)
Yes				0.613
				(0.280)
Observations	733	733	733	733
Pseudo R^2	0.358	0.358	0.363	0.364
AIC	629.01	634.69	632.08	632.91
BIC	661.19	680.66	682.65	688.07

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 7 Norwegian women

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
No	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
Yes	0.374**	0.389**	0.408*	0.443*
	(0.131)	(0.136)	(0.144)	(0.158)
Age	4.406**	4.128**	4.166**	4.151**
	(0.786)	(0.756)	(0.764)	(0.760)
Age squared	0.974**	0.975**	0.975**	0.975**
	(0.003)	(0.003)	(0.003)	(0.003)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	2.151**	2.240**	2.249**	2.221**
	(0.554)	(0.584)	(0.587)	(0.581)
2+	0.072**	0.075**	0.074**	0.074**
	(0.018)	(0.018)	(0.018)	(0.018)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.388+	1.395+	1.408+	1.422+
	(0.264)	(0.267)	(0.270)	(0.273)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		0.729	0.728	0.735
		(0.172)	(0.172)	(0.175)
Financial hardship				
No		1.000	1.000	1.000
		(.)	(.)	(.)
Yes		0.939	0.982	1.026
		(0.217)	(0.230)	(0.243)
Missing		0.000	0.000	0.000
		(0.016)	(0.018)	(0.029)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			0.772	0.765
			(0.156)	(0.155)
General Health issue				
No				1.000
				(.)
Yes				0.597
				(0.199)
Observations	1228	1228	1228	1228
Pseudo R^2	0.467	0.468	0.469	0.471
AIC	823.42	827.21	827.57	827.10
BIC	859.21	878.35	883.82	888.46

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Multiple logistic regression results for propensity to realise a positive fertility intention within three years by depression status. Exponentiated coefficients (odds ratios) with standard errors in parentheses. Separate analysis for Swedish men (Table 8), Norwegian men (Table 9), Swedish women (Table 10), and Norwegian women (Table 11).

Table 8 Swedish men

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
No	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
Yes	1.378	2.026	2.183	2.155
	(1.129)	(1.865)	(2.025)	(2.000)
Age	1.278	1.356	1.364	1.371
	(0.303)	(0.332)	(0.334)	(0.337)
Age squared	0.996	0.995	0.995	0.994
	(0.003)	(0.004)	(0.004)	(0.004)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	2.944**	2.833**	2.950**	2.962**
	(1.155)	(1.126)	(1.185)	(1.191)
2+	1.505	1.481	1.414	1.406
	(0.741)	(0.757)	(0.730)	(0.727)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.225	1.215	1.266	1.245
	(0.409)	(0.410)	(0.431)	(0.427)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		0.929	0.857	0.849
		(0.464)	(0.431)	(0.428)
Financial hardship				
No		1.000	1.000	1.000
		(.)	(.)	(.)
Yes		1.605	1.658	1.650
		(0.718)	(0.747)	(0.744)
Missing		0.000	0.000	0.000
		(0.000)	(0.001)	(0.001)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			0.612	0.603
			(0.199)	(0.197)
General Health issue				
No				1.000
				(.)
Yes				0.505
				(0.759)
Observations	180	180	180	180
Pseudo R^2	0.052	0.066	0.076	0.076
AIC	247.97	250.47	250.17	251.97
BIC	270.32	282.40	285.29	290.28

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 9 Norwegian men

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
CES Depression scale = 0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
CES Depression scale = 1	0.271+	0.334	0.413	0.402
	(0.203)	(0.267)	(0.333)	(0.326)
Age	1.073	1.053	1.018	1.039
	(0.264)	(0.271)	(0.264)	(0.271)
Age squared	0.998	0.998	0.999	0.999
	(0.004)	(0.004)	(0.004)	(0.004)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	1.806+	1.823+	1.795+	1.794+
	(0.552)	(0.564)	(0.562)	(0.563)
2+	1.159	1.189	1.173	1.175
	(0.395)	(0.414)	(0.413)	(0.415)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.980*	1.950*	1.899*	1.881*
	(0.528)	(0.520)	(0.514)	(0.510)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		1.057	0.896	0.981
		(0.706)	(0.596)	(0.669)
Missing		0.000	0.000	0.000
		(0.003)	(0.001)	(0.001)
Financial hardship				
Financial hardship = No		1.000	1.000	1.000
		(.)	(.)	(.)
Financial hardship = Yes		0.839	0.886	0.921
		(0.302)	(0.323)	(0.341)
Missing		1.000	1.000	1.000
		(.)	(.)	(.)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			0.466*	0.473*
			(0.140)	(0.142)
General Health issue				
No				1.000
				(.)
Yes				0.708
				(0.380)
Observations	270	270	270	270
Pseudo R^2	0.052	0.055	0.073	0.074
AIC	356.09	361.17	356.66	358.25
BIC	381.28	397.16	396.24	401.43

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 10 Swedish women

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
No	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
Yes	0.364*	0.395*	0.495	0.494
	(0.153)	(0.169)	(0.220)	(0.220)
Age	2.216**	2.186*	2.329**	2.325**
	(0.667)	(0.670)	(0.735)	(0.734)
Age squared	0.986**	0.986**	0.985**	0.985**
	(0.005)	(0.005)	(0.005)	(0.005)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	2.780**	2.896**	2.942**	2.948**
	(0.898)	(0.992)	(1.015)	(1.017)
2+	0.772	0.786	0.770	0.773
	(0.305)	(0.314)	(0.311)	(0.313)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.007	0.976	0.910	0.917
	(0.297)	(0.291)	(0.276)	(0.282)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		0.906	0.853	0.850
		(0.285)	(0.271)	(0.271)
Financial hardship				
No		1.000	1.000	1.000
		(.)	(.)	(.)
Yes		0.858	0.980	0.977
		(0.316)	(0.368)	(0.367)
Missing		0.000	0.000	0.000
		(0.002)	(0.003)	(0.003)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			0.570+	0.568+
			(0.170)	(0.170)
General Health issue				
No				1.000
				(.)
Yes				1.113
				(0.736)
Observations	261	261	261	261
Pseudo R^2	0.105	0.108	0.118	0.118
AIC	337.77	342.79	341.19	343.17
BIC	362.72	378.44	380.40	385.94

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 11 Norwegian women

	Model 1 A	Model 1B	Model 1 C	Model 1D
Depression				
CES Depression scale = 0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
CES Depression scale = 1	0.580	0.600	0.678	0.688
	(0.294)	(0.304)	(0.344)	(0.350)
Age	2.096**	1.937*	1.975*	1.961*
	(0.585)	(0.547)	(0.560)	(0.557)
Age squared	0.987**	0.988**	0.988**	0.988**
	(0.005)	(0.005)	(0.005)	(0.005)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	3.017**	3.272**	3.291**	3.256**
	(0.807)	(0.903)	(0.914)	(0.905)
2+	0.870	0.947	0.946	0.948
	(0.308)	(0.343)	(0.346)	(0.347)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	2.573**	2.578**	2.661**	2.657**
	(0.654)	(0.659)	(0.686)	(0.685)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		0.603+	0.594+	0.592+
		(0.182)	(0.180)	(0.180)
Missing		187769.698	274984.709	130284.824
		(1.873e + 08)	(2.742e + 08)	(89297485.881)
Financial hardship				
Financial hardship = No		1.000	1.000	1.000
		(.)	(.)	(.)
Financial hardship = Yes		0.916	1.004	1.040
		(0.266)	(0.297)	(0.312)
Missing		1.000	1.000	1.000
		(.)	(.)	(.)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			0.591*	0.586*
			(0.153)	(0.152)
General Health issue				
No				1.000
				(.)
Yes				0.710
				(0.341)
Observations	377	377	377	377
Pseudo R^2	0.100	0.107	0.115	0.116
AIC	479.16	481.69	479.54	481.03
BIC	506.68	521.02	522.79	528.22

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

See Appendix Table 12.

Table 12 Multiple logistic regression results for propensity to realise a positive fertility intention within 3–8 years by depression status among Swedish women. Exponentiated coefficients (odds ratios) with standard errors in parentheses

	Model 3 A	Model 3B	Model 3 C	Model 3D
Depression				
No	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
Yes	0.868	0.793	0.784	0.770
	(0.455)	(0.440)	(0.446)	(0.440)
Age	1.800	1.908	1.895	1.875
	(0.735)	(0.802)	(0.809)	(0.807)
Age squared	0.988+	0.987+	0.988+	0.988+
	(0.007)	(0.007)	(0.007)	(0.007)
Parity				
0	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
1	0.896	0.921	0.914	0.921
	(0.478)	(0.514)	(0.516)	(0.521)
2+	0.081**	0.075**	0.075**	0.076**
	(0.057)	(0.053)	(0.053)	(0.053)
Highest educational degree				
No university education	1.000	1.000	1.000	1.000
	(.)	(.)	(.)	(.)
University education	1.237	1.321	1.334	1.401
	(0.580)	(0.637)	(0.658)	(0.719)
Employment				
Employed		1.000	1.000	1.000
		(.)	(.)	(.)
Other		1.331	1.342	1.313
		(0.674)	(0.689)	(0.679)
Economic hardship				
No		1.000	1.000	1.000
		(.)	(.)	(.)
Yes		0.475	0.469	0.453
		(0.254)	(0.259)	(0.255)
Missing		1053794.170	1041735.212	453976.518
		(1.579e+09)	(1.561e+09)	(4.402e+08)
Relationship satisfaction				
Satisfied			1.000	1.000
			(.)	(.)
Not satisfied			1.044	1.038
			(0.493)	(0.490)
General Health issue				
No				1.000
				(.)
Yes				1.418
				(1.425)
Observations	129	129	129	129
Pseudo R^2	0.239	0.255	0.255	0.256
AIC	149.95	153.15	155.14	157.02
BIC	169.97	181.74	186.60	191.33

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Abbreviations

AMEs	Average marginal effects
CES-D Scale	Centre for Epidemiologic Studies Depression Scale
GGS	Generations and Gender Survey
GGS-I	Generations and Gender Survey, round I

Acknowledgements
Preliminary versions of this paper were presented at the 22nd Nordic Demographic Symposium in Oslo, June 9–11, 2022, the 28th Annual Postgraduate Population Studies Conference (PopFest) in Florence, October 26–28, 2022, and the Swedish Register-Based Research Summit 2023 in Stockholm, November 14, 2023. The authors are grateful for comments received during those conferences. The authors also thank Gunnar Andersson and Gerda Neyer for their helpful comments.

Author contributions
EC and WK both contributed to the study's conception, its design, data analysis and interpretation, and writing.

Funding
Open access funding provided by Stockholm University. The authors acknowledge financial support from the Swedish Research Council for Health, Working life and Welfare (FORTE), grant numbers 2018 – 00310 and 2020 – 00639, Riksbankens Jubileumsfond for project P20-0517 on Fertility intentions and fertility decline in Sweden, the Research Council of Finland (decision number: 345546), and the Strategic Research Council affiliated with the Research Council of Finland (decision number 364374 for the FLUX consortium).

Data availability
For round I of the Swedish Generations and Gender Survey (GGS), data from both wave 1 and the follow-ups are available through the Generations and Gender Programme's (GGP) website (www.ggp-i.org). For round I of the Norwegian GGS, both wave 1 and the follow-up can be accessed via the Norwegian Centre for Research Data (www.nsd.no/en), while wave 1 is also available through the GGP website.

Declarations

Competing interests
The authors declare that they have no competing interests.

Received: 17 September 2025 / Accepted: 22 January 2026
Published online: 09 February 2026

References

Aebi, J. A., & Orth, U. (2025). Low self-esteem as a risk factor for depression: A longitudinal study with continuous time modeling. *Journal of Personality and Social Psychology: Personality Processes and Individual Differences*, *129*(5), 954–971. https://doi.org/10.1037/pspp0000560

Almeida, N. D., Basso, O., Abrahamowicz, M., Gagnon, R., & Tamblyn, R. (2016). Risk of miscarriage in women receiving antidepressants in early pregnancy, correcting for induced abortions. *Epidemiology (Cambridge, Mass.)*, *27*(4), 538–546. https://doi.org/10.1097/eDe.0000000000000484

American Psychiatric Association (2020, October). What is depression? https://www.psychiatry.org/patients-families/depression/what-is-depression

Arias-de la Torre, J., Vilagut, G., Ronaldson, A., Serrano-Blanco, A., Martín, V., Peters, M., Valderas, J. M., Dregan, A., & Alonso, J. (2021). Prevalence and variability of current depressive disorder in 27 European countries: A population-based study. *Lancet Public Health*, *6*, e729–e738. https://doi.org/10.1016/S2468-2667(21)00047-5

Breslau, J., Miller, E., Jin, R., Sampson, N. A., Alonso, J., Andrade, L. H., Bromet, E. J., de Girolamo, G., Demyttenaere, K., Fayyad, J., Fukao, A., Gălăon, M., Gureje, O., He, Y., Hinkov, H. R., Hu, C., Kovess-Masfety, V., Matschinger, H., Medina-Mora, M. E., Ormel, J., Posada-Villa, J., Sagar, R., Scott, K. M., & Kessler, R. C. (2011). A multinational study of mental disorders, marriage, and divorce. *Acta Psychiatrica Scandinavica*, *124*(6), 474–486. https://doi.org/10.1111/j.1600-0447.2011.01712.x

Buber-Ennser, I. (2014). Attrition in the Austrian generations and gender survey: Is there a bias by Fertility-Relevant aspects? *Demographic Research*, *31*(16), 459–496. https://doi.org/10.4054/DemRes.2014.31.16

Carlsson, E. (2023). The realization of short-term fertility intentions among immigrants and children of immigrants in Norway and Sweden. *International Migration Review*, *57*(3), 979–1016. https://doi.org/10.1177/01979183221107930

Comolli, C. L., Neyer, G., Andersson, G., Dommermuth, L., Fallesen, P., Jalovaara, M., Jónsson, A. K., Kolk, M., & Lappegård, T. (2021). Beyond the economic gaze: Childbearing during and after recessions in the nordic countries. *European Journal of Population*, *37*(2), 473–520. https://doi.org/10.1007/s10680-020-09570-0

Dommermuth, L., Klobas, J., & Lappegård, T. (2015). Realization of fertility intentions by different time frames. *Advances in Life Course Research*, *24*, 34–46. https://doi.org/10.1016/j.alcr.2015.02.001

Elmer, T., & Stadtfeld, C. (2020). Depressive symptoms are associated with social isolation in face-to-face interaction networks. *Scientific Reports*, *10*, 1444. https://doi.org/10.1038/s41598-020-58297-9

Evans-Hoeker, E. A., Eisenberg, E., Diamond, M. P., Legro, R. S., Alvero, R., Coutifaris, C., Casson, P. R., Christman, G. M., Hansen, K. R., Zhang, H., Santoro, N., & Steiner, A. Z. (2018). Major depression, antidepressant use, and male and female fertility. *Fertility and Sterility*, *109*(5), 879–887. https://doi.org/10.1016/j.fertnstert.2018.01.029

Frank, P., Batty, G. D., Pentti, J., Jokela, M., Poole, L., Ervasti, J., Vahtera, J., Lewis, G., Steptoe, A. & Kivimäki, M. (2023). Association between depression and physical conditions requiring hospitalization. *JAMA Psychiatry*, *80*(7), 690–699. https://doi.org/10.1001/jamapsychiatry.2023.0777

Golovina, K., Elovainio, M., & Hakulinen, C. (2023). Association between depression and the likelihood of having children: A nationwide study in Finland. *American Journal of Obstetrics and Gynecology*, *228*(2), 211.

Goodwin, R. D., Dierker, L. C., Wu, M., Galea, S., Hoven, C. W., & Weinberger, A. H. (2022). Trends in U.S. Depression prevalence from 2015 to 2020: The widening treatment gap. *American Journal of Preventive Medicine*, *63*(5), 726–733. https://doi.org/10.1016/j.amepre.2022.05.014

Grahek, I., Shenhav, A., Musslick, S., Krebs, R. M., & Koster, E. H. W. (2019). Motivation and cognitive control in depression. *Neuroscience & Biobehavioral Reviews*, *102*, 371–381. https://doi.org/10.1016/j.neubiorev.2019.04.011

Grundström, J., Kiviruusu, O., Konttinen, H., & Berg, N. (2024). Reciprocal associations between parenthood and mental well-being – a prospective analysis from age 16 to 52 years. *Current Psychology*, *43*, 2238–2252. https://doi.org/10.1007/s12144-023-04487-3

Gustavson, K., Røysamb, E., von Soest, T., Helland, M. J., Karevold, E., & Mathiesen, K. S. (2012). Reciprocal longitudinal associations between depressive symptoms and romantic partners' synchronized view of relationship quality. *Journal of Social and Personal Relationships*, *29*(6), 776–794. https://doi.org/10.1177/0265407512448264

Gyllenberg, D., Marttila, M., Sund, R., Jokiranta-Olkoniemi, E., Sourander, A., Gissler, M., & Ristikari, T. (2018). Temporal changes in the incidence of treated psychiatric And neurodevelopmental disorders during adolescence: An Analysis of two National Finnish birth cohorts. *Lancet Psychiatry*, *5*, 227–236. https://doi.org/10.1016/S2215-0366(18)30038-5

Hare, D. L., Toukhsati, S. R., Johansson, P., & Jaarsma, T. (2014). Depression and cardiovascular disease: A clinical review. *European Heart Journal*, *35*, 1365–1372. https://doi.org/10.1093/eurheartj/eht462

Heshmati, A., Honkaniemi, H., Fritzell, S., & Juárez, S. P. (2025). Parental leave benefits and maternal postpartum mental health in Sweden. *JAMA Network Open*, *8*(4), e258062. https://doi.org/10.1001/jamanetworkopen.2025.8062

Hiilamo, H. (2020). Why fertility has been declining in Finland after the global recession? A theoretical approach. *Finnish Yearbook of Population Research*, *54*, 29–51. https://doi.org/10.23979/fypr.85090

Jonsson, U., Bohman, H., Hjern, A., von Knorring, L., Paaren, A., Olsson, G., & von Knorring, A. L. (2011). Intimate relationships and childbearing after adolescent depression: A population-based 15 year follow-up study. *Social Psychiatry and Psychiatric Epidemiology*, *46*, 711–721. https://doi.org/10.1007/s00127-010-0238-7

Joosten, D. H. J., Nelemans, S. A., Meeus, W., & Branje, S. (2022). Longitudinal associations between depressive symptoms and quality of romantic relationships in late adolescence. *Journal of Youth and Adolescence*, *51*, 509–523. https://doi.org/10.1007/s10964-021-01511-2

Kailaheimo-Lönnqvist, S., Moustgaard, H., Martikainen, P., & Myrskylä, M. (2024). Own depression, partner's depression, and childlessness: A nationwide register-based study. *Social Science & Medicine*, *361*, 117356. https://doi.org/10.1016/j.socscimed.2024.117356

Kailaheimo-Lönnqvist, S., Nisén, J., Metsä-Simola, N., Martikainen, P., & Myrskylä, M. (2025). Different mental health disorders and childlessness: The importance of partnership status. *MPIDR Working Paper*, *2025-010*. https://doi.org/10.4054/MPIDR-WP-2025-010

Kapitány, B., & Spéder., Z. (2012). Realization, postponement or abandonment of childbearing intentions in four European countries. *Population*, *67*(4), 599–629. https://doi.org/10.3917/popu.1204.0711

Karhu, J., Veijola, J., & Hintsanen, M. (2024). The bidirectional relationships of optimism and pessimism with depressive symptoms in adulthood – A 15-year follow-up study from Northern Finland birth cohorts. *Journal of Affective Disorders*, *362*, 468–476. https://doi.org/10.1016/j.jad.2024.07.049

Kravdal, Ø., Flatø, M., & Torvik, F. A. (2025). Fertility among Norwegian women and men with mental disorders. *European Journal of Population*, *41*, 17. https://doi.org/10.1007/s10680-025-09739-5

Krokstad, S., Weiss, D. A., Krokstad, M. A., Rangul, V., Kvaløy, K., Ingul, J. M., Bjerkeset, O., Twenge, J., & Sund, E. R. (2022). Divergent decennial trends in mental health according to age reveal poorer mental health for young people: Repeated cross-sectional population-based surveys from the HUNT Study, Norway. *British Medical Journal Open*, *12*, e057654. https://doi.org/10.1136/bmjopen-2021-057654

Levine, S. Z. (2013). Evaluating the seven-item center for epidemiologic studies depression scale short-form: A longitudinal US community study. *Social Psychiatry and Psychiatric Epidemiology*, *48*, 1519–1526. https://doi.org/10.1007/s00127-012-0650-2

Liu, Q., He, H., Yang, J., Feng, X., Zhao, F., & Lyu, J. (2020). Changes in the global burden of depression from 1990 to 2017: Findings from the global burden of disease study. *Journal of Psychiatric Research*, *126*, 134–140. https://doi.org/10.1016/j.jpsychires.2019.08.002

Liu, A., Akimova, E. T., Ding, X., Jukarainen, S., Vartiainen, P., Kiiskinen, T., Koskelainen, S., Havulinna, A. S., Gissler, M., Lombardi, S., Fall, T., Mills, M. C., & Ganna, A. (2024). Evidence from Finland and Sweden on the relationship between early-life diseases and lifetime childlessness in men and women. *Nature Human Behaviour*, *8*, 276–287. https://doi.org/10.1038/s41562-023-01763-x

Magaard, J. L., Seeralan, T., Schulz, H., & Brütt, A. L. (2017). Factors associated with help-seeking behaviour among individuals with major depression: A systematic review. *Plos One*, *12*(5), e0176730.

Marazziti, D., Consoli, G., Picchetti, M., Carlini, M., & Faravelli, L. (2010). Cognitive impairment in major depression. *European Journal of Pharmacology*, *626*(1), 83–86. https://doi.org/10.1016/j.ejphar.2009.08.046

Mojtabai, R., Olfson, M., & Han, B. (2016). National trends in the prevalence and treatment of depression in adolescents and young adults. *Pediatrics*, *138*(6), e20161878. https://doi.org/10.1542/peds.2016-1878

Nakhai-Pour, H. R., Broy, P., & Bérard, A. (2010). Use of antidepressants during pregnancy and the risk of spontaneous aborton. *Canadian Medical Association Journal*, *182*(10), 1031–1037. https://doi.org/10.1503/cmaj.091208

Nillni, Y. I., Wesselink, A. K., Gradus, J. L., Hatch, E. E., Rothman, K. J., Mikkelsen, E. M., & Wise, L. A. (2016). Depression, anxiety, and psychotropic medication use and fecundability. *American Journal of Obstetrics and Gynecology*, *215*(4), 453e1–453e8. https://doi.org/10.1016/j.ajog.2016.04.022

Nilsen, W., Olsson, C. A., Karevold, E., O'Loughlin, C., McKenzie, M., & Patton, G. C. (2012). Adolescent depressive symptoms and subsequent pregnancy, pregnancy, pregnancy completion and pregnancy termination in young adulthood: Findings from the Victorian adolescent health cohort study. *Journal of Pediatric and Adolescent Gynecology*, *25*(1), 6–11. https://doi.org/10.1016/j.jpag.2011.06.013

OECD. (2024). *OECD data Archive. Indicator: Fertility rates, subject: Total, measure: Children/woman, frequency: Annual*. BBEL%2BAUT%2BAUS.FERTILITY.A&to[TIME_PERIOD]=false&vw=tb. https://data-explorer.oecd.org /vis?lc=en&df[ds]=DisseminateArchiveDMZ&df[id]=DF_DP_LIVE&df[ag]=OECD&df[vs]=&av=true&pd=1960%2C2022&dq=OAVG%2BUSA%2BGBR%2BTUR%2BCHE%2BSWE%2BESP%2BSVN%2BSVK%2BPRT%2BPOL%2BNZL%2BNOR%2BNLD%2BMEX%2BLUX%2BLTU%2BLVA%2BKOR%2BJPN%2BITA%2BISR%2BIRL%2BISL%2BHUN%2BGRC%2BDEU%2BFRA%2BFIN%2BDNK%2BEST%2BCZE%2BCRI%2BCOL%2BCHL%2BCAN%2

Ohlsson-Wijk, S., & Andersson, G. (2022). Disentangling the Swedish fertility decline of the 2010s. *Demographic Research*, *47*(12), 345–358. https://doi.org/10.4054/DemRes.2022.47.12

Oppenheimer, C. W., & Hankin, B. L. (2011). Relationship quality and depressive symptoms among adolescents: A short-term multi-wave investigation of longitudinal, reciprocal associations. *Journal of Clinical Child & Adolescent Psychology*, *40*(3), 486–493. https://doi.org/10.1080/15374416.2011.563462

Power, R. A., Kyaga, S., Uher, R., MacCabe, J. H., Långström, N., Landen, M., McGuffin, P., Lewis, C. M., Lichtenstein, P., & Svensson, A. C. (2013). Fecundity of patients with schizophrenia, autism, bipolar disorder, depression, anorexia nervosa, or substance abuse vs their unaffected siblings. *JAMA Psychiatry*, *70*(1), 22–30. https://doi.org/10.1001/jamapsychiatry.2013.268

Radloff, L. S. (1977). The CES-D scale: A Self-Report depression scale for research in the general population. *Applied Psychological Measurement*, *1*(3), 385–401. https://doi.org/10.1177/014662167700100306

Weye, N., McGrath, J. J., Lasgaard, M., Momen, N. C., Knudsen, A. K., Musliner, K., & Plana-Ripoll, O. (2023). Agreement between survey- and register-based measures of depression in Denmark. *Acta Psychiatrica Scandinavia*, *147*(6), 581–592. https://doi.org/10.1111/acps.13555

Whooley, M. A., Kiefe, C. I., Chesney, M. A., Markovitz, J. H., Matthews, K., & Hulley, S. B. (2002). Depressive symptoms, unemployment, and loss of income. *Archives of Internal Medicine*, *162*, 2614–2620. https://doi.org/10.1001/archinte.162.22.2614

Publisher's note