

Consistency and Continuity in Material and Psychosocial Adversity Among Australian Families with Young Children

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Abstract Prior studies on longitudinal continuity of adversity have mostly examined persistence of individual adversity, rather than of families and have focussed mainly on material disadvantage. However, adversity is multi-dimensional, and in the case of families with children, it includes psychosocial as well as material elements. While both material and psychosocial elements are recognized as critical to child development, these aspects of family adversity are often studied in isolation and there is a dearth of longitudinal evidence on the extent to which such factors are transient or persistent. Using the first three waves (2004–2005, 2006–2007, 2008–2009) of the longitudinal study of Australian children this paper investigated the consistency and continuity of multiple adversity in families with children using material and psychosocial indicators. First, longitudinal factor analysis determined that a consistent factor structure of multiple adversity adequately fit the data longitudinally. Second, cross-tabular analysis showed significant changes in the prevalence of specific adversities over waves. In particular adversity related to changes in family composition and social support followed an increasing trend. Adversity in two material elements—economic status and hardship—decreased over time. Third, variance-components models revealed that though aggregate scores of material and psychosocial adversity indicated a high degree of continuity over time, continuity in disaggregated measures

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showed that within families a great deal of variability in adversity occurs, with intra-class correlations ranging from 0.27 to 0.84. The more persistent forms of adversity—family, substance use, economic adversity—are areas where targeted interventions are feasible while employment conditions and time pressure are more transient and may require intervention at the population level to reduce overall prevalence of the adversities. Our study has reinforced the need to assess psychosocial adversity in studies of families with children as a balance to the more commonly utilized material adversity.

Keywords Australia · Families with children · Material and psychosocial adversity · Continuity · Longitudinal factor analysis · Variance components models

1 Introduction

Adversity in families with young children is of key policy concern because of its relevance to children's social, psychological and physical development. Investment in early childhood is broadly considered to yield high returns because it delivers beneficial outcomes not only in the short-term but well into the future, including the adult years of those children when they grow up. There is a very large literature covering childhood environmental factors that promote or compromise future healthy development, yet we know comparatively little about the “natural history” of the adversity itself. That is, there are relatively few studies that describe whether adversity is persistent over time for individual families, how many families escape from adversity over a period of time, or how many families enter into adversity over time.

Of those studies that have examined longitudinal continuity, all have been done on persistence of individual adversity, rather than of families, and the majority have focussed on material disadvantage—typically using indicators of income to study the persistence of poverty. These studies on the dynamics of low income and poverty revealed that the number and types of people experiencing poverty over a period of time are very different from those experiencing poverty at any single point in time and that there is a great deal of movement into and out of poverty (Bane and Ellwood 1986; Stevens 1999; Devicienti 2011). Cross-sectional estimates of poverty therefore understate the number of people that will ever experience poverty.

Poverty persistence is itself complex, involving different numbers and spacing of spells, and different durations of spells. Early studies of poverty persistence argued that only a small minority of people are persistently poor. However, Bane and Ellwood (1986) using a spell-based hazard approach found that although most people in the US have very short spells of poverty, the small minority that have long spells actually represent the majority of those who are poor at any given point in time. This reflects a common pattern in the study of circumstances over time (e.g., studies of unemployment) where rates of transition over time (i.e. *incidence*) are dominated by short-term spells, whereas long-term spells dominate the *point prevalence* of a condition. A limitation of Bane and Ellwood's (1986) study was their focus on single spells of poverty which failed to take account recurrence of poverty following an exit. Stevens (1999), using the same dataset, extended their study taking into account multiple spells and spell duration and found that about half of those who reach the end a poverty spell return to poverty within 4 years, indicating substantial poverty recurrence. Similarly and more recently, Devicienti (2011) found that about 41 % of the British population spends at least 5 out of 10 years in poverty if multiple spells are

considered, but only 16 % are considered to be in poverty when single spells only are considered.

These findings on persistence emphasise the importance of longitudinal research designs for understanding the dynamics and complexities of poverty. However, the field has largely taken a one-dimensional approach, using income as the sole measure of poverty. One exception was the study by Devicienti et al. (2014) that examined poverty persistence in Italy using a multidimensional index of lifestyle deprivation as well as income poverty. Lifestyle deprivation was indicated by 13 items covering the lack of material goods (e.g., colour TV, washing machine, telephone, automobile), heating, food and furnishing quality, and paying bills on time, plus more psychosocial dimensions such as having a holiday and being able to afford social events (e.g., hosting friends or family for a drink or meal at least once a month). They found frequent movements in and out of poverty when either income poverty or lifestyle deprivation were considered. About 60 % of those who fell into poverty (assessed by either measure) escape after 1 year and 25 % of those who escape are at risk of becoming poor again after a further 1 year. The authors concluded that although the longitudinal behaviours of the two measures were similar there were important differences in the factors associated with persistence of income poverty or lifestyle deprivation. As examples, number of adult health problems in the household was associated with increased persistence of lifestyle deprivation but not with persistence of income poverty, whereas self-employment was associated with higher persistence in income poverty but lower persistence in lifestyle deprivation.

Research on social exclusion has further emphasised the multidimensional nature of adversity, widening the types of non-income related adversity that are considered. However, studies on the longitudinal dynamics of social exclusion are limited. One of the first studies tracking exclusion over time was reported by Burchardt et al. (2002). They examined exclusion in five dimensions—low income, low wealth, lack of productive activity, political disengagement, and social isolation—using the 1991–1995 British household panel survey (BHPS). They found that low wealth and political disengagement showed the least mobility over waves while there was a great deal of movement in and out of low income. They also found very strong correlations (ranging from 0.7 to 0.8) between an overall exclusion score in 1995 and scores in previous years.

Similarly, Poggi (2007) using the European Community Household Panel (ECHP) for Spain considered both material and psychosocial dimensions (e.g., having an adequate income, having adequate housing, social relationships, being healthy, and living in a safe and clean environment). Descriptive findings from the study showed moderate associations (correlations of about 0.4) between an aggregated social exclusion score in 1 year with social exclusion in the following year. Over the 7 years of data collection, rates of social exclusion decreased both for the aggregated measure as well as for each dimension (with the exception of ability to have social relationships). A great deal of movement in and out of social exclusion also occurred, as indicated by the high proportion (22 %) of the sample that experienced some exclusion in any 1 year, and decreasing proportions experiencing more persistent exclusion (8 % in two consecutive years down to <1 % in six or more consecutive years).

Unlike the research on poverty persistence measures of social exclusion are multidimensional, and have included some relational and psychosocial dimensions as well as the material. However, nearly all of these have been developed with a focus on adults. When considering adversity in children's lives, research is unequivocal that both material and psychosocial dimensions are critical to child development and, although this is well-recognised, the many dimensions of family adversity relevant to children are often studied

in isolation. Quality of care, parent availability and wellbeing, family relationships and interactions, as well as material hardship are all important influences on child outcomes (Bradley and Corwyn 2002; Gunnar and Quevedo 2007; Parke 2004) and we would expect many of these factors to be on-going.

Relevant socio-economic and material factors may also be conceptually broader than just income, education, and employment. For example poor working conditions and job insecurity are powerful predictors of adult health, and may affect children through their impact on parent's outcomes, family psychosocial stress, care of children and family resources (Butterworth et al. 2011; Strazdins et al. 2010). When parents are depressed, they are more likely to appear withdrawn, angry, and sad when engaging with their children who, in turn, are more likely to show emotional or behavioural difficulties, poor physical health, and impaired social and cognitive skills (Downey and Coyne 1990; Lovejoy et al. 2000). In spite of the recognition of these aspects of family adversity as important for child development, there is a paucity of longitudinal evidence on the extent to which such factors are transient or persistent.

This paper contributes to the existing literature by investigating the consistency and continuity of multiple adversity in families over three waves of a longitudinal study using comprehensive measures that include both material and psychosocial indicators relevant to families with children. An earlier paper by Gubhaju et al. (2013) described the development of these measures of adversity among families with young children using the first wave of data from the longitudinal study of Australian children (LSAC). This showed that psychosocial adversity was, overall, more closely correlated (relative to material adversity) with measures of family wellbeing and specifically with behaviour difficulties in the children. The summary measures of adversity developed in this previous paper were only applied to Wave 1 of the LSAC.

The main objectives of the current paper were to determine whether the multi-faceted and detailed measures of family adversity are valid longitudinally and to investigate the consistency and continuity of these measures over three waves of the survey.

Specifically the aims were:

- (1) to determine whether a consistent factor structure of multiple adversity fits the longitudinal data;
- (2) to estimate stability or change in the prevalence of multiple adversity over waves for particular dimensions of adversity (constructs) and for higher-order measures representing material and psychosocial adversity respectively (components);
- (3) to investigate the continuity of adversity over time for individual families, using construct and component scores at Waves 1, 2 and 3.

2 Data and Methodology

2.1 Data

This study used data from the first three waves of '*Growing up in Australia*', the longitudinal study of Australian children (LSAC), a nationally representative, cross-sequential, longitudinal study of Australian children. At Wave 1, in 2004–5, data were collected from two age cohorts. The first cohort is known as the B cohort or infant cohort and consists of 5107 families with babies aged 0–1. The families were interviewed every 2 years. At Wave 2 the children were 2–3 years and at Wave 3 the children were 4–5 years. The second

cohort is known as the K cohort or child cohort consisting of 4983 families with children aged 4–5 years at the time of the Wave 1 interview, 6–7 at Wave 2, and 8–9 at Wave 3. The design of the LSAC is described in greater detail elsewhere (Sanson et al. 2002).

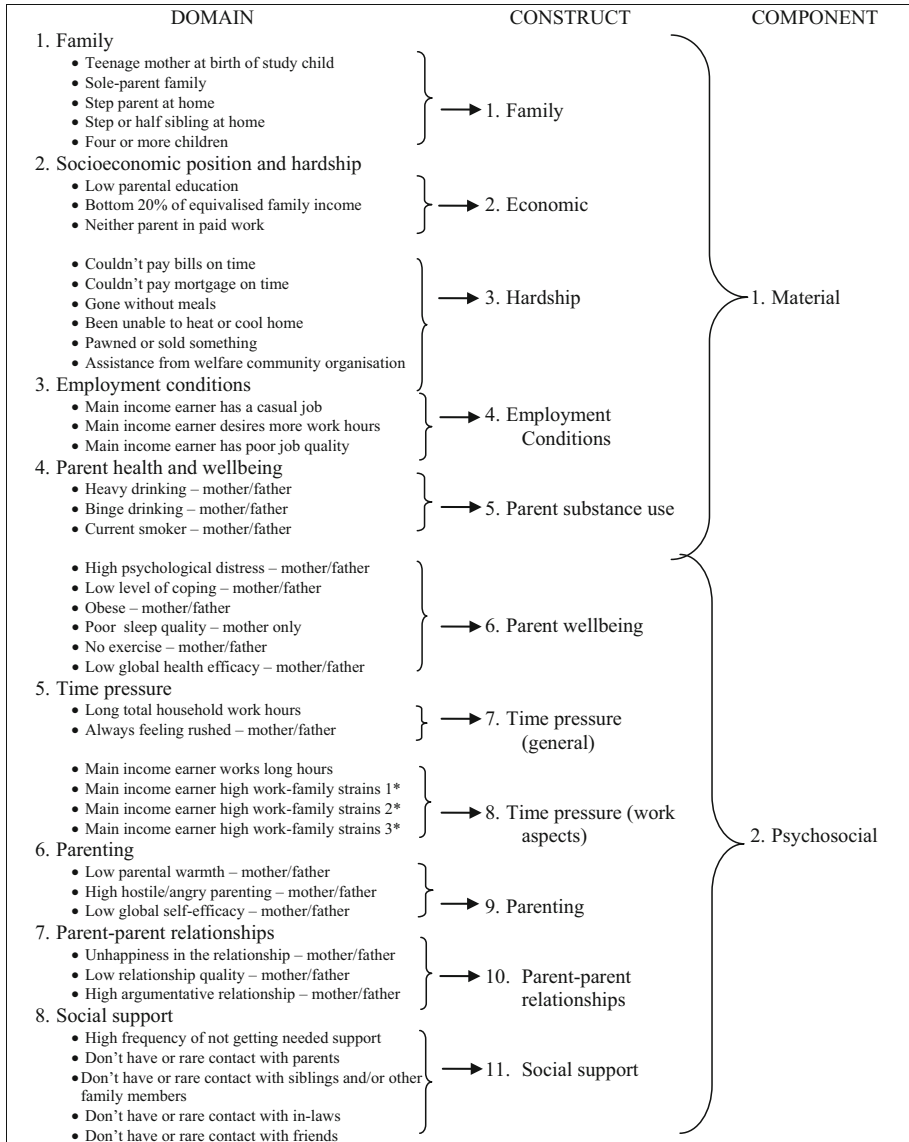


Fig. 1 Hierarchical structure of the adversity indices. *The three items are part of the work-family conflict scales consisting of the following items (1) because of my work responsibilities I have missed out on home or family activities; (2) because of my work responsibilities my family time is less enjoyable and more pressured; (3) because of my family responsibilities I have had to turn down work activities or opportunities that I would prefer to take on. Respondents stating strongly agree or agree are coded as having high work-family strains

Data were collected from both parents labelled as Parent 1 (P1) and Parent 2 (P2). P1 is usually the primary carer and in 97 % of cases is the biological mother. P2 is the other parent residing in the household. The overall participation rate for the P1 interview at Wave 1 was 55 % for the B cohort and 47 % for the K cohort. Data were mainly collected via a face-to-face interview with P1 in the family home which was then supplemented by self-complete questionnaires for both P1 and P2. Of the families that completed the P1 interview 85 % of P1's and 79 % of P2's completed the self-complete questionnaire. About 78 % of two-parent families completed both P1 and P2 questionnaires.

All P1 and P2 variables can also be transformed to reflect mother or father status. "Mother" refers to any female P1 or P2 and "father" refers to any male P1 or P2. Our analyses used the mother and father variables, unless noted otherwise. The achieved sample at Wave 1 has been compared to the ABS 2001 Census of Population and Housing and there was a 10 % over-representation of mothers who had completed year 12 education in both cohorts, and a 2 and 4 % under-representation of sole-parent families in the B and K cohort, respectively, compared to the Census data. The LSAC sample has been assigned statistical weights to ensure their characteristics match those of a corresponding age at the time of the 2001 Census (Soloff et al. 2005, 2006).

All analyses in this paper were conducted on a balanced sample of families that were present in all three waves of the survey. About 90 % of the original sample in both the B and K cohort responded to the first three waves of the survey. This reduced the overall sample to 4253 in the B cohort and 4196 in the K cohort. Sensitivity analyses were conducted to evaluate any biases resulting from attrition and are presented in the final section of the paper.

2.2 Methodology

This work draws on the measures of family adversity developed by Gubhaju et al. (2013) for the first wave of the LSAC. Some modifications were necessary to extend the original cross-sectional summary measures of adversity and ensure that measures were comparable across the three waves used in the present study (see "Appendix 1" for more details). The present paper used 11 of the summary measures, referred to as *constructs*, which were derived by factor analysis of many indicators of adversity from the domains of family background, socio-economic position and hardship, employment conditions of parents, time pressure, parenting, parent–parent relationships, parent health and wellbeing, and social support. These constructs were further reduced to form two overall *components* of family adversity labelled (1) material and (2) psychosocial adversity. All of the adversity scores were previously validated against several outcome measures of child development in Wave 1 of the study (Gubhaju et al. 2013). Figure 1 illustrates the conceptual domains of family adversity, the indicators within each one of these domains, the resulting eleven constructs revealed by factor analysis, and the two overarching components ("Appendix 2" provides details on how each one of the indicator variables within domains have been defined).

We used confirmatory longitudinal factor analysis (LFA) to determine whether the previous factor structure derived from the cross-sectional data in Wave 1 remained consistent longitudinally across three waves of the LSAC. This was done using the statistical software Mplus (Muthen and Muthen 1998–2010). In this analysis, a constrained model in which all loadings and intercepts were constrained to be equal across all three time points were compared to an unconstrained model where the loadings and intercepts were free to vary across time. Items and factors were allowed to correlate across waves. Model fit for both models was evaluated using the comparative fit index (CFI), the Tucker–Lewis Index (TLI), and the root

mean square error of approximation (RMSEA). Comparison of the model fit for the constrained and unconstrained models assessed the longitudinal consistency of the factor structure of the 11 constructs (Aim 1). For the CFI and TLI, a score equal to and above 0.95 indicates good model fit while a score equal to and above 0.90 indicates adequate model fit. For the RMSEA a score below 0.06 indicates good model fit and a score below 0.08 indicates adequate model fit while scores above 0.10 indicate poor model fit.

Table 1 Longitudinal factor analysis fit measures for the unconstrained and constrained models, Longitudinal Study of Australian Children, B (infant) and K (child) cohorts, Waves 1–3

Constructs	B cohort			K cohort		
	CFI	TLI	RMSEA	CFI	TLI	RMSEA
Family						
Unconstrained	0.99	0.99	0.04	0.99	0.99	0.03
Constrained	0.99	0.99	0.04	0.99	0.99	0.04
Economic position						
Unconstrained	1.00	0.99	0.01	1.00	1.00	0.01
Constrained	0.98	0.96	0.03	1.00	1.00	0.02
Hardship						
Unconstrained	0.99	0.98	0.01	0.99	0.99	0.02
Constrained	0.95	0.95	0.02	0.97	0.96	0.03
Employment conditions						
Unconstrained	1.00	1.02	0.00	0.98	0.96	0.01
Constrained	0.98	0.96	0.02	0.92	0.89	0.02
Parent wellbeing						
Unconstrained	0.97	0.96	0.03	0.97	0.97	0.03
Constrained	0.97	0.97	0.03	0.97	0.97	0.03
Parent substance use						
Unconstrained	0.95	0.93	0.07	0.97	0.95	0.08
Constrained	0.95	0.94	0.07	0.96	0.96	0.08
Time pressure (general)						
Unconstrained	1.00	1.01	0.00	1.00	1.00	0.01
Constrained	0.98	0.96	0.03	0.99	0.98	0.02
Time pressure (work aspects)						
Unconstrained	0.99	0.98	0.02	0.98	0.97	0.03
Constrained	0.99	0.99	0.02	0.98	0.97	0.03
Parenting						
Unconstrained	0.92	0.90	0.03	0.96	0.94	0.03
Constrained	0.91	0.90	0.03	0.95	0.94	0.03
Parent–parent relationships						
Unconstrained	0.97	0.95	0.05	0.95	0.93	0.05
Constrained	0.95	0.94	0.05	0.95	0.94	0.05
Social support						
Unconstrained	1.00	1.00	0.01	1.00	1.00	0.01
Constrained	0.98	0.98	0.02	0.99	0.99	0.03

CFI Comparative Fit Index, TLI Tucker–Lewis Index, RMSEA Root Mean Square Error of Approximation

Bivariate cross-tabular analyses examined the trends in prevalence of multiple adversity, assessed by the dimensions derived using factor analysis (constructs) and the two higher-order measures of overall material and psychosocial adversity (components) in each of the waves (Aim 2). To compare prevalence of adversity over time, we dichotomized those constructs, which had been measured on a continuous scale, based on appropriate cut-points determined for each of the constructs in the B and K cohorts over the three waves. The defined adversity category for each of the constructs over the three waves in the B and K cohort ranged from 11 percent to 43 percent of the population. The individual dichotomous construct measures were also summed to derive component scores. Families without employment necessarily have missing scores for employment conditions and time pressure related to work and lone parent families similarly have missing scores for parent–parent relationships. This would lead to the omission of many families from analyses of component scores over three waves. To retain these families in longitudinal analyses of component scores, the material component scores were summed omitting the employment conditions and time pressure (work aspects) constructs and the psychosocial component was summed omitting the parent–parent relationship construct. The modified scores for the two components therefore ranged from 0 to 4 rather than from 0 to 5 for material and 0–6 for psychosocial. Chi square tests of significance determined whether any differences in material or psychosocial adversity across waves were statistically significant.

Finally, variance-components models using restricted maximum likelihood estimation methods (REML) were used to partition the variance over time in the adversity measures into change within and between families. The intra-class correlations (ICC) from these models assessed the continuity of adversity over time by examining the consistency of specific constructs and components (Aim 3). A higher ICC indicates consistent experience of adversity for individual families over time, while a lower ICC indicates change in adversity within families over time.

Longitudinal weights were used in all but the variance-components models, as REML estimation methods do not support the use of weights.

3 Results

3.1 Derivation of Longitudinal Summary Measures of Adversity

The longitudinal confirmatory factor analysis found that both the unconstrained and constrained models showed adequate to good model fit (Table 1).

With the exception of the TLI score for the constrained model of employment conditions construct in the K cohort, both the CFI and TLI scores were equal to or above 0.90 (indicating an adequate to good fit) for the unconstrained and constrained models for all constructs. The RMSEA scores for the parent substance use constructs in the unconstrained and constrained model for both cohorts were the only ones that showed adequate model fit (0.07–0.08) while all other RMSEA scores for the other constructs were below 0.06 indicating good model fit. Due to space constraints, we did not report the standardized factor loadings (in the unconstrained models) of every indicator in each of the constructs for each wave. Results are available from authors upon request. The loadings were similar across Waves 1, 2, and 3 for most constructs. These analyses confirmed that the summary measures of adversity adequately fit the data consistently over the three waves of the survey and are appropriate for longitudinal use.

3.2 Trends in Prevalence of Multiple Adversity Across Waves

Next, the prevalence of adversity at each wave was examined using percentages for each construct as well as the two components. Figure 2 shows the percent experiencing adversity by wave in both the B and K cohorts for the material and psychosocial adversity constructs.

With the exception of the employment conditions construct for the B and K cohorts and the time pressure (work aspects) construct for the B cohort, Chi square tests of significance

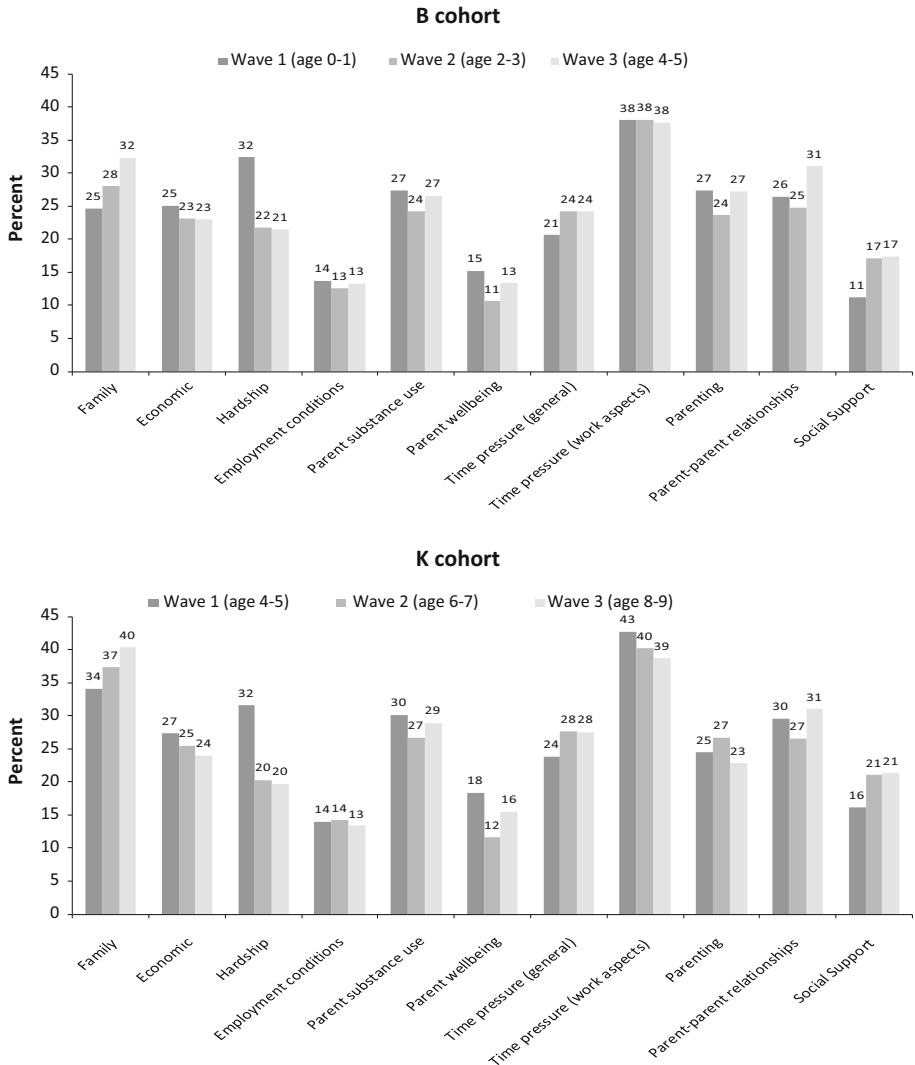


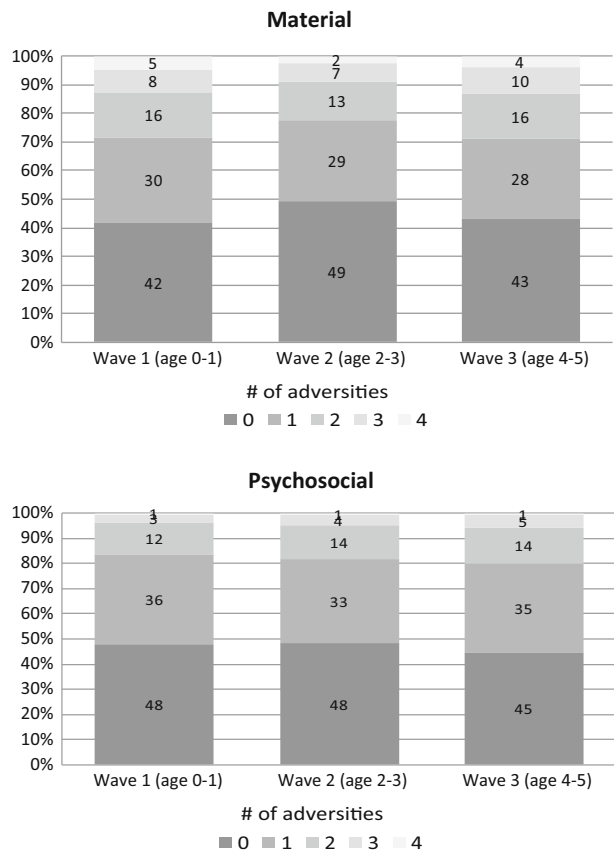
Fig. 2 Percent experiencing adversity by construct, Longitudinal Study of Australian Children, B (infant) and K (child) cohorts, Waves 1–3. *Notes* Chi square tests of significance found significant differences (p value <0.05) in percentages over waves for most constructs, with the exception of employment conditions for both the B and K cohorts and time pressure (work aspects) for the B cohort

showed that all percentage changes across waves were significant at the 0.05 level. Trends for the B cohort are shown in the upper panel. Among the material adversity constructs, families with young children experienced an increasing trend in family adversity across waves while adversity declined for the economic and hardship constructs between Waves 1 and 2 and then remained stable. A particularly large drop in the percentage experiencing hardship adversity was observed between Waves 1 and 2. Adversity in employment conditions remained stable while adversity in parent substance use fluctuated between waves.

For the psychosocial adversity constructs, while adversity showed an increasing trend for time pressure (general), parent–parent relationships and social support constructs, adversity remained fairly stable for time pressure (work aspects) and fluctuated between waves for the parent wellbeing and parenting constructs.

Trends for the K cohort are shown in the lower panel of Fig. 2. A noticeable continuing increasing trend in family adversity was observed consistent with the findings in the B cohort. In the B cohort, the prevalence of adversity in the family construct went up from 25 % in Wave 1 to 32 % in Wave 3. In the K cohort, family adversity continued its upward trend from 34 % in Wave 1 to 40 % in Wave 3. This may reflect the cumulative nature of some types of family adversity in that children’s age is associated with greater opportunity for families to separate and/or form step/blended families. Similarly, a positive trend in

Fig. 3 Percent with multiple adversities by components, Longitudinal Study of Australian Children, B (infant) cohort, Waves 1–3. *Notes* dichotomous summary measures of adversities are added up. The material scale excludes employment conditions and the psychosocial scale excludes time pressure (work) and parent–parent relationships so that unemployed sole-parent families are not excluded from the figures presented

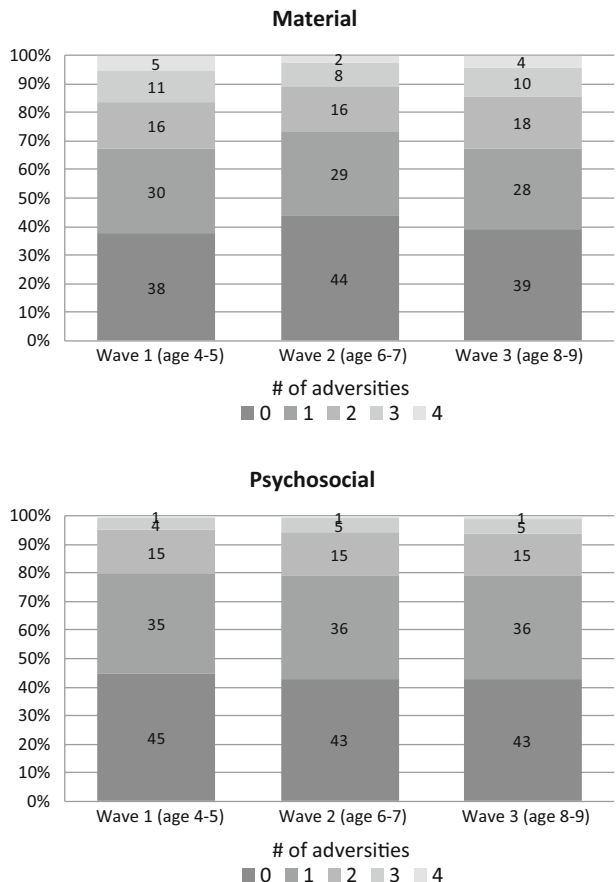


social support adversity observed from Wave 1 in the B cohort (11 %) to Wave 3 in the K cohort (21 %), may reflect decreasing frequency of contact with friends and family as a consequence of the children getting older. While most of the other trends were similar to those observed in the B cohort, one difference was a decreasing trend in adversity in time pressure (work aspects) in the K cohort (from 43 % in Wave 1 to 39 % in Wave 3) compared to no significant change between waves in the B cohort.

Figures 3 and 4 show trends in multiple adversity across waves at the higher-order component level—material and psychosocial—for the B and K cohorts using the balanced panels of participating families.

Dichotomous summary measures of adversity were summed to derive scores at the component level. As described previously, the analyses omit employment conditions from the material scale, and time pressure (work aspects) and parent–parent relationships from the psychosocial scale in order to include unemployed and sole-parent families in the figures presented. These figures showed very little change in overall material and psychosocial adversities over waves. In terms of the differences between material and psychosocial adversities, a greater proportion of children experienced all four material

Fig. 4 Percent with multiple adversities by components, Longitudinal Study of Australian Children, K (child) cohort, Waves 1–3. *Notes* dichotomous summary measures of adversity are added up. The material scale excludes employment conditions and the psychosocial scale excludes time pressure (work) and parent–parent relationships so that unemployed sole-parent families are not excluded from the figures presented



adversities (2–5 % across waves) compared to all four psychosocial adversities (1 % in all three waves).

In summary, results of the trends in adversity over three waves of the survey using balanced panels showed that there was very little change at the component level between waves, but there was some variability in specific adversities at the construct level.

3.3 Continuity of Multiple Adversity Over Time

This section adopted a longitudinal approach to explore continuity of adversity over waves, using intra-class correlations (ICC) to partition variance in adversity into within- and between-family variance. Figure 5 plots ICCs by construct for a balanced sample of children in Waves 1–3 of the B and K cohorts. The squares in the figures represent the material adversity constructs and the triangles represent the psychosocial adversity constructs.

Immediately evident from this figure was the great deal of variability in continuity, indicating that persistence differs by type of adversity. For example, in Fig. 5, family adversity had one of the highest continuities with 80–90 % of the variance attributed

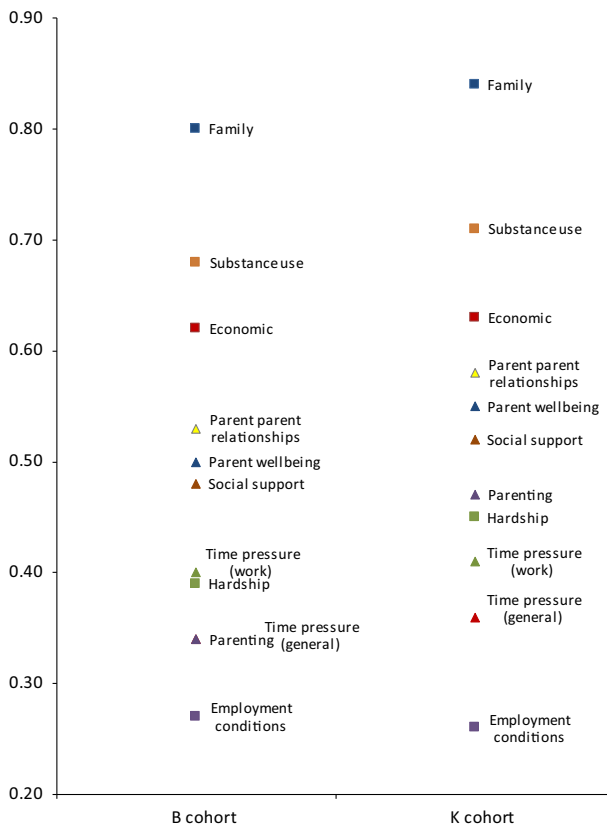


Fig. 5 Intra-class correlations by construct, Longitudinal Study of Australian Children, B (infant) and K (child) cohorts, Waves 1–3. *Note square* represents the material constructs; *triangle* represents the psychosocial constructs

between families. In contrast employment conditions had one of the lowest continuities with only one-quarter of the variance between families. Thus, family adversity (or lack thereof) was more persistent over time while families were more likely to move between different states of employment condition adversity. The three adversities with highest continuity—family, substance use, and economic—all fell within the material adversity component. (The other two from the material component, hardship and employment conditions, had much lower continuity.) The psychosocial adversity constructs tended to fall in the middle range of ICC values. The results were almost identical between the two cohorts, though the ICC for parenting was 0.34 for the B cohort [confidence interval (CI) of 0.32–0.36] and 0.47 for the K cohort (CI of 0.45–0.48).

Next we examined the ICC at the component level for material and psychosocial measures (Table 2). Since three constructs had to be omitted to include all families in the analyses, a second set of analyses was conducted using a sample of two-parent employed families only, thus allowing the inclusion of all constructs. A third set of analyses was conducted for two-parent families omitting these three constructs to test whether any differences found between all families and two-parent families were due to the restricted sample or the omission of constructs.

It is not surprising that material adversity had higher continuity than psychosocial adversity given three out of the four constructs in material adversity ranked high in continuity at the construct level. This indicated that material adversity was much more persistent for individual families over time. Comparison of results between the different family types showed that the small differences in ICC scores could be mainly attributed to the omission of constructs rather than differences between the samples used in the respective analyses.

All of the results presented above are based on analyses using the continuous construct summary scores. We repeated the analyses using the dichotomized construct summary scores and found similar results and therefore only present results from the continuous scores.

3.4 Sensitivity Tests

In the results presented so far there were certain families that were excluded due to missing data and because of the inevitable attrition in longitudinal surveys. Results of particular analyses may be biased depending on the type of respondents that are excluded. Therefore,

Table 2 Intraclass correlations by components and total adversity, Longitudinal Study of Australian Children, B (infant) and K (child) cohorts, Waves 1–3

Adversity	All families		Two-parent families (all constructs)		Two-parent families (eight constructs)	
	B cohort	K cohort	B cohort	K cohort	B cohort	K cohort
Material	0.75	0.77	0.71	0.77	0.70	0.77
Psychosocial	0.52	0.61	0.61	0.66	0.52	0.61

Results for all families and two-parent employed families (eight constructs) excludes the employment conditions, time pressure (work), and parent–parent relationships constructs

Table 3 Summary score distributions (%)—Longitudinal Study of Australian Children, B (infant) and K (child) cohort, Wave 1, comparison of unbalanced (UB) & balanced (B) sample

Construct	Sample	Score range								Disadvantaged (%)	N
		0	1	2	3	4	5	6			
B cohort											
Material adversity constructs											
Family	UB	74.9	18.4	6.0	0.8					25.1	5107
	B	75.4	17.9	5.8	0.9					24.6	4253
Economic	UB	74.0	13.8	7.9	4.3					26.1	5105
	B	74.9	13.7	7.3	4.1					25.1	4253
Hardship	UB	67.2	18.2	8.2	4.0	1.6	0.5	0.3		32.8	5099
	B	67.6	18.2	8.2	3.5	1.6	0.6	0.4		32.4	4250
Employment conditions	UB	85.7	11.2	2.9	0.3					14.3	3344
	B	86.3	10.7	2.8	0.3					13.8	3019
Parent substance use	UB	52.9	19.0	19.9	4.7	2.7	0.8			28.1	4289
	B	53.1	19.6	19.1	4.7	2.7	0.9			27.4	3751
Psychosocial adversity constructs											
Parent wellbeing	UB	42.1	22.1	20.3	9.5	4.1	1.3	0.7		15.6	4313
	B	41.7	22.6	20.5	9.0	4.3	1.3	0.6		15.3	3772
Time pressure (general)	UB	79.7	17.3	2.7	0.3					20.3	4332
	B	79.4	17.6	2.7	0.3					20.6	3787
Time pressure (work aspects)	UB	25.4	36.7	24.9	11.1	1.9				37.9	3346
	B	25.1	36.9	24.9	11.1	2.0				38.0	3021
Parenting	UB	49.8	22.6	19.9	6.0	1.3	0.4			27.6	5072
	B	49.9	22.7	19.8	6.0	1.3	0.3			27.4	4235
Parent–parent relationships	UB	56.1	17.2	12.0	7.5	4.0	2.3	1.0		26.7	3994
	B	56.2	17.3	11.9	7.4	3.9	2.2	1.1		26.4	3537
Social support	UB	60.6	27.0	8.2	3.1	1.2	0.0			12.4	4311
	B	62.0	26.8	7.8	2.6	0.7	0.1			11.2	3762
K cohort											
Material adversity constructs											
Family	UB	65.3	25.0	7.5	2.0	0.1				34.6	4983
	B	65.9	25.5	6.8	1.7	0.2				34.1	4196
Economic	UB	72.1	15.1	8.2	4.6					27.9	4979
	B	72.6	15.4	8.3	3.7					27.4	4195
Hardship	UB	67.7	17.2	8.5	4.0	2.0	0.5	0.2		32.3	4973
	B	68.4	17.2	8.1	3.8	1.8	0.5	0.2		31.6	4193
Employment conditions	UB	85.9	11.0	2.8	0.4					14.1	3227
	B	86.0	10.9	2.7	0.5					14	2943
Parent substance use	UB	51.9	17.7	19.6	5.0	4.3	1.6			30.4	4124
	B	52.2	17.6	19.5	5.0	4.3	1.4			30.2	3641
Psychosocial adversity constructs											
Parent wellbeing	UB	40.9	21.4	19.2	10.3	5.4	2.1	0.7		18.6	4167
	B	40.9	21.4	19.3	10.1	5.5	2.1	0.7		18.4	3674

Table 3 continued

Construct	Sample	Score range							Disadvantaged (%)	N
		0	1	2	3	4	5	6		
Time pressure (general)	UB	76.2	20.1	3.0	0.7				23.9	4197
	B	76.2	20.0	3.2	0.7				23.8	3691
Time pressure (work aspects)	UB	22.8	34.5	27.8	13.2	1.7			42.7	3235
	B	23.1	34.2	27.5	13.5	1.7			42.8	2950
Parenting	UB	55.2	19.7	18.2	5.2	1.1	0.6		25.1	4904
	B	55.3	20.2	17.7	5.0	1.1	0.7		24.5	4144
Parent–parent relationships	UB	53.4	17.2	13.3	7.6	4.2	3.1	1.2	29.4	3685
	B	53.4	17.0	13.6	7.8	4.3	2.8	1.2	29.6	3294
Social support	UB	52.9	30.6	11.5	4.0	0.9	0.2		16.6	4180
	B	53.3	30.5	11.5	3.9	0.7	0.1		16.2	3676

UB unbalanced sample, *B* balanced sample

in this section, we conducted some sensitivity tests to determine whether the families that were excluded from certain analyses differed from the families included in analyses.

3.4.1 Attrition

In longitudinal surveys, a proportion of respondents is always lost over time. In the LSAC about 90 % of the original sample responded to the first three waves of the survey. To determine whether the 10 % that have been excluded would make a difference to the overall findings, summary score distributions for Wave 1 of the B and K cohort (Table 3) are presented for the unbalanced sample and compared with the results for the balanced sample used in this analysis. Reassuringly, the profile of summary score distributions was very similar between the balanced and unbalanced samples. There were some minor differences—of one percentage point in certain constructs—indicating that the percentage of families experiencing adversity was somewhat higher among the unbalanced sample, i.e. those lost from the study experienced more adversity on average.

Attrition was further investigated by a series of bivariate and multivariate logistic regression models in which constructs and components were used to predict who is more likely to complete all three waves of the survey (results not shown). Bivariate results at the construct level showed that with the exception of time pressure (work), time pressure (general) and parenting constructs, those who experienced more adversity were less likely to continue in all three waves. In the multivariate models, families that experience hardship adversity were consistently less likely to stay in all three waves. At the component level, both material and psychosocial measures were significant predictors of attrition in bivariate analyses but, when both were in the same model, only material adversity was significant in predicting attrition.

In summary, families that experienced adversity (especially material adversity) were more likely to drop out of the survey and therefore be missing from our analyses. However, the overall profile of summary scores and the prevalence of adversity showed very little difference between the balanced and unbalanced samples, indicating that our overall results were not changed substantially by attrition.

3.4.2 Missing Data

There was a significant level of missing data from the self-complete questionnaires. Many of the indicators making up the adversity constructs were from self-complete questionnaires, with the exception of the family, economic, and hardship indicators. Therefore, sensitivity tests were conducted by examining summary score distribution and the ICCs of these three constructs when restricted to only the self-complete sample. Table 4 shows the summary score distributions and percent experiencing adversity for the three constructs for the Wave 1 balanced self-complete sample for the B and K cohorts. This can be compared with the summary score distributions for the balanced full sample in the same table.

Again, there were very small differences in the overall profiles, though the differences pointed to the self-complete sample experiencing slightly less adversity in respects to the three constructs. However, the ICCs were very similar for both samples (results not shown) and therefore the overall results did not differ with regards to continuity and consistency of the constructs.

4 Discussion

Extending previous work by Gubhaju et al. (2013), we determined in this paper whether the cross-sectional summary measures of material and psychosocial adversity were valid longitudinally. We investigated the longitudinal change and continuity of these summary measures over three waves (representing 4 years) of the survey. First, using longitudinal

Table 4 Summary score distributions (%), Longitudinal Study of Australian Children, B (infant) and K (child) cohorts, Wave 1, comparison of balanced self-complete (SC) sample and the full sample for selected constructs

Construct	Sample	Score range							Disadvantaged (%)	N	
		0	1	2	3	4	5	6			
B cohort											
Family	SC	77.0	16.6	5.7	0.7					23.0	3534
	Full	75.4	17.9	5.8	0.9					24.6	4253
Economic	SC	76.9	12.7	6.7	3.7					23.1	3534
	Full	74.9	13.7	7.3	4.1					25.1	4253
Hardship	SC	70.4	17.5	6.8	3.2	1.4	0.4	0.4		29.6	3531
	Full	67.6	18.2	8.2	3.5	1.6	0.6	0.4		32.4	4250
K cohort											
Family	SC	67.3	24.4	6.5	1.6	0.1				32.7	3469
	Full	65.9	25.5	6.8	1.7	0.2				34.1	4196
Economic	SC	73.9	15.3	7.5	3.3					26.1	3468
	Full	72.6	15.4	8.3	3.7					27.4	4195
Hardship	SC	70.4	16.6	7.4	3.4	1.8	0.3	0.2		29.6	3466
	Full	68.4	17.2	8.1	3.8	1.8	0.5	0.2		31.6	4193

SC self-complete

confirmatory factor analysis, our results determined that the summary measures of adversity adequately fit the data over the three waves. This first step confirmed that the factor structures developed cross-sectionally, as represented by eleven constructs covering material and psychosocial adversity, were consistent over time.

Second, we examined trends in the prevalence of multiple adversity over waves, to estimate stability or change in the specific dimensions of adversity (constructs) and the higher-order measures of material adversity and psychosocial adversity (components). Analysis at the construct level showed considerable change in the prevalence of specific adversities over time. In particular, a noticeable increasing trend in adversity related to changes in family composition was observed in both the B and K cohorts. Adversity related to social support also followed an increasing trend. Adversity in two material adversity constructs—economic and hardship adversity—decreased in both cohorts over time. Financial hardship, in particular, declined quite considerably between Wave 1 and Wave 2 in both the B and K cohorts. One difference between the B and K cohorts was a decreasing trend in adversity in time pressure (work aspects) in the K cohort compared to no significant change in the B cohort, possibly reflecting the different lifecourse stages of these families (B cohort families having younger children). Although there were significant changes in the prevalence of specific adversities over waves, with some increasing and some decreasing, such differences tended to cancel each other out when adversity was assessed at the component level, so there was very little change in overall material adversity and psychosocial adversity across waves.

Third, we assessed the longitudinal continuity of adversity for individual families. This was done using variance-components models where the variance over time of specific constructs and components was partitioned into variance within and between families. The results (similar for both the B and K cohorts) showed that some of the specific adversities faced by families were strongly persistent over time, while others were more transient. Among the material adversity constructs, family, substance use, and economic adversities had the highest levels of continuity while hardship and employment conditions had the lowest. Continuity in psychosocial adversity constructs tended to fall between these extremes. It was striking that values of ICCs across all the construct measures ranged from a low of 0.27 to a high of 0.84, illustrating the diversity in stability of the different constructs assessed.

For some constructs, the degree of continuity was elevated by the inclusion of particular indicators that are not amenable to change or are less likely to change over the period of the lifecourse covered by the three waves of the study. This included the indicator of the mother being a teenager at the birth of the study child and, to some extent, families having four or more children, which are both included in the family adversity construct. Low parental education is an indicator that is also unlikely to change and which is included in the economic adversity construct. Sensitivity analyses (results not shown) tested whether removing these indicators less amenable to change over time would modify the ICC for the family and economic construct. These showed minimal effects. For example, the ICC for the family construct decreased from 0.80 to 0.77 in the B cohort and remained the same at 0.84 for the K cohort when removing being a teenager at birth of study child and having four or more children from the construct. For the economic construct, removing low parental education reduced the ICC from 0.62 to 0.55 in the B cohort and from 0.63 to 0.55 in the K cohort.

Nevertheless, the large variation in ICCs indicated that different types of adversity were very different in respect of their temporal stability and this has important implications for policy and potential interventions. Where stability is low (sometimes referred to as

“churn”), attempts to reduce the adversity in question or to ameliorate its consequences can be thwarted by the constant movement of families into and out of the risk group. It is important to note the considerable stability of the substance use factor (covering smoking and drinking of parents) implying that targeted interventions are more feasible. In contrast, the very low stability of employment conditions and time pressure (both general and work related) suggest that interventions need to be at a population level, reducing the prevalence of adversities, rather than targeted at families which fall into those categories of adversity at a particular point in time. (Of course, the latter strategy could also be applied when adversity shows high continuity.) More targeted intervention strategies could also be considered in relation to parent–parent relationships and parent wellbeing, whereas material hardship demonstrates a lower continuity.

Overall material adversity showed greater continuity than did psychosocial adversity when assessed at the component level. Given the considerable variability in ICCs within each of the components, this finding is perhaps not of great significance. The comparison between the two components would vary if a different set of constructs was used to measure each or if different weighting were applied to different constructs (such weighting is not considered in the present analyses). However, material adversity still showed greater continuity even when removing indicators less amenable to change such as being a teenager at birth of study child, having four or more children, and low parental education that are part of the family and economic constructs included in the material component.

Our findings add to the literature on the persistence of poverty and social exclusion in two ways. First, we show that the assessment of a wide range of adversity, most notably through the inclusion of measures of psychosocial adversity, is feasible. Our measures can be used to understand persistence, continuity and change in a much more comprehensive way, capturing key aspects of adversity that are especially important to families and to the long-term development of children. Most previous studies of the persistence of adversity have focused solely on income related measures of disadvantage or have considered an aggregate score of deprivation measures or social exclusion. Supporting the main findings of these previous studies that have emphasized the substantial persistence of poverty and disadvantage, our aggregate scores of material and psychosocial adversity (components) also showed a high degree of continuity with ICC's ranging from 0.52 to 0.77 (Table 2). Overall, psychosocial adversity shows rather less persistence over time than material adversity, yet the continuity is still substantial. Given the importance of psychosocial adversity for child development, this information on stability and change for families is crucial.

Our second key contribution is to show that more specific measures of adversity at the construct level demonstrate considerable variability in their degree of persistence, and this variability occurs within both the material and psychosocial components (Fig. 5). This heterogeneity is only evident when measures are disaggregated at the construct levels, indicating the value of the hierarchical approach to the measurement of family adversity. As far as we are aware only one other study has examined the variability in persistence of adversity at the level equivalent to the construct measures used in our present study. Burchardt et al. (2002) examined social exclusion in five dimensions—low income, low wealth, lack of productive activity, political disengagement, and social isolation. They found that low wealth and political disengagement were the most persistent constructs while low income was the least persistent. Our analyses considered a wider range of both material and psychosocial adversity, and the variance-components approach provided an extension and enhancement of the descriptive approach used by Burchardt et al. (2002).

Our approach also refines their research by including more child and family specific indicators of adversity.

Our study had several limitations. First, the analysis was limited to families with young children and may not be generalizable to families with children of other age groups. Second, adversities specific to employed families and two-parent families, such as employment conditions, time pressure (work aspects), and parent–parent relationships could not be included in the component analysis without necessarily also excluding jobless and sole-parent families. Third, our analysis was limited to only three waves of the survey and therefore some of the more sophisticated longitudinal analyses using spell-based hazard models, which require data over a long and continuous period, could not be considered in our study. Fourth, all longitudinal studies confound historical changes over the period of study with age-related changes of the participants (including family life stages). The LSAC has a particular redeeming feature in this respect because it contains two cohorts (B and K) born 4 years apart. In some instances, it was possible to see similar trends playing out for both cohorts. However, it is never possible to completely disentangle the components of temporal change.

A major strength of our study was the incorporation of a wide array of material and psychosocial measures, particularly measures relevant to families with children, in the discussion of consistency and continuity of adversity over time.

5 Conclusion

Measures of material and psychosocial adversity representing multiple constructs are appropriate for longitudinal assessment of families with young children and show considerable variability in their degree of stability and change over time. For some measures, continuity is very high over two-year intervals whereas other measures demonstrate considerable “churn”. The former, more persistent forms of adversity (including family type, parent substance use and economic adversity) are areas where targeted interventions may be feasible. The latter forms of adversity (including parent employment conditions and time pressure) represent a moving target, as individual families move in and out of the risk group. This implies the need for interventions that operate at the population level to reduce the overall prevalence of the adversities in question.

The present work complements previous cross-sectional analyses which emphasised the policy and practical utility of multi-dimensional measures of adversity (Gubhaju et al. 2013). These measures are valuable for profiling the pattern of adversity in population subgroups that represent the clients of services or the intended targets of policy reform or more specific interventions. The longitudinal analyses have added valuable insights into which facets of adversity show greater stability over time. The longitudinal work has also reinforced the need to consider the two higher-order components of psychosocial and material adversity. Both psychosocial and material adversity are known to be important in their influence on child development. It is therefore essential to assess psychosocial constructs of adversity in studies of families with children as a balance to the more commonly utilized measures of material adversity.

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Appendix 1: Adjustments Made to Wave 1 Summary Measures of Adversity

We draw on cross-sectional summary measures of adversity developed by Gubhaju et al. (2013) using Wave 1 of the LSAC. To ensure comparability across three waves of the survey, for our present analysis some adjustments had to be made to the indicators and constructs used in the Wave 1 analysis. Specifically, the indicator “Difficulty affording medical care for study child” was removed from the hardship construct and the indicator “no fruit and vegetable consumption” was dropped from the parent wellbeing construct as these questions were not asked in Wave 2 and/or Wave 3. The indicator “any medical condition” was also removed from the parent wellbeing construct as there was an unusual and unexplained large decline in the percent reporting any medical condition between Wave 1 and subsequent waves (Wave 2 and Wave 3). Similarly, the life events construct was removed from this particular analysis because of a change in the way the question was asked between Wave 1 and Wave 2/Wave 3. The time pressure (work) construct has been reconfigured. The cross-sectional Wave 1 measure consisted of four items—main earner (1) works long hours, (2) desires less work hours; (3) has high work-family strains; (4) has high work-family gains. Due to a change in the way the question was asked between Wave 1 and Wave 2/Wave 3, the percentage desiring less work hours increased twofold between waves. Once this item was removed the Wave 1 factor structure was no longer supported and thus the construct was re-configured based on four indicators: main income earner working long hours plus three items from the work-family strains scale (strongly agree or agree) that (1) because of my work responsibilities I have missed out on home or family activities; (2) because of my work responsibilities my family time is less enjoyable and more pressured; (3) because of my family responsibilities I have had to turn down work activities or opportunities that I would prefer to take on.

Appendix 2: Indicator-Level Definitions of Adversity

Family

The five measures of family adversity that are included in this domain are being a teenage mother at birth of study child, sole-parent family, presence of a step parent at home, presence of a step or half sibling at home, four or more children in the family.

Socioeconomic Position and Hardship

Measures of adversity in this domain include low parental education (defined as either both parents or a sole parent with less than year 12 education), bottom 20 % of equivalised family income, neither parent in paid work (or a sole parent not having paid work was), and six financial hardship items that assessed hardship due to a shortage of money in the last 12 months.

Employment Conditions

Measures of adversity in the employment conditions domain are if the main income earner works in a casual job, desires to work more hours, and has poor job quality. For single earner sole-parent families and single earner two-parent families, the main income earner is simply the sole income earner in the family—whether it is the mother or father. For dual-earner families, the parent that works more hours is defined as the main income earner. In the event where both mother and father work the same number of hours, main income earner is determined by the parent that has a permanent or ongoing job. In the remaining number of cases where both parents work the same number of hours and both have a permanent or ongoing job, the father is taken as the main income earner. Job quality was measured using the job quality index (JQI) developed by Strazdins et al. (2010). The JQI consists of four dichotomous work condition variables measuring whether or not the work condition is favourable or unfavourable in terms of family friendly leave, flexible hours, job control, and job security. Scores on each work condition were summed to create an index of job quality with scores ranging from 0 to 4 where higher scores indicate higher job quality. Our measure of adversity is poor job quality (0 or 1 on the index).

Parent Health and Wellbeing

Several indicators measured substance use, mental health, and health behaviours of both the mother and father. A complication in creating a summary score using fathers' information is that it is only applicable to two-parent families. Our approach here was to create three summary scores—(1) a summary score for sole-parent families only, (2) a summary score for two-parent families where both the mother and father had answered the relevant question, and (3) a summary score for two-parent families where the father did not answer the relevant question, using only the mothers' information. This was done to minimise the loss of cases as a result of missing data, especially on the fathers' information. We then converted all three scales into percentiles and used these to obtain equivalent measure across the three sub-groups. In this domain, heavy drinking was defined as more than two drinks per day for women and more than four drinks per day for men and binge drinking as five or more drinks (for women) or seven or more drinks (for men) in a sitting 2–3 times a month or more often. These definitions were based on the 2001 Australian alcohol guidelines (National Health & Medical Research Council 2002). Current smoking represents a health adversity. Parent mental health was assessed using the Kessler K6 screening scale of psychological distress (Kessler et al. 2003). The six items of the Kessler scale were summed to create an overall psychological distress scale ranging from 0 to 24. Parents who scored eight and above were considered to have high psychological distress. Low level of coping was defined as coping “not at all” or “a little” on a question that asked, “how well do you think you are coping?” with response scales ranging from “not at all” to “extremely well.” Obesity was defined as a body mass score (BMI) of 30 and above. Sleep quality was measured by a question that rated overall sleep quality in the past month from very bad to very good. A rating of “very bad” was taken as poor sleep quality. No exercise was defined as not doing at least 30 min of moderate or vigorous physical activity in a week. Low global health efficacy was defined as “fair” or “poor” self-rated overall functioning and wellbeing versus good, very good, or excellent.

Time Pressure

Our derived measure of long total household work hours (45 h or more per week) includes unemployed families—work hours of families that had neither parent in paid work is set to zero and work hours for two-parent families was divided by 2 so that it was equivalent to work hours of sole-parent families. Frequency of feeling rushed asked how often the mother and/or father felt rushed. We considered those stating that they always felt rushed (as opposed to never, rarely, sometimes, or often) as experiencing adversity. The remaining time pressure indicators were only applicable to employed families only. Work-family strains are part of the work-family conflict scales consisting of the following items (1) because of my work responsibilities I have missed out on home or family activities; (2) because of my work responsibilities my family time is less enjoyable and more pressured; (3) because of my family responsibilities I have had to turn down work activities or opportunities that I would prefer to take on. Respondents stating strongly agree or agree are coded as having high work-family strains.

Parenting

In the LSAC, several scales were developed from questions relating to parenting behaviours, resulting in indices for parental warmth and hostile parenting (B cohort) or angry parenting (K cohort). Low parental warmth meant scoring on the bottom 20 % of the scale and high hostility/angry parenting meant scoring on the top 20 % of the scale. Low global parental self-efficacy was defined as a self-rating of “not being very good” or “having some trouble” being a parent compared to being “an average” to “a very good” parent.

Parent–Parent Relationships

This domain is only applicable to two-parent families and assess the relationship between the mother and their resident partner, which may not necessarily be the child’s parent. Unhappiness in the relationship meant being extremely unhappy to a little unhappy as opposed to happy to perfectly happy. Low relationship quality was defined as scoring on the bottom 20 % of the Hendrick Relationship Quality Scale (Hendrick 1988). High argumentative relationship was defined as scoring on the top 20 % of a modified conflict subscale from the Quality of Co-Parental Interaction scale (Ahrons 1981).

Social Support

High frequency of not getting needed support was defined if respondents stated they “very often” or “often” felt that they needed support and help but could not get it from anyone. Rare contact with family members meant being in contact less than once every month.

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