



Growing Up in New Zealand

Now We Are Twelve

Life in early adolescence

Supplementary materials for Material Hardship

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Summary

This technical document describes the supplementary information for the material hardship report, written for the 12-year data collection wave reporting in 2023.

Material Hardship Items

Tables 1 and 2 detail the questions relating to material hardship that were asked to participants at each data collection wave.

Table 1. DEP-17 Items Used to Derive a Material Hardship Variable at Age 12

Question Introduction	Question	Response Options and Coding
Now we are going to ask you about some things you may or may not have or do.	Do you have a meal with meat, fish, or chicken (or vegetarian equivalent) at least each second day?	Score = 1 if enforced lack, 0 otherwise. (an enforced lack is when the item is not had because of cost.)
	Do you have two pairs of shoes in a good condition that are suitable for your daily activities?	
	Do you have suitable clothes for important or special occasions?	
	Do you have home contents insurance?	
	Do you have give presents to family or friends on birthdays, Christmas, or other special occasions?	
In the last 12 months, have you had to do any of these things to keep down costs?	Go without fresh fruit and vegetables	Response options: not at all, a little, a lot Score=1 if “a lot”, 0 otherwise
	Buy cheaper cuts of meat or buy less meat (or vegetarian equivalent) than you would like?	
	Postpone or put off visits to the doctor?	
	Postpone or put off visits to the dentist?	
	Do without or cut back on trips to the shops or other local places?	
	Put up with feeling cold to save on heating costs?	
	Delay replacing or repairing broken or damaged appliances?	
-	When buying, or thinking about buying, clothes or shoes for yourself how much do you usually feel limited by money available?	Response options: not at all limited, a little limited, quite limited, very limited Score=1 if very limited, 0 otherwise
-	If you (or your partner) had an unexpected and unavoidable expense of \$500 in the next week, could you pay in a month without borrowing?	Response options: yes, no Score =1 if no, 0 otherwise
In the last twelve months, have any of the following happened to you (or your partner) because of a shortage of money?	You could not pay electricity, gas, rates, or water bills on time?	Response options: not at all, once, more than once)
	You borrowed from friends or family to meet everyday living costs?	Score = 1 if more than once, 0 otherwise
	You could not pay for car insurance, registration or warrant of fitness on time?	Response options: Never, only once, more than once Score = 1 if more than once, 0 otherwise

Table 2. Items to Inform the Longitudinal Material Hardship Variables

Time Point	Items	Response Options
9-month	<i>In the last 12 months have you personally:</i>	0 = No 1 = Yes
	Been forced to buy cheaper food so that you could pay for other things you needed?	
	Put up with feeling cold to save heating costs?	
	Made use of special food grants or food banks because you did not have enough money for food?	
	Continued wearing shoes with holes because you could not afford replacements?	
	Gone without fresh fruit and vegetables often, so that you could pay for other things you needed?	
	Received help in the form of food, clothes, or money from a community organisation (like the Salvation Army)?	
2-year	How well does your (and your partner's combined) total income meet your everyday needs?	0 = More than enough 1 = Enough 2 = Just enough 3 = Not enough
4.5-year	<i>In the last 12 months have you personally:</i>	0 = No 1 = Yes
	Been forced to buy cheaper food so that you could pay for other things you needed?	
	Put up with feeling cold to save heating costs?	
	Made use of special food grants or food banks because you did not have enough money for food?	
	Continued wearing shoes with holes because you could not afford replacements?	
	Gone without fresh fruit and vegetables often, so that you could pay for other things you needed?	
	Received help in the form of food, clothes or money from a community organisation (like the Salvation Army)?	
8-year & 12-year	<i>Dep-17 index, see Table 1.</i>	

Analytic Sample

To determine the analytic sample for the cross-sectional analyses at age 12, we selected only participants who indicated that they were living in NZ at the time of the survey. This was to provide targeted insights relevant to those who were currently living in NZ. Those who did not select which country they were living in (i.e., a NA response) were also included in the analytic sample.

Imputation Strategy to Deal with Missing Data

At age 12, individual cases were examined for missing data across the DEP-17 index. In total, 15.1% ($n = 687$) of participants were found to have at least one missing value. Cases with missing data were investigated further to determine eligibility for imputation. A total of 170 cases had missing data on 50% or more of the DEP-17 items. Imputation was deemed inappropriate for these participants and, subsequently, they were removed from the analytic sample. For the remaining cases with missing values, imputation was considered appropriate to retain as much of the sample as possible for analyses.

Imputation was used to estimate (or “fill in”) the missing values using multiple imputations. This approach uses other data we have about the participant to make a best estimation of what they might have said and makes the findings less biased than if participants with missing data were excluded from the analysis. Imputation was performed in R software (version 3.6.2) using the MICE package (1). The imputed values were informed by the DEP-17 items and sociodemographic variables at age 12 relating to child ethnicity (externally prioritised, child reported), maternal education, household income, maternal age, and area-level deprivation. In total, 100 imputed datasets were created (with a maximum of 20 iterations), with these datasets pooled for the analyses.

Imputation was also utilised for the longitudinal analyses, in a similar manner to the imputation at age 12. To be included in the analytic sample for the longitudinal analyses, each participant was required to have full data across all material hardship items at both the 9-month and 12-year data collection waves. Therefore, imputation “filled in” missing data at the 2-year, 4.5-year, and 8-year DCWs. To qualify for imputation, participants were required to have material hardship data across at least three out of five data collection waves. Again, imputation was performed in R software (version 3.6.2) using the MICE package (1). The imputed values were informed by the material hardship items at each data collection wave, and sociodemographic variables relating to maternal education, maternal age (antenatal wave), area-level deprivation (antenatal wave), household income (antenatal wave), and child reported ethnicity (externally prioritised; 12-year). In total, 100 imputed datasets were created (with a maximum of 20 iterations) and again, these datasets were pooled for analyses.

Material Hardship at Age 12

As noted in the report, at age 12, material hardship was measured using the DEP-17 index (2). These items focused on low living standards with respect to enforced lack of essentials, economising, restrictions, and financial strain. For the cross-sectional analyses, scores were summed across the scale and range from 0–17, with a higher score indicating lower living standards. Figure 1 displays the distribution of scores. Cut-offs were then used to group children into three categories: material wellbeing (scores 0–5), material hardship (6–8), and severe material hardship (9+). These categories align with the StatsNZ material hardship groupings (2).

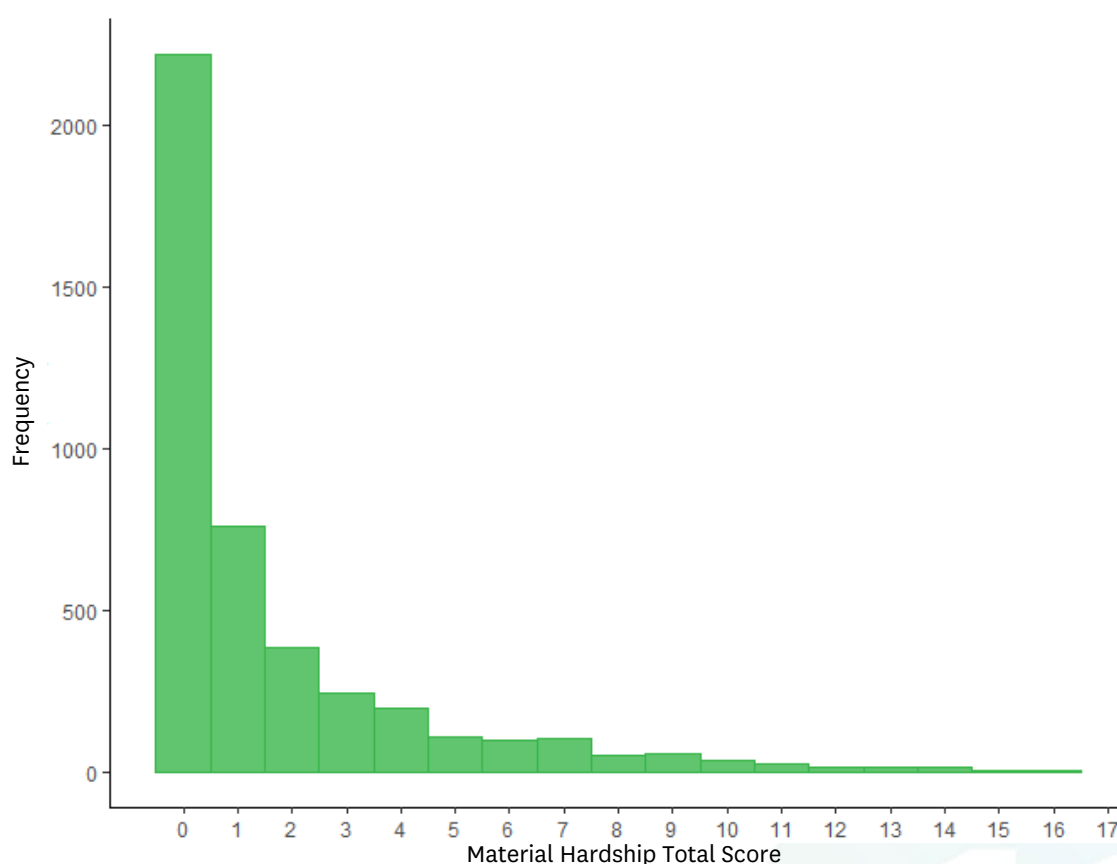


Figure 1. Distribution of Material Hardship Total Scores at Age 12

Longitudinal Analysis of Material Hardship

For the longitudinal analyses, a material hardship variable was derived for each participant at the 9-month, 2-year, 4.5-year, 8-year, and 12-year data collection waves. At each time point, participants were categorised as either living in material hardship or not living in material hardship. To allocate children into these categories, we used the available deprivation items at each data collection wave, as presented above in Table 2.

At each time point, the dichotomised material hardship items were summed to create a total sum score. This process resulted in total scores that were on different scales at each time point (i.e., 9-month, 0–5; 2-year, 0–3; 4.5-year, 0–5; 8-year, 0–17). To account for these differences in scales, sum scores were converted to z-scores which is a form of standardisation. Then, the cut-points for the material hardship categories, as established by StatsNZ, were applied to each time point. StatsNZ uses the threshold of six or more hardship indicators to indicate living in material hardship (2). We applied this threshold in our analyses where we found this point in the distribution at 8-year and 12-year, averaged this point, and applied this threshold to the all the time points. This created two categories—not living in material hardship and living material hardship at each point. While these labels are used throughout our report, we acknowledge that the ‘not in material hardship’ group may have been experiencing low levels of material hardship.

Sequence Analysis

As stated in the report, social sequence analysis was used to investigate children’s longitudinal experiences of material hardship. Social sequence analysis is an analytic technique designed to identify sequences of experiences, such as living in material hardship. Using the TraMineR package in R software (version 3.6.2), we found 32 unique trajectories (3). We were able to analyse these sequences to see at what time points children experienced material hardship. However, to interpret the trajectories of hardship in a manageable way, cluster analysis was applied.

Clustering

We performed hierarchical clustering as a method of grouping data points (or in our case sequences of material hardship) together based on the dissimilarities between each pair of data points. We used agglomerative clustering where each data point started in a separate cluster and then were successively merged with the closest pair of clusters into a larger cluster until all data points were in a single cluster. We then visualised the results using a dendrogram which shows this merging of the clusters in Figure 2. From the dendrogram we suspected that between 2–5 clusters would be the best solution for our data, but we tested a range of cluster solutions (2:8 cuts) and evaluated the associated fit statistic to choose the optimal number of clusters (see Table 3). Based on the results from the fit statistics a four-class solution was chosen. Although the fit statistics for a five-class solution were similar, four classes were chosen for ease of interpretability.

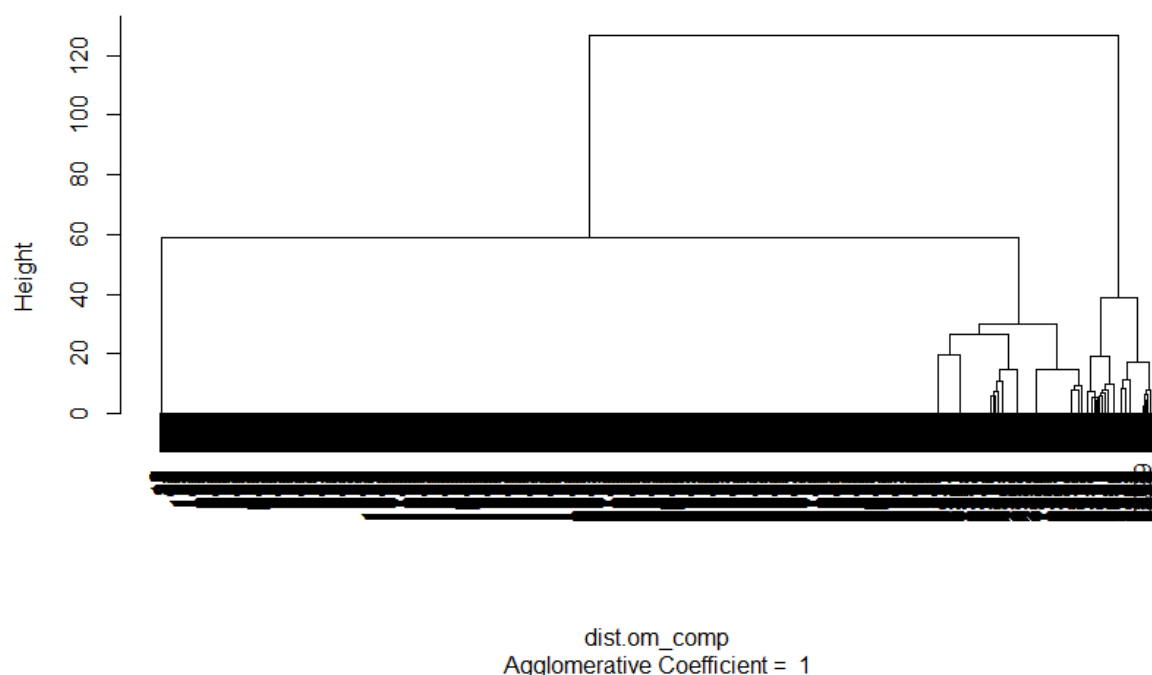


Figure 2. Dendrogram of Material Hardship Sequences.

Table 3. Tested Class Solutions and Associated Fit Statistics

Class solution	PBC	HGSD	HC	ASW	CHSQ
2	0.82	0.99	0.01	0.84	7077
3	0.81	0.97	0.01	0.79	5652
4	0.79	0.97	0.01	0.81	4545
5	0.79	0.97	0.00	0.81	4757
6	0.79	0.98	0.00	0.84	4614
7	0.79	0.99	0.00	0.88	4685
8	0.79	1.00	0.00	0.90	4756

Note: PBC = Point Biserial Correlation; HGSD = Hubert's Somers' D; HC = Hubert's C; ASW = Average Silhouette Width; CHSQ = Calinski-Harabasz index

References

1. van Buuren S, Groothuis-Oudshoorn K. mice: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*. 2011; 45(3), 1-67. doi:10.18637/jss.v045.i03.
2. StatsNZ. Measuring child poverty: Material hardship. 2019.
3. Gabadinho A, Ritschard G, Müller N, Studer M. Analyzing and Visualizing State Sequences in R with TraMineR. *Journal of Statistical Software*. 2011; 40(4), 1-37. doi:10.18637/jss.v040.i04.

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