



WORKING PAPER SERIES

TRANSFORMATIVE EVENT, DISRUPTION OR CUMULATIVE DISADVANTAGE? LABOR MARKET AND EDUCATION TRAJECTORIES OF YOUNG MOTHERS IN AUSTRALIA

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No. 2020-04

March 2020



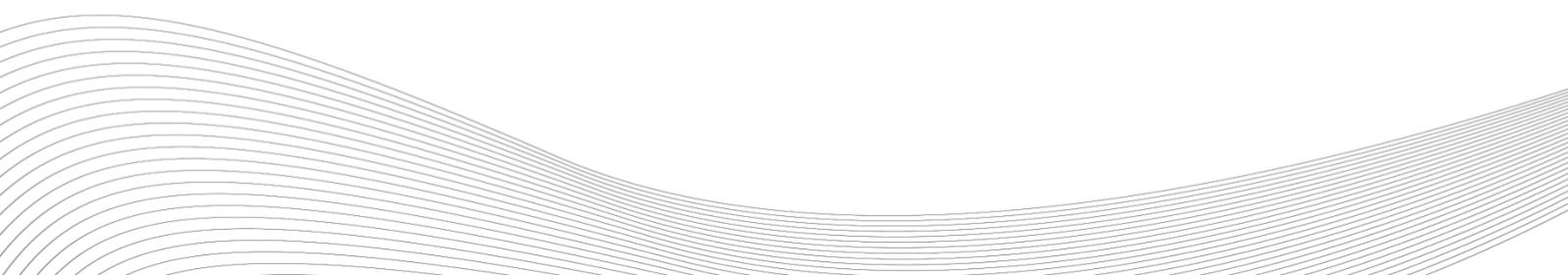
NON-TECHNICAL SUMMARY

Young motherhood is generally viewed as a risky event, adding complexity and hardship to the life of both the young woman and her child. Previous research has found that young mothers fall behind on both educational- and income measures later in life. At the same time, qualitative research reports stories of motherhood as a transformative experience, where the birth of a child provides motivation for a fresh start, moving young women away from previously unstable paths. While these two scenarios might appear contradictory, it may be that outcomes vary for different groups of women depending on the path they were already on before becoming a parent.

We investigate the effects of young parenthood on the following years of labour market and educational participation, using data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. We use a longitudinal sequence based approach, taking into account the stability of the educational and work pathways of young mothers by looking at how they transition in and out of employment on a week by week basis, in a measure of 'precarity'. By utilising this detailed information on the labour market and educational pathways before the birth of their first child, we can compare young mothers to peers who were on a very similar path, but did not become parents. This way, we come closer to the answer of how the life of young mothers diverges from what would otherwise be expected, were they to not have a child.

Our results suggest that young motherhood has a negative impact for young women who were initially on a path that was not associated with a lot of precarity, such as women stably in education. This supports the idea of young motherhood as a cumulative disadvantage. However, this was not true for women on the most precarious paths. For them, becoming a mother did not impact their continuing labour market trajectory negatively, but neither did it lead to any improvements in comparison to women on similar paths who did not become a parent. We can conclude that we do not see the narratives of transformative power translated in to reality for this group. This leaves us with the question, how can we harness the transformative energy expressed by disadvantaged young mothers in qualitative research, and move past the point where young women are 'not that much worse off than expected' to 'better than expected', after becoming a parent?

These insights are useful for decreasing stigma towards young parents, and blaming all misfortune on 'bad choices'. Indeed, stigma has been quoted as a significant barrier for young mothers, leading them to avoid interacting with supportive services, the very behaviour that could help young mothers utilise their transformative energy.



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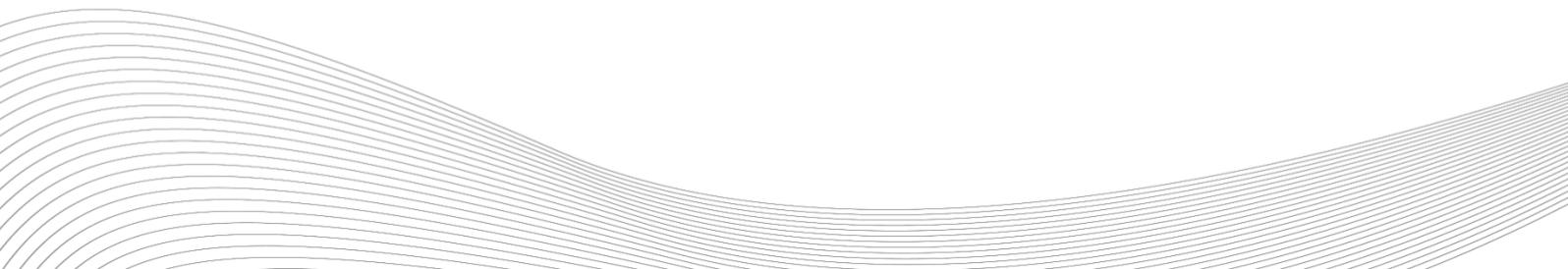
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ACKNOWLEDGEMENTS

This work was supported by the Australian Research Council Centre of Excellence for Children and Families over the Life Course (project number CE140100027) and the Swedish Research Council for Health, Working Life and Welfare (project number 2018-00861). The views expressed herein are those of the authors and are not necessarily those of the Australian Research Council or the Swedish Research Council for Health, Working Life and Welfare. This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the author and should not be attributed to either DSS or the Melbourne Institute.

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ABSTRACT

Young motherhood is often framed as detrimental to the life chances of young women with research showing negative impacts on education and labor market outcomes. At the same time, qualitative research reports narratives of motherhood as a transformative experience, providing motivation for a fresh start and moving young women away from previously unstable life pathways. These scenarios appear contradictor, however outcomes might vary for different groups of women depending on their pre-birth trajectories. We investigate the effects of early parenthood using the Household, Income and Labour Dynamics in Australia (HILDA) survey. We employ a sequence based approach to compare labor market- and educational precarity of young mothers and non-parenting peers. We employ a novel sequence matching technique creating a comparison group of non-parenting young women, based on similarities in early labor market trajectories. We find that young mothers have higher levels of precarity in their pre-birth trajectories. Moreover, our results show that becoming a young mother is connected to an average increase in labor market and educational precarity post birth, which supports the hypothesis of cumulative disadvantage. However, only mothers with the least precarious trajectories prior to birth experience this development, whereas young women already on highly precarious paths see a decrease in precarity over time. Although our results don't support cumulative disadvantage for the most disadvantaged women, neither does it support the idea of parenthood as a transformative event. Our results point to the importance of understanding heterogeneity in the outcomes of young mothers.

Keywords: young parenthood; young mothers; early fertility; sequence analysis; labor market trajectory; labor market precarity

Suggested citation: Kalucza, S., Lam, J., & Baxter, J. (2020). 'Transformative Event, Disruption or Cumulative Disadvantage? Labor Market and Education Trajectories of Young Mothers in Australia'. Life Course Centre Working Paper Series, 2020-04. Institute for Social Science Research, The University of Queensland.

Introduction

Young motherhood is often framed as detrimental to the continued life chances of women, with research showing negative impacts on education and labor market outcomes (Furstenberg 2003). This may be because parenting at a young age restricts women's opportunities to complete education or pursue employment, or because young parenthood is a marker of other kinds of characteristics that are associated with onward disadvantage, such as low attachment to education, limited employment opportunities or aspirations, and disrupted family relationships. Previous research has indicated higher welfare dependence, lower educational completion and lower lifetime income for young mothers compared to their non-parenting peers or those who become parents at a later age (e.g. Hoffman et al. 1993, Assini-Maytin and Green 2015). These outcomes may be due to a large range of factors and events taking place in the life of a young woman after becoming a parent, such as unscheduled interruptions to education, reduced employment and career opportunities, increased economic burdens of childcare, housing instability and relationship instability.

While parenthood undoubtedly creates stressors that can disrupt educational and labor market pathways, some effects previously thought to be due to entering into parenthood have been explained by selection. Young women who have had less opportunity for high quality education and labor market participation may be more likely to enter parenthood earlier than their more advantaged peers. Research applying new and more advanced methodologies show that the direct effects of young parenthood are smaller than previously thought (Diaz and Fiel 2016). Nevertheless, a body of evidence shows that while the remaining effects of early fertility on later life outcomes are small, they are persistent across studies (Dariotis, Pleck, Astone and Sonenstein 2011; Kane, Morgan, Harris and Guilkey 2013). This has been found across a range of different outcomes, including educational attainment (e.g. Ashcraft, Fernández-Val and Lang 2013; Fletcher and Wolfe 2009; Holmlund 2005; Kane et al. 2013; Olausson, Haglund, Weitoft and Cnattingius 2001; Sanders, Smith and Zhang 2007; Schulkind and Sandler 2019; Webbink, Martin and Visscher 2011), and income (Ashcraft et al. 2013; Fletcher and Wolfe 2009). Studies also find that children of teenage parents report worse outcomes over time, suggesting intergenerational effects (Card 1981; Myrskylä and Fenelon 2012). Hence, it is important to be able to appropriately compare young women who become parents, to women of similar backgrounds who do not become parents at a young age.

Beyond impacting the size of the effects, the impact of young motherhood might differ depending on the structure and stability of the trajectory she was on prior to becoming a parent. Consideration of life pathways prior to motherhood for young mothers perhaps capture a more realistic picture of the impact of parenthood. The social pathways of individuals who eventually become a young parent and those who do not may be quite different. In line with this, some researchers have suggested that young motherhood has a positive effect on some women's outcomes, in contrast to evidence about the detrimental effects of young motherhood (Dowling, Mantovani and Hollins 2018; Edin and Kefalas 2005; SmithBattle 2007: SmithBattle and Leonard 2012; Smith, Skinner and Fenwick, 2012). This evidence is especially prevalent in qualitative and ethnographic research where narratives from young women indicate that motherhood is viewed as a transformative event that triggers a turning point towards more positive life trajectories (Edin and Kefalas 2005; Dowling et al. 2018; SmithBattle 2007: SmithBattle and Leonard 2012). In these studies, young women indicate that the birth of a child provides motivation for a fresh start moving them away from previously unstable paths and providing an incentive to pursue more secure pathways for themselves and their child. The transformative narrative not only contrasts to the public perception of young parenthood as a disruptive life event of private and public concern (Furstenberg 2003), but also with persistent negative effects found in many quantitative studies (Dariotis et al. 2011; Hofferth and Hayes 1987; Kane et al. 2013).

In this paper, we examine the effects of early parenthood by bringing methodological developments in sequence analysis to the study of life course outcomes for young mothers. We focus on education and employment outcomes using rich longitudinal data from the Households, Income and Labour Dynamics in Australia survey (HILDA) that enables us to observe young women before and after childbirth, and compare them to their peers who do not become parents at a young age. We define young motherhood as women who give birth prior to age 25 years. This demarcation is chosen for two reasons. First age 25 represents a period in the life course when it is expected that most people have moved out of the family home, education is completed, and employment is well-established. Second, this age cutoff is useful for comparative reasons, as it is used to distinguish younger and older mothers in official Australian government statistics. Becoming a parent prior to age 25 has become increasingly uncommon in Australia, and today only 14% of mothers are younger than 25 (Australian Institute for Health and Welfare 2019).

Our contribution is twofold. First we use a longitudinal sequence-based approach to measure post-parenthood outcomes using a new measure of labor market and educational precarity,

henceforth referred to as labor market precarity. The new measure by Ritschard, Bussi and O'Reilly (2018) extends existing sequence complexity measures by taking into consideration the difference between wanted (e.g. employment) and unwanted (e.g. unemployment) states, and the transitions between them, capturing a more dynamic picture of the years following an early birth. Some research has examined labor market precarity in early careers through the use of sequence analysis (e.g. Anyadike-Danes and McVicar 2010; Brzinsky-Fay 2007; Scherer 2001; Witteveen 2017). This work however, has largely focused on precarious versus stable full-time employment trajectories in the whole population of youth. To our knowledge, this approach to labor market precarity has not been employed in the study of outcomes for young parents, even though the scarring effects of early parenthood has been a big topic in the young parenthood literature. By stratifying our young mothers on the precarity of their pre-birth trajectory, we investigate whether the impact of an early first birth differs depending on the structure and stability of their initial pathway.

Second, we employ a novel sequence matching approach, matching young mothers-to-be to young women who did not become young mothers, using their pre-parenthood labor market and educational trajectories. Hence, we construct a comparison population of non-parenting peers on similar initial trajectories as the young mothers-to-be, which enables closer estimates of the causal effects of early motherhood on labor market precarity. This enables us to disentangle some of the selection effects into young motherhood from the impact of young motherhood on labor market and educational pathways. A similar sequence matching strategy has previously been employed by Barban, DeLuna, Lundholm, Svensson and Billari (2020); however, we extend this approach by matching sequences for the time varying event of having a first child.

With these contributions we provide further insight into whether young motherhood entrenches social disadvantage in education and employment outcomes, or has a positive effect, potentially due to transformed aspirations and motivations, or a null effect once dynamic life course pathways prior to birth are considered.

Background

Young Motherhood, Education and Labor Market Outcomes

Previous literature points to several possible scenarios about the effects of young motherhood on education and employment outcomes. Some research finds that young motherhood is expressed as transformative and empowering (Edin and Kefalas 2005; Dowling et al. 2018; SmithBattle 2007; SmithBattle and Leonard 2012). In contrast to experiences that sometimes characterize the lives of these young women, such as dropping out of school, violence and drug use, motherhood emerges as a turning point to previous negative patterns of behaviors and trajectories. Young women from disadvantaged and complex life circumstances describe motherhood as bringing new feelings of meaning and purpose, requiring them to grow up and mature quickly, and leave behind disruptive behaviors and habits (e.g. Dowling et al. 2018; SmithBattle 2007; SmithBattle and Leonard 2012; Smith, Skinner and Fenwick, 2012). In several studies, young mothers describe their previous life as empty and aimless (Camarena et al. 1998; Mantovani et al. 2016). After becoming a mother, some young women report a desire to go back to school, to be able to financially provide for their child, and to be a good role model (Dowling et al. 2018; SmithBattle 2007). For others, becoming a mother may be the first time education and college emerge as an aspiration (Camarena et al. 1998; SmithBattle 2007). These studies suggest that motherhood is empowering for disadvantaged women and may provide a break with previously negative life pathways. If this is the case, we would expect that young women on disadvantaged pathways will experience an improvement in education and employment outcomes following a birth compared to their equally disadvantaged, but non-parenting peers. We refer to this as the transformative hypothesis.

Another possibility is that while young motherhood may have a transformative effect on motivations and aspirations, these may not be realized in objective outcomes, such as education, employment or income. Having a child young might encourage women to change their outlook and plans, but the reality of completing further education or securing and remaining in steady employment may be difficult to realize given barriers such as lack of childcare, limited housing, transport or financial resources, and stigma towards young mothers. These barriers might lead to further disadvantage, despite new motivations, where women with already weak labor market attachments and resources are further encumbered by the additional responsibilities and demands of a child. This means that young motherhood might transform motivations but without any changes to the detrimental effect on labor market precarity.

This result would be consistent with a cumulative disadvantage hypothesis that draws on social stratification studies to suggest that adversity in early life continues to reverberate throughout the life course, resulting in widening gaps between the advantaged and the disadvantaged over time (Dannefer 2003; DiPrete and Eirich 2006). This hypothesis suggests that women who were already on a sub-optimal path prior to parenthood at a young age, will continue on an increasingly sub-optimal path post childbirth due to the additional hardships and stigma attached to early childbearing. There is evidence to suggest that the difficulties faced by young parents are related largely to resource access (Mollborn, Lawrence, James-Hawkins and Fomby 2014). Children, planned or not, require financial and time resources and tend to exacerbate already limited access to resources among young parents (Mollborn 2007). Young mothers with weak or no social support from family, the father of the child, or the state, face significant barriers to successful career and educational outcomes (Mollborn 2010; Mollborn and Blalock 2012). This hypothesis is supported if we observe young mothers who were initially on a disadvantaged path prior to becoming parents, continue to experience negative developments in their labor market precarity post-birth compared to their non-parenting peers.

In contrast to the cumulative disadvantage approach that implies cascading negative impacts building on earlier sub-optimal pathways, early parenthood may be a disruptive life event that triggers diverging destinies (McLanahan 2004). Under this scenario, young women who do or do not become early mothers may be very similar in characteristics and labor market trajectories prior to parenthood, but find themselves on distinctly different pathways as a result of early parenthood. The child as disruptor hypothesis suggests that young women are progressing in a similar way to their peers prior to birth, but the birth of a child disrupts their educational pathway and normative sequences of life course events leading to detrimental outcomes. While early research in the area of young and teenage parenthood found substantial detrimental effects of young parenthood on schooling and work (for a review see Hofferth and Hayes 1987), the evidence has been substantially weakened through research showing that adverse outcomes for both parent and child can partly, or completely, be attributed to socio-economic factors prior to birth (e.g. Cunningham 2001; Jeon et al. 2011, Sigle-Rushton 2005; Stange 2011). However, the idea of young parenthood as a disruptive event remains prominent in much policy and public commentary. Support for this hypothesis would be evidenced by none or minimal differences in the labor market precarity of young mothers-to-be and their peers, with a widening detrimental gap to young mothers post-parenthood compared to their peers.

We focus on labor market outcomes since economic wellbeing in Australia, as in many other Western liberal countries, is determined in large part by labor market participation, and particularly fulltime, continuous employment in the labor market. Precarious employment is a concern across many advanced industrialized countries and young adults face particularly high levels of employment uncertainty (Chesters et al. 2018; Kalleberg 2018). Understanding employment stability over a sustained period of time may be more advantageous than capturing employment status at one point in time, as it is likely to be a better indicator of income stability and also captures whether individuals may be moving in and out of the labor force, and in and out of employment. Furthermore, young people may return to school or other forms of education to improve their chances in the labor force. Consideration of education status in conjunction with employment status is therefore desirable. It has been argued that a shortcoming of the field of labor market research is the often simplistic snapshot measures of career instability and precarity that do not take account of employment biographies in between events where considerable instability and precarity may be observed (Witteveen 2017). Furthermore, the early career path may be viewed as a period within the life course, and treating this period as a whole reflecting the structural character of the life course gives us a more holistic understanding of school-to-work transitions, compared to approaches focusing on single events (Brizinsky-Fay 2014).

We employ a longitudinal sequence-based measure of labor market precarity for our measure of whether young parents have stable or unstable labor market and educational trajectories. We use this measure to investigate the hypotheses outlined above, and in doing so, contribute to knowledge about whether early parenthood is associated with labor market precarity, the strength of any observed associations, and the nature of the association between early parenthood and labor market precarity. Our analyses first draw on descriptive sequence analysis to map trajectories of education and labor market participation. We then present results from multivariate regression models examining labor market precarity based on labor market sequences prior to and following the transition to parenthood. Finally we investigate individual changes in precarity pre- and post-transition. Together these models enable examination of the complexity and precariousness of labor market trajectories of young mothers, and how precarious trajectories are disrupted, reinforced or unaffected by an early transition to motherhood.

Precarity can be measured and defined in many different ways and refers to a range of dimensions of work and workers (Campbell and Price 2016). In this study precarity refers to longitudinal instability and prevalence of inactivity in the labor market and educational

sectors, and not to other precarious working conditions such as low wage work or casual work. Inactivity can mean several different things, and one can question whether inactivity due to child rearing is an equally ‘negative’ outcome as inactivity due to unemployment. We believe that within the context of the current research, examining trajectories of young mothers who have no or few years on the labor market prior to becoming a parent, that we can define long-term inactivity as a negative outcome, as long as absences from the labor market or lack of entry of the same can have long term consequences for the continued labor market attachment and wage progression for young women (e.g. Bäckman and Nilsson 2016; Gregg and Tominey 2005; Schmitten and Umkehrer 2017). We measure precarity in a way that excludes the first year post birth, to allow for some time spent at home with the new child without penalizing the precarity measure. Spells of inactivity after the first child can be due to the arrival of additional children, however effects have been shown to be the most pronounced with repeated spells of labor market inactivity (Gregg and Tominey 2005; Schmitten and Umkehrer 2017). Hence, such inactivity is precarious for the educational and labor market pathway, even though periods of childrearing might be fulfilling in other ways.

Methods

Data

This study examines data from waves 1 to 17 (year 2001 to 2017) of the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Survey is an ongoing panel study that started in 2001 with a representative sample of Australian households at the first year of data collection. Surveys were collected from individuals aged 15 and over, living in the same households. The sample is designed to be representative of the non-institutionalized resident population of Australia with some minor exceptions, including very remote areas and diplomatic personnel of other nations. Data collection for the HILDA Survey combines a self-complete questionnaire and computer-assisted face-to-face interviews. The survey aims to capture a wide range of information on economic and personal well-being, labor market dynamics and family life. Response rates are generally very high, with the latest wave at the time of writing (wave 17) observing a re-interview rate exceeding 95% (Wilkins, Butterworth and Vera-Toscano 2019). For a detailed description of the sample design and following rules, please see HILDA statistical reports (Watson and Wooden 2002; Wilkins et al. 2019). We utilize household information on children and families, as well as the labor market calendar module, a module we believe is an under-utilized source of longitudinal information on labor market and educational participation.

Sample

The sample for this study is restricted to women only, as there are very few young fathers observed in HILDA. Young mothers are defined as having their first child before age 25, and were eligible for this study if they had their first child between 2004 and 2014. As we are interested in the change in labor market precarity both prior to and following parenthood, individuals becoming young parents outside of the study period, or too close to the beginning or end of the study period, were excluded. To be included, the young mothers had to have entered the study at least three years prior to their first birth and exited no earlier than three years post first birth. This allows us to follow women's pathways leading up to their first birth and for the three years following it. The span of seven years was chosen in order to balance a sizable study sample, with a sufficient observation period to examine labor market and educational pathways. Our restrictions resulted in an analytic sample of 170 young mothers.

The longitudinal sampling frame for the analyses is represented schematically in Fig. 1. As the figure indicates, the young mothers are observed for 3 years prior to the birth of their first child and 3 years following the birth. This is represented by 36 periods of data prior to birth from the HILDA survey education and employment calendar module, and 36 periods following the birth.

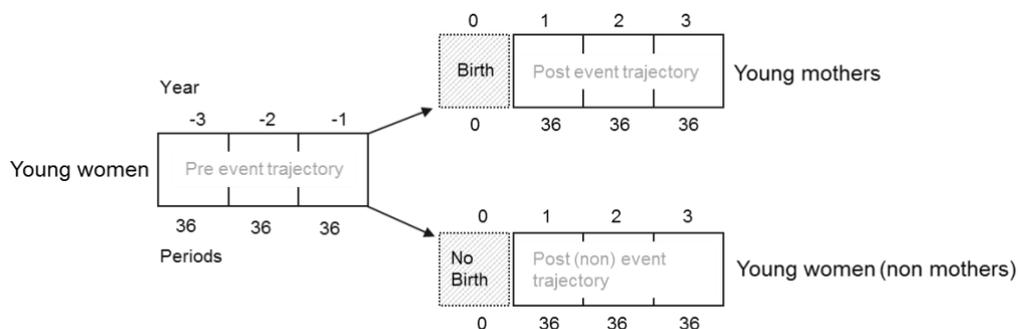


Fig. 1 Longitudinal sampling frame

The comparison group was selected by identifying women of the same birth cohorts as the young mothers, but who did not have a child before age 25. These women had to be observed in HILDA over at least a span of 7 years, covering the same age periods as our young mothers. As these individuals did not have a natural break point for 'before' and 'after', through the birth of their first child, each 'control' individual had their available trajectories split by a

‘mid trajectory age,’ corresponding to the possible ages at first birth for the comparable young mothers (18-24)¹. Their trajectories were then constructed three years backwards and three years forward (excluding the mid-point year, year 0 in Fig. 1) in the same manner as the trajectories were created for young mothers, using the same inclusion criteria.

Measures

Labor Market and Educational Trajectories

To create labor market and educational trajectories, we utilized the HILDA labor market calendar module, where each respondent was asked for each of three periods per month (early/mid/late, January to December), whether they have (1) been employed, (2) unemployed and looking for work, (3) unemployed and not looking for work, or (4) studied. This resulted in trajectories comprised of 36 periods per year, or 216 periods in total (excluding year 0, Fig. 1).

Precaire Measure

The measure of labor market and educational trajectory precarity is calculated using the Ritschard et al. (2018) precarity index. This index was created to account for the cumulative process of precarity by considering successions of negative spells and changes in labor market precarity (Ritschard et al. 2018). The index, created from sequence data, is based on the complexity index as a measure of sequence instability (see Gabadinho, Ritschard, Studer and Müller, 2010, and Gabadinho, Ritschard, Müller and Studer, 2011). The problem with the complexity index in cases such as labor market precarity is that while it measures instability in the trajectory, it does not account for the fact that certain states are more desirable than others. To remedy this, the precarity index includes correction terms based on the difference between the proportions of downward and upward transitions in the sequence, and to account for the degree of precarity at the start of the sequence (Ritschard et al. 2018).

$$\text{prec}(s) = \lambda a(s_1) + (1 - \lambda) c(s) \alpha (1 + q(s))^\beta$$

Where $a(s_1)$ is the degree of precarity associated with the starting state in the sequence, $c(s)$ is the complexity of the sequence, calculated from the number of transitions and

¹ More details available from authors.

diversity of states in the sequence, and $(1 + q(s))$ is a correction factor where $q(s)$ is denoting the difference in the weighted proportions of negative and positive transitions. Hence a greater $q(s)$ will penalize the original complexity score, which does not take into calculation whether states are 'good' or 'bad'. The parameter λ controls the tradeoff between the impact of the starting cost versus the complexity and state quality corrector, while the exponents α and β control the respective importance of the complexity and the correction. Further detail can be found in Ritschard et al. (2018).

The index is implemented through the *tramineR* package for R (Gabadinho et al. 2011), where being in employment or education is considered active, and hence 'good' states, and unemployment, both looking for work and not, are considered as inactive and 'bad' states from a labor market perspective. Hence moving between employment and education is only precarious in the sense that it increases the complexity of the trajectory, introducing another transition, whereas moving from education to unemployment both includes an additional transition, and carries a penalty for going from an active to an inactive state. Sensitivity analysis of the precarity score was performed by tuning the index to place less emphasis on the initial starting cost ($\lambda = 0.1$) and more emphasis on the complexity and quality components. Tuning the index in this way does not substantially alter the outcomes of our analyses, and the analyses presented in this paper use the precarity score with its default settings.

Age at First Birth

In order to identify whether someone is a young parent (less than 25 years old at first child according to our definition), the age at birth for each individual is calculated from the information given about resident and non-resident children.

Independent Variables

Background characteristics in the analyses include whether English is your first language. This indicator is positive if an individual is born in Australia or has indicated that English is their first language. Aboriginal/Torres Strait Islander is an indicator of whether individuals identify themselves as Aboriginal or Torres Strait islander. Family structure refers to family structure in the childhood home. It measures whether respondents have grown up with two parents in their family home, one parent and a stepparent, a single parent, or other. Sibship size is calculated from information on how many younger and older siblings the individual reported having at the last available measurement before the birth of their own first child,

or corresponding period for the comparison population. Mental wellbeing is measured by the five-item Mental Health Inventory (MHI-5) in the Medical Outcomes Study Short Form (SF-36) instrument, measured at the start of the seven-year trajectory. If mental wellbeing data is missing at the starting point, we impute with information reported either one year prior to, or one year after the start point. By allowing one year into the initial trajectory as the latest possible measurement point for wellbeing, we ensure that the wellbeing of young mothers-to-be is not influenced by the pregnancy. Relationship status is measured during the year of birth, or if missing, the year after. An individual is denoted as living with parents, if they are not married or in a de facto-relationship, while living with their parents.

Analytic Strategy

In order to study precarity longitudinally over the course of seven years, we employ sequence analysis. Sequences are ordered listings of fixed elements, such as education and employment over a period of time that are treated as a complete unit of analysis, instead of being broken into separate events of becoming employed, unemployed or graduating from an educational institution. Sequence analysis found its way into the social sciences during the 1990s due to its ability to identify patterns in sequences which are representations of trajectories (Abbott, 1995). Each sequence includes a certain number of ‘spells’ or periods, in our case 36 periods per year. We create the sequences from the labor market and educational calendar of HILDA, and use them to both visualize the sequences and to calculate precarity in the years leading up to birth (or the corresponding period for controls) and the years following.

Comparison Population

Although the dataset is rich in longitudinal labor market and education data, it includes only a few childhood disadvantage indicators, making traditional methods of matching to reduce bias unsuitable. Instead we harness information regarding pre-birth labor market and educational trajectories to construct a comparison population. This is done by calculating a distance matrix through optimal matching from the pre-parenthood sequences of young parents and the corresponding period for their non-parenting peers. From this distance matrix individuals from the comparison population with the smallest sequence distance to each young mother sequence were obtained. This means that the comparison population consists of those non-parenting peers with the most similar initial trajectories to that of the

young mothers. This approach has previously been implemented by Barban et al. (2020)². The early sequences capture much of the heterogeneity in background factors leading to diminished selection in later life outcomes. The closest, second closest and third closest sequences are obtained in this manner for each individual, known as many-to-one matching, resulting in a comparison population of 438 sequences and 308 unique non young parent individuals. Details on precarity in the pre-birth trajectories and covariate distribution in the young mothers group, all possible comparison individual groups and matched comparison individuals can be found in Appendix 1, Table A1 and A3.

Missing Data

In the HILDA calendar data, we fully or partly observe 222 young women who became young parents within the study period. Fifty-two women (23.4%) were missing either the whole first year, the whole last year, or two consecutive years of calendar data during their seven year sequences. These 52 women were excluded from our analytic sample. To fill gaps in life course histories that constituted no longer than 12 consecutive months, we applied multiple imputation for categorical time series through the *mice* package in STATA (Halpin, 2016). Each sequence was imputed five times. In instances where the imputation resulted in multiple unique sequences per individual, precarity scores were averaged across the imputed sequences. Missing data on other covariates such as family structure, relationship status and family size were minimal at <1%; with the highest prevalence was for mental health at 3.2%. We ran models using multiple imputation (R package *mice*) for the missing data on these covariates. As findings using imputed information were substantially similar as those using complete cases, we present results based on complete cases.

Modeling

The precarity measures, including initial precarity (3 years leading up to birth), post birth precarity (3 years following birth, excluding the first year post birth), and the change in precarity as measured by subtracting initial precarity from post birth precarity, were used in multilevel linear regression models, using the *lme4* package (Bates, Mächler, Bolker & Walker, 2015). By using a multilevel model, nesting observations within individuals, we are

² Barban et al. (2020) implements a combined propensity score and sequence matching approach. In our analysis, with limited background factors to match on, including a propensity score did not improve our matching.

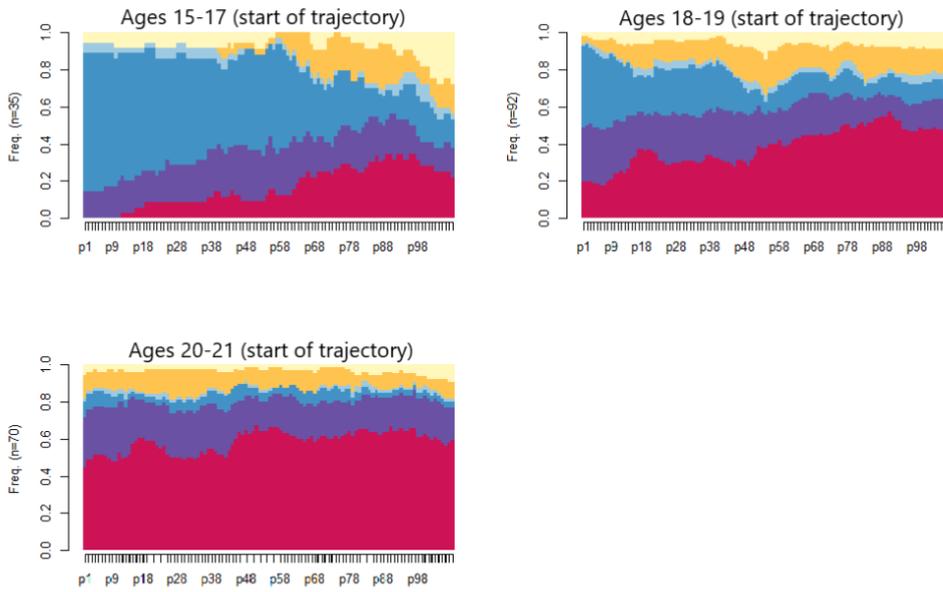
correcting for the fact that some comparison individuals appear several times, studied over different time spans.

Results

Description of Sequences

Visually inspecting the sequences of labor market states in the three years leading up to child birth for the young mothers, with corresponding age periods for their non-parenting peers (Fig. 2), it becomes clear that the young mothers were already on a more precarious labor market trajectory prior to becoming a parent. We observe a larger proportion of young mothers-to-be in both unemployment (looking for work) and inactivity (not looking for work) starting years before birth. Even so, at any time during the three-year period leading up to birth, a majority of young mothers-to-be were either in education or employment, although the education group is distinctively smaller for young mothers-to-be compared to their peers. Instead of being in education, we find a larger proportion of young mothers-to-be in employment. Exact distribution of time spent in states can be found in Appendix 1, Table A2.

Young Mothers



Unmatched Comparison Individuals

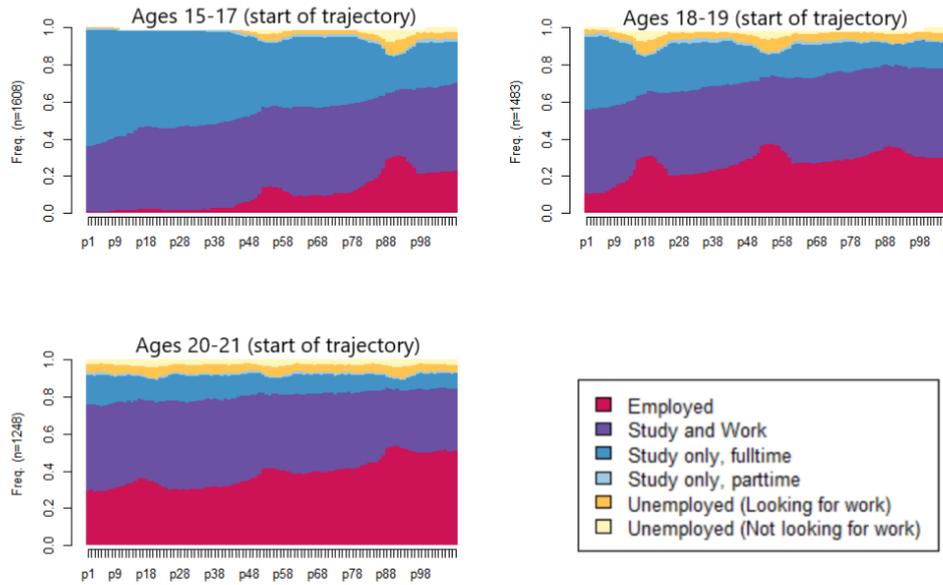


Fig 2. Sequence distribution of labor market states for young mothers pre-birth, and unmatched women in corresponding periods before childbirth (Years -3 to -1).

Examining the sequences in labor market states following childbirth (Fig. 3), we find that differences between the groups are stark. While the non-parenting young women remain in education or increase their time in employment, the young mothers become inactive in the labor market, likely due to the need to spend time at home with their child. We do still see time spent in employment among the young mothers, especially in the older age group, but time spent in education is not as prevalent compared to the non-mothers.

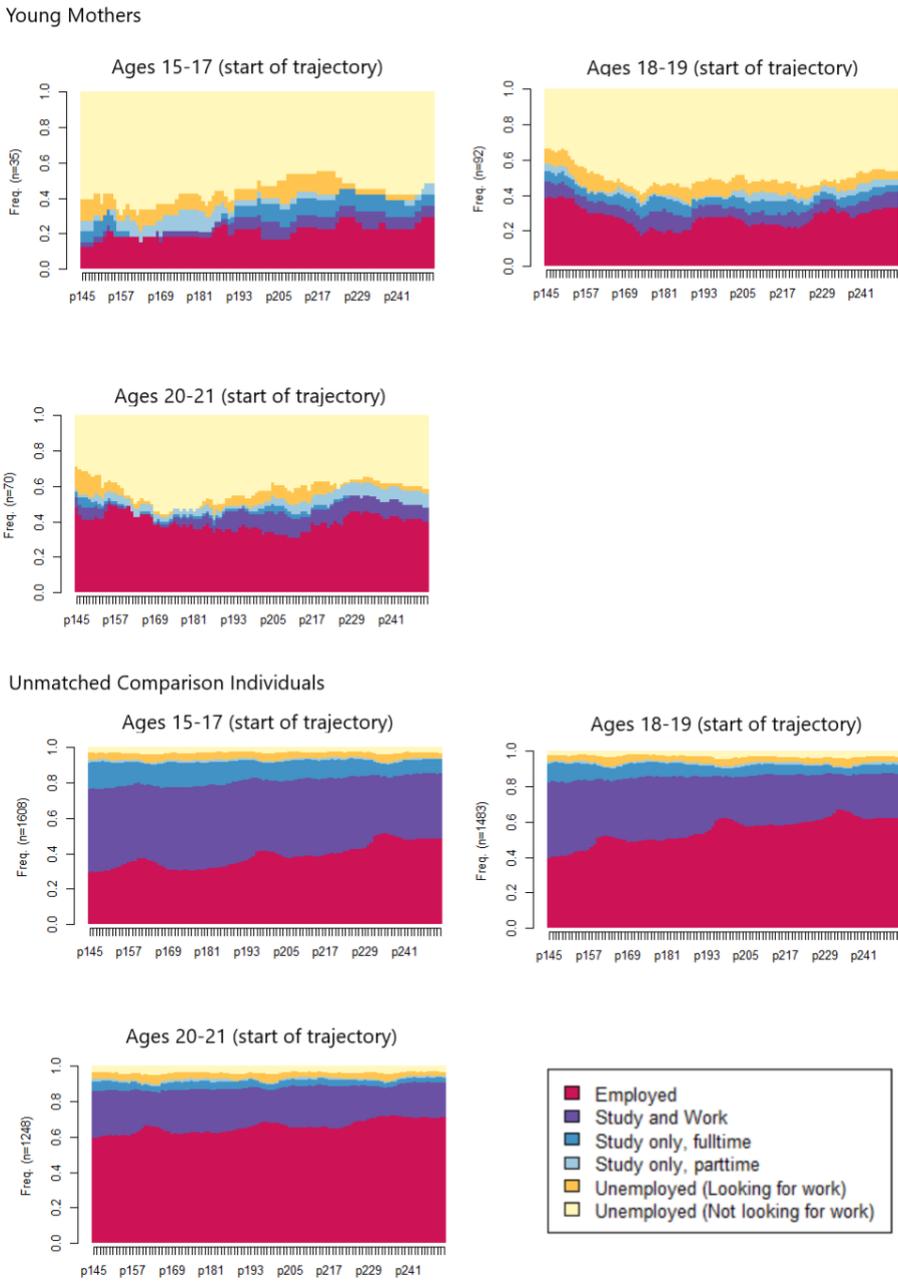


Fig. 3. Sequence distribution of labor market states for young mothers post birth, and unmatched women, post (no) event point (Years 1 to 3).

Pre- and Post-Motherhood Precarity

After concluding substantial differences in initial labor market trajectories of young mothers compared to their non parenting peers, we now turn to analyses investigating the impact of young parenthood on labor market precarity following birth, beyond the descriptive differences seen in Fig. 2 and 3. In order to do this we first construct a matched sample of peers, consisting of young women who have a similar early labor market trajectory to the young mothers, as previously described in the methods section. We present results of three multivariate models examining the labor market precarity of young mothers compared to the matched sample of non-parenting peers.

The first model in each of the regression tables show the impact of young parenthood only (tables 1, 2 and 3), the second models adds relevant background covariates (tables 1,2 and 3) and initial precarity (tables 2 and 3), and the third adds interaction effects of young

Linear regression models on pre-parenthood precarity		
	Model 1	Model 2
Young Parent	3.75(1.68)	2.64 (1.73)
Age 20-22		4.08 (2.55)
Age 23-24		0.05 (2.76)
English is first language		-7.67 (4.22)
Indigenous Australian		2.82 (3.99)
Family Structure (ref. Living with both parents)		
1 parent + step-parent		5.29 (2.62)
Other		3.33 (4.91)
Single parent		4.94 (1.89)
Sibship size (ref. 2 children)		
Only child		-0.91 (3.67)
Three or more		0.95 (1.72)
Mental wellbeing Score		-2.78 (0.84)
Constant	26.85 (0.92)	37.12 (7.76)
Observations	536	536
R ₂	0.009	0.100
Adjusted R ₂	0.007	0.058
Residual Std. Error	17.687 (df = 534)	17.229 (df = 511)
F Statistic	4.886 (df = 1; 534)	2.372 (df = 24; 511)

Notes: Outcome is normalized precarity score pre childbirth (or corresponding period) parenthood and initial precarity (tables 2 and 3). We also report 95% confidence intervals found in Fig. 4,5 and 6.

Table 1. Regression of young parent status and background characteristics on pre-parenthood labor market precarity

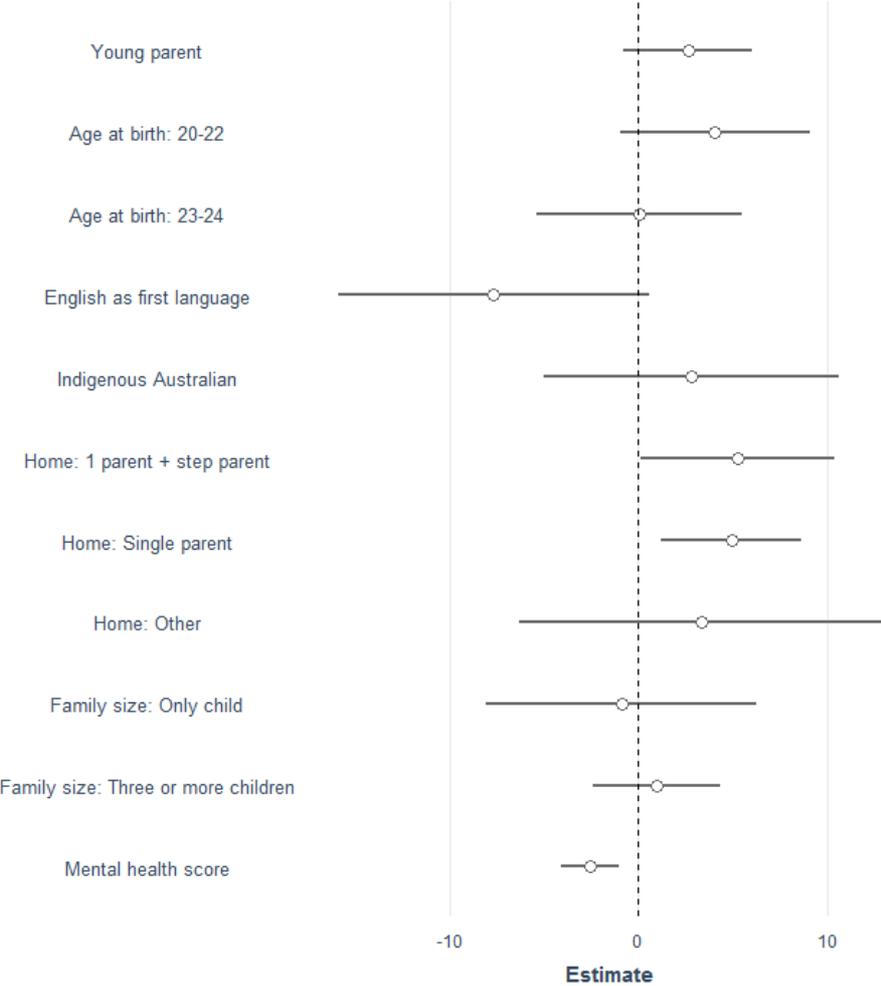


Fig. 4. Confidence intervals (95%) of the regression coefficients from regression on pre-parenthood precarity, table 1, model 2.

Table 1 shows the regression results of the impact of young parenthood, initial precarity and other background factors, on later levels of precarity. Even after matching, the young parent group has a slightly higher average level of precarity compared to their matched peers (3.8) on the precarity scale of 0-100 (Table 1, Model 1). Adjusting for background characteristics however, such as having grown up in a single parent or step family household, Aboriginal/Torres Strait Islander status, or not having English as first language, reduces the group differences to 2.6 (Table 1, Model 2), but with a 95% confidence interval overlapping a zero group difference (Fig. 4). This illustrates that our sequence matching approach eliminates differences in the early trajectory as indicated, suggesting our matched group of women were a suitable comparison group for further analysis.

We also see that higher self-reported mental well-being is associated with low initial labor market and educational precarity (coeff. -2.8), while living in a single parent home compared to a two parent home is associated with higher precarity (4.9). Living with one parent and a step parent is associated with a similar average increase in precarity compared to two parent homes (5.3), however the uncertainty around this estimate is larger (se. 2.6). Similarly, having English as first language seems to be associated with a less precarious initial trajectory (-7.7), but the estimate has a standard error of 4.2, and the upper bound of the 95% confidence interval (Fig. 4) overlaps zero.

The models for post parenthood trajectories indicate that young parents have higher post-birth precarity (9.0) compared to the same period for their non-parenting peers, decreasing to 8.8 (table 2, model 3) when controlling for initial precarity, sociodemographic factors and relationship status.

Having a low initial precarity level corresponds with a marginally lower post birth precarity, with the coefficients for belonging to quartile two, three or four compared to the lowest quartile being 2.5, 3.1 and 2.3 respectively. All three estimates however, are associated with substantial uncertainty, with 95% confidence intervals overlapping zero (Fig. 5). A similar case can be observed for age at first child, where being in the older age span of 23-24 years old is associated with a slightly lower post parenthood precarity (-3.7), and a higher level of precarity for indigenous Australians (5.7), but with a confidence interval just overlapping zero in the upper respectively lower bounds (Fig. 5).

Table 2. Regression of young parent status and background characteristics on post-parenthood labor market precarity

Linear regression models on post-parenthood precarity			
	Model 1	Model 2	Model 3
Young parent	8.95 (1.25)	9.01 (1.41)	8.81 (2.65)
Initial precarity, quartile 2 ^a		2.68 (1.58)	2.50 (1.84)
Initial precarity, quartile 3 ^a		2.83 (1.59)	3.11 (1.83)
Initial precarity, quartile 4 ^a		2.80 (1.65)	2.30 (1.97)
Age at birth: 20-22 ^b		-1.98 (1.82)	-2.03 (1.83)
Age at birth: 23-24 ^b		-3.74 (2.01)	-3.74 (2.01)
English as first language		2.35 (3.28)	2.33 (3.29)
Indigenous Australian		5.84 (3.07)	5.73 (3.09)
Family size: Only child ^c		1.11 (2.01)	1.19 (2.02)
Family size: Three or more children ^c		0.48 (3.80)	0.39 (3.83)
Home: 1 parent + step parent ^c		2.79 (1.48)	2.88 (1.49)
Home: Other ^d		-0.94 (2.87)	-0.90 (2.90)
Home: Single parent ^d		-1.65 (1.33)	-1.66 (1.34)
Mental health score		-0.53 (0.64)	-0.56 (0.65)
Relationship status: De facto ^e		-2.15 (1.55)	-2.22 (1.55)
Relationship status: Married ^e		-0.88 (2.18)	-0.83 (2.19)
Relationship status: Single, living with parents ^e		-0.52 (1.48)	-0.53 (1.48)
Young parent x Initial precarity, quartile 2			0.67 (3.58)
Young parent x Initial precarity, quartile 3			-1.26 (3.63)
Young parent x Initial precarity, quartile 4			1.30 (3.50)
Constant	14.80 (0.71)	12.99 (5.97)	13.13 (6.01)
Observations	535	535	535
Log Likelihood	-2,113.25	-2,046.18	-2,039.71
Akaike Inf. Crit.	4,234.51	4,158.37	4,151.42
Bayesian Inf. Crit.	4,251.63	4,299.68	4,305.58

Notes:

^a Reference category is quartile 1

^b Reference category is 18-19

^c Reference category is Home: Two parents

^d Reference category is Family size: Two children

^e Reference category is Relationship status: Single

Models 2 and 3 includes control for birth year, not included in table.

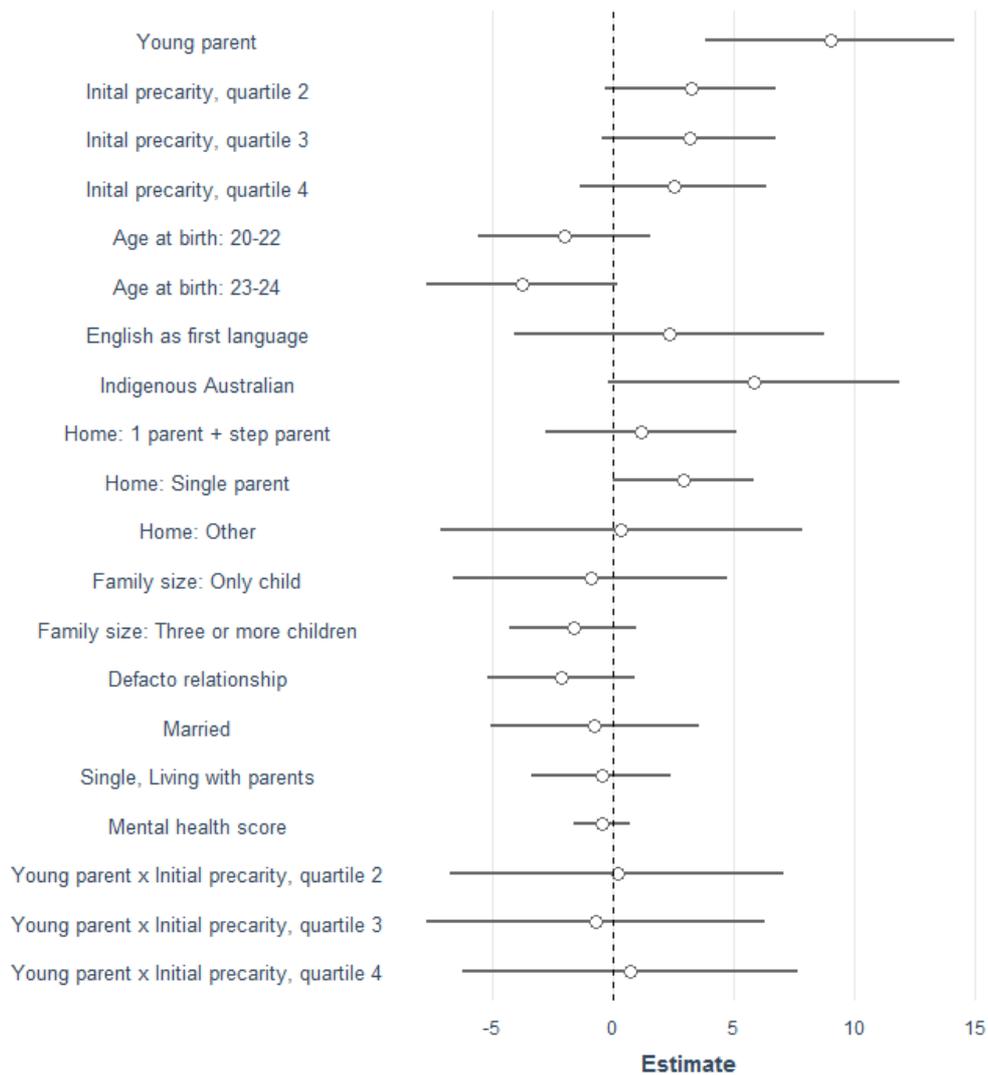


Fig 5. Confidence intervals (95%) of the regression coefficients from regression on post-parenthood precarity, table 2, model 3.

To summarize, our findings show that young mothers are worse off in terms of absolute levels of precarity, compared with their non-parenting peers who had similar initial trajectories but did not become young mothers. In the next section, we continue our investigation by examining individual level change in precarity. This allows us to examine whether there is an increase or decrease in the development of precarity for young mothers as compared to their non-parenting peers.

Difference in Pre- and Post-Parenthood Precarity

As we were interested in the impact of becoming a parent on labor market precarity, we further examine changes in precarity between the three years leading up to childbirth, and three years following child birth, compared with corresponding periods for matched peers

(tables 3). As reported in Table 3, we first find an overall increase in precarity for young parents, compared to their peers.

Table 3. Regression of young parent status and background characteristics individual difference in pre- and post-parenthood trajectory precarity.

Multilevel regression models, Change in precarity score before and after having a child			
	Model 1	Model 2	Model 3
Young parent	4.51 (1.93)	7.92 (1.54)	10.70 (2.92)
Initial precarity, quartile 2 ^a		-7.12 (1.76)	-6.61 (2.06)
Initial precarity, quartile 3 ^a		-17.97 (1.77)	-16.87 (2.04)
Initial precarity, quartile 4 ^a		-39.97 (1.83)	-38.60 (2.19)
Age at birth/ mid-sequence: 20-22 ^b		-2.00 (2.05)	-2.10 (2.06)
Age at birth/ mid-sequence: 23-24 ^b		-2.97 (2.26)	-3.05 (2.27)
English as first language		4.00 (3.57)	4.26 (3.57)
Indigenous Australian		7.41 (3.35)	7.54 (3.35)
Home: 1 parent + step parent ^c		0.45 (2.20)	0.55 (2.20)
Home: Other ^c		-3.10 (4.15)	-3.21 (4.16)
Home: Single parent ^c		1.77 (1.61)	1.87 (1.62)
Family size: Only child ^d		-0.52 (3.12)	-0.86 (3.13)
Family size: Three or more children ^d		-0.96 (1.46)	-1.02 (1.46)
Mental health score		-0.04 (0.70)	-0.16 (0.71)
Relationship status: De facto ^e		-1.14 (1.71)	-1.01 (1.71)
Relationship status: Married ^e		-1.69 (2.40)	-1.58 (2.41)
Relationship status: Single, Living with parents ^e		-0.61 (1.63)	-0.58 (1.63)
Young parent x Initial precarity, quartile 2			-2.08 (3.95)
Young parent x Initial precarity, quartile 3			-4.33 (4.01)
Young parent x Initial precarity, quartile 4			-4.56 (3.86)
Constant	-11.35 (1.07)	-0.71 (6.59)	-1.48 (6.61)
Observations	535	535	535
Log Likelihood	-2,359.71	-2,100.29	-2,092.93
Akaike Inf. Crit.	4,727.42	4,266.58	4,257.85
Bayesian Inf. Crit.	4,744.54	4,407.90	4,412.01

Notes:

^a Reference category is quartile 1

^b Reference category is 18-19

^c Reference category is Home: Two parents

^d Reference category is Family size: Two children

^e Reference category is Relationship status: Single

Models 2 and 3 includes control for birth year, no included in table.

Outcome measure is *post precarity - initial precarity*, hence a positive coefficient corresponds to an increase in precarity over time.

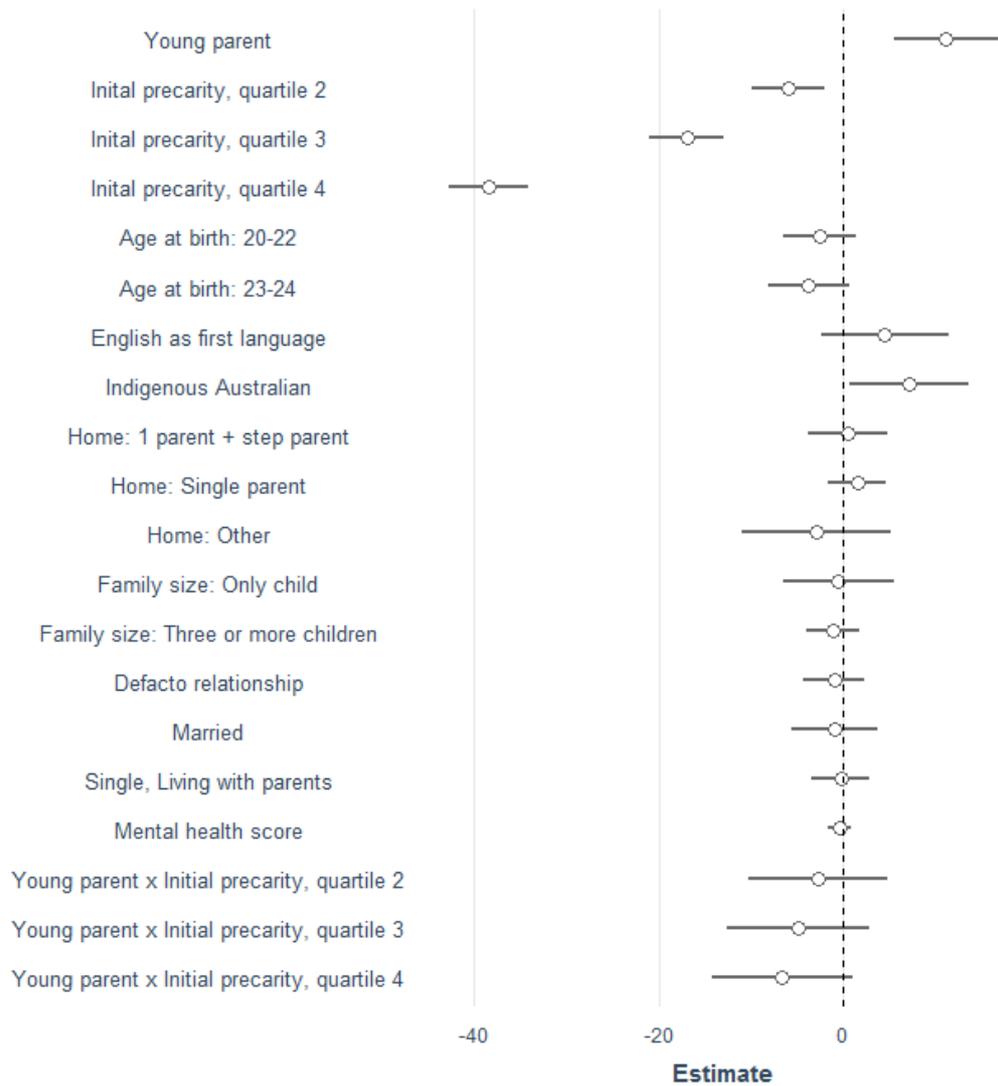


Fig. 6. Confidence intervals (95%) of regression coefficients, table 3, model 3.

Our model shows young parents were on average 4.5 units (0-100 scale) worse off in the bivariate model (table 3, model 1), with the coefficient increasing to 7.9 when controlling for background characteristics and initial precarity (table 3, model 2). Adding an interaction between initial precarity and being a young parent (table 3, model 3: Fig. 6) also shows that the detrimental effect for young parents is weaker among those with high initial precarity (Quartile 4, -4.6), reducing the main effect of 10.7 for Quartile 1 by almost 50%. However, the standard error for the interaction term is high (3.9), and the differences in effect of young parenthood on later precarity over initial precarity are not certain.

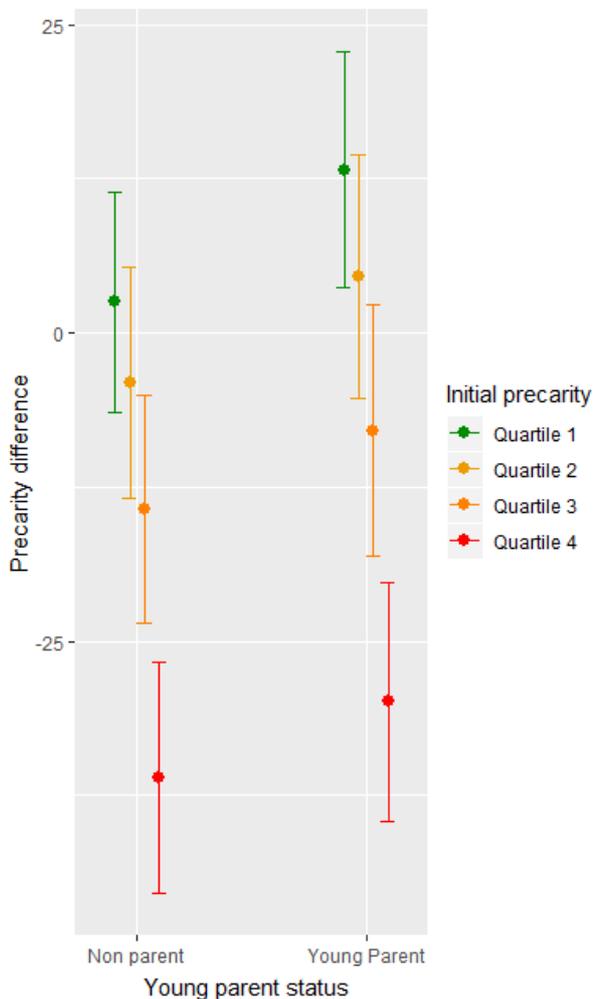


Fig. 7. Predicted values for young mothers and matched peers stratified over initial precarity, table 3, model 3.

While we cannot see clear evidence that the effect of young parenthood differs depending on initial precarity, looking at Fig. 7, illustrating the predicted values³ from model 3 for young mothers and matched peers stratified over initial precarity, we can see that becoming a young parent does not always lead to overall detrimental paths. Young women with the lowest level of initial precarity do experience a detrimental effect, with increased precarity between the stages before and after parenthood. Meanwhile, young mothers with the highest levels of initial precarity, belonging to quartile 4, see an improvement over time (Fig. 7).

Discussion

We assess the impact of early parenthood on labor market outcomes for young women using an innovative new measure of labor market precarity. We employ a longitudinal sequence based approach to measure post parenthood labor market and educational outcomes, taking into account stability of the educational and employment pathways of young mothers over a sustained period of time. Our analyses draw on research findings from both qualitative and quantitative research on young motherhood, to consider how the experience of young motherhood may vary across different sub-groups of mothers, with special attention paid to the pathways that the young women were on prior to becoming mothers. Specifically, we

³ For predicted values, continuous factors are set to their means and categorical values set to their reference category. Implemented through `sjPlot::plot_model` in R.

pay attention to potential heterogeneity in the implications of a transition to parenthood at a young age, in terms of labor market precarity and educational attachment. We advance existing literature by drawing on a rich, longitudinal dataset from Australia, to capture changes during the transition to parenthood for this group of young mothers, with the opportunity to position young mothers in comparison to peers on similar paths. We find that women who become young mothers have higher levels of precarity in their trajectories before becoming parents. This points to selection into young motherhood among disadvantaged youth on already disrupted paths, in line with a substantial previous body of evidence (e.g. Al-Sahab, Heifetz, Tamim, Bohr and Connolly 2012; Kalucza 2018; Geronimus and Korenman 1992; Väisänen and Murphy 2014).

Beyond this, our results show that becoming a young mother is connected to an average increase in labor market and educational precarity post birth, which supports the hypothesis of cumulative disadvantage. Our findings however, also show heterogeneous effects depending on precarity trajectories prior to the birth. We find that mothers with the least precarious trajectories prior to the transition to parenthood experience an increase in labour market and educational precarity, whereas young women already on precarious paths see a decrease in precarity over time. In our sample, we do not find an additional negative effect of becoming a young parent for the most disadvantaged women, contrary to the cumulative disadvantage hypothesis. These results are in line with recent American evidence indicating that teenage parenthood has negative short term labor market effects for young women from high income areas and for white women, while no such effects were observed in low income areas or for minority groups (Gorry 2019).

On the other hand, while our results do not support cumulative disadvantage for the most disadvantaged women, neither do they support the idea of parenthood as a transformative event. The high precarity group of mothers fare no better than their non parenting peers on similar initial paths. The transformative hypothesis might still be at work, in the way that young disadvantage women indeed feel increased motivation and heightened self-esteem, however we see no evidence that this is translated in to improved labor market attachment or educational activities. We see two possible explanations for this; first it is possible that structural barriers, such as enrollment systems and lack of childcare, makes this translation difficult to manage for young mothers, something that has been illustrated in young mothers narratives (SmithBattle 2007). Meanwhile young mothers who have supportive school staff and counselors are helped finding ways to capitalize on their newfound aspirations (Camarena et al. 1998; SmithBattle 2007). It could also be that the stressful realities of

parenthood hinders this translation. A 2018 study looking at life satisfaction of young mothers compared to matched peers found no improvement among young mothers and concluded that “the desire for a better future... may be undermined by the day-to-day demands of parenthood” (Zito 2018). Second, it is possible that the transformative hypothesis works on a longer time scale, where the channels of self-confidence and newfound strength and motivation needs more time to translate into action than the present study allows. This would suggest that future studies should examine the longer-term effects of young motherhood.

An important result from our analysis is that social selection is a driver in the observed precarity among young mothers, and that young mothers from particularly precarious paths still see an over-time improvement in their precarity. This illustrates that becoming a parent does not look to be a disastrous event radically altering an existing trajectory, as would be expected by the disruptive hypothesis. The most disruptive effects of young motherhood seem to exist among those young women on initially low precarity paths, in line with previous results from analyses of heterogeneity in educational outcomes of teenage pregnancy (Diaz and Fiel 2016). These insights are useful for decreasing stigma towards young parents, and blaming all misfortune on ‘bad choices’. Indeed, stigma has been quoted as a significant barrier for young mothers, leading them to avoid interacting with supportive services (McArthur and Winkworth 2018), the very behaviour that could help young mothers utilise their transformative energy.

Limitations

As with all studies, the present one has some limitations. While HILDA provides rich longitudinal data, with yearly information on labor market activity divided into 36 periods per year, resulting in over 600 periods total for the 17 waves of the HILDA survey, studying low prevalence outcomes such as young parenthood greatly limits the original sample size. This leads to substantial uncertainty around some of our estimates, which we have attempted to clearly communicate through the use of confidence interval plots.

Furthermore, it is important to remember that the precarity measure utilized is relative to the sample, not to the whole population of young mothers. This means that the ‘most precarious’ mothers are relative to other young women in the HILDA sample. It is possible that there are biases where young mothers who were the most precarious are excluded from our analytic sample.

Finally, it is possible that the effects of young motherhood on outcomes varies for different groups of women. For example, it is plausible that small average negative effects of young parenthood on later life outcomes masks larger detrimental effects for some young mothers, no effects for other groups of young mothers, and positive effects for others. Examining only average effects runs the risk of obscuring differential effects in certain sub-groups of women who may vary in their responses to early motherhood, depending on a range of factors such as the degree to which motherhood was planned or accidental, or their access to social and economic resources. While we have differentiated the effects of young parenthood taking into account their pre-parenthood precarity, more work is needed on the heterogeneity in outcomes of young parents.

Conclusion

Is young motherhood associated with cumulative disadvantage, disruption to labor market trajectories or is it a transformative event? Our analysis suggests that in the context of education and labor market attachment the foremost is more likely than the latter. However, it is not as simple as young motherhood resulting in cumulative disadvantage for all groups. The question is whether we can even call these processes cumulative disadvantage when, according to our results, it is the women on the least precarious initial paths who fare the worst. For those on already precarious paths, young parenthood is possibly slowing down their precarity improvement somewhat, but this effect is not statistically certain. What we can conclude it that we do not see the narratives of transformative power translated in to reality. Which leaves us with the question, how can we harness the transformative energy expressed by disadvantaged young mother research? How can we move past the point where these young women are 'not that much worse off than expected' to 'better than expected'?

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APPENDIX

Table A1. Number of transitions and mean precarity.

Group	Young parent	<i>Matched</i> Non young parents	<i>All</i> Non young parents	
N transitions before		4.0	3.6	2.9
N transitions after		2.8	2.9	2.4
Mean precarity before		36.2	34.1	27.9
Mean precarity after		39.3	34.1	32.7

Notes: A transition refers to moving from one type of state to another, such as from unemployment to employment.

Table A2. Mean time (months) spent in states, before and after childbirth.

Mean time in states (Before)	Study only (fulltime)	Study only (part time)	Study & Employment	Employed	Unemployed Looking for work	Unemployed Not looking For work
Young parent	6.6	1.0	7.6	13.9	3.6	2.1
Matched comparison	7.8	0.7	8.8	13.7	3.1	1.9
All comparison	8.2	0.4	14.7	6.6	0.8	0.7
Mean time in states (After)	Study only (fulltime)	Study only (part time)	Study & Employment	Employed	Unemployed Looking for work	Unemployed Not looking For work
Young parent	1.6	1.3	2.4	10.5	2.3	17.1
Matched comparison	2.4	0.3	11.0	15.6	1.0	0.9
All comparison	2.2	0.4	8.9	20.1	2.12	2.3

Table A3. Covariate distribution, over parenthood status.

Variable		Non young parent	Young parent
		n(%)	n(%)
Initial precarity (Quartiles, low to high)	q1	95 (26.5)	31 (20.8)
	q2	91 (25.3)	37 (24.8)
	q3	93 (25.9)	34 (22.8)
	q4	80 (22.3)	47 (31.5)
English is first language		344 (95.8)	148 (99.3)
Indigenous Australian		9 (2.5)	12 (8.0)
Family Structure	2 parents	247 (68.8)	83 (55.7)
	1 parent + step-parent	30 (8.4)	21 (14.1)
	Other	6 (1.7)	7 (4.7)
	Single parent	76 (21.2)	38 (25.5)
Relationship status	de facto	75 (20.9)	53 (35.6)
	married	19 (5.3)	32 (21.5)
	living with parents	157 (43.7)	17 (11.4)
	single	108 (30.1)	47 (31.5)
Family size	Only child	0 (0.0)	0 (0.0)
	One sibling	131 (36.5)	32 (21.4)
	Two siblings	108 (30.0)	46 (30.9)
	Three or more siblings	120 (33.5)	71 (47.74)
Age category	<20	34 (9.5)	21 (14.1)
	20-22	201 (56.0)	77 (51.7)
	23-24	124 (34.5)	51 (34.2)