

Unintended pregnancy and long-term maternal mental health: findings from the Generation R Study.

Adriana P. C. Hermans

Erasmus MC

Eline M. Poels

Erasmus MC

Hilmar Bijma

Erasmus MC

Manon H.J. Hillegers

Erasmus MC

Hanan El Marroun

Erasmus MC

Clair A. Enthoven

`c.enthoven@erasmusmc.nl`

Erasmus MC

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Abstract

Purpose.

Unintended pregnancies are common around the world and have been linked to maternal mental health problems. Limited research has been devoted to studying risk and resilience factors in the relationship between unintended pregnancy and maternal mental health.

Methods.

Data from 8496 women from the Dutch population-based Generation R cohort in Rotterdam were analysed to assess the associations between unintended pregnancy and depressive and anxiety symptoms of these mothers in the prenatal period up to 17 years after childbirth. The role of distribution of care, perceived social support, and perceived childcare support in the associations was explored using four-way decomposition.

Results.

Having an unintended pregnancy with initial and prolonged ambivalent feelings was linked to increased depressive and anxiety symptoms up to 17 years after childbirth, which decreased in strength over time. All investigated factors were independently associated with depressive and anxiety symptoms, and perceived social support may mediate some of the associations between unintended pregnancy and depressive and anxiety symptoms at 6, 9 and 17 years after childbirth.

Conclusions.

Our findings highlight the link between unintended pregnancy with ambivalent feelings and long-term symptoms of depression and anxiety in women, which reduced in strength over time. Access to family planning services and mental health support are important particularly in the context of complex feelings about the pregnancy and perceived social support should be further investigated as a potential modifiable factor.

Clinical trial registration

Clinical trial number: not applicable.

Article Highlights

- Unintended pregnancy with ambivalent feelings was associated with long-term depressive and anxiety symptoms in a Dutch population.
- While apparent up to 17 years after childbirth, these associations decreased in strength over time.
- Perceived social support may mediate part of these associations.

1. INTRODUCTION

Unintended pregnancies, defined as pregnancies that are unplanned or unwanted at the time of conception, are very common all around the world. Of all pregnancies worldwide, 44% were estimated to be unintended from 2010 to 2014 (Bearak et al., 2018). Per 1000 women, recent estimates report 64 unintended pregnancies (Bearak et al., 2020), with highest rates of unintended pregnancy in the Sub-Saharan Africa (91 in 1000) and west Asia and north Africa (86 in 1000), and lowest rates in Europe and northern America (35 in 1000) and Australia and New Zealand (38 in 1000) in women aged 15–49 years.

Unintended pregnancy has been associated with poorer mental health and adverse circumstances, including perinatal depression and maternal psychological stress in the short and longer term (Abajobir et al., 2016; Bahk et al., 2015; Barton et al., 2017; Garipey et al., 2016; Gastaldon et al., 2022; Herd et al., 2016; Leathers & Kelley, 2000; Qiu et al., 2020; Wang et al., 2025). This emphasizes the need to identify risk and resilience factors that may play a role in the association between unintended pregnancy and long-term maternal mental health.

Thus far, little research has been performed on resilience factors in the relationship between unintended pregnancy and women's mental health. Some studies have investigated factors that are often referred to as 'co-occurring risks' (Bahk et al., 2015; Barton et al., 2017; Beumer et al., 2023). Some of these factors are pre-existing and may confound the relationship between unintended pregnancy and mental health, such as socioeconomic factors and pre-pregnancy mental health. Other factors may have been influenced by the intendedness of the pregnancy, such as single parenthood, distribution of care between the woman and her partner after childbirth, social support, and help with childcare. Limited research investigated the mechanisms through which such factors are related to both unintended pregnancy and women's mental health, for instance via mediation, interaction, or both. Furthermore, whilst the link between pregnancy intention and women's mental health may be bidirectional (Hall et al., 2014) and history of mental health problems has been linked to pregnancy intention (Enthoven et al., 2022), few studies have investigated this while considering prior history of psychiatric conditions. Maternal mental illness is an important cause of maternal mortality, including via suicide and addiction (Wisner et al., 2024), and understanding factors at play in the relationship with unintended pregnancy may guide efforts to improve perinatal mental health in women.

To address this gap, this study aimed to investigate whether unintended pregnancy is associated with (1) prenatal and long-term mental health and (2) whether distribution of care, perceived social support, and perceived childcare support may explain this association with mental health, through mediation and/or interaction effects using 17 years follow-up data from a Dutch population-based birth cohort.

2. MATERIALS AND METHODS

This study was preregistered in the Open Science Framework (<https://osf.io/n7zd6/overview>). Deviations from preregistered plans are reported (Supplementary materials). The analysis scripts are openly accessible at <https://github.com/JanaHermans/unintended-parenthood-mental-health>.

2.1 Study population

The study population consisted of women included in the Generation R Study, a population-based prospective cohort study from foetal life onwards, designed to identify early environmental and genetic determinants of growth, development, and health. Cohort details have been described previously (Jaddoe et al., 2006; Kooijman et al., 2016). Pregnant women living in Rotterdam whose expected delivery date was between April 2002 and January 2006 were invited to participate. In total, 9978 women were enrolled at baseline. If women were enrolled with multiple pregnancies, one pregnancy was randomly included. Participants were included if they had at least 10% of study variables available and in the case of multiple pregnancies data from one was randomly included, resulting in a sample size of 8496 women.

2.2 Study measures

2.2.1 Exposure

Pregnancy intention was measured at enrolment using a self-report questionnaire in which participants reported whether their pregnancy was planned or not. In case of an unplanned pregnancy, women reported how they felt about the pregnancy using four answering categories: "pleased from the start"; "initially mixed feelings"; "still mixed feelings"; or "mostly unhappy about the pregnancy". Given that few women reported "still having mixed feelings" (N = 102) or "feeling mostly unhappy" (N = 24), these categories were merged. For the first research aim, pregnancy intention was categorised into "planned", "unplanned and wanted from the start", "unplanned and initially ambivalent feelings", and "unplanned and prolonged ambivalent feelings".

For the second research aim, pregnancy intention was analysed as a binary exposure (planned versus unplanned) to avoid violation of the positivity assumption (i.e. a non-zero probability of each pregnancy intention level for every combination of covariates).

2.2.1 Outcomes

Women's mental health was assessed at 20 weeks of gestation, at 2 and 6 months after birth, and at 3, 9, and 17 years after birth using the Brief Symptom Inventory (Derogatis & Melisaratos, 1983). A sum score was computed for the depression and anxiety subscales (both 6 items), which was standardised (z-scores) with higher scores reflecting more symptoms.

2.2.3 Explanatory factors

The explanatory factors were all self-reported at 6 months postpartum. Distribution of care between the parents was measured by asking women how she and her partner divided caregiving tasks (with categories ranging from 'nearly always by me' to 'nearly always by my partner'). This was summarised in a z-score, with a positive value indicating more involvement of the mother relative to the partner, and a negative value indicating more involvement of the partner relative to the mother.

Social support discrepancies were measured using the Social Support List 12 – Discrepancies (SSL12-D), measuring the difference between one's desired level of social support and one's experienced level of social support with items 'doesn't happen enough', 'I don't really miss this', 'just right', or 'happens a little too often'. This variable was standardised to z-scores and inverted, meaning a higher score reflected less perceived social support.

Perceived childcare support was measured with one item asking whether women were offered help to look after their child(ren) (e.g. babysitting, day care, or transport), with similar items as perceived social support. This measure was dichotomised into 'doesn't happen enough' and 'I don't really miss this/just right/happens a little too often'. Further details on explanatory factors assessment are described in the Supplement.

2.2.4 Covariates

Analyses were adjusted for maternal national origin (Dutch, Surinamese-Antillean, Turkish-Moroccan, non-Dutch European, other), age at conception (years), marital status (married/living together vs. no partner), level of education (university degree, 'higher' vocational training, three or more years of secondary school, primary or no education), monthly household income, (< €1200, €1200–2000, > €2000) and history of childhood trauma (history vs. no history). Lifetime history of psychiatric conditions (history vs. no history) was included in sensitivity analyses. For details on covariate assessment, see the Supplement.

2.3 Statistical analyses

First, generalized linear mixed models were used to examine the association between pregnancy intention and prenatal, postpartum, and long-term depressive and anxiety symptoms (20 weeks of gestation, at 2 and 6 months after birth, and at child ages 3, 9, and 17 years). Differences over time were investigated by including an interaction term between pregnancy intention and number of years after childbirth. Models were adjusted for national origin, level of education, household income, age, marital status, and maternal childhood trauma.

Second, we investigated individual associations between the explanatory factors and depression and anxiety at 3, 9 and 17 years, adjusting for pregnancy intention and covariates. Since explanatory factors were measured 6 months postpartum, we could not include prenatal and postpartum mental health in these models. Following, we conducted four-way decomposition using the R-package CMAverse (version 0.1.0) in R (version 4.3.1). This provides a mechanistic interpretation of exposure-outcome relations, breaking the relation down into four components. The total effect of pregnancy intention was composed in a pure indirect effect attributed to mediation only (PIE), an effect attributed to interaction only (INTref), an effect attributed to both mediation and interaction (INTmed), and a controlled direct effect not attributed to mediation or interaction (CDE) (Fig. 1, Van der Weele, 2014). We employed the g-formula approach by Robins (1986) to account for potential exposure-induced

confounding of depression during pregnancy in the association between the explanatory factors and depression and anxiety outcomes. Missing data were imputed for all variables using Multivariate Imputation by Chained Equations (MICE) to mitigate selection bias. False discovery rate (FDR) correction with the Benjamini Hochberg method was applied to correct for multiple testing.

Several sensitivity analyses were conducted. Firstly, to assess the role of pre-existing psychiatric conditions in the associations, models were additionally adjusted for psychiatric history. Second, all analyses were also conducted in cases with complete data on the exposure and mediator, and at least one outcome measurement. Lastly, depression and anxiety were investigated as a binary outcome (i.e. scoring below or above a validated clinical cut-off of 0.75 (de Beurs, 2004) separately for anxiety and depressive symptoms), given the right-skewed distribution of the data, which could not be mitigated by transformations.

3. RESULTS

Study population characteristics are shown in Table 1. Mean age at childbirth was 30.3 (SD = 5.4), 79.5% (N = 6762) of women were married or living with a partner, 20.5% (N = 1739) of women had a university-level education, 43.0% (N = 3655) of women had a monthly income over €2000 per month, and 48.1% (N = 4084) of women were of Dutch national origin. Out of all women, 62.9% (N = 5342) had a planned pregnancy, 13.8% (N = 1170) had an unplanned pregnancy and were pleased, 9.9% (N = 841) had an unplanned pregnancy with initially ambivalent feelings, and 1.4% (N = 116) had an unplanned pregnancy with prolonged ambivalent feelings.

3.1 Associations between pregnancy intention and maternal mental health over time

Compared to planned pregnancy, having an unplanned pregnancy was associated with 0.12–0.76 higher depressive and 0.08–0.58 higher anxiety z-scores, see Table 2. A significant negative interaction with age indicates that these associations decreased over time. Pregnancy intention was also associated with depression and anxiety symptoms at all six time points individually (the prenatal period and 2 months, 6 months, 3 years, 9 years, and 17 years after birth), apart from the ‘unplanned and pleased’ group which was only associated with depressive symptoms at time points up to 6 months post-partum (Tables S2-3).

3.2 Explanatory factors of the associations between pregnancy intention and maternal mental health over time

Distribution of care, perceived social support, and perceived childcare support were individually associated with increased depressive and anxiety symptoms over time (Table S4). Four-way decomposition showed that the association between pregnancy intention and depression and anxiety symptoms is mostly attributed to the controlled direct effect (Tables 3–5). There was some evidence of a pure indirect effect through lack of social support for both depressive and anxiety symptoms at all time points (Table 4). This indirect effect through lack of social support was associated with 0.01 (95% CI 0.00, 0.02) higher anxiety symptoms at 3 years, anxiety and depressive symptoms at 9 years, and depressive symptoms at 17 years and 0.01 (95% CI 0.00, 0.01) higher symptoms of depression at 3 years and anxiety at 17 years, but these effects were no longer significant after multiple testing correction.

3.3 Sensitivity analyses

Pregnancy intention remained associated with depressive and anxiety symptoms after additional adjustment for psychiatric history (Table S5). When investigating depression and anxiety as a binary outcome, pregnancy intention was associated with depression at all 6 time points and with anxiety up until 13 years after childbirth. Again, the unplanned and pleased group was only associated with depression up to 6 months post-partum and not with anxiety at any time point (Table S6). In the complete-case analyses, with N = 2328, pregnancy intention was associated with depressive and anxiety symptoms over time

(Table S7). There was no evidence of mediation, interaction, or mediated interaction by distribution of care, perceived social support, or perceived childcare support after adjusting for psychiatric history (Tables S8-10).

4. DISCUSSION AND CONCLUSIONS

This study investigated the associations between pregnancy intention and depressive and anxiety symptoms over time, as well as the role of distribution of care, perceived social support, and perceived childcare support in these associations. In a population-based cohort of 8496 women, we found robust associations between unintended pregnancy with initial and prolonged ambivalent feelings and depressive and anxiety symptoms up to 17 years after childbirth, which decreased in strength over time. There was some evidence for perceived social support mediating part of the association between unintended pregnancy and depressive and anxiety symptoms at 6, 9 and 17 years postpartum.

Unintended pregnancy was associated with higher symptoms of both depression and anxiety for all categories of feelings about the pregnancy (pleased, initially ambivalent, prolonged ambivalent). This is in line with earlier work (Abajobir et al., 2016; Bahk et al., 2015; Herd et al., 2016; Wang et al., 2025) and may relate to an interplay of family-level influences (Bahk et al., 2015; Barton et al., 2017; Chan, 2021) as well as broader societal factors, including socioeconomic status (Zhao et al., 2025) and stigma (Smith et al., 2016). Unintended pregnancy with prolonged ambivalent feelings showed the largest association with mental health over time. Furthermore, there was a significant interaction with time, showing that the associations decreased over the follow-up time of 17 years. Work by Bahk et al. (2015) found no interaction with time for depression prevalence scores, but their study only followed up to the first two years after childbirth. Findings are partly in line with work by Beumer et al. (2023), which showed that pregnancy intentions were associated with psychological distress at 3 months and 5 years after childbirth, but not at 12 years after childbirth. One explanation could be that their study assessed pregnancy intention as a multidimensional construct with continuous scales and also adjusted for prenatal psychological distress. Our findings identify an unintended pregnancy accompanied by prolonged ambivalent feelings as an important risk factor for clinically relevant long-term depression and anxiety symptoms, that warrants attention in routine antenatal and postnatal care, including in care provided by Psychiatry, Obstetrics and Paediatrics (POP) clinics.

While distribution of care, perceived social support, and perceived childcare support were all individually linked to depressive and anxiety symptoms, no evidence was found for mediation, interaction, or mediated interaction by distribution of care or perceived childcare support. This is in contrast with Bahk et al. (2015), who showed that the link between unintended pregnancy and maternal mental health was partially explained by fathers' participation in childcare. This discrepancy could be explained by a different definition of pregnancy intention, different timing of maternal mental health assessment (namely up to 2 years, rather than 17 years after childbirth), or potential differences in the Dutch and Korean study populations. In contrast, some evidence for a small positive pure indirect effect was found for lack of social support, both for anxiety and depressive symptoms. There is increasing evidence that social support may play a buffering role in the link between unintended pregnancy and maternal mental health (Barton et al., 2017; Dibaba et al., 2013). While the pure indirect effect did not survive multiple testing correction, our findings still indicate that the link between unintended pregnancy and depressive and anxiety symptoms may in part be explained by a lack of social support and indicate this as an important modifiable factor to be investigated further.

This study has several strengths. Firstly, we included data on depressive and anxiety symptoms with six repeated time-points up to 17 years after childbirth, allowing the investigation of associations in both the short- and long-term. Furthermore, by employing four-way decomposition in combination with g-methods, the potential role of distribution of care, perceived social support, and perceived childcare support could be investigated in detail whilst accounting for depressive and anxiety symptoms during pregnancy, which may have confounded the associations between these factors and long-term outcomes. Lastly, given the potential bidirectionality between unintended pregnancy and depressive and anxiety symptoms, this study assessed the robustness of results accounting for psychiatric history.

Several limitations also need to be mentioned. Firstly, the right-skewed distribution of the outcome data could only be partially mitigated, leading to the inclusion of the extra sensitivity analysis with binary outcomes. This strategy could not be taken in

the four-way composition, since this resulted in insufficient group sizes for appropriate estimation. In addition, pregnancy intention groups were collapsed into two categories (intended vs. unintended) for the four-way decomposition for the same reason, which may have obscured associations in the group with the strongest associations with outcomes, namely those with an unintended pregnancy with prolonged ambivalent feelings. Moreover, the collected data on perceived childcare support relied on one item only, which limited the ability to capture a diversity in experiences of women and in the support they receive. Additionally, it could be informative to complement the women's subjective experience of help with childcare with objective reports of childcare support. Future research should investigate these factors in more detail and include other relevant psychosocial variables, such as financial difficulties, stigma, and contact with healthcare professionals, in understanding the relation between unintended pregnancy and mental health.

In conclusion, this study showed that the association between unintended pregnancy and symptoms of depression and anxiety in women reduced over time, but was still apparent in the long-term up to 17 years after childbirth, particularly when they had prolonged ambivalent feelings about the pregnancy. Lack of support may be an important factor that partly explains the relation between pregnancy intention and depressive and anxiety symptoms. These findings highlight the need for accessible family planning services and adequate social and mental health support during pregnancy and for a prolonged period after childbirth, in particular for those with complex feelings about their pregnancy.

Note

This figure illustrates the four-way decomposition of the effect of pregnancy intention on maternal mental health. Panel A illustrates the controlled direct effect, panel B the pure indirect effect, panel C the reference interaction effect, and panel D the mediated interaction effect using directed acyclic graphs, with the effect of interest highlighted in green. The four-way decomposition was assessed using three separate models (one per explanatory factor, i.e. distribution of care, perceived social support, and perceived childcare support), but for simplicity shown here in one graph.

Declarations

Author Contribution

APCH was responsible for conceptualisation, formal analysis, investigation, visualisation, data curation, and writing—original draft. CAE contributed to conceptualisation, data curation, methodology, supervision, and writing—review and editing. HM contributed to conceptualisation, methodology, funding acquisition, supervision, and writing—review and editing. EMPP, HB, and MHJH contributed to conceptualisation and writing—review and editing.

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Data Availability

Data described in the manuscript cannot be made publicly available because of confidentiality, but data can be requested and shared with a formal data-sharing agreement. Requests for data, code book, and analytic code can be directed to datamangementenr@erasmusmc.nl.

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Tables

Table 1
Study characteristics.

Maternal age at childbirth, years		Planned (N = 5342)	Unplanned and pleased (N = 1170)	Unplanned and initially ambivalent (N = 841)	Unplanned and prolonged ambivalent (N = 116)	Missing (N = 1027)
	Maternal age at childbirth, years, mean (SD)	31.1 (4.8)	28.5 (5.9)	27.7 (6.0)	29.4 (6.2)	30.5 (5.7)
Marital status	Married/living together	4913 (92.0%)	799 (68.3%)	487 (57.9%)	66 (56.9%)	497 (48.4%)
	No partner	338 (6.3%)	337 (28.8%)	333 (39.6%)	48 (41.4%)	125 (12.2%)
Maternal education	University degree, n (%)	1408 (26.4%)	127 (10.9%)	62 (7.4%)	18 (15.5%)	124 (12.1%)
	'Higher' vocational training, n (%)	1106 (20.7%)	174 (14.9%)	88 (10.5%)	13 (11.2%)	126 (12.3%)
	Three or more years of secondary school, n (%)	1542 (28.9%)	411 (35.1%)	299 (35.6%)	35 (30.2%)	183 (17.8%)
	Primary or no education, n (%)	1139 (21.3%)	411 (35.1%)	358 (42.6%)	44 (37.9%)	203 (19.8%)
Income	< €1200	511 (9.6%)	271 (23.2%)	263 (31.3%)	45 (38.8%)	203 (19.8%)
	€1200–2000	703 (13.2%)	188 (16.1%)	144 (17.1%)	26 (22.4%)	121 (11.8%)
	> €2000	2873 (53.8%)	349 (29.8%)	150 (17.8%)	21 (18.1%)	262 (25.5%)
Maternal national origin	Dutch, n (%)	3057 (57.2%)	411 (35.1%)	233 (27.7%)	31 (26.7%)	352 (34.3%)
	Surinamese-Antillean, n (%)	764 (14.3%)	170 (14.5%)	156 (18.5%)	36 (31.0%)	173 (16.8%)
	Turkish-Moroccan, n (%)	428 (8.0%)	270 (23.1%)	204 (24.3%)	20 (17.2%)	113 (11.0%)
	Non-Dutch European, n (%)	459 (8.6%)	85 (7.3%)	52 (6.2%)	4 (3.4%)	67 (6.5%)
	Other, n (%)	600 (11.2%)	222 (19.0%)	187 (22.2%)	24 (20.7%)	164 (16.0%)
Maternal childhood trauma	History of childhood trauma	863 (16.2%)	144 (12.3%)	64 (7.6%)	5 (4.3%)	74 (7.2%)
	No history of childhood trauma	3190 (59.7%)	711 (60.8%)	516 (61.4%)	76 (65.5%)	428 (41.7%)
Maternal psychiatric history	History of psychiatric conditions	2186 (40.9%)	409 (35.0%)	233 (27.7%)	18 (15.5%)	272 (26.5%)
	No history of psychiatric conditions	1144 (21.4%)	271 (23.2%)	223 (26.5%)	42 (36.2%)	139 (13.5%)

Maternal age at childbirth, years		Planned (N = 5342)	Unplanned and pleased (N = 1170)	Unplanned and initially ambivalent (N = 841)	Unplanned and prolonged ambivalent (N = 116)	Missing (N = 1027)
	Maternal age at childbirth, years, mean (SD)	31.1 (4.8)	28.5 (5.9)	27.7 (6.0)	29.4 (6.2)	30.5 (5.7)
Distribution of care	(Z-score), mean (SD)	-0.1 (1.0)	0.2 (1.1)	0.4 (1.1)	0.4 (1.2)	0.1 (1.0)
Perceived social support	(Z-score), mean (SD)	-0.1 (0.9)	0.1 (1.1)	0.4 (1.3)	0.4 (1.4)	0.2 (1.2)
Perceived childcare support	Don't miss this/Just right/Too much	2418 (45.3%)	343 (29.3%)	218 (25.9%)	35 (30.2%)	366 (35.6%)
	Not enough	293 (5.5%)	44 (3.8%)	32 (3.8%)	8 (6.9%)	62 (6.0%)

Table 2
Associations pregnancy intention and maternal mental health over time.

Term	Depressive symptoms				Anxiety symptoms			
	β	95% CI	P	P_{FDR}	β	95% CI	P	P_{FDR}
<i>Main effect</i>								
Unplanned and pleased	0.12	[0.07, 0.17]	< 0.001	< 0.001	0.08	[0.03, 0.13]	0.003	0.003
Unplanned and initially ambivalent	0.32	[0.25, 0.40]	< 0.001	< 0.001	0.23	[0.16, 0.30]	< 0.001	< 0.001
Unplanned and prolonged ambivalent	0.76	[0.59, 0.93]	< 0.001	< 0.001	0.58	[0.42, 0.75]	< 0.001	< 0.001
<i>Age interaction</i>								
Unplanned and pleased	-0.01	[-0.01, -0.00]	0.001	0.003	-0.00	[-0.01, 0.00]	0.061	0.061
Unplanned and initially ambivalent	-0.01	[-0.02, -0.01]	< 0.001	< 0.001	-0.01	[-0.01, -0.01]	< 0.001	< 0.001
Unplanned and prolonged ambivalent	-0.03	[-0.05, -0.02]	< 0.001	< 0.001	-0.02	[-0.03, -0.01]	< 0.001	< 0.001
<i>Note:</i> Beta coefficients were obtained from linear mixed models with pregnancy intention as the predictor and maternal depressive and anxiety symptoms as outcomes, with planned pregnancy as the reference group. Main effect estimates reflect the change in maternal mental health symptoms (z-score) per pregnancy intention group and the age interaction estimates reflect the change in symptoms per year for each pregnancy intention group. Models were adjusted for national origin, age at conception, marital status, level of education, monthly household income, and history of childhood trauma.								

Table 3

Four-way decomposition of the association between pregnancy intention and maternal mental health - the role of distribution of care.

Effect	3 years postpartum				9 years postpartum				17 years postpartum			
	β	95% CI	<i>P</i>	<i>P_{FDR}</i>	β	95% CI	<i>P</i>	<i>P_{FDR}</i>	β	95% CI	<i>P</i>	<i>P_{FDR}</i>
<i>Depressive symptoms</i>												
Controlled direct effect	0.12	[0.04, 0.20]	0.002	0.011	0.13	[0.05, 0.21]	0.001	0.003	0.11	[0.04, 0.18]	0.002	0.008
Reference interaction	-0.00	[-0.00, 0.00]	0.944	0.944	0.00	[-0.00, 0.00]	0.874	0.997	-0.00	[-0.00, 0.00]	0.825	0.925
Mediated interaction	-0.00	[-0.00, 0.00]	0.983	0.983	0.00	[-0.00, 0.01]	0.475	0.783	-0.00	[-0.00, 0.00]	0.817	0.969
Pure indirect effect	0.00	[-0.00, 0.00]	0.257	0.386	0.00	[-0.00, 0.00]	0.241	0.482	0.00	[-0.00, 0.00]	0.280	0.560
Total effect	0.12	[0.05, 0.20]	0.001	0.004	0.13	[0.05, 0.21]	0.001	0.002	0.11	[0.04, 0.18]	0.002	0.005
<i>Anxiety symptoms</i>												
Controlled direct effect	0.09	[0.02, 0.15]	0.008	0.016	0.08	[0.01, 0.15]	0.027	0.033	0.09	[0.02, 0.17]	0.014	0.017
Reference interaction	-0.00	[-0.00, 0.00]	0.937	0.944	0.00	[-0.00, 0.00]	0.718	0.997	0.00	[-0.00, 0.00]	0.874	0.925
Mediated interaction	-0.00	[-0.01, 0.00]	0.483	0.965	0.00	[-0.00, 0.01]	0.364	0.783	0.00	[-0.00, 0.01]	0.803	0.969
Pure indirect effect	0.00	[-0.00, 0.00]	0.226	0.386	0.00	[-0.00, 0.00]	0.617	0.763	0.00	[-0.00, 0.00]	0.531	0.797
Total effect	0.09	[0.02, 0.15]	0.008	0.012	0.08	[0.01, 0.16]	0.024	0.024	0.09	[0.02, 0.17]	0.013	0.014

Note: Beta coefficients were obtained from four-way decomposition with pregnancy intention (binary) as the predictor, distribution of care as the explanatory factor, and maternal depressive and anxiety symptoms as outcomes. Planned pregnancy was the reference group and the controlled direct effect was controlled at a distribution of care z-score of zero. Models were adjusted for national origin, age at conception, marital status, level of education, monthly household income, and history of childhood trauma.

Table 4

Four-way decomposition of the association between pregnancy intention and maternal mental health - the role of perceived social support.

Effect	3 years postpartum				9 years postpartum				17 years postpartum			
	β	95% CI	<i>P</i>	<i>P_{FDR}</i>	β	95% CI	<i>P</i>	<i>P_{FDR}</i>	β	95% CI	<i>P</i>	<i>P_{FDR}</i>
<i>Depressive symptoms</i>												
Controlled direct effect	0.11	[0.03, 0.18]	0.005	0.014	0.13	[0.05, 0.20]	0.002	0.003	0.10	[0.03, 0.17]	0.003	0.008
Reference interaction	0.00	[-0.00, 0.00]	0.598	0.944	0.00	[-0.00, 0.00]	0.696	0.997	-0.00	[-0.00, 0.00]	0.925	0.925
Mediated interaction	0.01	[-0.00, 0.01]	0.159	0.956	0.00	[-0.00, 0.01]	0.405	0.783	-0.00	[-0.01, 0.01]	0.810	0.969
Pure indirect effect	0.01	[0.00, 0.01]	0.035	0.106	0.01	[0.00, 0.02]	0.030	0.095	0.01	[0.00, 0.02]	0.026	0.083
Total effect	0.12	[0.05, 0.20]	0.002	0.004	0.14	[0.06, 0.22]	0.001	0.002	0.11	[0.04, 0.18]	0.002	0.005
<i>Anxiety symptoms</i>												
Controlled direct effect	0.07	[0.01, 0.14]	0.026	0.026	0.08	[0.01, 0.15]	0.034	0.034	0.09	[0.01, 0.16]	0.020	0.020
Reference interaction	0.00	[-0.00, 0.00]	0.772	0.944	0.00	[-0.00, 0.00]	0.997	0.997	-0.00	[-0.00, 0.00]	0.907	0.925
Mediated interaction	0.00	[-0.00, 0.01]	0.371	0.965	0.00	[-0.00, 0.01]	0.522	0.783	0.00	[-0.01, 0.01]	0.907	0.969
Pure indirect effect	0.01	[0.00, 0.02]	0.028	0.106	0.01	[0.00, 0.02]	0.032	0.095	0.01	[0.00, 0.01]	0.028	0.083
Total effect	0.08	[0.02, 0.15]	0.012	0.012	0.09	[0.01, 0.16]	0.018	0.023	0.09	[0.02, 0.17]	0.013	0.014

Note: Beta coefficients were obtained from four-way decomposition with pregnancy intention (binary) as the predictor, perceived social support as the explanatory factor, and maternal depressive and anxiety symptoms as outcomes. Planned pregnancy was the reference group and the controlled direct effect was controlled at a perceived social support z-score of zero. Models were adjusted for national origin, age at conception, marital status, level of education, monthly household income, and history of childhood trauma.

Table 5

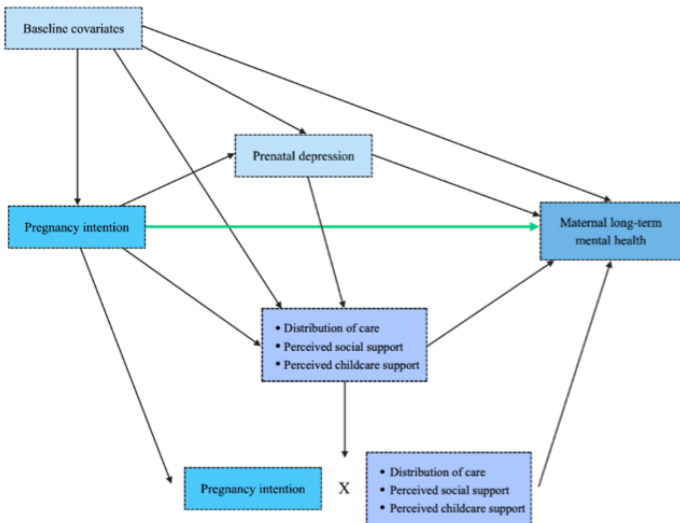
Four-way decomposition of the association between pregnancy intention and maternal mental health - the role of perceived childcare support.

Effect	3 years postpartum				9 years postpartum				17 years postpartum			
	β	95% CI	<i>P</i>	<i>P_{FDR}</i>	β	95% CI	<i>P</i>	<i>P_{FDR}</i>	β	95% CI	<i>P</i>	<i>P_{FDR}</i>
<i>Depressive symptoms</i>												
Controlled direct effect	0.10	[0.02, 0.18]	0.016	0.024	0.13	[0.05, 0.21]	0.001	0.003	0.11	[0.04, 0.19]	0.004	0.008
Reference interaction	0.02	[-0.01, 0.05]	0.130	0.782	0.01	[-0.02, 0.03]	0.554	0.997	-0.00	[-0.02, 0.02]	0.852	0.925
Mediated interaction	0.00	[-0.01, 0.01]	0.873	0.983	0.00	[-0.00, 0.00]	0.956	0.956	-0.00	[-0.00, 0.00]	0.969	0.969
Pure indirect effect	0.00	[-0.00, 0.01]	0.832	0.832	0.00	[-0.00, 0.01]	0.763	0.763	0.00	[-0.00, 0.00]	0.852	0.852
Total effect	0.12	[0.04, 0.20]	0.002	0.004	0.14	[0.06, 0.22]	0.001	0.002	0.11	[0.04, 0.18]	0.003	0.006
<i>Anxiety symptoms</i>												
Controlled direct effect	0.08	[0.01, 0.14]	0.026	0.026	0.09	[0.02, 0.16]	0.018	0.026	0.10	[0.02, 0.17]	0.012	0.017
Reference interaction	0.01	[-0.01, 0.03]	0.492	0.944	-0.00	[-0.03, 0.02]	0.812	0.997	-0.00	[-0.02, 0.02]	0.710	0.925
Mediated interaction	0.00	[-0.00, 0.00]	0.888	0.983	-0.00	[-0.00, 0.00]	0.840	0.956	-0.00	[-0.00, 0.00]	0.888	0.969
Pure indirect effect	0.00	[-0.00, 0.01]	0.704	0.832	0.00	[-0.00, 0.01]	0.637	0.763	0.00	[-0.00, 0.00]	0.797	0.852
Total effect	0.08	[0.02, 0.15]	0.011	0.012	0.09	[0.01, 0.16]	0.020	0.023	0.09	[0.02, 0.17]	0.014	0.014

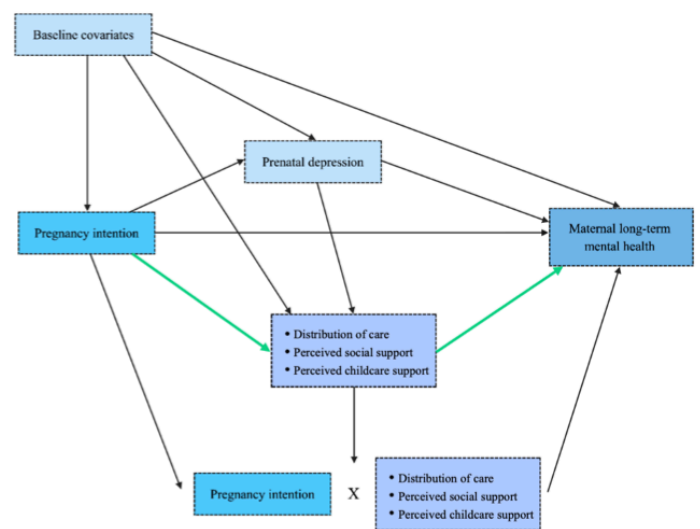
Note: Beta coefficients were obtained from four-way decomposition with pregnancy intention (binary) as the predictor, perceived childcare support as the explanatory factor, and maternal depressive and anxiety symptoms as outcomes. Planned pregnancy was the reference group and the controlled direct effect was controlled at the childcare level 'Don't miss this/Just right/Too much'. Models were adjusted for national origin, age at conception, marital status, level of education, monthly household income, and history of childhood trauma.

Figures

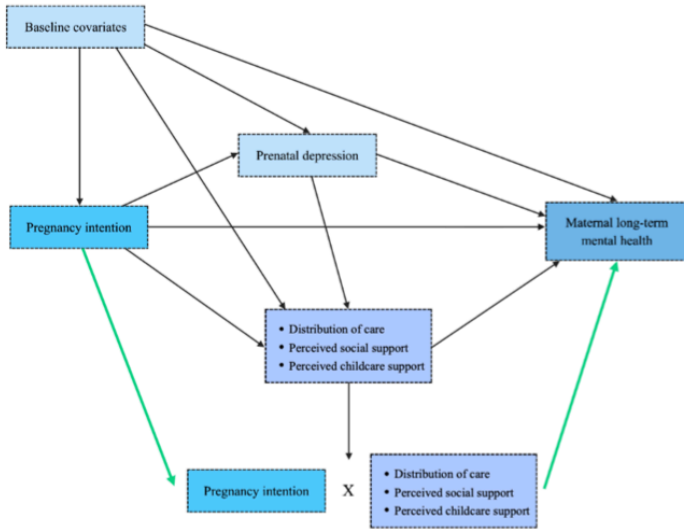
A. Controlled direct effect (CDE)



B. Pure indirect effect (PIE)



C. Reference interaction effect (INTref)



D. Mediated interaction effect (INTmed)

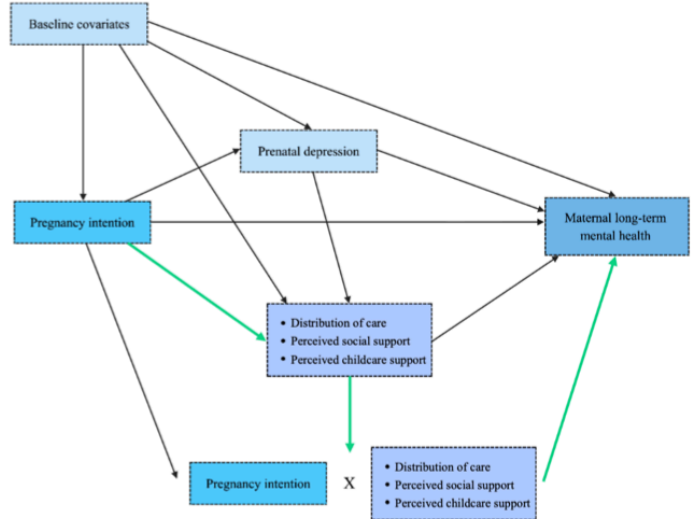


Figure 1

Four-way decomposition of effects.

Note: This figure illustrates the four-way decomposition of the effect of pregnancy intention on maternal mental health. Panel A illustrates the controlled direct effect, panel B the pure indirect effect, panel C the reference interaction effect, and panel D the mediated interaction effect using directed acyclic graphs, with the effect of interest highlighted in green. The four-way decomposition was assessed using three separate models (one per explanatory factor, i.e. distribution of care, perceived social support, and perceived childcare support), but for simplicity shown here in one graph.

Supplementary Files

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- [supplement.docx](#)