

Comparability of household and individual food consumption data – evidence from Sweden

W Becker*

National Food Administration, PO Box 622, SE-751 26 Uppsala, Sweden

Abstract

Objective: Comparison of household and individual food consumption.

Design, setting and subjects: Combined household and individual food consumption survey carried out in Sweden in 1989. A random sample of 3000 subjects aged 0–74 years, the household to which the subject belonged constituted the household unit. Each household recorded all the foods it purchased over a 4-week period, except food eaten outside the home. For the selected subject, excluding children <1 year old, food intake was obtained with a simplified 7-day record. Food consumption from the two data sets was compared for the whole sample and for one-person households, respectively.

Results: Reasonable agreement ($\pm 20\%$) was seen for many major foods including cereal products, milk, cheese, meat and meat products, and fish, and after correction for inedible part, fruit and vegetables. Purchases were lower for sweet bakery products, alcoholic beverages and potatoes, while the opposite was seen for oils and fats, cream and sugar. For one-person households the two data sets showed similar differences in consumption patterns between men and women. The gross differences observed can be explained by factors like home baking, eating out and recorded level of processing, e.g. as raw food including inedible part or as a prepared dish.

Conclusions: The results show reasonable agreement between purchased and eaten amounts for aggregated food groups but marked differences were seen for some important individual items. Household-based consumption data are useful for many purposes provided the limitations of the data are accounted for.

Keywords
Household budget surveys
Dietary surveys
Food consumption
Sweden

During 1989, Statistics Sweden in co-operation with the Swedish National Food Administration carried out a combined household and dietary survey of the Swedish population^{1–3}. The design of the study was similar to the traditional household expenditure surveys carried out in Sweden. Special features of this survey were that only foods were included, that both expenditures and amounts were recorded, and that the dietary intake of one household member was included. In this paper household food acquisition and food intake are compared.

Material and methods

A random sample of about 3000 subjects aged 0–74 years was drawn from the Swedish population register (Table 1). The household to which the subject belonged constituted the participating household unit. Each household was asked to record all the foods it purchased over a 4-week period. For food eaten outside the home only expenditures were recorded. The selected subject was asked to

record his or her food intake using a simplified 7-day record. Children below 1 year old were excluded.

The record book gives pre-printed alternatives (with quantity indications in household measures) for foods, meal components and an indication of where and when the meals are consumed. Using a portion guide with photographs, sizes of cooked food portions eaten at main meals could be estimated. The use of fat spreads on sandwiches was estimated with the help of an illustration shown in the introductory interview. Snacks and other between-meal eating occasions were recorded in household measures, number, etc., in the traditional way.

Food acquisition of the household was compared with the food consumption obtained by the 7-day record.

Results

About 2000 persons completed the study with a participation rate of 70%. Participation was lower in larger cities and surrounding areas than in rural areas, and

*Corresponding author: Email wulf.becker@slv.se

Table 1 Combined household budget and individual survey in Sweden, 1989

	Household survey	Individual survey module
Survey name	Hushållens livsmedelsutgifter 1989	Befolkningens kostvanor och näringsintag i Sverige 1989 (HULK)
Agency responsible	Statistics Sweden, Stockholm	National Food Administration, Uppsala
Data collection	13 consecutive sub-samples during 1 year	13 consecutive sub-samples during 1 year
Sampling frame	Population register	Population register
Sampling unit	Individual, then household	Individual
Net sample	2970 subjects, 0–74 years	2937 subjects, 1–74 years
Participation	2079 households (70%)	2047 subjects (70%)
Typology of data	Foods purchased and home produced, amounts and expenditures	Foods consumed
Survey method	Purchase record	Food record (partly pre-coded)
Duration	4 weeks	7 days
Foods outside home	Only expenditures for meals eaten outside the home	Yes
Number of food items	~400 (aggregated)	~1000
Number of food groups	18 main groups ~200 subgroups and individual food items	37 main groups 130 subgroups
Language	Swedish	Swedish
Coding	National	National
Published data	Ref. 3	Ref. 1

lower among younger and older households in comparison to mid-age households^{1,3}.

In a previous study⁴, the average household acquisition and individual consumption of 80 foods and food categories were compared with respect to the percentage of consumers (percentage eaters/buyers). Data were calculated for all households, irrespective of age (2.27 persons per household). Intake and purchase data for some foods are presented in Table 2. Purchase data refer to net weights but are not corrected for inedible parts. Higher intakes than purchases were seen for cakes and buns, bread (excluding crisp bread), rice, pasta, milk, potatoes, juice, sweet desserts and some beverages, while the opposite was seen for oils and fats, cream, vegetables, fruit and sugar. For rice, pasta, juices, soft drinks, tea and coffee, these differences can be explained by the addition of water during preparation. If that is compensated for,

the differences are rather small. For bread and sweet bakery products (buns, cakes, biscuits, etc.) differences are most likely due to home baking and eating out. Some of the purchased fat is used for cooking or as an ingredient of various dishes, and that amount is not recorded separately in the dietary record. The same applies to sugar and cream. The larger purchased amounts of fruit and vegetables are largely due to the inedible part being included in these figures.

Food acquisition and consumption was compared among one-person households (aged 18–64 years) for which both data sets were available. Data include 7-day records for 121 males and 118 females and purchase data for 109 males and 118 females. In Figs 1–5 purchased and consumed amounts for certain foods and food groups are presented for men and women separately. Since the individual food consumption data refer to edible food as

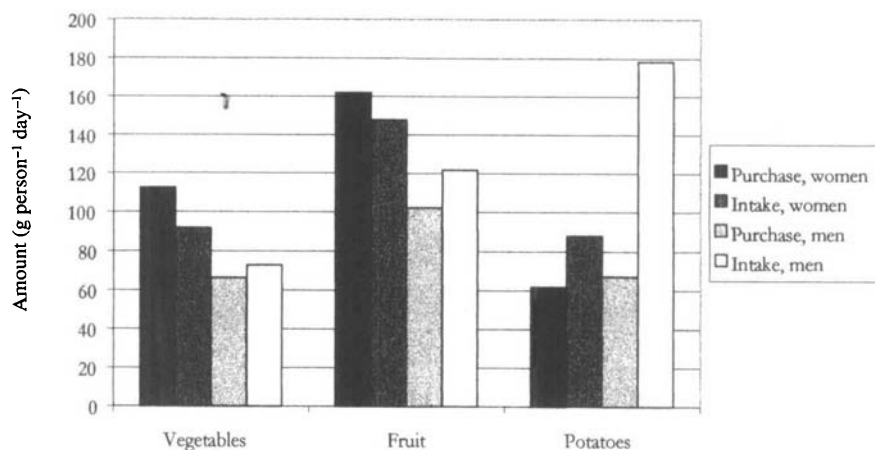


Fig. 1 Average amounts of vegetables, fruit and potatoes (g person⁻¹ day⁻¹) eaten and purchased by one-person households according to 7-day records or household diaries

Table 2 Average amounts of foods (g person⁻¹ day⁻¹) eaten and purchased according to 7-day record or household diary. All subjects and households

Food	7-day record (<i>I</i>) <i>n</i> = 2036	Purchase (<i>P</i>)* <i>n</i> = 2079	Difference [(<i>P</i> - <i>I</i>)/ <i>I</i>] (%)
Bread and cereals	263 (171)†	177	4
Sweet bakery products	42	15	-64
Bread, all types	93	75	-19
Pasta	17 (6)†	8	33
Rice	19 (7)†	7	0
Oils and fats	16	42	163
Butter	3	4	33
Table margarine	17	19	12
Cheese	37	34	-8
Milk	442	371	-16
Cultured milk	88	71	-19
Milk 0.5% fat	110	86	-22
Milk 1.5% fat	76	69	-9
Milk 3% fat	125	124	-1
Cream	3	15	400
Eggs	15	21	40 (23)‡
Meat and poultry	107	112	5
Beef (and dishes)	15	8	-47
Chicken (and dishes)	5	10	100
Liver patty	6	4	-33
Minced meat (and dishes)	21	12	-43
Pork (and dishes)	25	32	28
Sausage (and dishes)	24	23	-4
Fish and shellfish	30	32	7
Caviar, roe	2	2	0
Fish (and dishes)	21	22	5
Shellfish (and dishes)	8	5	-38
Vegetables, total	73	98	34 (21)‡
Carrots	9	12	33 (13)‡
Cucumber	6	10	100 (80)‡
Mushrooms	2	4	100
Lettuce and similar	10	10	0 (-10)‡
Tomatoes	19	16	-16
Fruit, berries, total	114	142	25 (0)‡
Apples	38	34	-11 (18)‡
Bananas	25	35	40 (12)‡
Berries	5	9	80
Citrus fruits	23	32	39 (-1)‡
Raisins	1	1	0
Fruit juice, nectars	64	19§	-70
Potatoes	137	111	-19 (-35)‡
Sugar and products	72	71	-1
Sweets	9	9	0
Honey	1	1	0
Ice cream	17	14	-18
Jam, marmalade	11	9	-18
Sugar	5	29	480
Sweet desserts	29	9	-69
Non-alcoholic beverages			
Coffee	348 (17)†	16	
Tea	102 (2)†	1	
Mineral water	24	7	-71
Soft drinks, syrups	136	63§	-
Alcoholic beverages	122	66	-46
Beer	99	53	-46
Spirits	4	2	-50
Wine	19	11	-42
Miscellaneous			
Potato crisps	1	1	
Almonds, nuts	1	3	
Ketchup	2	4	
Savoury snacks, excluding nuts	2	1	

* All data refer to net weight as purchased, i.e. no adjustments made for inedible parts, addition of water to concentrated or dry beverages.

† Values in brackets calculated as dry product (rice, pasta, porridge, tea, coffee) and as flour content in pizza, pancakes, etc.

‡ Values in brackets are percentage difference after adjustment for inedible part.

§ Includes ready-to-drink and concentrated products.

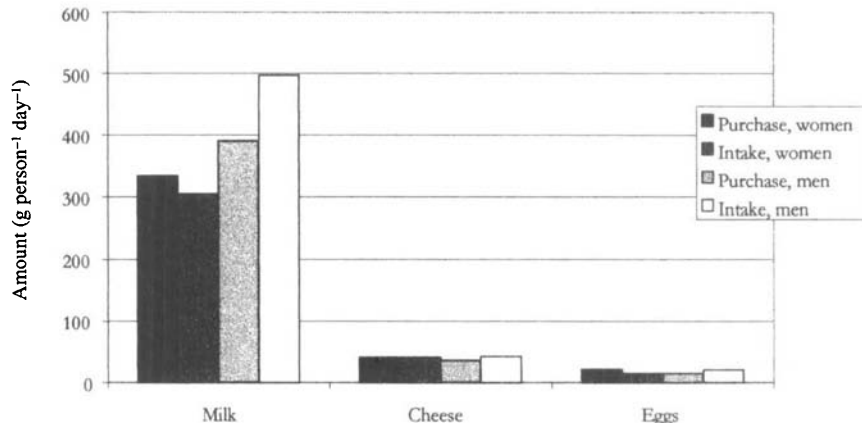


Fig. 2 Average amounts of milk, cheese and eggs ($\text{g person}^{-1} \text{day}^{-1}$) eaten and purchased by one-person households according to 7-day records or household diaries

eaten, some corrections of household acquisition data were made, e.g. for inedible parts of fruit, vegetables, potatoes and eggs.

There was generally good agreement with respect to gender for both data sets for foods like vegetables, fruit, fish, milk, cheese, bread, ice cream and sweets. Purchase and intake levels were also relatively similar, but consumption levels differed by more than 25–30% for potatoes, sweet bakery products, meat and sweets (men). The intake of potatoes was considerably higher than the purchased amounts, especially for men, which might be explained by a large part of the potato consumption occurring outside the home for this group. Men consumed more meat than they purchased which also could be explained by eating outside the home. The opposite was found for women. Home baking and eating outside the home could explain that the subjects ate more sweet bakery products than they bought. On the other hand, the purchase of sweets exceeded the reported intake for men, which could be an indication of underreporting of this food group.

Discussion

The results show that there was a reasonable agreement between purchased and eaten amounts for aggregated foods. The household data seem to underestimate the consumption of a number of foods including potatoes, sweet bakery products and alcoholic beverages, which can probably be explained by eating outside the home, a practice that is common among children (day-care centres, schools) and adults (lunch restaurants) in Sweden. For certain population groups who eat out frequently the differences could be substantial, as shown for the one-person households. For foods like fats and oils, sugar and cream, the dietary survey data indicated an apparent underestimation in comparison with the purchase data. Part of this apparent underestimation can be attributed to these foods appearing as part of other prepared foods such as dishes, sauces and bakery products.

There are a number of limitations and pitfalls involved in a comparison of household acquisition and individual

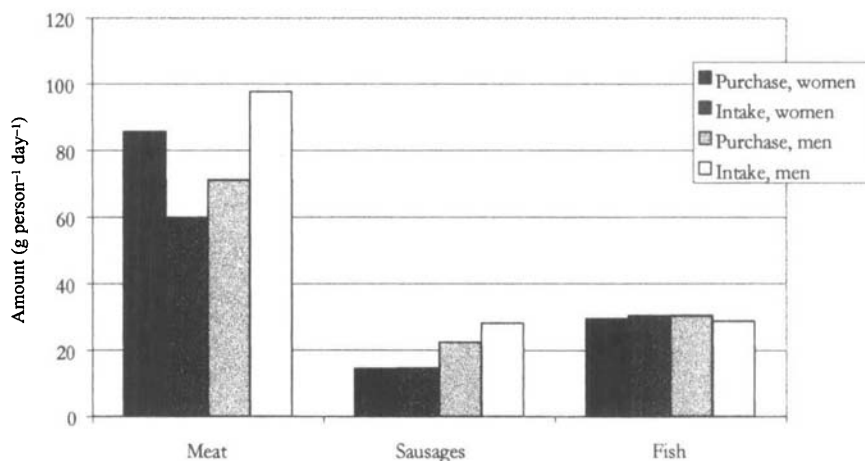


Fig. 3 Average amounts of meat, sausages and fish ($\text{g person}^{-1} \text{day}^{-1}$) eaten and purchased by one-person households according to 7-day records or household diaries

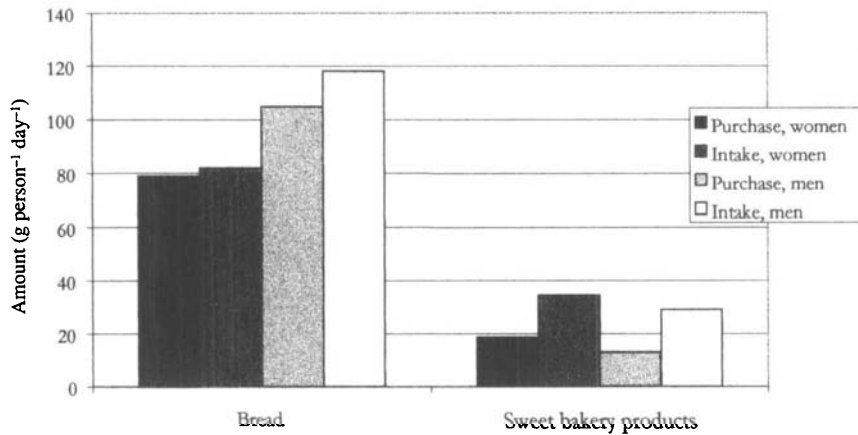


Fig. 4 Average amounts of bread and sweet bakery products (g person⁻¹ day⁻¹) eaten and purchased by one-person households according to 7-day records or household diaries

food consumption data. The household data refer to foods as purchased whereas individual data refer to foods as eaten. The household data thus refer to the raw or processed food entering the household, and any loss due to preparation (trimming, inedible parts), wastage of spoiled food or leftover food is not accounted for. The individual data refer to the ingested food in the form of prepared, cooked dishes, without inedible parts. In principle, the amounts of food brought into the household will generally exceed the amounts ingested. For some foods, however, consumption may exceed purchase due to addition of water. The differences in the data sets can be corrected for to some extent, but the degree of detail in both data sets is sometimes insufficient in this respect. In the Swedish survey, the degree of detail of the household data was less good for separating e.g. meat cuts with and without bone, and it was difficult to distinguish between ready-to-drink and concentrated fruit juice.

Foods eaten outside the home should receive special

attention. In Sweden, many people eat a prepared meal outside the home during weekdays and pre-school and school children are served at least one meal during weekdays. Such data were not included in the purchase record.

The degree of detail at the food level differs between the two data sets. The household data are in some instances more detailed than the individual data, since the purchase record was open while the individual record to a large extent was pre-coded. Although many food items that appear in the published household data are aggregated into broader categories, more detailed data can be obtained. The data are, however, not very detailed on processing.

Despite these limitations the analyses show that household purchase data can be a valuable tool for obtaining information on the food pattern of a population. Such data can then be used for estimations of the nutrient quality of the diet and of the exposure of contaminants, additives, etc. Household data can also

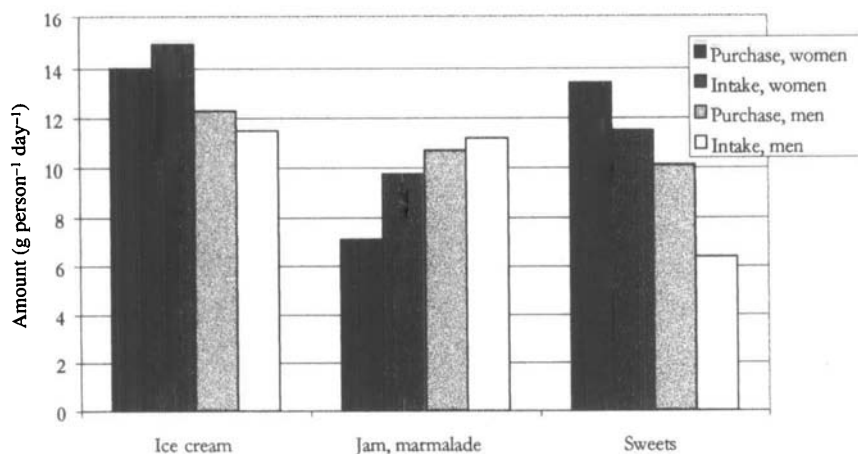


Fig. 5 Average amounts of ice cream, jam & marmalade and sweets (g person⁻¹ day⁻¹) eaten and purchased by one-person households according to 7-day records or household diaries

provide information that could be difficult to obtain in individual surveys, e.g. regarding meat cuts, types of edible fat, spices and condiments, as well as type of processing. Household data can also be used a calibration tool for other data sources on food consumption.

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