The following document is intended to provide a background on the ALSWH income management question. This document was originally prepared for the 2020 ALSWH Technical Report, but has been republished in the Data Dictionary Supplement to improve access to this information for data users.

Validation of the ALSWH income management survey question

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Income within the context of socioeconomic status

Socioeconomic status (SES) refers to 'the social and economic position of a given individual, or group of individuals, within the larger society' (ABS, 2011). Socioeconomic status is viewed as a relative state (individual advantage/disadvantage compared to others) and is often difficult to quantify. SES is most commonly operationalised as education, social class or income, but other elements such as employment, wealth, location, health, consumption and household structure also contribute towards measurements of SES (ABS, 2011).

Income is often considered to be a clear indicator of material resources, and is strongly associated with higher/better SES (Darin-Mattson et al, 2017). Income is associated with better health outcomes (higher income increases the ability to access more services and resources to aid health) as well as indirectly influencing social participation and opportunities to improve life circumstances, which influence long-term health (Marmot, 2002). As such, income resources are often measured within the context of health surveys, such as ALSWH.

Ability to manage on available income

Many ALSWH surveys include an income management question, which is phrased as 'How do you manage on the income you have available?' with the following response options: 'It is impossible', 'It is difficult all of the time', 'It is difficult some of the time', 'It is not too bad' and 'It is easy' (Figure 1). This question has been used in many published papers based on ALSWH data, but its provenance is unclear, and it has not been previously validated within ALSWH. This investigation seeks to address these concerns.

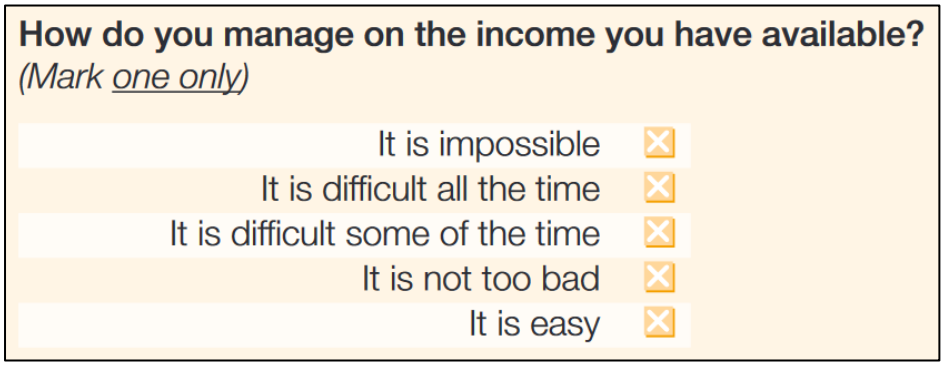

Figure 1 Example of ALSWH questionnaire item on the ability to manage on available income, (Survey 8 of the 1973-78 cohort, 2018).

A search of the literature for use of this income management question predominantly returned results from studies based on ALSWH data. We found three papers that used other surveys where the income management question was used with the same wording (Ashman et al., 2017, Gregorevic et al., 2018, Gregorevic et al., 2020), but these did not provide references that might indicate the origin of the question.

A similar question which asks respondents about their ease in meeting health care costs was included in the Australian Living Standards Study Berwick Report published in 1993 (McDonald, 1993). The Australian Living Standards Study (ALSS) was conducted by the Australian Institute of Family Studies (AIFS), with the relevant question included in Part 2 of the questionnaire on page 35. The question is phrased as 'How easy or difficult is it for you to meet the total health care costs of your family?'. Respondents could select one of the following options: 'Easy or very easy', 'Moderate/OK' or 'Difficult or very difficult' (Figure 2).

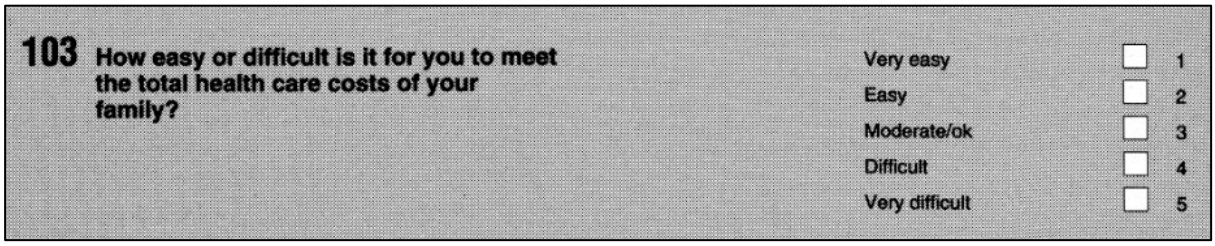

Figure 2 Ease of meeting health care costs question from the Australian Living Standards Study (part 2, question 103, page 35).

This question is similar in content and structure to the ALSWH income management question, and predates the first ALSWH survey in 1996. It has been suggested that this question may have been modified for use in ALSWH, although there is no documented evidence to support this.

Another similar question was included in the Poverty in the United Kingdom survey conducted in 1968 and 1969 in each of fifty-one constituencies in the United Kingdom (Townsend, 1979). The question was posed as 'Do you find it especially difficult to manage on your income?' with dichotomous response options yes and no. An AIFS report (Brownlee, 1990) on the development of the ALSS extensively

references and analyses the Townsend study, suggesting that the Townsend study may have been used to inform the development of the income questions used in the ALSS.

Financial resource questions under consideration

This investigation considers four questions that seek to measure financial resources within ALSWH, although there is a primary focus on the income management question that is regularly used across surveys in all four ALSWH cohorts. Table 1 outlines the phrasing of the questions under consideration. The Question column contains shorthand names for the questions that will be used throughout this document for brevity (e.g. 'Income management' refers to the question that asks about participant's ability to manage on the income that they have available to them).

Table 1 Summary of financial resource and education questions under consideration.

Question	Phrasing of question
Income management	How do you manage on the income you have available?
Household income	What is the average gross (before tax) income of your household (e.g. you and your partner, or you and your parents sharing a house)?
Highest qualification	What is the highest qualification you have completed?
	What is the highest level of education you have completed?
Stress about money	Over the last 12 months, how stressed have you felt about the following areas of your life: Money

ALSWH survey data also includes the Socioeconomic Indices for Area (SEIFA) Economic Resources score, but this was not included in this analysis as it is an ecological variable that did not exhibit strong correlation with individual-level measures of financial resources.

Surveys that measure financial resources and educationError! Reference source not found.Table 2 shows that the income management question has been regularly included in surveys in all cohorts. Although not shown in Table 2, the income management question is also included in each of the six-monthly follow-up surveys of the 1921-26 cohort. The highest qualification question has been sparingly included in the 1921-26 and 1946-51 cohorts, but has been regularly included in the 1973-78 and 1989-95 cohorts. The household income question has only been included in two surveys of the 1946-51 cohort and three surveys for the 1973-78 cohort. The stress about money question has been regularly included in all cohorts except the 1921-26 cohort, where it was only included at Survey 1.

Table 2 Inclusion of financial resource and education questions across cohorts and surveys.

		Survey Wave							
Cohort	**Question**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1921-26	Income management	Yes	Yes	Yes	Yes	Yes	Yes		
	Household income								
	Highest qualification	Yes							
	Stress about money	Yes							
1946-51	Income management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Household income		Yes	Yes					
	Highest qualification	Yes					Yes		
	Stress about money	Yes	Yes			Yes	Yes	Yes	Yes
1973-78	Income management	Yes		Yes	Yes	Yes	Yes	Yes	Yes
	Household income		Yes	Yes	Yes				
	Highest qualification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Stress about money	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1989-95	Income management	Yes	Yes	Yes	Yes	Yes			
	Household income								
	Highest qualification	Yes	Yes	Yes	Yes	Yes			
	Stress about money	Yes	Yes	Yes	Yes	Yes			

Yes	Question available
	Question not available
	Survey does not exist

A note on the household income variable

The household income questions for the 1946-51 and 1973-78 cohorts are split into two parts: personal income and household income. The exception is Survey 2 in the 1946-51 cohort where the question was split into personal income and partner's income. We generated a derived household income variable that was the sum of the personal income and partner's income for this investigation to allow comparison with the other surveys. The mid-points of each category were used as estimates in the summation. For example, if the personal income was reported as being in the $120 to $300 per week category and the partner's income was in the $700 to $999 per week category, then the total was $210 + $850 = $1,060, and the resulting category for household income was the $1,000 to $1,500 per week category.

Missing data for financial resource and education variables

Responses to the household income question of don't know and don't want to answer were treated as missing, in addition to any actual missing responses. Missing data for all questions, excluding the

household income question, ranges from 0.36% to 5.37%. Missing data for household income ranges from 16.8% to 36.1% (Table 3 and Figure 3).

With respect to the income management question, very low rates of missing were observed, with

- 0.7-2.1% missing observed across six surveys for the 1921-26 cohort;
- 0.6-1.4% missing observed across eight surveys for the 1946-51 cohort;
- 0.3-5.1% missing observed across seven surveys for the 1973-78 cohort; and
- 1.1-3.7% missing observed across five surveys for the 1989-95 cohort.

There was a noticeable increase in the proportion of missing observed for the income management question for the 1973-78 cohort at Survey 6 (1.3%), Survey 7 (5.1%) and Survey 8 (4.9%). We hypothesise that this increase may have been due to the ordering of the questions in the survey. In Survey 6, the income management question was included alongside other SES questions, but in Surveys 7 and 8, the income management question was included following a series of dietary questions.

There have been four ALSWH surveys where a small number of women were offered a short survey instead of the complete survey. These shortened surveys were offered at Survey 2 for the 1921-26, 1946-51 and 1973-78 cohorts, and Survey 3 for the 1946-51 cohort. The short surveys were restricted to the questions deemed most important and not all financial resource questions were included. Cells shaded yellow in Table 3 indicate that the question was not included in these short surveys, and so women who completed the short survey have been excluded from the denominator in the missingness calculation (as they did not have the opportunity to respond to that particular question). The values in Table 3 are presented graphically in Figure 3.

Table 3 Missing data (%) for financial resource and education questions.

		Survey Wave							
Cohort	**Question**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1921-26	Income management	2.1	1.2	0.7	1.3	1.1	1.1		
	Household income								
	Highest qualification	5.3							
	Stress about money	3.5							
1946-51	Income management	0.6	1.3	1.2	0.8	0.6	0.9	1.4	1.3
	Household income		36.1	27.6					
	Highest qualification	1.0					5.4		
	Stress about money	0.9	1.5			2.5	3.4	0.8	0.7
1973-78	Income management	0.4		0.5	0.5	0.4	1.3	5.1	4.9
	Household income		24.7	21.2	16.8				
	Highest qualification	0.6	3.6	2.4	0.4	2.2	1.9	5.4	4.8
	Stress about money	0.5	1.2	0.7	0.4	0.3	1.3	2.1	2.3
1989-95	Income management	1.1	1.8	3.3	3.7	2.6			
	Household income								
	Highest qualification	1.1	1.8	3.2	2.8	2.5			
	Stress about money	1.1	1.8	3.1	3.7	2.0			

XX.X	Percent missing data
	Question not available
	Short survey respondents excluded
	Survey does not exist

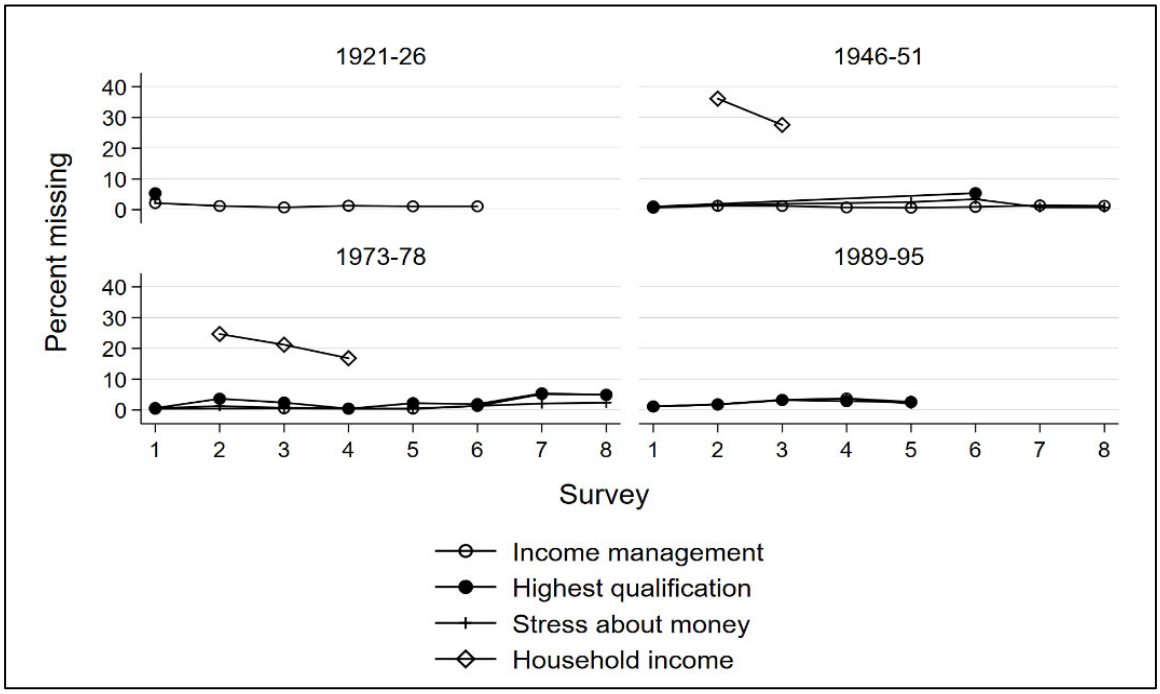

Figure 3 Missing data for financial resources and education questions for each cohort.

Income management according to household income and stress about money

As expected, a higher proportion of women respond that they find it easier to manage on their available income when their household income is higher. Figure 4 shows an increasing proportion of women in the 1946-51 cohort describe their ability to manage on available income as ‘Easy’ as their household income increases from ‘$1 to $119 per week’ (3.1%) through to ‘$1,500 or more per week’ (48.7%). The opposite trend holds true for the ‘Difficult all of the time’ and the ‘Impossible’ categories. Figure 5 shows similar trends for the 1973-78 cohort, with an increasing proportion of women who describe their ability to manage on available income as ‘Easy’ with household incomes of ‘$1 to $119 per week’ (0%) through to ‘$1,500 or more per week’ (35.4%).

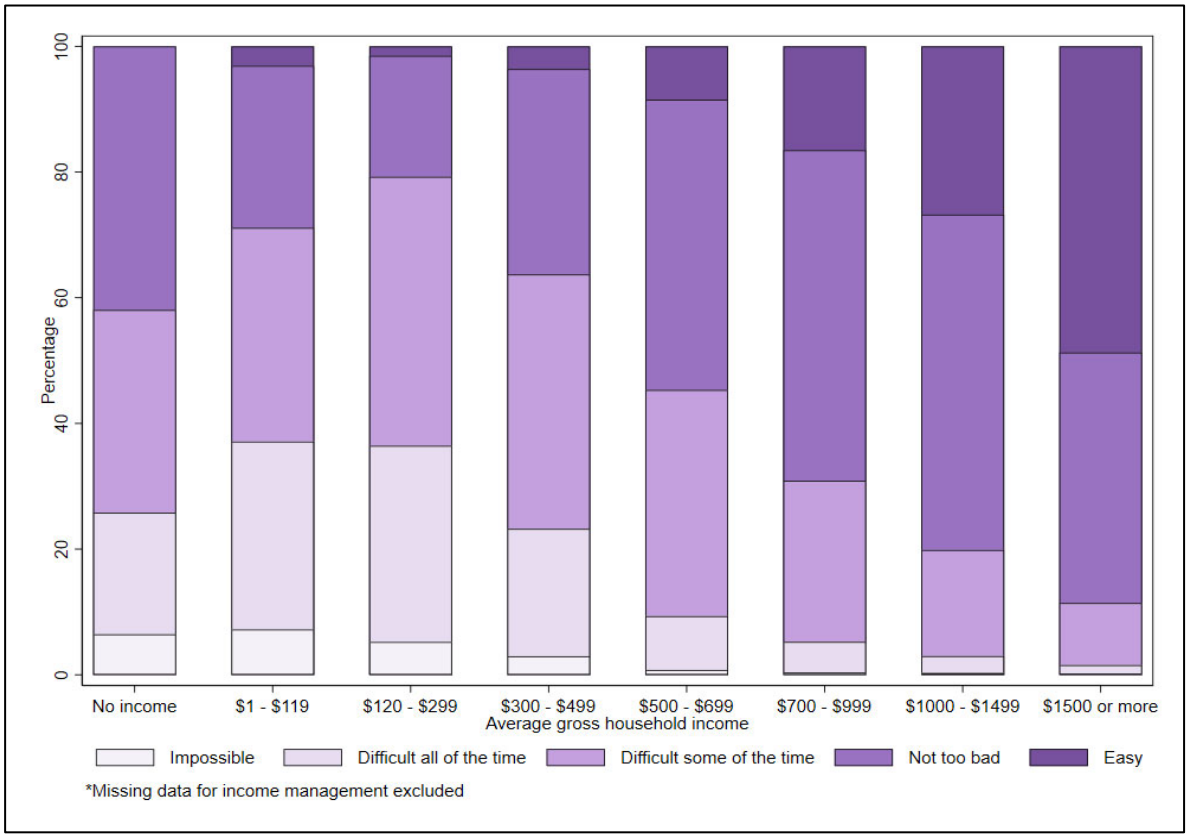

Figure 4 Responses for income management among women from the 1946-51 cohort (Survey 3, 2001), according to household income.

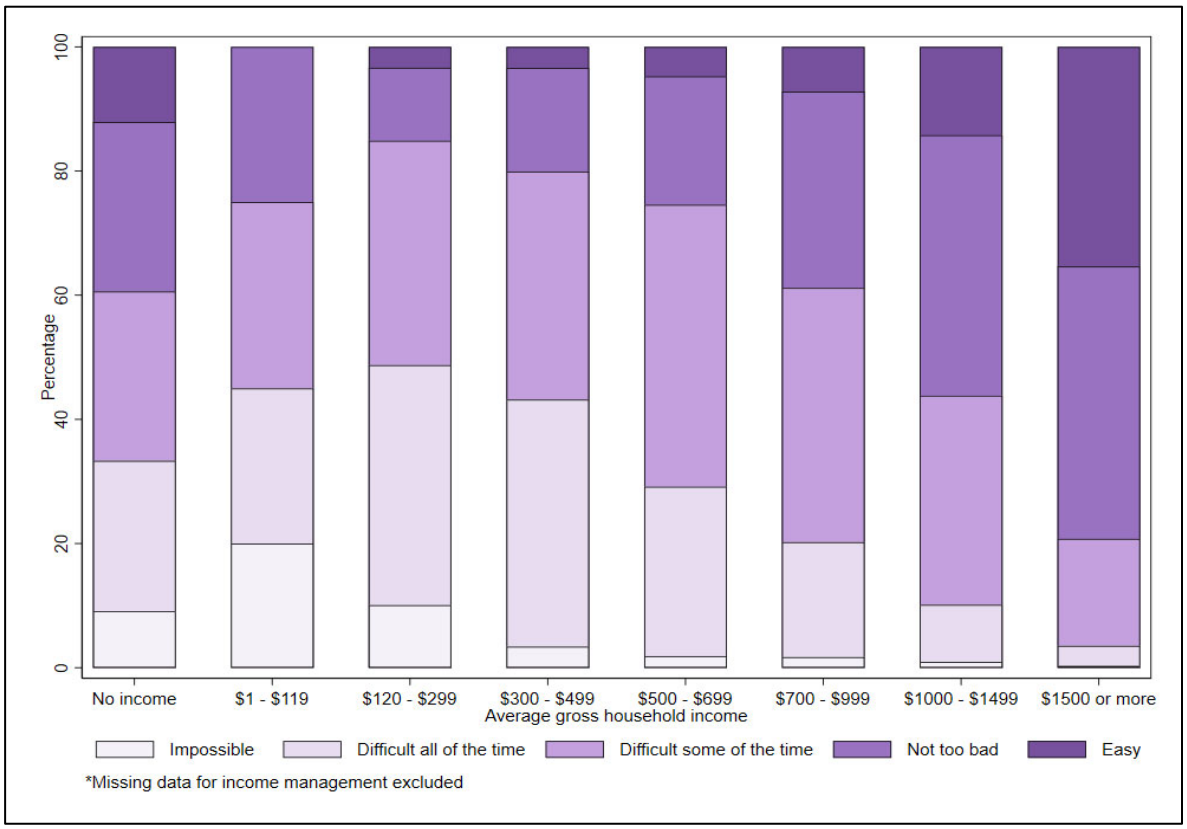

Figure 5 Responses for income management among women from the 1973-78 cohort (Survey 4, 2009), according to household income.

Figure 6 presents an increasing proportion of women in the 1989-95 cohort who describe their ability to manage on available income as 'Easy' as stress levels concerning money move from 'Extremely stressed' (1.0%) to 'Not at all stressed' (54.1%).

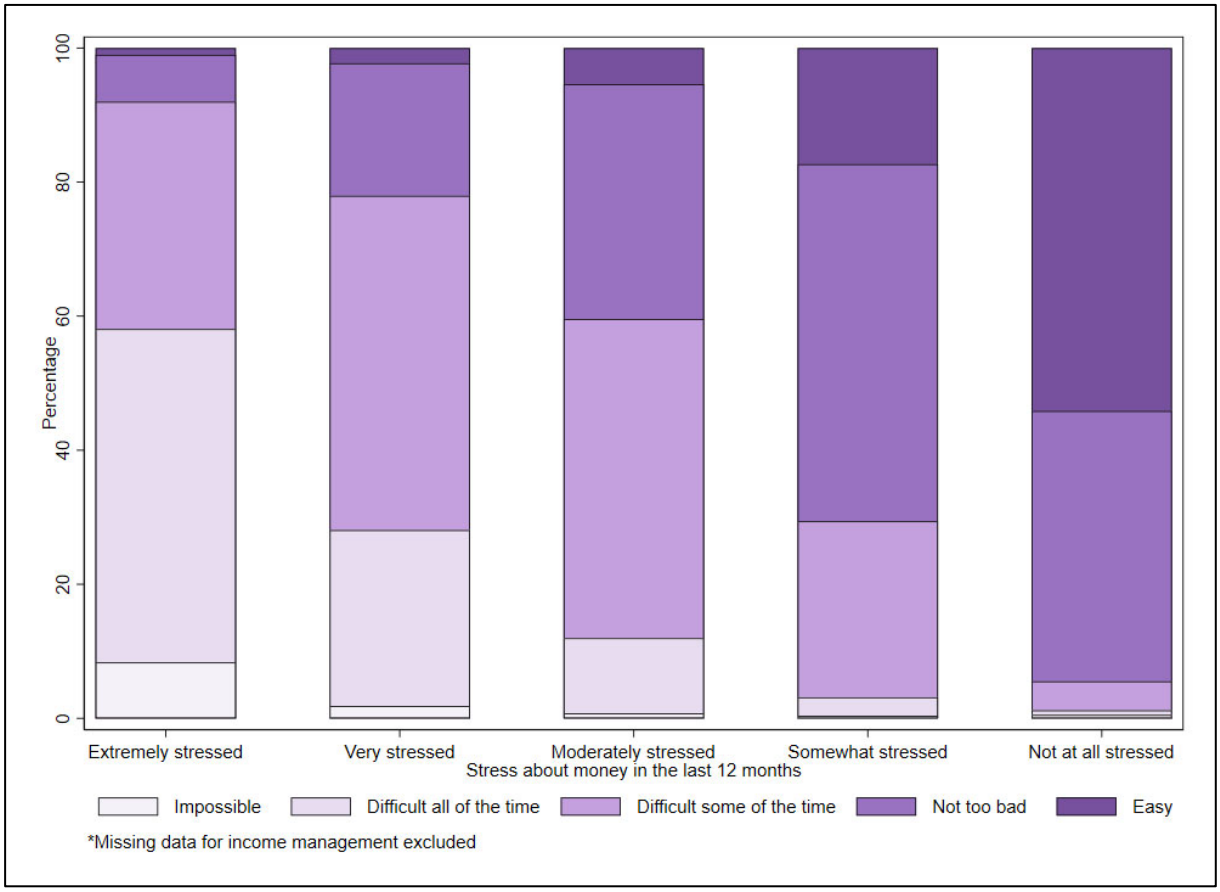

Figure 6 Responses for income management among women from the 1989-95 cohort (Survey 5, 2017), according to household income.

Spearman's rank-order correlation coefficient

Spearman's rank-order correlation coefficient, also known as Spearman's rho, measures the strength and direction of association between two ordinal categorical or continuous variables. Here, we present the strength and direction of association between the income management question and the other measures of financial resources. Like Pearson's correlation coefficient, Spearman's rho is measured on a scale of minus one to one, with values nearer plus or minus one indicating greater correlation.

Table 4 presents Spearman's rho for income management and each of the other financial resources and education questions. These coefficients were computed for both the first and last survey where each combination of questions was included. For example, income management and highest qualification were both included at Survey 1 and Survey 6 for the 1946-51 cohort, so the Spearman's rho was computed separately for Survey 1 and Survey 6.

These coefficients show that the income management question exhibits greater correlation with the household income and stress about money questions, and less correlation with the highest qualification question.

Table 4 Spearman's correlation coefficients for income management and highest qualification, household income and stress about money.

Cohort	Survey	Highest qualification	Household income	Stress about money
1921-26	1	0.09	-	0.40
1946-51	1	0.11	-	0.59
	2	-	0.47	-
	3	-	0.50	-
	6	0.18	-	-
	8	-	-	0.59
1973-78	1	0.12	-	0.53
	3	-	0.47	-
	4	-	0.46	-
	8	0.23	-	0.66
1989-95	1	0.06	-	0.57
	5	0.26	-	0.64

Cronbach's alpha and Zumbo's ordinal alpha

Cronbach's alpha is a numerical measure of internal consistency, or reliability, of a set items on a scale. Conceptually, and mathematically, we can think of the income management question, the stress about money question and, where available, the household income question as items that make up a two-item or three-item scale that seeks to measure the underlying latent construct of financial resources. The financial resources construct is latent because it cannot be directly measured. The highest qualification question was excluded from these conceptual constructs as it was not as strongly related to financial resources as the other two questions either conceptually or statistically (using Spearman's rank-order correlation coefficients).

We can then use Cronbach's alpha to measure the internal consistency between the income management question and the other questions that seek to measure the financial resources construct. Cronbach's alpha is measured on a scale of zero to one. A higher value for Cronbach's alpha suggests the items have more shared covariance and are more likely to be measuring the same underlying construct (Hinton, 2004). Additional tests are required to test for unidimensionality.

We also present Zumbo's ordinal alpha as an alternative measure of internal consistency. Zumbo's ordinal alpha is a modified form of Cronbach's alpha that relies on a polychoric correlation matrix, rather than Pearson's correlation matrix, and is preferred over Cronbach's alpha when handling ordinal item response data that is skewed or contains few item response levels (Gadermann, Guhn & Zumbo, 2012).

We performed each Cronbach's alpha and Zumbo's ordinal alpha calculation for the first survey where the two or three items were all included.

There is good internal consistency across all four cohorts for the combinations of questions used to measure financial resources. Cronbach's alpha and Zumbo's ordinal alpha estimates ranged from 0.61 to 0.80, with higher values observed when using Zumbo's ordinal alpha (Table 5). The high degree of shared covariance suggests that the two or three questions intended to measure financial resources in each cohort are likely to be measuring the same underlying construct.

Table 5 Cronbach's alpha and Zumbo's ordinal alpha for conceptual financial resources scale.

		Items included in conceptual financial resources scale				
Cohort	**Survey**	**Item 1**	**Item 2**	**Item 3**	**Cronbach's alpha**	**Zumbo's ordinal alpha**
1921-26	1	Income management	Stress about money	-	0.61	0.80
1946-51	2	Income management	Stress about money	Household income	0.68	0.74
1973-78	3	Income management	Stress about money	Household income	0.67	0.73
1989-95	1	Income management	Stress about money	-	0.70	0.76

Conclusion

The observed internal consistency between the items for income management, stress about money and household income indicate that these items are measuring the same latent construct of individual's financial resources. Given that the household income question has not been asked at many surveys and when it has been included, it has high rates of missing data, it is reasonable to include the items of income management and stress about money as alternative measures of available financial resources. This is preferable as participants seem more willing to respond to these questions, resulting in less missing data while still adequately measuring their financial resources. We believe that the income management item is a consistent and valid measure.

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