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Food insecurity: Discrepancy within Australian couple households

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Abstract

Food security remains a global public health priority but there may be bias in the prevalence of household food insecurity, depending upon who answers the questions. Using a cross-section from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, we analysed components of food insecurity reported separately by both partners in 718 households, allowing examination of discrepancies among couples. We modelled discrepancy in reports of food insecurity on 8 items using binary logit models for each question and a binomial regression for the number of questions on which there was discrepancy. Among couples who differed on an item, (conditional) discrepancy rates ranged from 71.75% to 85.86%. Females were more likely than males to report food insecurity on most items. Key characteristics associated with discrepancy were female's and male's age, female's education, being born in Australia, renting and male's employment. Male's age and birthplace were associated with discrepancy on more items while male's higher education and being a homeowner were associated with discrepancy on fewer items. Among couples who differed in responses, females were more likely to report food insecurity if they were older or had a disability, if their male partner was younger or had no disability, or if either person had more education than high school. The prevalence of food insecurity among couple households may be underestimated by 7.4 percentage points due to discrepancies in reporting. Discrepancies can reduce the accuracy of measures of food insecurity, impeding the targeting of responses, and lead to a less efficient allocation of resources to combat food insecurity.

KEYWORDS
Australia, couples, discrepancy, food insecurity, HILDA

1 | BACKGROUND

Food security remains a global public health priority and is the subject of the United Nations' Sustainable Development Goal 2. Indeed, Target 2.1 aims to end hunger and ensure all people have continuous access to safe, nutritious and sufficient food by 2030 (Food and Agriculture Organization et al., 2021). Food insecurity is typically very high in low-income countries. The causes of food insecurity tend to be inadequate agricultural productivity, lack of access to resources and reliance on subsistence farming (Food and Agriculture Organization, 2014). High-income countries, like Australia, have low overall prevalence of food insecurity. However, despite this low overall prevalence, there may still be disparities in the population if certain groups such as low-income households, marginalised groups or particular demographic groups have a higher prevalence of food insecurity (Seivwright et al., 2020). Analysis of these groups can help to identify root causes of food insecurity and aid in designing effective social policies and support systems, thereby improving health outcomes, productivity and social cohesion, and leading to a more inclusive and resilient society.

In assessing the prevalence of food insecurity, the ideal would be to compare minimum dietary energy requirements with dietary energy consumption at an individual level. However, individual consumption data on specific items are rarely available on a large scale (Food and Agriculture Organization et al., 2021). Most Australian data on food insecurity only use a single question about going without meals due to a lack of money. However, there is scope to use nationally representative household survey data on food insecurity experiences using, for example, the 8-item Food Insecurity Experience Scale (FIES) Survey Module developed by the Food and Agriculture Organization of the United Nations (Ballard et al., 2013).

As with any household survey, there is scope for differences in reporting, depending upon who answers the questions. We refer to these differences as discrepancies. Such discrepancies have been studied in the context of couples' reports of financial difficulty (Breunig et al., 2007), relationship timing among couples (Reimondos et al., 2011) and food insecurity among parents (Foster et al., 2020; Nagao-Sato et al., 2021). There is some evidence that discrepancies over financial difficulties are related to the severity of hardship (based on income) and information asymmetries more than, say, gender differences in views (Breunig et al., 2007). Discrepancy over relationship timing may also represent recall error and may be relevant for individuals recalling food insecurity from an earlier time than specified in a survey. However, it appears that having a partner present at interview improves recall and this may be important for each partner filling in a separate self-completion questionnaire (Reimondos et al., 2011).

Closer to our investigation, previous studies have noted discrepancies over food insecurity tend to result from fathers reporting less and mothers more food insecurity. This could be due to mothers sacrificing their own needs for those of others, men perceiving admission of food insecurity as emasculating, gender differences in social desirability bias, differences in the share of household tasks or differences in health literacy as has been found in the United States among low-income, food-insecure cohabiting parents (Foster et al., 2020). Investigating discrepancies in food insecurity between Latino mothers and fathers in the United States, Nagao-Sato et al. (2021) found discrepancies in food insecurity were associated with differences in nutrition education and in reports of fruit and vegetable availability in the household, although only two items on food insecurity were included. Among married couples in Canada, higher rates of food insecurity were reported by women and attributed to women having greater awareness of household requirements and/or information asymmetries (Matheson & McIntyre, 2014). Discrepancies may also arise due to the wording of questions. In particular, Foster et al. (2019) found low-income, food-insecure cohabiting parents in the United States differed in their concept of worry in relation to food insecurity, with women associating worry with stress, depression and difficulties whereas men had a more optimistic outlook and tended not to report worry. There were also gender differences in the interpretation of providing a balanced meal and in what constitutes the household.

In some countries, such as Bangladesh, food insecurity discrepancies can arise due to relative earnings differentials leading to power imbalances affecting food allocation within a household (Coates et al., 2010). In such instances, there may be "buffering" of the primary income earner's consumption at the expense of the partner's consumption and, despite discrepancy, both respondents are correct in their individual assessments of their own level of food insecurity. Correspondence in food insecurity at the household level can also be improved by relating questions to the broader household rather than individual experiences (Coates et al., 2010). However, there may remain differences if members of the household conceal their experience of food insecurity from others in the household (Carlos Chavez et al., 2017). For example, cultural beliefs and norms about the value of foods and differential needs (due to different types of responsibilities) may mean women put the needs of men above their own needs (Briones Alonso et al., 2018). Family conflict may also reduce information sharing, leading to discrepancies on food insecurity—women may limit food intake, eating last and alone, to avoid domestic violence (Lentz, 2018).

It is important to study the nature and extent of discrepancies about food insecurity in order to understand potential bias in reports of food insecurity prevalence. Correctly measuring the prevalence of food insecurity is important for effective health promotion strategies, which may involve targeted interventions and policies. Inaccurate data may lead to a misallocation of resources. Standard household surveys in which one member of the household reports on food insecurity may underrepresent the extent of the problem and fail to fully capture associations with other sociodemographic characteristics. A detailed study may also shed light on potential explanations for the discrepancies. There is very little research on discrepancies over food insecurity. Studies typically focus on parents rather than all couples and may only use one or two measures of food insecurity. Studies of couples have either used many items but analysed proportions of discrepancies rather than adjusting for covariates or have adjusted for covariates in their analysis but combined many items into a single metric. In this paper, we analysed a unique Australian data source that captured data on detailed aspects of food insecurity separately reported by both partners in a household. This allowed us to examine aspects of discrepancies among couples and potential correlates.

2 | METHODS

2.1 | Data

Our study draws upon cross-sectional data from wave 20 (2020) of the Household, Income and Labour Dynamics in Australia (HILDA) Survey ([dataset]* Department of Social Services & Melbourne Institute of Applied Economic and Social Research, 2022). This survey has been running since 2001 and collects data annually from all individuals in a household aged 15 years or over in a nationally representative sample of more than 7000 Australian households. Topics include household and family dynamics; welfare, income and wealth; employment, unemployment and joblessness; and life satisfaction, health and well-being. A comprehensive overview of HILDA is provided in Watson and Wooden (2012). Ethics approval for this project was granted by the University of Melbourne LNR 2B 2022-24371-31475-4.

As we were investigating discrepancies in responses to food insecurity questions within families, we limited our analysis to couples (with or without children or dependents). We defined couples with food insecurity as those couples for whom both partners responded and at least one partner reported food insecurity on at least one measure. To assess discrepancies, we focused on 718 couples (representing an estimated 788,734 couples in the population, based on population weights included with the survey) in which both partners answered the same questions, although item non-response reduced our sample to 654–691 couples depending on the food insecurity measure as, in our sample, 93% of couples answered all eight questions, 6% answered seven questions and the remaining 1% answered up to six questions. In wave 20, among all food-insecure couples there were only 1.8% ($n=13$) same-sex couples for whom differential effects would be difficult to precisely estimate, so we removed them from our analysis.

2.2 | Measurement of food insecurity and discrepancies

Our analysis was based on a set of eight questions on food insecurity introduced in HILDA in wave 20 (2020) from the FIES (Ballard et al., 2013). The prompt text was: *During the last 12 months, was there a time when, because of a lack of money*:

1. You were worried you would not have enough food to eat
2. You were unable to eat healthy and nutritious food
3. You ate only a few kinds of foods
4. You had to skip a meal
5. You ate less than you thought you should
6. Your household ran out of food
7. You were hungry but did not eat
8. You went without eating for a whole day.

For each item, responses were recorded as yes/no and each item was considered to be a separate measure of food insecurity.

For each question on food insecurity, discrepancy was defined as a within-couple difference in responses to that item. Two rates of discrepancy were considered: unconditional (considering all couples for whom at least one person in the couple reported food insecurity on at least one item—the full sample[1]) and conditional (considering couples for whom someone answered yes to that particular question, thereby excluding couples who concurred there was no food insecurity on that question). The two measures allow for a comparison of a broad group of food-insecure couples (any item recorded as insecurity for either person) versus a narrower group (for whom someone reported food insecurity on that item). For each of these two measures of discrepancy, we have also included indicators of "who said yes" in a discrepancy (male or female).

2.3 | Covariates

Individual characteristics were measured separately for females and males as follows. Age was recorded in single years (continuous). Employment status was recorded as employed or not employed. Education had three levels: high school, further education (certificates and diplomas attained after completion of school) and higher education (university). Country of birth was recorded as Australian born or foreign born. Disability was recorded as yes/no. Household characteristics were number of children in the household (continuous), equivalised household disposable income in Australian dollars (continuous), homeowner (yes/no) and urban/non-urban residence location.

2.4 | Statistical approach

We began by summarising discrepancy rates according to characteristics of the sample. We then considered aspects of food insecurity for our couples to get an idea of the extent of the problem and look at gender differences. We identified the questions with the most and least discrepancies and where there was discrepancy, whether the male or female partner tended to report food insecurity. We modelled the association between discrepancy and female, male and family characteristics using binary logit models for each question and a binomial regression for the number of food insecurity questions on which there was discrepancy (using the number of questions answered as an exposure variable). We also investigated the question of "who said yes" in the discrepancy and what characteristics were associated with that outcome. Finally, we estimated the prevalence of food insecurity under different assumptions about the discrepancy. Our results were based on all individuals who had responded to the food insecurity item and for whom all characteristics were recorded.

3 | RESULTS

3.1 | Descriptive characteristics

Characteristics of couples and associated unconditional discrepancy rates are provided in Table 1. Each rate in columns headed (1) to (8) shows the percentage of couples with a given characteristic who differ about food insecurity on that measure, given that at least one member of the couple reported food insecurity on at least one measure. Rates in the final column indicate the share of couples (for whom at least one member of the couple reported food insecurity on at least one measure) with that characteristic. Discrepancy rates differ by a range of characteristics, including age (older females and older males were less likely to differ), male's education (higher levels associated with less discrepancy), male's birthplace (foreign born less likely to differ) and homeowner/mortgagee (typically less discrepancy). Interestingly, there was no systematic pattern in discrepancies by income level or by the numbers of children.

3.2 | Profile of food insecurity and discrepancies

Table 2 shows there was some variation in the numbers of couples in the population answering each question (given at least one person indicated food insecurity on at least one question) due to item non-response (column 1). Unconditional discrepancies (column 2) captured the discrepancy rate but included in the denominator couples who concurred there was no food insecurity on that question. Columns 3 and 4 in this table show the percentage of females and males answering yes to indicate food insecurity on each measure among all couples for whom at least one person indicated food insecurity on at least one question. Apart from measure 8 (You went without eating for a whole day), females were more likely than males to report food insecurity. The most prevalent type of food insecurity was associated with measure 3 (You ate only a few kinds of foods). Conditional discrepancy (column 5) was much higher as it excluded from the calculation couples who concurred there was no food insecurity on that question. Conditional discrepancy was highest for measure 2 (You were

TABLE 1 Unconditional discrepancy rates by characteristics of respondents, population weighted.

	Food insecurity measure[a,b]								
	1	2	3	4	5	6	7	8	
Variable category	%	%	%	%	%	%	%	%	**% Of category**
Female age band									
15–24	30.03	46.52	57.55	24.94	47.95	26.53	32.01	17.07	6.81
25–34	28.67	54.92	39.71**	20.29	25.64**	20.77	26.82	16.60	22.77
35–44	41.64	50.75	50.51	17.46	36.03	15.05	30.04	17.71	23.16
45–54	26.37	42.93	46.19	20.65	34.64	10.75***	21.22	18.15	21.96
55–64	35.53	44.07	49.49	19.03	37.86	6.79***	23.92	12.84	13.15
65–74	17.29	47.97	46.27	20.12	30.98*	5.42***	16.17**	15.13	7.20
75+	0.00***	42.94	19.09***	10.04**	26.43**	5.66***	16.45*	13.02	4.94
Male age band									
15–24	28.62	61.59	39.49	21.93	40.38	20.56	28.02	14.55	5.38
25–34	28.07	49.62	48.19	20.05	28.71	19.82	23.22	17.86	20.58
35–44	41.37	60.28	45.22	16.26	34.73	18.60	29.99	13.78	20.25
45–54	28.83	38.87**	46.05	23.20	34.96	10.93	25.42	21.23	23.11
55–64	36.62	42.81	56.14	19.41	34.66	10.93	25.00	13.81	15.86
65–74	16.72	50.94	33.99	18.30	32.02	8.08*	19.22	17.14	8.42
75+	6.07**	36.13**	32.61	12.70	33.77	0.00***	17.73	12.04	6.39
Female not employed	28.23	46.25	42.69	22.04	32.01	14.57	24.96	18.81	43.28
Female employed	31.07	49.58	47.76	17.20	34.73	13.10	24.84	14.50	56.72
Male not employed	27.72	42.80	38.67	21.74	32.59	12.07	25.16	21.03	33.37
Male employed	30.91	50.86*	49.03**	18.06	34.04	14.56	24.76	13.98**	66.63
Female high school	29.20	47.89	42.31	21.49	29.99	15.43	21.99	18.09	35.97
Female further education	34.43	43.11	48.19	20.56	42.66**	15.10	27.34	16.38	35.89
Female higher education	25.21	54.25	46.17	15.34	26.86*	10.22	25.25	14.41	28.14

TABLE 1 (Continued)

Variable category	Food insecurity measure[a,b] 1 %	2 %	3 %	4 %	5 %	6 %	7 %	8 %	% Of category
Male high school	37.74**	52.70	42.59	15.02*	40.07*	18.12	26.16	15.46	35.76
Male further education	28.72	45.72	49.75	27.43***	33.72	13.32	29.83**	19.41*	44.57
Male higher education	18.21***	45.29	41.56	8.77***	21.81***	6.89**	11.84***	11.41*	19.67
Number of children									
0	26.44	46.20	46.30	18.86	31.62	12.11	23.54	16.62	55.99
1	35.85	50.49	41.43	13.45	38.91	13.79	23.06	18.47	18.75
2	25.44	47.76	46.86	29.32	31.28	14.03	30.21	15.06	15.94
3 or more	47.04*	56.29	47.30	15.39	39.00	23.63	27.45	13.02	9.32
Female foreign born	29.39	45.93	44.48	14.86	37.66	11.23	26.03	14.16	36.32
Female Australian born	30.10	49.40	46.20	21.84*	31.22	15.17	24.24	17.66	63.68
Male foreign born	22.05	46.27	39.20	10.75	36.24	12.00	21.42	11.97	36.01
Male Australian born	34.39*	49.27	49.27*	24.22***	32.08	14.74	26.92	18.73*	63.99
Female has no disability	28.60	50.99	43.45	17.31	32.28	13.10	24.50	13.82	63.50
Female has disability	32.03	43.13	49.28	22.78	35.82	14.85	25.59	20.75*	36.50
Male has no disability	28.93	50.90	43.60	17.88	32.25	14.40	25.22	15.34	64.53
Male has disability	31.47	43.16	49.18	21.83	35.95	12.52	24.30	18.20	35.47
Equivalised household disposable income ($)									
0–24,999	22.64	48.24	42.23	22.35	31.10	11.54	22.59	26.86	9.24
25,000–49,999	36.95**	50.25	47.30	20.74	34.96	16.37	26.82	15.23*	51.04
50,000–74,999	22.59	45.50	46.71	17.77	31.35	10.88	20.68	15.76	23.72
75,000–99,999	28.65	46.45	28.43	17.87	41.40	12.64	31.57	9.99**	10.08
100,000–124,999	8.37	32.83	76.52***	8.00*	15.94	2.92*	17.13	24.46	4.33
125,000–149,999	0.00***	79.93	32.35	32.35	32.35	45.93	32.35	32.35	0.47

(Continues)

TABLE 1 (Continued)

	Food insecurity measure[a,b]								
	1	2	3	4	5	6	7	8	
Variable category	%	%	%	%	%	%	%	%	**% Of category**
150,000 or more	11.70	52.83	43.83	0.00***	23.34	0.00***	11.64	20.65	1.13
Non-homeowner	35.06	46.69	49.54	24.58	33.99	17.48	26.24	21.43	45.45
Homeowner/mortgagee	25.70**	49.34	42.37	15.14***	33.14	10.65**	23.73	12.26***	54.55
Non-urban residence	40.74	59.39	48.21	12.80	38.78	18.76	28.08	12.67	20.13
Urban residence	27.43	45.65*	45.00	20.72*	32.41	12.62	24.19	17.19	79.87
Sample (couples)	689	688	689	690	690	689	691	654	
Population (couples)	781,515	781,185	783,313	785,454	785,262	784,211	786,504	741,392	

[a]Food insecurity measures: 1 You were worried you would not have enough food to eat; 2 You were unable to eat healthy and nutritious food; 3 You ate only a few kinds of foods; 4 You had to skip a meal; 5 You ate less than you thought you should; 6 Your household ran out of food; 7 You were hungry but did not eat; 8 You went without eating for a whole day.

[b]Wald test of difference in discrepancy rate for a food insecurity measure from the first category for each variable: *p .1; **$p < .05$; ***$p < .01$. Further education comprises certificates and non-school diplomas undertaken after completing high school. Higher education is any level of university education. Among couples reporting insecurity on at least one measure.

TABLE 2 Food insecurity responses by couples and discrepancy, population weighted[a].

Question	(1) Population	(2) Unconditional discrepancy %	(3) Unconditional Yes (female) %	(4) Unconditional Yes (male) %	(5) Conditional discrepancy %	(6) Conditional Yes (female) %	(7) Conditional Yes (Male) %
1. You were worried you would not have enough food to eat	781,515	29.84	27.64	18.18	78.87	65.85	34.15
2. You were unable to eat healthy and nutritious food	781,185	48.13	35.75	28.23	85.86	57.82	42.18
3. You ate only a few kinds of foods	783,313	45.57	42.30	32.85	75.50	60.37	39.63
4. You had to skip a meal	785,454	19.29	18.11	16.36	71.75	54.54	45.46
5. You ate less than you thought you should	785,262	33.56	27.70	22.26	80.37	58.10	41.90
6. Your household ran out of food	784,211	13.73	11.68	8.95	79.92	59.96	40.04
7. You were hungry but did not eat	786,504	24.89	18.79	17.94	80.79	51.72	48.28
8. You went without eating for a whole day	741,392	16.38	12.67	13.02	77.85	48.94	51.06

[a]Unconditional discrepancy indicated discrepancy among all couples for whom at least one person indicated food insecurity on at least one question. Unconditional Yes (female/male) in columns 3 and 4 indicated the percentage of females/males answering yes to that question among all couples for whom at least one person indicated food insecurity on at least one question. Conditional discrepancy indicated discrepancy among couples for whom someone answered yes on that question and therefore excluded couples that agreed there was no food insecurity on that question. Conditional Yes (female/male) in columns 6 and 7 indicated the percentage of females/males answering yes among couples with discrepancy on that question.

unable to eat healthy and nutritious food). The final two columns of Table 2 show “who said yes” in the case of conditional discrepancy. We found a higher proportion of females than males indicating food insecurity on all measures apart from measure 8 (You went without eating for a whole day).

We now consider discrepancy rates across measures. Figure A1 in the appendix shows the discrepancy rates for couples for whom at least one person indicated food insecurity on at least one question. This rate was based on the number of items answered by both respondents in each couple, that is, the number of items on which there was a discrepancy relative to the number of items with responses. A rate of 0 indicated total correspondence and 1 indicated total discrepancy. The mean discrepancy rate was 0.291, indicating couples tended to differ on few items.

3.3 | Multivariable analyses

Delving deeper into unconditional discrepancies, Table 3 shows results from binary logit models of discrepancy for each measure of food insecurity. Each model reported the association between female and male characteristics and discrepancy. Odds ratios above 1 indicate characteristics positively associated with discrepancy. So, for example a male with further education (certificates and non-school diplomas) or higher (university) education was associated with less discrepancy on measure 1 (You were worried you would not have enough food to eat). This confirms our finding in Table 1.

There were several characteristics associated with discrepancy. Controlling for other variables, age only had a significant association with 1 (worry) and 6 (ran out). In particular, increasing male age was associated with more discrepancy in terms of worry, increasing female age was associated with less discrepancy on running out of food and increasing male age was associated with more discrepancy on running out of food. Having a male who was employed was associated with more discrepancy on 2 (eat healthy) and 3 (few foods) but less discrepancy on 8 (whole day). Compared with completing high school, higher levels of female education were associated with increased discrepancy on 2 (eat healthy) 5 (ate less) and 7 (hungry). Higher levels of male's education were associated with less discrepancy on 1 (worry), 5 (ate less) and 7 (hungry) and more discrepancy on 4 (skip meal).[2] For females, being born in Australia was associated with less discrepancy on 1 (worry) and 7 (hungry). For males, being born in Australia was associated with more discrepancy on 1 (worry), 3 (few foods) and 4 (skip meal). Increasing income was associated with less discrepancy on 2 (eat healthy) and more discrepancy on 5 (ate less). Compared with renters, homeowners and mortgagees showed less discrepancy on 4 (skip meal) and 8 (whole day). Living in urban areas was associated with less discrepancy on 1 (worry) and 2 (eat healthy) but more discrepancy on 4 (skip meal). Again, confirming the descriptive statistics from Table 1, there was no significant discrepancy by the numbers of children.

To examine the “depth” of discrepancy, we now consider a model for the number of items on which couples differed (Table 4). Again, we limit the sample to couples for whom at least one respondent reported insecurity on at least one measure. Increasing female age was associated with discrepancy on fewer items. This is consistent with results in Table 4 that show on most measures the odds of discrepancy with increasing female age were less than 1 (although many of those results were not statistically significant (imprecisely measured)). However, male's age had the opposite association. The extent of discrepancy was also lower if males had higher education or if the couple were homeowners and higher if the male was born in Australia or the female had a disability.

We then considered “who said yes” in each discrepancy using binary logit models (Table A1 in appendix). In each case, the dependent variable was coded 0 for male said

TABLE 3 Binary logit models of food insecurity unconditional discrepancies, population weighted[a].

	1		2		3		4		5		6		7		8	
Measure	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Female age	1.01	(0.85, 1.20)	1.11	(0.96, 1.28)	0.93	(0.81, 1.07)	0.97	(0.85, 1.12)	0.89	(0.77, 1.03)	0.73***	(0.59, 0.92)	0.89	(0.78, 1.02)	0.89	(0.76, 1.03)
	0.98***	(0.97, 0.99)	0.99*	(0.98, 1.00)	0.99	(0.98, 1.00)	0.99	(0.98, 1.01)	1	(0.99, 1.01)	0.96***	(0.94, 0.98)	0.99**	(0.97, 1.00)	0.99	(0.98, 1.01)
Female age squared	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1.00**	(1.00, 1.01)	1	(1.00, 1.00)	1	(1.00, 1.00)
	1.00***	(1.00, 1.00)	1.00*	(1.00, 1.00)	1.00*	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1.00***	(1.00, 1.00)	1.00**	(1.00, 1.00)	1	(1.00, 1.00)
Male age	1.18*	(1.00, 1.39)	0.89	(0.77, 1.03)	1.07	(0.92, 1.25)	1.06	(0.91, 1.23)	1.1	(0.95, 1.27)	1.39***	(1.12, 1.71)	1.1	(0.95, 1.28)	1.14	(0.96, 1.35)
	0.98**	(0.97, 1.00)	0.99**	(0.98, 1.00)	0.99	(0.98, 1.00)	0.99	(0.98, 1.01)	1	(0.99, 1.01)	0.97***	(0.95, 0.98)	0.99*	(0.98, 1.00)	1	(0.99, 1.01)
Male age squared	1.00*	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1.00***	(0.99, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)
	1.00***	(1.00, 1.00)	1.00**	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1.00***	(1.00, 1.00)	1.00*	(1.00, 1.00)	1	(1.00, 1.00)
Female employed	1.12	(0.68, 1.85)	1.01	(0.67, 1.54)	1.21	(0.76, 1.95)	0.82	(0.49, 1.37)	0.99	(0.63, 1.56)	0.8	(0.43, 1.46)	0.75	(0.45, 1.26)	0.86	(0.49, 1.52)
	1.15	(0.71, 1.84)	1.14	(0.78, 1.65)	1.24	(0.84, 1.84)	0.74	(0.47, 1.17)	1.14	(0.71, 1.82)	0.89	(0.51, 1.56)	1	(0.64, 1.55)	0.75	(0.47, 1.21)
Male employed	0.99	(0.58, 1.72)	1.47*	(0.94, 2.31)	1.62**	(1.03, 2.56)	0.75	(0.44, 1.29)	0.91	(0.55, 1.51)	0.98	(0.57, 1.68)	0.72	(0.44, 1.17)	0.53**	(0.32, 0.90)
	1.17	(0.73, 1.86)	1.38*	(0.95, 2.00)	1.54**	(1.06, 2.24)	0.8	(0.50, 1.27)	1.07	(0.67, 1.72)	1.25	(0.72, 2.16)	0.98	(0.62, 1.54)	0.63**	(0.39, 1.00)
Female further education	1.13	(0.72, 1.77)	0.84	(0.52, 1.36)	1.15	(0.76, 1.74)	1.11	(0.67, 1.83)	1.79**	(1.10, 2.91)	1.06	(0.59, 1.92)	1.51*	(0.97, 2.33)	1.08	(0.63, 1.84)
	1.39	(0.88, 2.20)	0.73	(0.48, 1.12)	1.17	(0.80, 1.71)	1.13	(0.74, 1.72)	1.86**	(1.14, 3.04)	1.19	(0.63, 2.25)	1.22	(0.81, 1.84)	1	(0.61, 1.65)
Female higher education	0.95	(0.48, 1.87)	1.58*	(0.92, 2.70)	1.21	(0.70, 2.07)	1.12	(0.58, 2.14)	1.03	(0.56, 1.89)	1.03	(0.45, 2.37)	2.00**	(1.02, 3.91)	1.22	(0.60, 2.49)
	0.72	(0.39, 1.34)	1.41	(0.89, 2.23)	1.04	(0.66, 1.65)	0.68	(0.41, 1.13)	0.64	(0.38, 1.09)	0.65	(0.34, 1.24)	1.04	(0.60, 1.80)	0.82	(0.45, 1.49)
Male further education	0.56**	(0.32, 0.96)	0.72	(0.46, 1.14)	1.28	(0.79, 2.07)	2.21***	(1.30, 3.78)	0.82	(0.53, 1.27)	0.67	(0.36, 1.24)	1.2	(0.68, 2.11)	1.5	(0.86, 2.60)
	0.91	(0.55, 1.51)	0.84	(0.55, 1.28)	1.34	(0.87, 2.08)	2.59***	(1.65, 4.05)	1	(0.65, 1.53)	0.91	(0.48, 1.70)	1.59*	(0.98, 2.58)	1.50*	(0.95, 2.35)
Male higher education	0.34**	(0.15, 0.79)	0.63	(0.35, 1.15)	0.86	(0.43, 1.73)	0.59	(0.26, 1.35)	0.40**	(0.18, 0.90)	0.37*	(0.12, 1.11)	0.27***	(0.10, 0.72)	0.81	(0.37, 1.80)
	0.46**	(0.25, 0.84)	0.87	(0.53, 1.42)	0.8	(0.47, 1.36)	0.34***	(0.17, 0.68)	0.48**	(0.26, 0.87)	0.42*	(0.16, 1.09)	0.34***	(0.17, 0.67)	0.6	(0.31, 1.15)
Number of children	1.07	(0.85, 1.36)	1.06	(0.88, 1.27)	1.02	(0.82, 1.27)	1.08	(0.89, 1.31)	1.09	(0.88, 1.35)	0.97	(0.71, 1.33)	1	(0.81, 1.24)	0.91	(0.72, 1.16)
	1.21*	(0.97, 1.50)	1.11	(0.94, 1.30)	1.02	(0.85, 1.23)	1.05	(0.89, 1.24)	1.1	(0.84, 1.42)	1.25	(0.88, 1.76)	1.07	(0.90, 1.26)	0.92	(0.75, 1.14)
Female Australian born	0.59**	(0.37, 0.95)	1.25	(0.76, 2.08)	0.8	(0.50, 1.30)	0.71	(0.38, 1.33)	0.69	(0.42, 1.15)	1.09	(0.52, 2.28)	0.58**	(0.34, 0.98)	0.74	(0.38, 1.43)
	1.04	(0.59, 1.84)	1.15	(0.72, 1.86)	1.09	(0.69, 1.73)	1.63*	(0.94, 2.81)	0.76	(0.43, 1.35)	1.4	(0.63, 3.11)	0.92	(0.55, 1.54)	1.31	(0.71, 2.40)

(Continues)

TABLE 3 (Continued)

	1		2		3		4		5		6		7		8	
Measure	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Male Australian born	2.13**	(1.19, 3.84)	1.26	(0.76, 2.09)	1.56*	(0.98, 2.48)	2.30**	(1.17, 4.51)	0.83	(0.52, 1.33)	0.73	(0.37, 1.45)	1.41	(0.81, 2.44)	1.34	(0.69, 2.60)
	*1.86**	*(0.93, 3.74)*	*1.13*	*(0.70, 1.83)*	*1.51**	*(0.95, 2.39)*	*2.66****	*(1.44, 4.92)*	*0.83*	*(0.46, 1.50)*	*1.24*	*(0.58, 2.64)*	*1.35*	*(0.76, 2.38)*	*1.70**	*(0.92, 3.15)*
Female disability	1.43	(0.87, 2.35)	0.81	(0.53, 1.24)	1.41	(0.90, 2.22)	1.33	(0.83, 2.14)	1.23	(0.79, 1.89)	1.47	(0.83, 2.62)	1.13	(0.70, 1.82)	1.47	(0.82, 2.62)
	1.18	*(0.73, 1.92)*	*0.73*	*(0.49, 1.07)*	*1.26*	*(0.84, 1.90)*	*1.4*	*(0.89, 2.20)*	*1.17*	*(0.73, 1.86)*	*1.17*	*(0.67, 2.05)*	*1.06*	*(0.69, 1.63)*	*1.60**	*(0.99, 2.58)*
Male disability	1.22	(0.70, 2.14)	0.85	(0.54, 1.33)	1.53*	(0.96, 2.43)	1.13	(0.70, 1.82)	1.24	(0.79, 1.93)	1.12	(0.65, 1.90)	0.98	(0.61, 1.55)	0.89	(0.51, 1.54)
	1.12	*(0.69, 1.82)*	*0.73*	*(0.50, 1.07)*	*1.25*	*(0.83, 1.87)*	*1.27*	*(0.81, 1.99)*	*1.18*	*(0.73, 1.89)*	*0.85*	*(0.49, 1.47)*	*0.95*	*(0.61, 1.48)*	*1.23*	*(0.76, 1.99)*
Log income	0.84	(0.50, 1.42)	0.74*	(0.52, 1.06)	1.24	(0.81, 1.91)	1.19	(0.74, 1.92)	1.56*	(0.97, 2.51)	0.85	(0.46, 1.55)	1.34	(0.79, 2.27)	1.18	(0.67, 2.08)
	0.99	*(0.69, 1.41)*	*0.94*	*(0.69, 1.28)*	*1.31*	*(0.94, 1.84)*	*0.95*	*(0.70, 1.31)*	*1.22*	*(0.84, 1.76)*	*0.88*	*(0.61, 1.27)*	*1.09*	*(0.76, 1.56)*	*0.88*	*(0.61, 1.27)*
Homeowner	0.69	(0.42, 1.15)	1.16	(0.75, 1.79)	0.71	(0.45, 1.11)	0.59**	(0.36, 0.98)	0.94	(0.58, 1.51)	0.92	(0.53, 1.60)	0.92	(0.54, 1.57)	0.55**	(0.30, 1.00)
	*0.64***	*(0.41, 0.99)*	*1.1*	*(0.76, 1.59)*	*0.75*	*(0.50, 1.14)*	*0.55****	*(0.36, 0.85)*	*0.97*	*(0.61, 1.53)*	*0.56**	*(0.31, 1.01)*	*0.88*	*(0.55, 1.40)*	*0.52***	*(0.32, 0.86)*
Urban	0.54*	(0.28, 1.03)	0.60*	(0.35, 1.04)	0.79	(0.42, 1.46)	1.85*	(0.94, 3.63)	0.81	(0.47, 1.42)	0.73	(0.35, 1.52)	0.84	(0.39, 1.78)	1.3	(0.66, 2.54)
	*0.54**	*(0.27, 1.08)*	*0.57**	*(0.32, 1.03)*	*0.87*	*(0.48, 1.59)*	*1.76*	*(0.88, 3.50)*	*0.76*	*(0.41, 1.40)*	*0.65*	*(0.24, 1.74)*	*0.82*	*(0.40, 1.71)*	*1.4*	*(0.69, 2.84)*
States	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Sample (couples)	686		685		683		684		684		672		685		648	
Population (couples)	779,492		779,161		777,366		779,507		779,315		767,515		780,557		735,445	

[a]Food insecurity measures: 1 You were worried you would not have enough food to eat; 2 You were unable to eat healthy and nutritious food; 3 You ate only a few kinds of foods; 4 You had to skip a meal; 5 You ate less than you thought you should; 6 Your household ran out of food; 7 You were hungry but did not eat; 8 You went without eating for a whole day. Dependent variables were unconditional discrepancy (1 = yes, 0 = no) among couples in which at least one respondent reported insecurity on at least one measure. Further education comprises certificates and non-school diplomas undertaken after completing high school. Higher education is any level of university education. Results in italics are unadjusted for any covariates. Adjusted results control for all covariates. Significance denoted as *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

yes and 1 for female said yes. Where there was discrepancy, the female was more likely to report food insecurity on item 1 (worry) if they had further education or had a disability. The male was more likely to report such food insecurity if they had further education or if the female in the couple was born in Australia. On item 2 (eat healthy), the female was more likely to report food insecurity if they were older, had increasing numbers of children or had a disability. The male was more likely be the one to report food insecurity if they were older or Australian born (as the partner). The female was more likely to report insecurity on item 3 (few foods) if they had further education or a disability. The male was more likely to report insecurity if they were older, if they had higher education, were Australian born, or if their female partner was employed or Australian born. Item 4 was skipping a meal and the only significant associations were with education and disability. The female member of the couple was more likely to be the one to report insecurity if they had further education or disability. The male was more likely to report insecurity if they were employed or had a disability. In terms of item 5 (ate less), the only significant association was between the female being the one to report insecurity and having a disability. On item 6 (ran out), an increasing number of children was associated with the male being the one to report food insecurity. The general lack of significance for this item is likely related to the smaller sample size as this item had the lowest rate of unconditional discrepancy. Item 7 was You were hungry but did not eat. Key factors associated with the female being the one to report insecurity were the female being employed and having a disability. Male reporting was associated with them being older, having higher education, being Australian born or having a disability. Higher household income was also associated with the male being the one to report insecurity on this measure. Factors associated with the female reporting insecurity on item 8 (whole day) were their age, having higher education and disability. The male was more likely to be the one to report insecurity if they were older, had higher education, had a disability or was a homeowner or if the female in the couple was employed.

3.4 | Limits on prevalence estimates

Our final piece of analysis measured the prevalence of food insecurity in all couple households for each item using different assumptions about discrepancy (Table A2 in appendix). By making different assumptions about the “truth” underlying the discrepancies, we estimated the minimum and maximum prevalence of food insecurity among all couple households. This analysis showed that if all discrepancies were for “truly” food-secure households, prevalence ranged from 0.53% to 2.28%. If we adopted the reverse and assumed all discrepancies were for “truly” food-insecure households, prevalence ranged from 2.65% to 9.3%. In many household surveys, a single respondent is chosen to answer the questionnaire. Assuming this selection was random within the couple, we estimated the prevalence of food insecurity on that basis. Our results showed prevalence based on this measure ranged from 1.95% to 6.78%.

4 | DISCUSSION

Our analysis showed females were more likely than males to report food insecurity on all items apart from not eating for a whole day. Some of the key characteristics associated with discrepancy were female's and male's age, female education, females being born in Australia, renting and male's employment. Income, living in urban areas and male's education and birthplace had mixed results. Taking the number of items as a measure of the depth of discrepancy, we found male's age and birthplace (born in Australia) associated with greater depth of discrepancy and male's higher education and being a homeowner associated with lesser depth of

TABLE 4 Binomial model of the number of food insecurity discrepancies, population weighted[a].

Variable	Coef.	Variable	Coef.
Female age	−0.061*	Number of children	0.035
	(0.035)		(0.055)
Female age squared	0.001	Female Australian born	−0.206
	(0.0004)		(0.138)
Male age	0.070*	Male Australian born	0.257**
	(0.036)		(0.113)
Male age squared	−0.001**	Female disability	0.178*
	(0.0004)		(0.098)
Female employed	−0.028	Male disability	0.090
	(0.116)		(0.099)
Male employed	−0.003	Log income	0.076
	(0.113)		(0.093)
Female further education	0.136	Homeowner	−0.182*
	(0.106)		(0.097)
Female higher education	0.190	Urban	−0.175
	(0.125)		(0.134)
Male further education	−0.009	Constant	−1.717*
	(0.101)		(0.969)
Male higher education	−0.586***	States	Yes
	(0.149)	Observations	715
		Population	786, 712

[a]Dependent variable was the number of unconditional discrepancies (1 = yes, 0 = no) among couples in which at least one respondent reported insecurity on at least one measure. Further education comprises certificates and non-school diplomas undertaken after completing high school. Higher education is any level of university education. Standard errors are shown below each coefficient. The results are adjusted for the effects of all variables in the model. Significance denoted as $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

discrepancy. Among couples who differed, the female was more likely to report the insecurity if they were older or had more education than high school, their male partner was younger or had more education than high school, if the female had a disability or their male partner did not. Being Australian born was associated with females being less likely to be the one reporting food insecurity but only on some aspects of insecurity. Employment and numbers of children had mixed results.

Foster et al. (2020) studied inter-rater reliability (another measure of discrepancy) using the 18-item Household Food Security Survey Module for cohabiting mothers and fathers in the United States. Among the comparable eight items we used in HILDA, they found items 1 (worry not enough food to eat), 5 (ate less than you thought you should) and 6 (ran out of food) were all inconsistent (unreliable) between parents. However, 56% of our sample had no children (whereas the sample in Foster et al. (2020) all had children). For these three comparable items, there was more discrepancy among those with children compared to those without and this may explain why our discrepancy rates are not the highest for these three measures of food insecurity.

Where there was discrepancy, there may be several explanations. There may be "true" discrepancies due to different experiences. In these instances, although the partners differed, their interpretation of events was accurate. This arises because the food insecurity questions in HILDA relate to individual experiences: almost every question is phrased as "you" rather than "your household". This can give rise to discrepancy where, for example, the respondent was making a sacrifice in order for others in the household to receive enough food (this could also be termed ignorance by others). The only question relating to the household was in terms of running out of food. Again, there could have been different experiences if the time without food was very short (1 day, perhaps) and one partner concealed the event from the other.

There may also be "false" discrepancies, where one partner was factually incorrect in their response. This type of discrepancy could arise in several ways. Breunig et al. (2007) explain that there could be false positives or false negatives for a number of reasons. False positives could arise if one individual recalled an earlier event of food insecurity prior to the time frame nominated in the questionnaire. Ongoing monetary problems might be one reason for this. Individuals may also ignore or misinterpret the introductory conditioning statement ("…because of a lack of money…") and have, say, only gone without food due to being on a voluntary diet. Responses to these food insecurity questions may also be related to another event that was seen as a close substitute for food insecurity, such as being unable to heat the home—a problem relating to the "energy or food" decision (Fry et al., 2023). Perhaps food insecurity was viewed by some individuals as equivalent to being unable to pay bills. False negatives could arise if one individual recalled an event of food insecurity but attributed it to another time outside that nominated in the questionnaire. This could occur if the experience was some time ago and the individual now feels back in control of their finances. An individual could have forgotten the experience if there were no other consequences or recalled the experience but rationalised it as not significant enough to report (e.g., they did not feel pressured to ask for help from welfare organisations). Finally, a false negative could arise if the individual felt the stigma associated with food insecurity.

Notwithstanding "truth" or "falsity" of discrepancies, in the context of our eight items of food insecurity, a predisposition to worrying, earlier experiences of food insecurity or differences in health literacy (affecting interpretations of food variety and food quality) may also lead individuals in the same objective circumstances to report some types of food insecurity more than other types of food insecurity. Differences in mealtime routines may also mean that the severity of running out of food is interpreted in different ways, as some couples may be able to make other arrangements such as having meals with their extended family.

Underlying discrepancies is the notion that one response represents the "truth" of the situation. We estimated food insecurity prevalence assuming two extremes within-couple households: All discrepancies were truly food-secure versus all discrepancies were truly food insecure. This gave a range for prevalence estimates that varied by up to 7.4 percentage points. This shows the importance of correctly identifying food insecurity in household surveys to estimate prevalence. As many household surveys of food insecurity randomly select an adult respondent, discrepancies in couple households may result in measurement error. Our analysis showed using a random respondent led to prevalence estimates at the upper end of the possible range.

Discrepancies can reduce the accuracy of measures of the prevalence of food insecurity. Accurate measurement of food insecurity provides a clear picture of the nature and extent of the problem and is essential for effective health promotion strategies. There are many health promotion implications for correctly measuring food insecurity. Correspondence on food insecurity within households can lead to more accurate data, which allows public health practitioners to identify populations and areas with higher levels of food insecurity. This enables the design of interventions that are tailored to the specific needs of different groups, ensuring that resources are allocated where they are most needed. Proper measurement allows for efficient allocation of resources, including food assistance programmes, nutritional education and community outreach. Public health practitioners who understand the scope of food insecurity can ensure interventions assist those who are most vulnerable.

Accurate data also enable public health practitioners to assess intervention effectiveness over time: Practitioners can determine whether strategies are making a meaningful impact and adjust approaches accordingly by comparing food insecurity prevalence before and after interventions. Understanding the correlates of food insecurity through analysis of accurate data can guide the development of prevention strategies. Accurate data allow public health practitioners to offer appropriate support services, such as financial counselling for those experiencing mild food insecurity or food assistance for those with severe food insecurity. Public health practitioners can also use these data to raise awareness about the problem and push for policies that address the systemic causes of food insecurity at local, regional and national levels. Accurate data on food insecurity facilitates collaboration between healthcare providers, community organisations, researchers and policymakers to aid the development of comprehensive strategies that tackle food insecurity from different perspectives. Finally, public health practitioners can use accurate data to assist in long-term health improvement strategies in communities, reducing the risk of health problems associated with inadequate access to food, such as malnutrition, chronic diseases and mental health issues.

There are several examples of where data have informed policies to alleviate food insecurity. Such data are also used in ongoing evaluations. For example, the United States Department of Agriculture Supplemental Nutritional Assistance Program targets low-income families and supplements their food budget by providing food benefits. Data on food insecurity are regularly collected to evaluate the programme (Coleman-Jensen et al., 2022). The Brazilian Cash Transfer Program was introduced in 2003 and is designed to promote food security and is regularly evaluated in the academic literature (Neves et al., 2022). Ethiopia has the Productive Safety Net Program that was introduced in 2002 and was based on a government food security strategy. This programme's impact on food insecurity is regularly studied (Tadesse & Gebremedhin Zeleke, 2022). The United Nations World Food Program (https://www.wfp.org/food-assistance) was established in 1961 and regularly evaluates its own food insecurity interventions including cash transfer programmes and food aid. India's National Food Security Act has a targeted public distribution system that provides highly subsidised food grains to the majority of the population to alleviate food insecurity (Puri, 2022). Data are used for the distribution system to target recipients.

4.1 | Limitations

Despite our rigorous analysis, there remain several limitations to our study. Firstly, our data only captured discrepancies with regard to personal (individual) food insecurity, which may genuinely differ within a household. However, household food insecurity assesses the collective experience of a group, capturing shared struggles within, in our case, a couple. It would have been illuminating to investigate the extent to which personal and household food insecurity align and to consider objective measures of food insecurity. Secondly, the questions in HILDA only relate to food insecurity arising from a lack of financial resources. It would be interesting to assess the nature and extent of discrepancies in food insecurity arising from non-monetary reasons for food insecurity, such as a lack of access to adequate food or having a limited range of food available. Thirdly, our sample was relatively small partly due to food insecurity being relatively uncommon in the Australian population and item non-response among those surveyed. This small sample (and limited coverage of some groups in HILDA) precluded analysis of minority groups such as couples from particular ethnic backgrounds, Indigenous Australians, same-sex couples, and of couples in unstable accommodation or who were homeless. Without sufficient data, we are unable to determine whether and by how much discrepancy rates differ for these groups relative to the general population of couples. Fourthly, collecting data on these metrics hinders the exploration of whether discrepancy correlates with the frequency of food insecurity problems, making it difficult to determine whether food insecurity is a one-off episode, which may go unnoticed in the assessment of food insecurity, whereas recurring issues are less likely to be missed by one person.

Finally, there are several variables in HILDA that could shed some light on proposed explanations for discrepancy. For example, time use variables and responsibility for paying household bills could indicate the degree of specialisation in household tasks like cooking and shopping and therefore not knowing about food insecurity in the household. Managing day-to-day spending and paying bills could coincide with responsibility for food shopping expenditure. Feeling on top of day-to-day finances, being comfortable with current levels of spending and (not) seeking help from welfare or community organisations could also explain some false negatives. However, a full investigation of these mechanisms is not possible in the current context as the sample is already small and some of these variables have relatively large item non-response that would further limit the sample.

5 | CONCLUSION

This paper examined discrepancy within Australian couple households relating to food insecurity using large, nationally representative data for Australia. Food insecurity is relatively rare in Australia, so the analytical sample was relatively small (about 3% of the adult population). Food insecurity is therefore an important problem for society and monitoring prevalence is critical. However, most surveys do not question more than a representative adult (perhaps a household head) and therefore any discrepancy may hide some food insecurity. More evidence on food insecurity will come from a future release of Australia's 2020–21 National Health Survey. In that survey, for each household, one adult and one child were selected as survey respondents. However, within-household discrepancy may mean those results fail to fully capture the nature and extent of food insecurity in Australia, rendering inferences about this problem less reliable.

Future research on food insecurity should focus on investigating the role of each individual in the household in relation to food acquisition, preparation and consumption as well as their perceptions of food insecurity. Additional data collection could shed more light on relative contributions of different mechanisms leading to discrepancy in terms of distinguishing real discrepancies (actual experiences) from false positives and false negatives to determine "who is right". This would allow researchers and policymakers to adjust food insecurity prevalence estimates from survey data by respondent gender when only one individual is surveyed.

AUTHOR CONTRIBUTIONS

Jane M. Fry: Conceptualization; data curation; formal analysis; methodology; project administration; writing – original draft; writing – review and editing; software. **Jeromey B. Temple:** Conceptualization; methodology; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have nothing to declare.

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ENDNOTES

[1] Discrepancy was defined as a difference in responses given both individuals in the couple had responded to the same question. Our analysis showed if we had included couples for whom one person did not answer the question and represented a missing value as a discrepancy, less than 0.5% of the population would have been added and our unconditional and conditional discrepancy rates would have been less than 0.5 ppt higher.

[2] To investigate whether differences in education levels rather than individual levels might be important in explaining discrepancies, we used an interaction term for male and female education. However, among all of the interaction terms, only one coefficient for different levels of education was significant, indicating it is the levels of each partner's education rather than the difference that matters for discrepancies.

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APPENDIX

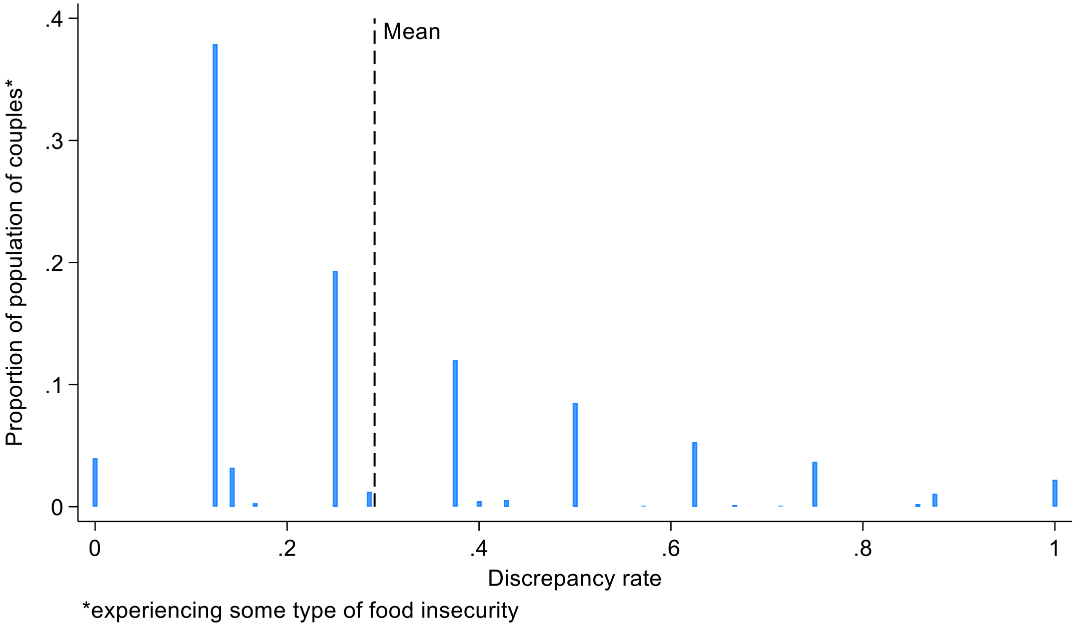

FIGURE A1 Food insecurity discrepancy rates, population weighted†. † 93% of respondents answered all 8 food insecurity questions; discrepancy rates were calculated as the number of measures on which couples differed relative to the number of questions answered by both respondents; 0 represented total correspondence, 1 represented total discrepancy; population weighted. $N = 788{,}734$ couples.

TABLE A1 Binary logit models of food insecurity discrepancies among couples who differed, population weighted[a].

	1		2		3		4		5		6		7		8	
Measure	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Female age	1.19	(0.83, 1.72)	1.51***	(1.21, 1.88)	1.14	(0.89, 1.47)	1.23	(0.88, 1.72)	1.01	(0.82, 1.24)	1.17	(0.78, 1.77)	1.18	(0.95, 1.47)	1.38*	(0.98, 1.96)
	0.99	(0.97, 1.02)	1	(0.98, 1.01)	1	(0.98, 1.02)	1.01	(0.99, 1.03)	1	(0.98, 1.01)	1.01	(0.98, 1.03)	1	(0.98, 1.02)	1.01	(0.99, 1.02)
Female age squared	1	(0.99, 1.00)	1.00***	(0.99, 1.00)	1	(1.00, 1.00)	1	(0.99, 1.00)	1	(1.00, 1.00)	1	(0.99, 1.00)	1.00**	(1.00, 1.00)	1.00**	(0.99, 1.00)
	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)
Male age	0.87	(0.61, 1.23)	0.67***	(0.53,0.85)	0.82*	(0.65, 1.03)	0.92	(0.66, 1.30)	0.95	(0.74, 1.23)	0.87	(0.54, 1.38)	0.77*	(0.59, 1.02)	0.60***	(0.41,0.86)
	1	(0.98, 1.02)	1	(0.98, 1.01)	1	(0.98, 1.01)	1.02**	(1.00, 1.04)	1	(0.99, 1.02)	1	(0.98, 1.03)	1	(0.99, 1.02)	1.01	(0.99, 1.03)
Male age squared	1	(1.00, 1.01)	1.00***	(1.00, 1.01)	1.00*	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.01)	1.00**	(1.00, 1.01)	1.01***	(1.00, 1.01)
	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1.00*	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)	1	(1.00, 1.00)
Female employed	0.77	(0.36, 1.64)	0.72	(0.35, 1.46)	0.56*	(0.30, 1.02)	1.37	(0.63, 2.97)	1.66	(0.79, 3.50)	0.86	(0.34, 2.21)	2.55**	(1.16, 5.60)	0.41**	(0.19,0.89)
	0.99	(0.51, 1.91)	0.85	(0.47, 1.53)	0.72	(0.42, 1.25)	0.75	(0.39, 1.46)	1.22	(0.66, 2.28)	0.94	(0.37, 2.37)	1.09	(0.67, 1.77)	0.46*	(0.21, 1.03)
Male employed	1.14	(0.39, 3.35)	0.79	(0.37, 1.68)	1.03	(0.56, 1.89)	0.23**	(0.07,0.71)	0.94	(0.41, 2.16)	0.44	(0.12, 1.65)	0.98	(0.35, 2.74)	2.04	(0.74, 5.61)
	1.55	(0.82, 2.92)	0.97	(0.56, 1.71)	1.16	(0.67, 2.02)	0.42**	(0.19,0.95)	1.09	(0.55, 2.19)	0.68	(0.29, 1.60)	1.01	(0.56, 1.80)	1.14	(0.59, 2.18)
Female further education	2.92***	(1.36, 6.30)	1.68	(0.90, 3.16)	2.56***	(1.28, 5.14)	2.66**	(1.02, 6.95)	1.33	(0.55, 3.23)	1.03	(0.33, 3.23)	1.52	(0.65, 3.52)	1.02	(0.36, 2.86)
	2.46**	(1.20, 5.04)	1.18	(0.62, 2.27)	1.69*	(0.92, 3.12)	2.35**	(1.03, 5.39)	1.75	(0.86, 3.58)	1.9	(0.69, 5.27)	1.67	(0.82, 3.42)	0.96	(0.43, 2.13)
Female higher education	1.06	(0.43, 2.64)	1.76	(0.86, 3.59)	1.93	(0.88,4.23)	0.73	(0.28, 1.92)	0.52	(0.18, 1.54)	0.49	(0.11, 2.26)	0.83	(0.29, 2.38)	3.11*	(0.90, 10.74)
	0.75	(0.37, 1.53)	1.11	(0.52, 2.37)	0.93	(0.51, 1.69)	0.40**	(0.20,0.80)	0.36***	(0.19,0.68)	0.61	(0.23, 1.61)	0.43***	(0.24,0.77)	1.01	(0.37, 2.73)
Male further education	0.50**	(0.25,0.99)	0.82	(0.45, 1.48)	1.06	(0.58, 1.92)	1.37	(0.64, 2.94)	0.99	(0.45, 2.16)	0.8	(0.20, 3.18)	1.29	(0.63, 2.63)	1.03	(0.44, 2.41)
	0.50**	(0.26,0.94)	0.85	(0.46, 1.57)	0.96	(0.55, 1.69)	1.15	(0.64, 2.07)	1.09	(0.62, 1.91)	0.55	(0.21, 1.48)	1.56	(0.86, 2.81)	1.08	(0.55, 2.12)
Male higher education	0.55	(0.14, 2.14)	0.46	(0.18, 1.18)	0.38**	(0.15,0.96)	0.75	(0.16, 3.44)	0.86	(0.24, 3.01)	1.06	(0.15, 7.35)	0.25**	(0.07,0.93)	0.15**	(0.03,0.82)
	0.49	(0.20, 1.24)	0.6	(0.26, 1.36)	0.62	(0.29, 1.34)	0.54	(0.20, 1.51)	0.48	(0.19, 1.22)	1.38	(0.29, 6.56)	0.24***	(0.11,0.54)	0.42	(0.13, 1.36)
Number of children	0.87	(0.63, 1.20)	1.35**	(1.01, 1.80)	1.12	(0.85, 1.47)	1.03	(0.73, 1.46)	1.16	(0.87, 1.56)	0.57**	(0.35,0.95)	1.24	(0.85, 1.81)	0.97	(0.59, 1.59)
	0.93	(0.66, 1.31)	1.24*	(0.99, 1.56)	1.12	(0.84, 1.51)	0.89	(0.68, 1.18)	1.11	(0.77, 1.59)	1.07	(0.65, 1.74)	1	(0.75, 1.32)	0.85	(0.63, 1.16)

(Continues)

TABLE A1 (Continued)

	1		2		3		4		5		6		7		8	
Measure	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Female	0.39*	(0.15, 1.01)	0.94	(0.50, 1.78)	0.55*	(0.28, 1.08)	0.55	(0.20, 1.49)	1.04	(0.42, 2.57)	0.63	(0.13, 3.00)	1.09	(0.49, 2.43)	1.33	(0.48, 3.71)
Australian born	*0.29****	*(0.14,0.61)*	*0.66*	*(0.33, 1.33)*	*0.56**	*(0.29, 1.05)*	*0.78*	*(0.35, 1.76)*	*0.9*	*(0.42, 1.92)*	*0.43*	*(0.12, 1.56)*	*1.22*	*(0.66, 2.26)*	*1.67*	*(0.66,4.18)*
Male	0.4	(0.13, 1.22)	0.47**	(0.23,0.97)	0.50*	(0.23, 1.07)	0.75	(0.25, 2.23)	0.59	(0.26, 1.37)	0.35	(0.08, 1.62)	0.44*	(0.18, 1.04)	1.11	(0.30,4.12)
Australian born	*0.21****	*(0.09,0.49)*	*0.52**	*(0.25, 1.07)*	*0.55**	*(0.27, 1.10)*	*0.71*	*(0.27, 1.87)*	*0.84*	*(0.40, 1.79)*	*0.68*	*(0.20, 2.33)*	*0.8*	*(0.43, 1.48)*	*1.38*	*(0.50, 3.84)*
Female disability	2.41**	(1.13, 5.15)	3.02***	(1.59, 5.75)	2.89***	(1.48, 5.62)	5.11***	(2.09, 12.49)	5.38***	(2.14, 13.48)	1.11	(0.37, 3.35)	5.08***	(2.44, 10.59)	3.04**	(1.20, 7.69)
	1.66	*(0.82, 3.35)*	*1.72**	*(0.98, 3.00)*	*1.93***	*(1.06, 3.51)*	*2.24***	*(1.15, 4.40)*	*3.02****	*(1.50, 6.10)*	*1*	*(0.41, 2.41)*	*2.68****	*(1.39, 5.17)*	*2.50***	*(1.14, 5.48)*
Male disability	0.79	(0.35, 1.79)	0.72	(0.36, 1.44)	0.81	(0.37, 1.77)	0.30**	(0.11,0.84)	0.79	(0.32, 1.92)	0.78	(0.20, 3.01)	0.52*	(0.26, 1.04)	0.16***	(0.05,0.48)
	0.98	*(0.55, 1.73)*	*0.85*	*(0.49, 1.47)*	*0.92*	*(0.49, 1.72)*	*1.29*	*(0.66, 2.53)*	*1.06*	*(0.55, 2.05)*	*1.07*	*(0.46, 2.45)*	*0.77*	*(0.44, 1.36)*	*0.65*	*(0.32, 1.30)*
Log income	0.86	(0.34, 2.18)	1.18	(0.71, 1.95)	0.93	(0.47, 1.86)	0.63	(0.27, 1.46)	1.12	(0.67, 1.86)	0.91	(0.25, 3.33)	0.40**	(0.20,0.80)	0.55	(0.21, 1.46)
	0.87	*(0.56, 1.35)*	*0.88*	*(0.57, 1.36)*	*0.92*	*(0.52, 1.64)*	*0.55*	*(0.23, 1.33)*	*1.12*	*(0.74, 1.68)*	*0.84*	*(0.55, 1.29)*	*0.71*	*(0.39, 1.27)*	*0.55*	*(0.25, 1.21)*
Homeowner	1	(0.45, 2.20)	0.93	(0.52, 1.69)	1.79	(0.88, 3.64)	0.72	(0.29, 1.77)	0.78	(0.38, 1.60)	2.42	(0.58, 10.12)	0.84	(0.37, 1.94)	0.43**	(0.19,0.96)
	1.12	*(0.55, 2.26)*	*0.95*	*(0.56, 1.61)*	*1.29*	*(0.70, 2.38)*	*0.71*	*(0.34, 1.49)*	*0.72*	*(0.38, 1.34)*	*1.41*	*(0.51, 3.91)*	*0.96*	*(0.54, 1.70)*	*0.58*	*(0.31, 1.12)*
Urban	0.63	(0.31, 1.29)	0.89	(0.41, 1.92)	0.98	(0.46, 2.08)	1.41	(0.63, 3.16)	1.27	(0.59, 2.73)	0.42	(0.08, 2.20)	1.01	(0.56, 1.81)	1.21	(0.49, 3.03)
	*0.47**	*(0.21, 1.05)*	*0.82*	*(0.33, 2.02)*	*0.71*	*(0.33, 1.53)*	*1.39*	*(0.65, 2.94)*	*1.47*	*(0.67, 3.22)*	*0.39*	*(0.10, 1.48)*	*1.99***	*(1.11, 3.58)*	*1.12*	*(0.51, 2.45)*
States	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Sample (couples)	202		314		310		151		231		106		184		126	
Population (couples)	231,628		372,378		353,971		150,964		262,955		107,100		195,202		119,504	

[a]Food insecurity measures: 1 You were worried you would not have enough food to eat; 2 You were unable to eat healthy and nutritious food; 3 You ate only a few kinds of foods; 4 You had to skip a meal; 5 You ate less than you thought you should; 6 Your household ran out of food; 7 You were hungry but did not eat; 8 You went without eating for a whole day. Dependent variables were conditional discrepancy among couples in which one respondent reported insecurity on that measure and the couple differed (food insecurity: 1 = female yes, 0 = male yes). Further education comprises certificates and non-school diplomas undertaken after completing high school. Higher education is any level of university education. Results in italics are unadjusted for any covariates. Adjusted results control for all covariates. Significance denoted as *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

TABLE A2 Estimated prevalence of food insecurity in all couple households under different assumptions about discrepancy, population weighted.

Question	Assuming all discrepancies are not food insecure %	Assuming all discrepancies are food insecure %	Assuming random respondent is correct in the assessment of food insecurity %
1. You were worried you would not have enough food to eat	1.23	5.81	4.18
2. You were unable to eat healthy and nutritious food	1.22	8.61	5.82
3. You ate only a few kinds of foods	2.28	9.30	6.78
4. You had to skip a meal	1.17	4.15	3.16
5. You ate less than you thought you should	1.26	6.44	4.65
6. Your household ran out of food	0.53	2.65	1.95
7. You were hungry but did not eat	0.91	4.75	3.03
8. You went without eating for a whole day.	0.72	3.25	2.21

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