

Psychosocial Urban Stress, Motivational Readiness and Behavioural Feasibility: Longitudinal Evidence from HILDA on Fertility Decision-Making in Major Australian Cities

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**Psychosocial Urban Stress, Motivational Readiness and Behavioural Feasibility:
Longitudinal Evidence from HILDA on Fertility Decision-Making in Major
Australian Cities**

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Abstract

Background

Declining fertility is an important demographic and public health concern, yet the role of psychosocial urban stress in fertility decision-making remains poorly understood. This study examined how financial stress, work-related stress, loneliness and time stress were associated with fertility intentions and subsequent fertility behaviour among women living in Australia's major cities.

Methods

Longitudinal data from the Household, Income and Labour Dynamics in Australia Survey were analysed. The sample comprised 25,512 person-wave observations from 5,056 women aged 18–45. Ordinary least squares and pooled logistic regression models examined associations between psychosocial urban stress, fertility intentions and a birth by the subsequent survey wave. Karlson–Holm–Breen decomposition assessed the intention-related component of the stress–behaviour associations.

Results

Fertility intention strongly predicted subsequent fertility behaviour, with each one-point increase associated with 1.622 times higher odds of a subsequent birth. Loneliness was consistently associated with lower fertility intentions ($\beta = -0.170$), and its association with fertility behaviour attenuated after fertility intention was included. Time stress (odds ratio 0.908) and financial stress (odds ratio 0.936) remained negatively associated with fertility behaviour after adjustment for fertility intention, whereas work-related stress showed no independent association. The decomposition analysis provided no formal evidence of mediation through fertility intention.

Conclusions

Psychosocial urban stress was associated with fertility decision-making through differentiated pathways. Loneliness was more closely related to motivational readiness for parenthood, whereas time stress and financial stress were more closely related to the behavioural feasibility of translating fertility intentions into subsequent childbearing.

Keywords: fertility intentions; fertility behaviour; psychosocial urban stress; motivational readiness; behavioural feasibility; HILDA; urban health; Australia.

1. Introduction

Fertility decline has become a central demographic and public health issue across many high-income societies. In Australia, fertility has remained below replacement level for decades, declining from 1.50 births per woman in 2023 to 1.48 in 2024, among the lowest levels recorded nationally (Australian Bureau of Statistics, 2025). This trend reflects broader changes in education, partnership formation, labour-market participation, housing affordability, and socioeconomic conditions rather than short-term demographic fluctuations (Lazzari, 2021; Matysiak, Sobotka & Vignoli, 2021). Beyond its demographic implications, declining fertility raises important questions about reproductive wellbeing and individuals' capacity to achieve their desired family size. Although many people continue to aspire to parenthood, these aspirations are increasingly shaped by the social, economic, and environmental conditions within which family formation occurs. These pressures are particularly evident in Australia's major cities, where housing affordability, labour-market competition, commuting demands, and changing patterns of social connection generate cumulative psychosocial pressures that influence health, wellbeing, and major life-course decisions (Evans, 2003; Galea, Freudenberg, & Vlahov, 2005; Lederbogen et al., 2011). Building on this literature, this study conceptualises psychosocial urban stress as the cumulative psychological and social demands arising from the spatial, economic, and institutional characteristics of urban environments, recognising that reproductive decision-making is shaped by both individual preferences and the urban contexts within which they are formed.

Recent fertility research increasingly views fertility intentions as dynamic evaluations that evolve as individuals reassess their relationships, employment, housing, health, and future expectations across the life course. Evidence from the COVID-19 pandemic likewise shows that major societal disruptions and uncertainty can prompt revisions to fertility plans and intentions (Luppi, Arpino & Rosina, 2020; Emery & Koops, 2022; Mooi-Reci et al., 2023). The Narrative Framework argues that reproductive decisions are shaped by imagined futures and perceived uncertainty (Vignoli, Bazzani et al., 2020; Vignoli, Guetto et al., 2020; Guetto, Bazzani & Vignoli, 2022), while Life Course Theory emphasises that intentions are continually revised as personal opportunities and constraints change (Barker & Buber-Ennsner, 2024). Although economic uncertainty remains a central explanation for declining fertility (Alderotti et al., 2021; Atalay, Li & Whelan, 2021; van Wijk & Billari, 2024), growing evidence demonstrates that work–family conflict, time scarcity, and social connectedness also influence perceived readiness for parenthood and the capacity to balance employment and family responsibilities (Latshaw & Yucel, 2022; Kurowska, Matysiak & Osiewalska, 2023;

Jarosz, Matysiak & Osiewalska, 2023; Artamonova et al., 2024). Broader urban health research similarly shows that loneliness and social isolation are shaped by neighbourhood design, housing conditions, and access to social infrastructure (Surkalim et al., 2022; Bower et al., 2023; Wickramaratne et al., 2022). Collectively, these studies indicate that fertility decision-making is embedded within a multidimensional psychosocial urban environment in which financial strain, employment demands, time scarcity, and social connectedness interact rather than operate independently.

Fertility intention is one of the strongest predictors of subsequent childbearing, yet intentions are not always realised (Guzzo & Hayford, 2020; Guzzo, 2022; Guzzo & Hayford, 2023; Spéder & Bálint, 2024). The key challenge is therefore not simply understanding why individuals intend to have children, but why those intentions are realised in some circumstances and not in others. Despite recent advances, three important gaps remain. First, research has largely examined individual stressors while giving comparatively little attention to psychosocial urban stress as a multidimensional construct. Second, fertility intentions and fertility behaviour are commonly analysed separately, limiting understanding of how psychosocial urban stress shapes the transition from intention to behaviour. Third, although many of these stressors are concentrated in metropolitan environments, cities are generally treated as contextual controls rather than as the primary setting within which reproductive decisions are formed and realised. These limitations point to the need for an integrated framework capable of explaining how multidimensional psychosocial urban stress shapes both fertility intentions and their subsequent realisation as fertility behaviour.

This study addresses these gaps by examining how multidimensional psychosocial urban stress is associated with fertility intentions and subsequent fertility behaviour among reproductive-age women living in Australia's major cities using longitudinal data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. By prospectively linking psychosocial urban stress and fertility intentions with subsequent childbearing, the study distinguishes between motivational readiness for parenthood and the behavioural feasibility of translating those intentions into realised fertility behaviour. Four dimensions of psychosocial urban stress, financial stress, work-related stress, loneliness, and time stress, are examined simultaneously to determine whether they influence different stages of fertility decision-making through distinct pathways. In doing so, the study advances the conceptualisation of psychosocial urban stress as a multidimensional construct, extends fertility decision-making theory by distinguishing motivational readiness from behavioural feasibility, positions urban environments as active influences on reproductive decision-making, and provides

evidence relevant to housing affordability, employment conditions, childcare accessibility, transport, and social connectedness in highly urbanised societies. The following sections develop the theoretical framework, describe the data and analytical strategy, present the empirical findings, and discuss their implications for fertility theory, urban health, and public policy.

The remainder of the paper is organised as follows. Section 2 develops the theoretical background and presents the conceptual framework and research hypotheses. Section 3 describes the data, sample construction, measures, and empirical strategy. Section 4 reports the main empirical results, including the associations between fertility intention, multidimensional psychosocial urban stress, and fertility behaviour, as well as the KHB decomposition analysis. Section 5 discusses the findings in relation to existing literature, with particular attention to intention-related and behavioural constraint pathways.

2. Theoretical framework and hypotheses

2.1 Fertility intention and fertility behaviour

Fertility intention is conceptualised as the motivational component of reproductive decision-making, reflecting an individual's assessment of the desirability and feasibility of parenthood under prevailing personal and social circumstances. Rather than representing a fixed preference, fertility intentions are dynamic evaluations that evolve as individuals reassess their resources, relationships, and future expectations across the life course. This perspective is consistent with the narrative framework of fertility decision-making, which argues that reproductive decisions are shaped by perceived uncertainty and expectations about future opportunities (Vignoli, Bazzani et al., 2020; Guetto, Bazzani and Vignoli, 2022). Empirical evidence likewise demonstrates that fertility intentions are continually revised in response to changes in partnership, employment, housing, health, and broader socioeconomic conditions (Barker and Buber-Ennsner, 2024; Bodin et al., 2021)

Although fertility intention is one of the strongest predictors of subsequent childbearing, intentions do not always translate into fertility behaviour. Their realisation depends on changing social, economic, and institutional circumstances rather than individual preferences alone (Guzzo, 2022; Spéder and Bálint, 2024). From a life-course perspective, fertility intentions therefore reflect perceived readiness for parenthood, whereas fertility behaviour depends on whether those intentions remain achievable over time. Accordingly, this study conceptualises fertility intention as both a predictor of fertility behaviour and a mechanism through which multidimensional psychosocial

urban stress may influence reproductive decision-making. Distinguishing between intention formation and the subsequent realisation of fertility behaviour provides the theoretical foundation for the conceptual framework developed in the following sections.

2.2 Multidimensional psychosocial urban stress

This study conceptualises psychosocial urban stress as a multidimensional construct arising from the cumulative demands of contemporary urban life rather than as a single exposure. Consistent with urban health and stress-process perspectives, financial stress, work-related stress, time scarcity, and loneliness are viewed as interconnected dimensions of the psychosocial environment through which urban conditions influence everyday decision-making. Although analytically distinct, these stressors frequently coexist and reinforce one another, shaping how individuals evaluate future opportunities, constraints, and readiness for parenthood.

Financial stress may reduce perceived economic readiness for family formation, work-related stress may increase competing employment demands, loneliness may diminish perceived social support, and time scarcity may restrict the capacity to balance work and family responsibilities (Alderotti et al., 2021; Atalay, Li and Whelan, 2021; Gatta et al., 2022; Jarosz, Matysiak and Osiewalska, 2023; Artamonova et al., 2024). Rather than operating independently, these dimensions collectively characterise psychosocial urban stress and provide the theoretical basis for examining how different forms of urban pressure influence fertility intentions and their subsequent realisation as fertility behaviour

2.3 Intention-related and behavioural constraint pathways

Behavioural feasibility refers to the objective and perceived capacity to translate fertility intentions into realised fertility behaviour. Individuals may continue to intend to have children while facing urban conditions that limit the practical feasibility of acting upon those intentions. Housing affordability, labour-market demands, long commuting times, limited discretionary time, and changing patterns of social connectedness may collectively reduce the capacity to realise reproductive intentions despite continued aspirations for family formation. These dimensions rarely operate independently and frequently reinforce one another within urban environments. Consequently, different dimensions of psychosocial urban stress are unlikely to influence fertility decision-making through identical mechanisms. Some primarily shape motivational readiness, whereas others constrain behavioural feasibility by limiting the realisation of existing fertility intentions. This framework does not assume that all dimensions of psychosocial urban stress operate through a single mechanism.

Rather, it proposes differentiated pathways in which some stressors primarily influence motivational readiness, whereas others exert stronger effects on behavioural feasibility. Distinguishing these complementary processes provides a more comprehensive explanation of the fertility intention–behaviour gap than conventional intention-mediated models and forms the theoretical foundation for the hypotheses developed below. This theoretical distinction implies that psychosocial urban stress may influence fertility decision-making through multiple, complementary pathways, providing the conceptual rationale for the hypotheses tested in this study

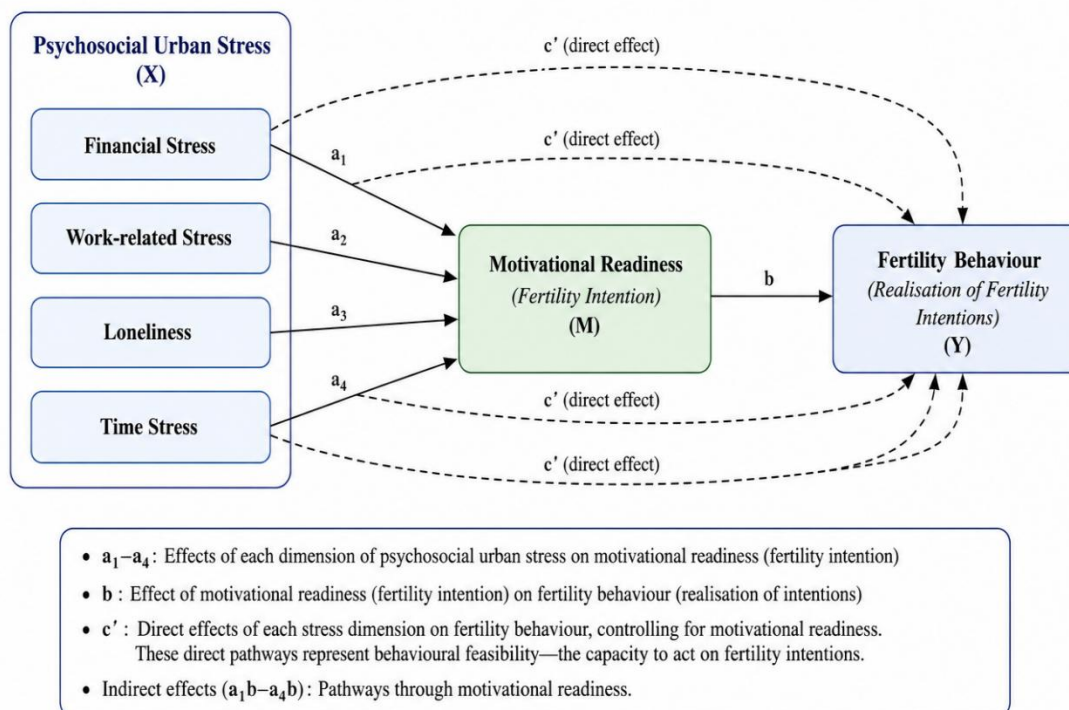


Figure. Conceptual framework illustrating the differentiated pathways linking multidimensional psychosocial urban stress with fertility behaviour through motivational readiness (fertility intention), while allowing direct effects that represent behavioural feasibility.

Figure 1. Conceptual framework linking multidimensional psychosocial urban stress, fertility intention, and fertility behaviour

The conceptual framework is summarised in Figure 1. It distinguishes between intention-related pathways, in which psychosocial urban stress is associated with fertility behaviour through fertility intention, and behavioural constraint pathways, in which stress dimensions are directly associated with fertility behaviour net of fertility intention.

2.4 Research hypotheses

The preceding theoretical framework suggests that multidimensional psychosocial urban stress may influence fertility decision-making through two complementary processes. The first concerns motivational readiness, reflected in fertility intentions, while the second concerns behavioural feasibility, reflected in the capacity to translate those intentions into fertility behaviour. Based on this framework, the following hypotheses are proposed.

Fertility intention and fertility behaviour

H1: Fertility intention is positively associated with subsequent fertility behaviour.

Women with stronger fertility intention at wave t are expected to have higher odds of fertility behaviour between wave t and wave $t + 1$.

Psychosocial urban stress and fertility intentions

H2: Higher levels of psychosocial urban stress are associated with lower fertility intentions, reflecting reduced motivational readiness for parenthood. The magnitude of these associations is expected to differ across stress dimensions.

Each stress dimension is expected to be associated with fertility intention, although the strength of the association may vary across domains. Specifically:

H2a: Financial stress is negatively associated with fertility intention.

H2b: Work-related stress is negatively associated with fertility intention.

H2c: Loneliness is negatively associated with fertility intention.

H2d: Time stress is negatively associated with fertility intention.

Psychosocial urban stress and fertility behaviour

H3: Higher psychosocial urban stress is associated with lower fertility behaviour.

Each stress dimension is expected to be associated with lower odds of subsequent fertility behaviour. Specifically:

H3a: Financial stress is negatively associated with fertility behaviour.

H3b: Work-related stress is negatively associated with fertility behaviour.

H3c: Loneliness is negatively associated with fertility behaviour.

H3d: Time stress is negatively associated with fertility behaviour.

Intention–behaviour pathway

H4: Fertility intention may account for part of the association between psychosocial urban stress and fertility behaviour.

Stress dimensions that are more closely related to perceived readiness, emotional support, and future orientation are expected to show stronger intention-related pathways. Stress dimensions that reflect practical constraints, such as time pressure and financial strain, are expected to retain direct associations with fertility behaviour after fertility intention is controlled.

3. Data and methods

3.1 Data and sample

This study employs a longitudinal observational design using data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a nationally representative annual panel survey of Australian households. The HILDA Survey provides repeated information on fertility intentions, fertility outcomes, employment, income, health, household circumstances, residential location, and psychosocial wellbeing, making it suitable for examining how psychosocial stress is associated with fertility decision-making over time. The analysis uses Release 23 of the HILDA Survey, covering annual survey waves from 2001 to 2023, with variable construction and documentation following the official HILDA User Manual (Summerfield et al., 2024). Eligible observations were restricted to women aged 18–45 residing in Australia’s major cities, consistent with the study’s focus on reproductive-age women living in metropolitan environments. This geographical restriction allows the analysis to examine variation in psychosocial stress within major-city settings rather than treating major-city residence as a contextual control in a national sample. Area-level socioeconomic conditions, regional unemployment, housing burden, and residential mobility are nevertheless included as controls to account for contextual variation within the urban sample. Fertility behaviour is measured prospectively as whether a respondent experienced a birth event between one survey wave and the subsequent wave. Because the outcome is observed using the next survey wave, the final available survey wave cannot contribute to the behavioural outcome. Observations were also excluded if respondents were men, were outside the reproductive age range, lived outside major cities, or had missing information on fertility behaviour, fertility intention, the four psychosocial urban stress dimensions, or any covariates used in the analytical models. Applying these criteria resulted in a common complete-case analytical sample of 25,512 person-wave observations from 5,056 women, drawn from survey years 2005–2009 and 2011–2022.

No eligible observations were available for 2010 under the final complete-case sample definition. Using a common sample across all models ensures that differences between model estimates reflect changes in model specification rather than changes in sample composition. Because valid information on work-related stress and employment-related measures is more consistently available among employed respondents, the final sample contains a high proportion of employed women and should be interpreted as a majority complete-case analytical sample rather than as a fully representative sample of all reproductive-age women in Australian cities.

3.2 Measures

3.2.1 Fertility behaviour

The dependent variable is fertility behaviour. It is operationalised as a binary indicator of whether the respondent experienced a birth event between wave t and wave $t + 1$. The variable is coded 1 if a birth occurred by the next survey wave and 0 otherwise. This prospective measure links conditions observed at wave t to subsequent fertility behaviour, which helps clarify the temporal ordering between psychosocial stress, fertility intention, and later fertility outcomes. Throughout the analysis, the term fertility behaviour is used to refer to this next-wave birth outcome. The original variable name, `birth_event_lead`, is treated as an operational measure rather than the conceptual term used in the paper.

3.2.2 Fertility intention

Fertility intention was measured using respondents' reported expectation of having a child in the future, recorded on a continuous scale ranging from 0 to 10. Higher scores indicate stronger intentions to have children. Consistent with the theoretical framework, fertility intention is conceptualised as reflecting motivational readiness for parenthood and is examined both as a predictor of subsequent fertility behaviour and as a pathway through which psychosocial urban stress may influence reproductive decision-making.

Fertility intention is used in two ways. First, it is examined as a predictor of subsequent fertility behaviour. Second, it is treated as a potential intention-related pathway through which psychosocial urban stress may be associated with fertility behaviour. This approach reflects the distinction between intending to have a child and subsequently experiencing fertility behaviour.

3.2.3 Multidimensional psychosocial urban stress

Consistent with the theoretical framework, psychosocial urban stress was operationalised as a multidimensional construct comprising financial stress, work-related stress, time stress and loneliness. These dimensions capture material,

occupational, temporal and relational pressures associated with contemporary urban life. Each stress measure was standardised as a z-score (mean = 0, SD = 1), allowing regression coefficients to be interpreted as the effect of a one-standard-deviation increase while facilitating comparison across stress dimensions. Financial stress reflects perceived economic strain; work-related stress reflects pressures associated with employment demands; time stress captures competing demands on discretionary time; and loneliness reflects perceived social disconnection. The four dimensions were analysed simultaneously to examine their independent associations with fertility intentions and fertility behaviour.

3.2.4 Covariates

The analyses adjusted for demographic (age, age², parity, partnership status), socioeconomic (employment, household income, weekly working hours), health (self-rated health), contextual (regional unemployment and SEIFA indices), housing (housing cost ratio), residential mobility, and survey-year characteristics. These variables were included because previous research has consistently linked them to fertility intentions, fertility behaviour, or both, thereby reducing potential confounding in the estimated associations between psychosocial urban stress and reproductive decision-making.

Demographic and life-course controls include age, age squared, parity, and partnership status. Parity is grouped into four categories: no children, one child, two children, and three or more children. Socioeconomic controls include employment status, log household income, and weekly working hours. Health is measured using self-rated health. Area-level and contextual controls include regional unemployment rate and SEIFA deciles for advantage/disadvantage, economic resources, and education/occupation. Housing and mobility controls include the housing cost ratio, capped at 3, residential move, and long-distance move of 50 kilometres or more. Survey year fixed effects are included to account for period-specific conditions that may influence fertility behaviour, fertility intention, and psychosocial stress. Major city residence is not included as a control variable because the main analytical sample is restricted to women living in major cities.

3.3 Analytical strategy

The analysis proceeds in four steps. All models are estimated using the major-city complete-case sample described above. The primary models are estimated without survey weights, as the analysis focuses on adjusted associations within the analytical sample rather than population-level prevalence estimates. Standard errors are clustered at the individual level to account for repeated observations from the same respondent

across survey waves, and survey year fixed effects are included in all models. Because the analysis examines a prospective binary fertility outcome and applies KHB decomposition in nonlinear models, the main behavioural models are estimated as pooled logistic regressions rather than individual fixed-effects models. The estimates are therefore interpreted as adjusted associations rather than within-person causal effects. Consistent with the conceptual framework, the analytical strategy was designed to examine psychosocial urban stress, fertility intentions, and fertility behaviour sequentially, allowing assessment of both intention-related and behavioural pathways

Let $Y_{i,t+1}$ denote fertility behaviour for individual i between wave t and wave $t + 1$, where $Y_{i,t+1} = 1$ indicates that a birth occurred by the next survey wave and $Y_{i,t+1} = 0$ otherwise. Let I_{it} denote fertility intention measured at wave t . Let S_{it} denote a vector of the four psychosocial urban stress dimensions: time stress, work-related stress, financial stress, and loneliness. Let X_{it} denote the vector of covariates, and let δ_t denote survey year fixed effects.

First, logistic regression models are used to examine whether fertility intention is associated with subsequent fertility behaviour. Logistic regression was selected because fertility behaviour was operationalised as a binary outcome indicating whether a respondent experienced a birth before the subsequent survey wave.

$$\text{logit}[P(Y_{i,t+1} = 1)] = \alpha + \beta I_{it} + X'_{it}\gamma + \delta_t + \varepsilon_{it}$$

where β captures the association between fertility intention and subsequent fertility behaviour. Models are estimated sequentially, beginning with fertility intention and year fixed effects, then adding age and parity controls, and finally including the full set of covariates. Results from the logistic models are reported as odds ratios.

Second, logistic regression models are used to examine whether multidimensional psychosocial urban stress is associated with fertility behaviour. The four psychosocial urban stress dimensions were entered simultaneously to estimate their independent associations while accounting for potential overlap between stressors.

$$\text{logit}[P(Y_{i,t+1} = 1)] = \alpha + S'_{it}\theta + X'_{it}\gamma + \delta_t + \varepsilon_{it}$$

where θ represents the vector of associations between the four stress dimensions and fertility behaviour. The four stress dimensions are included simultaneously so that each coefficient is estimated net of the other stress dimensions.

To assess whether fertility intention accounts for part of the association between psychosocial urban stress and fertility behaviour, fertility intention is then added to the behavioural model:

$$\text{logit}[P(Y_{i,t+1} = 1)] = \alpha + S'_{it}\theta + \beta I_{it} + X'_{it}\gamma + \delta_t + \varepsilon_{it}$$

A comparison of the stress coefficients before and after the inclusion of fertility intention provides an initial indication of whether the association between each stress dimension and fertility behaviour overlaps with fertility intention. This comparison is interpreted cautiously and is not treated as definitive evidence of mediation.

Third, ordinary least squares regression models are used to examine whether psychosocial urban stress is associated with fertility intention. Ordinary least squares regression was appropriate because fertility intention was measured on a continuous scale ranging from 0 to 10

$$I_{it} = \alpha + S'_{it}\lambda + X'_{it}\gamma + \delta_t + \mu_{it}$$

where λ represents the vector of associations between the four stress dimensions and fertility intention. These models correspond to the stress-to-intention pathways in the conceptual framework.

Fourth, the Karlson-Holm-Breen decomposition method is used to assess whether fertility intention accounts for part of the association between each stress dimension and fertility behaviour. This method is appropriate for nonlinear probability models because coefficients in logistic regression can change when a mediator is added partly because of rescaling rather than substantive mediation. The decomposition separates the change in coefficients into a direct component and an intention-related component.

Conceptually, the decomposition can be written as:

$$\text{Total association} = \text{Direct association} + \text{Intention-related component}$$

The KHB decomposition is estimated separately for each stress dimension, while adjusting for the remaining stress dimensions and the full set of covariates. The decomposition is used as a supplementary test of the intention-related pathway rather than as the sole basis for interpreting mediation.

The models are designed to strengthen temporal ordering by measuring psychosocial stress and fertility intention at wave t and fertility behaviour between wave t and wave

$t + 1$. However, the analysis remains associational. Although the models adjust for a broad set of observed characteristics, unmeasured time-varying factors may still influence psychosocial stress, fertility intention, and fertility behaviour. The results are therefore interpreted as patterned associations rather than causal effects. The longitudinal ordering strengthens temporal inference by ensuring that psychosocial urban stress and fertility intentions precede the observed fertility outcome. Nevertheless, the observational nature of the HILDA Survey means that residual confounding arising from unmeasured time-varying factors cannot be completely excluded. Prior to model estimation, diagnostic assessments were undertaken to evaluate multicollinearity and confirm the suitability of the regression models. Cluster-robust standard errors were used to account for repeated observations contributed by the same respondents across survey waves.

4. Results

4.1 Descriptive statistics

Table 1. Descriptive statistics

Major-city complete-case sample: 25,512 person-wave observations from 5,056 women.

Variable	Mean	SD	Min	Max
Fertility behaviour	0.071	0.257	0.000	1.000
Fertility intention	4.958	4.021	0.000	10.000
Time stress	0.330	0.924	-2.369	1.805
Work-related stress	0.037	0.983	-1.614	1.500
Financial stress	-0.030	0.956	-0.387	3.518
Loneliness	-0.077	0.913	-0.964	2.322
Age	31.216	7.723	18.000	45.000
Number of children	0.846	1.139	0.000	7.000
Log household income	10.517	0.794	3.219	14.012
Weekly working hours	32.403	13.059	0.000	105.000
Self-rated health	71.790	18.620	0.000	100.000
Regional unemployment rate	5.073	1.127	1.900	7.900
SEIFA advantage/disadvantage decile	6.546	2.713	1.000	10.000
SEIFA economic resources decile	5.848	2.722	1.000	10.000
SEIFA education/occupation decile	6.639	2.686	1.000	10.000
Housing cost ratio, capped at 3	0.627	0.655	0.000	3.000

Notes: The sample is restricted to reproductive-age women living in major cities. Fertility behaviour is measured as a next-wave birth event. Stress measures are standardised.

Table 1 presents descriptive statistics for the major-city complete-case sample used in the main analyses. The final analytical sample consists of 25,512 person-wave observations from 5,056 women aged 18–45 living in major cities. Fertility behaviour, measured as a next-wave birth event, was observed in 7.1% of person-wave observations. The mean fertility intention score was 4.96 on a 0–10 scale, indicating substantial variation in stated expectations about future childbearing.

Table 1B. Categorical distribution

Major-city complete-case sample: 25,512 person-wave observations from 5,056 women.

Variable	Category	N	Percent
Parity	No children	14,593	57.20
	One child	3,434	13.46
	Two children	5,071	19.88
	Three or more children	2,414	9.46
Partnered	No	9,517	37.30
	Yes	15,995	62.70
Employed	No	1,234	4.84
	Yes	24,278	95.16
Residential move	No	19,786	77.56
	Yes	5,726	22.44
Long-distance move, 50 km or more	No	24,674	96.72
	Yes	838	3.28

Notes: Percentages are calculated within the major-city complete-case sample. Major city residence is a sample restriction and is therefore not reported as a categorical covariate.

The average age of respondents in the analytical sample was 31.2 years. The mean number of children was 0.85. As shown in Table 1B, 57.2% of observations were from women with no children, 13.5% from women with one child, 19.9% from women with two children, and 9.5% from women with three or more children. Around 62.7% of observations were from partnered women, and 95.2% were from employed women. These patterns indicate that the analytical sample captures women across different stages of the reproductive life course, providing substantial variation in parity, partnership status, and socioeconomic circumstances relevant to fertility decision-making.

The four stress dimensions also show meaningful variation within the major-city sample. Time stress had a mean of 0.33, work-related stress had a mean of 0.04, financial stress had a mean of -0.03, and loneliness had a mean of -0.08. The standard deviations of these measures were close to one, reflecting the use of standardised stress

measures. The mean regional unemployment rate was 5.07%. The mean SEIFA deciles for advantage/disadvantage, economic resources, and education/occupation were 6.55, 5.85, and 6.64, respectively. The mean housing cost ratio, capped at 3, was 0.63. Around 22.4% of observations involved a residential move since the previous wave, while 3.3% involved a long-distance move of 50 kilometres or more.

Overall, the descriptive statistics show that fertility behaviour is relatively uncommon at the person-wave level, while fertility intention varies substantially. The sample also contains variation in psychosocial stress, life-course stage, socioeconomic position, area-level context, housing burden, and residential mobility. This provides the basis for examining whether different dimensions of psychosocial urban stress are associated with fertility intention and subsequent fertility behaviour among women living in major cities.

4.2 Fertility intention and fertility behaviour

Table 2. Fertility intention and fertility behaviour

	(1) Model 1	(2) Model 2	(3) Model 3
Fertility behaviour			
Fertility intention	1.508*** (0.024)	1.683*** (0.031)	1.622*** (0.030)
Year fixed effects	Yes	Yes	Yes
Age controls	No	Yes	Yes
Parity controls	No	Yes	Yes
Partnership control	No	No	Yes
Socioeconomic and health controls	No	No	Yes
Area, housing and mobility controls	No	No	Yes
Observations	25,512	25,512	25,512
Pseudo R-squared	0.170	0.294	0.328

Table 2 shows that fertility intention at wave t was strongly associated with fertility behaviour between wave t and wave $t+1$ across all specifications. A one-point increase in intention was associated with 1.508 times higher odds in Model 1, 1.683 after age and parity controls, and 1.622 in the fully adjusted model.

Thus, each additional point on the 0–10 intention scale was associated with approximately 62.2% higher odds of a next-wave birth, confirming intention as a strong predictor of subsequent fertility behaviour. However, intention did not fully explain

fertility behaviour: model fit increased after demographic and life-course controls, and partnership status, household income, working hours, SEIFA education/occupation decile and housing cost ratio were also associated with fertility behaviour.

4.3 Multidimensional urban stress and fertility behaviour

Table 3. Multidimensional urban stress and fertility behaviour

	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
Fertility behaviour				
Time stress	0.942* (0.027)	0.898*** (0.028)	0.920** (0.029)	0.908** (0.030)
Work-related stress	1.105*** (0.031)	0.992 (0.027)	1.026 (0.029)	1.020 (0.030)
Financial stress	0.918** (0.028)	0.936* (0.029)	0.943 (0.029)	0.936* (0.030)
Loneliness	0.704*** (0.024)	0.847*** (0.029)	0.883*** (0.031)	0.948 (0.033)
Fertility intention				1.620*** (0.030)
Year fixed effects	Yes	Yes	Yes	Yes
Parity controls	Yes	Yes	Yes	Yes
Age controls	No	Yes	Yes	Yes
Partnership control	No	Yes	Yes	Yes
Socioeconomic and health controls	No	No	Yes	Yes
Area, housing and mobility controls	No	No	Yes	Yes
Observations	25,512	25,512	25,512	25,512
Pseudo R-squared	0.067	0.186	0.197	0.330

Table 3 reports sequential models of the associations between the four stress dimensions and fertility behaviour. Model 1 includes stress measures, parity and year fixed effects; Model 2 adds age and partnership status; Model 3 adds socioeconomic, health, area, housing and mobility controls; and Model 4 adds fertility intention.

Time stress was consistently negatively associated with fertility behaviour. The odds ratio was 0.942 in Model 1, 0.898 after age, parity, partnership and year controls, and

0.920 in the fully adjusted model. After fertility intention was included, the association remained significant (OR = 0.908), suggesting that time stress is more closely linked to behavioural feasibility than to motivational readiness.

Work-related stress was positively associated with fertility behaviour in Model 1 (OR = 1.105), but this association disappeared after age, parity and partnership status were introduced and remained non-significant in the fully adjusted models, suggesting no independent behavioural association.

Financial stress was negatively associated with fertility behaviour in Models 1 and 2 (ORs = 0.918 and 0.936), became non-significant after full adjustment, and was significant again after fertility intention was included (OR = 0.936). This suggests a modest negative association with fertility behaviour, consistent with financial constraints affecting behavioural feasibility more than intention formation.

Loneliness was strongly negatively associated with fertility behaviour before fertility intention was introduced (OR = 0.704 in Model 1 and 0.883 in Model 3). After fertility intention was added, the association became non-significant (OR = 0.948), indicating substantial attenuation and a closer relationship with motivational readiness than with behaviour net of intention.

Overall, Table 3 indicates that stress dimensions were not uniformly associated with fertility behaviour. Time stress remained the clearest behavioural correlate, financial stress showed a modest final-model association, loneliness was attenuated after intention was included, and work-related stress showed no independent association after adjustment.

4.4 Multidimensional urban stress and fertility intention

Table 4. Multidimensional urban stress and fertility intention

	(1) Model 1	(2) Model 2	(3) Model 3
Time stress	0.036 (0.032)	0.006 (0.032)	0.025 (0.032)
Work-related stress	0.080** (0.028)	0.056* (0.027)	0.054* (0.027)
Financial stress	-0.038 (0.028)	-0.015 (0.027)	0.031 (0.026)
Loneliness	-0.369***	-0.265***	-0.170***

	(0.030)	(0.030)	(0.030)
Year fixed effects	Yes	Yes	Yes
Parity controls	Yes	Yes	Yes
Age controls	Yes	Yes	Yes
Partnership control	No	Yes	Yes
Socioeconomic and health controls	No	No	Yes
Area, housing and mobility controls	No	No	Yes
Observations	25,512	25,512	25,512
Adjusted R-squared	0.535	0.549	0.557

Table 4 examines whether the four stress dimensions are associated with fertility intention. Consistent with the conceptual framework, this analysis examines the extent to which different dimensions of psychosocial urban stress are associated with fertility intentions, representing motivational readiness for parenthood.

The clearest result is for loneliness. Across all model specifications, loneliness is negatively associated with fertility intention. In Model 1, a one-standard-deviation increase in loneliness is associated with a 0.369-point lower fertility intention score. After partnership status is added in Model 2, the coefficient decreases to -0.265 but remains statistically significant. In the fully adjusted model, loneliness remains negatively associated with fertility intention, with a coefficient of -0.170. This finding suggests that loneliness primarily influences motivational readiness for parenthood by reducing perceived social support and emotional preparedness, even after accounting for life-course stage, socioeconomic circumstances, health, and urban contextual characteristics. Work-related stress is positively associated with fertility intention. The coefficient is 0.080 in Model 1, 0.056 in Model 2, and 0.054 in the fully adjusted model. Although the magnitude is small, the association remains statistically significant. Rather than reducing motivational readiness, this pattern may reflect life-course positioning among women who remain actively engaged in employment while simultaneously considering future parenthood. However, because work-related stress is not independently associated with subsequent fertility behaviour, this positive association should be interpreted cautiously and not as evidence that work-related stress promotes childbearing.

Time stress is not significantly associated with fertility intention in any model. This finding is particularly important when considered alongside the behavioural models presented in Table 3. The absence of an association with fertility intentions suggests that time stress does not primarily reduce motivational readiness for parenthood.

Instead, its influence appears to arise through behavioural feasibility by limiting the practical capacity to realise existing fertility intentions. Financial stress is also not significantly associated with fertility intention in the fully adjusted model. The coefficient is small and positive after adjustment, but statistically non-significant. This indicates that financial stress has little independent influence on motivational readiness once broader socioeconomic and contextual characteristics are taken into account. Considered together with the behavioural results, financial stress appears more strongly related to behavioural feasibility than to the formation of fertility intentions.

Overall, the findings (see Table 4) support the proposition that multidimensional psychosocial urban stress influences fertility decision-making through differentiated pathways rather than a single uniform mechanism. Loneliness is the strongest correlate of motivational readiness for parenthood, whereas time stress and financial stress appear to influence fertility primarily through behavioural feasibility. Collectively, these findings reinforce the conceptual distinction between the formation of fertility intentions and their subsequent realisation as fertility behaviour.

4.5 Decomposition analysis

Table 5. KHB decomposition of stress associations with fertility behaviour

Major-city complete-case sample. Mediator: fertility intention. Outcome: fertility behaviour.

Stress dimension	Reduced model	Full model	Difference	p-value for difference
Time stress	-0.084*	-0.097**	0.012	0.963
	(0.033)	(0.033)	(0.265)	
Work-related stress	0.045	0.020	0.026	0.922
	(0.029)	(0.029)	(0.265)	
Financial stress	-0.051	-0.066*	0.015	0.956
	(0.032)	(0.032)	(0.265)	
Loneliness	-0.135***	-0.053	-0.082	0.757
	(0.035)	(0.035)	(0.265)	
Observations	25,512	25,512	25,512	
Full controls	Yes	Yes	Yes	

Notes: Coefficients are logit coefficients from the Karlson-Holm-Breen decomposition. The reduced model excludes fertility intention. The full model includes fertility intention. The difference component represents the intention-related component after accounting for rescaling in logistic regression. Each stress dimension is estimated in a separate KHB model, adjusting for the remaining stress dimensions, age, age squared, parity, partnership status, employment status, log household income, weekly working hours, self-rated health, regional

*unemployment rate, SEIFA deciles, housing cost ratio, residential mobility, long-distance mobility, and survey year fixed effects. Cluster-robust standard errors at the individual level are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.*

Table 5 reports the KHB decomposition results examining whether fertility intention accounts for part of the association between each stress dimension and subsequent fertility behaviour. The decomposition was used to assess whether the stress–behaviour associations operated through fertility intention or remained evident after fertility intention was included.

For time stress, the reduced and full coefficients were both negative and statistically significant, while the difference component was not significant. This suggests that fertility intention accounts for little of the association between time stress and fertility behaviour. Time stress therefore appears more closely related to behavioural feasibility than to motivational readiness. For work-related stress, neither the reduced nor the full coefficient was statistically significant, and the difference component was also non-significant. This is consistent with the behavioural models, which showed little independent association after adjustment.

For financial stress, the full coefficient was negative and statistically significant, whereas the difference component was non-significant. This provides little evidence that financial stress operates through fertility intention and instead suggests a closer relationship with behavioural feasibility. For loneliness, the reduced coefficient was negative and statistically significant, but the full coefficient became smaller and non-significant after fertility intention was included. Although the KHB results do not provide formal statistical evidence of mediation, this attenuation is consistent with loneliness being more closely linked to fertility intention than to fertility behaviour net of intention.

Overall, the decomposition results support the main conclusion that psychosocial urban stress is associated with fertility behaviour through differentiated pathways rather than a single uniform mediation process. Fertility intention strongly predicts subsequent fertility behaviour, but it does not statistically account for the stress–behaviour associations. Time stress and financial stress appear more closely related to behavioural constraints, while loneliness is more closely related to lower fertility intention.

5. Discussion

5.1 Overview of the findings

This study examined whether multidimensional psychosocial urban stress was

associated with fertility intentions and subsequent fertility behaviour among reproductive-age women living in Australia's major cities. Using longitudinal HILDA data, fertility intention was strongly and positively associated with later childbearing, confirming its importance as a predictor of fertility behaviour (Guzzo, 2022; Spéder and Bálint, 2024). However, fertility intention did not fully account for stress-related differences in subsequent childbearing. Loneliness was the only stress dimension consistently associated with lower fertility intentions, and its association with fertility behaviour was attenuated after fertility intention was included. In contrast, time stress remained negatively associated with fertility behaviour after fertility intention was considered, while financial stress showed a modest negative association in the final behavioural model. Work-related stress showed no independent association after adjustment. Overall, the results indicate that psychosocial urban stress is associated with fertility decision-making in dimension-specific ways, with loneliness more closely related to intentions and time and financial stress more closely related to subsequent behaviour.

5.2 Motivational readiness for parenthood

The strong association between fertility intentions and subsequent fertility behaviour reinforces extensive evidence that fertility intentions are central to reproductive decision-making (Guzzo, 2022; Spéder & Bálint, 2024). Within the present framework, fertility intentions reflect motivational readiness for parenthood by capturing individuals' perceived preparedness to have children under prevailing personal, social, and economic circumstances. Consistent with the Narrative Framework and Life Course Theory, readiness appears to evolve as opportunities and constraints change over time (Vignoli, Guetto et al., 2020; Barker & Buber-Ennsner, 2024). This finding is consistent with previous research showing that fertility intentions are continually revised in response to changing life circumstances rather than representing fixed reproductive preferences (Barker & Buber-Ennsner, 2024; Guzzo & Hayford, 2023). However, the present study extends this literature by demonstrating that psychosocial urban stress influences this process unevenly, with different stress dimensions contributing differently to motivational readiness.

Loneliness emerged as the strongest and most consistent predictor of lower fertility intentions, suggesting that perceived social disconnection reduces emotional preparedness for parenthood. This finding aligns with evidence showing that perceived social resources and emotional support are positively associated with fertility intentions (Artamonova et al., 2024) and with broader public health research identifying loneliness as a determinant of psychological wellbeing (Surkalim et al., 2022; Wickramaratne et al., 2022). The present findings extend this evidence by suggesting that loneliness

operates primarily through motivational readiness rather than directly reducing fertility behaviour. By contrast, work-related stress showed a weak positive association with fertility intentions but no independent association with fertility behaviour. Rather than indicating that work stress promotes childbearing, this pattern more likely reflects life-course positioning, whereby economically active, partnered women are also more likely to be planning future parenthood. Previous studies similarly show that employment conditions and flexible or home-based working arrangements may shape fertility planning and childbearing in context-dependent ways (Gatta et al., 2022; Kurowska, Matysiak, & Osiewalska, 2023; Osiewalska, Matysiak & Kurowska, 2024; Wang & Dong, 2024). Collectively, these findings suggest that motivational readiness is shaped primarily by psychosocial and relational resources rather than uniformly across all dimensions of psychosocial urban stress.

5.3 Behavioural feasibility and the realisation of fertility intentions

While fertility intentions strongly predicted subsequent fertility behaviour, they did not fully account for the associations between psychosocial urban stress and fertility behaviour. Time stress and financial stress remained associated with fertility behaviour after fertility intentions were considered, indicating that these stressors primarily influence behavioural feasibility—the capacity to translate reproductive intentions into realised childbearing. Time stress provided the clearest evidence of this process. Women experiencing greater time pressure remained less likely to have children despite reporting similar fertility intentions, suggesting that competing employment demands, commuting, household responsibilities, and limited discretionary time reduce opportunities to act on existing reproductive intentions. This finding complements recent research demonstrating that time resources, work–family conflict, and everyday caregiving demands influence fertility outcomes independently of fertility intentions (Jarosz, Matysiak, & Osiewalska, 2023; Latshaw & Yucel, 2022). Instead of reducing the desire to become parents, time scarcity appears to limit opportunities to act on existing reproductive intentions, particularly within metropolitan environments where commuting and intensive labour-market participation further compress discretionary time.

Financial stress followed a similar pattern. Although it showed little independent association with fertility intentions, it remained negatively associated with fertility behaviour, suggesting that financial insecurity primarily constrains the realisation rather than the formation of reproductive intentions. This finding is consistent with evidence that housing affordability, financial insecurity, and the increasing economic prerequisites of parenthood delay or prevent childbearing even among individuals intending to have children (Atalay, Li, & Whelan, 2021; van Wijk & Billari, 2024;

Japaridze & Sayour, 2024). The present study extends this literature by demonstrating that these constraints are particularly evident within Australia's major cities, where housing affordability and living costs reduce the behavioural feasibility of family formation despite continued reproductive aspirations. These findings indicate that psychosocial urban stress influences fertility decision-making through differentiated pathways. Whereas loneliness primarily shapes motivational readiness, time stress and financial stress primarily constrain behavioural feasibility. This distinction provides a more comprehensive explanation of the fertility intention–behaviour gap than conventional models that treat fertility intentions as the sole mechanism linking psychosocial conditions to fertility behaviour.

5.4 Theoretical implications

The present findings extend existing theories of fertility decision-making by showing that psychosocial urban stress does not influence fertility through a single intention-mediated pathway. Instead, different dimensions of psychosocial urban stress appear to affect different stages of reproductive decision-making. Loneliness primarily influenced motivational readiness by shaping perceived emotional preparedness and anticipated social support for parenthood, whereas time stress and financial stress were more closely associated with behavioural feasibility by limiting the capacity to translate fertility intentions into realised childbearing.

This interpretation builds on the Narrative Framework of fertility decision-making, which proposes that reproductive decisions are continually revised in response to changing expectations about future life circumstances (Vignoli, Guetto et al., 2020; Guetto et al., 2023). The findings also complement Life Course Theory, suggesting that changing personal resources and constraints influence not only whether individuals intend to have children but also whether those intentions remain achievable over time. By distinguishing between motivational readiness and behavioural feasibility, the present study provides a more refined explanation of the fertility intention–behaviour gap than approaches that treat fertility intentions as the sole mechanism linking psychosocial conditions to fertility behaviour. The study also contributes to urban health research by conceptualising psychosocial urban stress as a multidimensional urban phenomenon rather than a collection of independent stressors. Housing affordability, employment demands, commuting, time scarcity, and social connectedness should therefore be understood as interacting features of urban environments that shape reproductive decision-making in different but complementary ways.

5.5 Policy implications

The findings have implications for policies aimed at improving reproductive wellbeing in urbanised societies. Although financial assistance remains important, the results suggest that financial incentives alone are unlikely to address the broader psychosocial conditions shaping fertility behaviour. Policies should therefore consider both the motivation to have children and the practical conditions that enable those intentions to be realised.

For women experiencing high time stress, flexible working arrangements, predictable schedules, accessible childcare, improved transport, and reduced commuting burdens may increase the practical feasibility of family formation. Housing affordability is also important in Australia's major cities, where high living costs may delay or prevent childbearing despite continued fertility intentions. In addition, the association between loneliness and lower fertility intentions highlights the importance of social connectedness. Community infrastructure, family support programmes, and opportunities for social participation may strengthen perceived support and emotional preparedness for parenthood. Overall, urban family policy should move beyond isolated financial measures towards integrated approaches addressing time, housing, employment, childcare, and social connectedness.

5.6 Strengths, limitations and future research

This study has several important strengths. The longitudinal HILDA Survey enabled psychosocial urban stress and fertility intentions to be measured before subsequent fertility behaviour, strengthening temporal ordering compared with cross-sectional research. The focus on women living in Australia's major cities provided a conceptually consistent setting for examining psychosocial urban stress, while the multidimensional measurement of financial stress, work-related stress, loneliness, and time stress extends previous studies that have largely examined these stressors independently.

Several limitations should nevertheless be acknowledged. First, despite the longitudinal design, the analyses remain observational and residual confounding from unmeasured time-varying factors cannot be excluded. Second, fertility behaviour was measured over a one-year interval, which may not fully capture longer-term fertility planning or changes in fertility intentions occurring between survey waves. Third, restricting the analysis to major-city residents strengthens the urban focus but limits generalisability to regional and rural populations. Finally, the psychosocial urban stress measures do not capture every aspect of urban life, including neighbourhood safety, childcare accessibility, environmental quality, or partner-level influences that may also shape reproductive decision-making.

Future research should build on the present findings by incorporating objective

neighbourhood measures, multilevel modelling, and partner-level information to better understand how urban environments shape fertility across different social contexts. Comparative analyses between metropolitan and regional populations would help determine whether the differentiated pathways identified here are unique to urban settings or represent broader fertility processes. Further work examining housing affordability, transport systems, childcare accessibility, and neighbourhood social infrastructure would also strengthen understanding of how urban environments influence both motivational readiness and behavioural feasibility across the life course

5.7 Conclusion

This study examined how multidimensional psychosocial urban stress is associated with fertility intentions and subsequent fertility behaviour among reproductive-age women living in Australia's major cities. Using longitudinal HILDA data, the findings show that fertility intentions remain a strong predictor of subsequent childbearing, but do not fully account for the associations between psychosocial urban stress and fertility behaviour. Loneliness was most consistently associated with lower fertility intentions, suggesting that social disconnection primarily affects motivational readiness for parenthood. In contrast, time stress and financial stress were more closely associated with fertility behaviour after fertility intentions were considered, indicating that these stressors constrain the behavioural feasibility of realising existing reproductive intentions.

These findings show that psychosocial urban stress is best understood as a multidimensional urban phenomenon that shapes different stages of reproductive decision-making rather than as a single intention-mediated process. Policies aimed at improving reproductive wellbeing should therefore extend beyond financial incentives to address housing affordability, employment flexibility, commuting burdens, childcare accessibility, and social connectedness in urban environments. Although the longitudinal design strengthens temporal ordering, the analysis remains observational and cannot establish causality. Future research should incorporate objective neighbourhood measures, multilevel designs, partner-level information, and comparisons between metropolitan and regional populations to further examine how urban environments shape fertility decision-making across the life course.

Declarations

Ethics approval and consent to participate

The Household, Income and Labour Dynamics in Australia (HILDA) Survey received ethics approval from the Human Research Ethics Committee of the University of Melbourne, with approval renewed throughout the study. Informed consent was obtained from all survey participants or, where applicable, from their parents or legal guardians. The present study involved secondary analysis of de-identified unit record data accessed under licence through the Australian Data Archive. No participants were contacted, and no identifiable personal information was accessed. Additional ethics approval and consent to participate were therefore not required for the present secondary analysis. All methods were conducted in accordance with the relevant ethical guidelines and data-access requirements.

Consent for publication

Not applicable. The manuscript does not contain identifiable personal information, images, videos or individual-level details requiring consent for publication.

Availability of data and materials

The data analysed in this study were obtained from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, General Release 23 (Waves 1–23), administered by the Melbourne Institute of Applied Economic and Social Research. The data are available through the Australian Data Archive, subject to application, approval and compliance with the HILDA Survey data-access and confidentiality requirements: <https://doi.org/10.26193/NBTNMV>. Under the conditions of access, the authors are not permitted to redistribute the unit record data.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

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Michael Odei Erdiaw-Kwasie: Conceptualization, Methodology, Validation, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization, Project administration, supervision.

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