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Teenage Vegetarianism: Prevalence, Social and Cognitive Contexts

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The aim of this study was to measure the prevalence of teenage vegetarianism and associated food habits and beliefs. Two thousand senior secondary school students (mean age 16 years), from 52 schools in South Australia, participated in a two part survey. The findings show that teenage vegetarianism is primarily a female phenomenon, ranging in prevalence, according to definition, from 8 to 37% of women and 1 to 12% of men. Support for vegetarian practices was high especially from mothers (63%) and classmates (46%). Generally, "teenage vegetarians" consumed fewer red meats than non-vegetarians but ate more chicken. They cited health, animal welfare and environmental reasons in support of their habits. The importance of operational definitions of vegetarianism is emphasized and the findings are discussed in relation to likely motivational influences.

Introduction

Modern vegetarianism is an alternative eating pattern derived from the dominant meat-eating cultures of the West (Twigg, 1979). Characterized by the non-consumption of animal products, "vegetarianism" was so termed in 1847 by the British Vegetarian Society (Forward, 1898). While pursued for a variety of moral and metaphysical reasons before the nineteenth century, it was not until the early 1800s that vegetarianism was justified in terms of hypothesized nutritional superiority. The quick putrefaction of meat left out in the open was thought to indicate rottenness within the body and it was regarded as an inferior and unhealthy item of sustenance (Whorton, 1994). In the early 1900s, John Harvey Kellogg claimed that carnivorous habits not only involved animal cruelty but were associated with auto-intoxication diseases (Kellogg, 1919). They were blamed for a range of physical and psychological ailments ranging from depression to liver and kidney damage. This view of meat persists today, but rather than auto-intoxication, anti-meat advocates emphasize its cholesterol content and fattiness.

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Recent surveys of adult vegetarians (particularly Seventh-Day Adventists) have suggested that a vegetarian diet may convey definite health benefits (Chang-Claude *et al*., 1992; Fønnebø, 1994; Snowdon, 1988; White & Frank, 1994). Dwyer (1994), however, cautions against the quick acceptance of such conclusions by pointing out that lifestyles may also play an important role (as yet unknown) in morbidity. For example, vegetarians often refrain from tobacco and alcohol consumption and may lead less stressful lives. Nair and Mayberry (1994) also suggest that some characteristics of vegetarian diets, namely low fat and high fibre intakes, could (and should) be enjoyed by non-vegetarians.

Currently, there is an increasing trend towards vegetarianism in the Western world (e.g. Britain: Realeat Surveys, Note 2; Canada: The National Institute of Nutrition). Although health concerns are the most common reported reasons for practising vegetarianism (Dwyer *et al*., 1974; Dwyer, 1991; MORI, 1989), people may choose to become vegetarians for a variety of different philosophical, ecological and religious reasons (Dwyer, 1991). For example, several advocates argue that vegetarianism will help solve the world's environmental and starvation problems (Rifkin, 1992; Robbins, 1987).

Few studies of the prevalence of vegetarianism exist. The existing estimates tend to be unreliable and are hindered by the absence of operational definitions. Some studies have classified people as vegetarians according to their self-reported degree of meat abstention (Finley, Dewey, Lönnerdal & Grivetti, 1985; White & Frank, 1994) while others rely on responses to direct questions such as "Are you a vegetarian?" (Beardsworth & Keil, 1992; Wright & Howcroft, 1992).

Much has been written about adult vegetarianism and meat consumption—its health aspects and ethical links (Beardsworth & Keil, 1991; Dwyer, 1991; Richardson *et al*., 1994; Webster, 1994) and about meat perception and symbolism (Adams, 1990; Fiddes, 1991), but few studies have examined teenage vegetarianism. Most of these concern the health of adolescents, for example blood-iron levels (Nelson, Bakaliou & Trivedi, 1994); hormonal levels (Persky *et al*., 1992); height (Sabate *et al*., 1991) or blood pressure (Kuczmarski *et al*., 1994).

Despite a wealth of anecdotal reports, little is known about the prevalence of vegetarianism amongst teenagers, nor is much known about the kinds of foods that they consume. Beardsworth and Keil (1991) have suggested that, in the early stages of vegetarianism, foods perceived to be most "meat-like" (e.g. beef, then lamb, then pork, bacon and chicken) are consciously avoided. However, there is little empirical evidence to support this. In general, little is known about teenagers' dietary patterns.

Similarly, the cognitive and social contexts of "teenage vegetarianism" remain relatively unexamined. Wright and Howcroft (1992) are among the few who have investigated cognitive factors which may be associated with teenagers' adoption of a "vegetarian diet". They administered a lengthy questionnaire to 2255 British secondary students and compared their answers to an earlier sample of 942 adults. They found that many young people had considered becoming vegetarian, more for emotive reasons associated with animal welfare than for health reasons. About 8% of students and 7% of adults claimed to be vegetarian, although many of them ate some meat products.

Among possible social influences, family and peers might be expected to facilitate or inhibit the adoption of vegetarianism (Beardsworth & Keil, 1992; Freeland-Graves *et al*., 1986; Kerr & Charles, 1986). Again, little is known about the balance of support for and antagonism to vegetarian practices from close associates.

During 1994, the opportunity arose to examine the reported prevalence of "vegetarianism" among South Australian teenagers as part of a statewide survey of their food practices and social ideologies. In this paper we report on the prevalence of self-reported vegetarianism, its associated food consumption and its social and cognitive contexts. Some of the cognitive and ideological correlates of adolescent vegetarianism are described in another paper (Worsley & Skrzypiec, 1997).

Method

Prior Qualitative Studies

In the year preceding the quantitative study, interviews were conducted in several secondary schools among 16–18-year-old students. They were asked for their opinions about the butchering of animals for food and about eating meat. Generally the teenagers appeared to hold positive attitudes about meat products. The majority (particularly boys) felt that butchering was either humane or that it was necessary because of the nutritional value of meat. However, approximately half of the female interviewees said that rearing animals to be killed was "cruel" or "wrong" (because slaughter infringed animal rights). A large minority of women described red meat in unfavourable terms, such as "nauseating", "sick", "off", etc. Typically, teenage men said that they "loved" meat, whilst most teenage women just "liked" it. Further details of these qualitative studies are available from the authors.

Selection of Respondents for Quantitative Study

Students were selected from South Australian secondary schools which had been randomly selected according to the socio-economic characteristics of the regions in which they were located [classified according to postcode: Socio-Economic Indicators for Areas (SEISA); Australian Bureau of Statistics]. The Socio-Economic Status (SES) of these regions ranged from 1 (low) to 4 (high). The ratio of state (government run) schools selected in each of the four socio-economic clusters was based on the corresponding population ratio (figures obtained from South Australian Health Commission). Schools were then randomly selected from these clusters and approached for their participation (after approval from the Education Department had been obtained). Classes of Year 10 students (approximately 16 years of age) from each school took part in the survey. If a school was not willing to take part, another school within the same socio-economic classification was randomly selected. At least one private independent, co-educational or single-sex school (Catholic or another denomination) was also randomly selected within each cluster, so as to include respondents from these education systems. Students from both state and independent country schools were also sampled. The aim was to have an equal number of government and non-government school students so that suitable comparisons could be made between the systems (although 71% of senior South Australian students attend state schools). Over 2000 senior secondary school students, from 52 different schools, made up the stratified sample.

The Questionnaire

Items concerning the respondents' experiences of vegetarianism in the past and present, their views for and against it, and the support expected from others, were

included in a vegetarianism questionnaire (VEQ) which was based on Wright and Howcroft's (1992) instrument. Some of the questions (mainly associated with respondents' thoughts about becoming a vegetarian) were open ended, but the majority involved closed responses.

The VEQ was part of one of two booklets of questions which had been designed to examine media and ideological influences on young people's eating and dieting habits. A detailed description of the booklets is provided elsewhere (Worsley & Skrzypiec, 1997).

Self-reported vegetarianism was assessed by several questions in Booklet A (Table 1), but by one common question in both booklets: *Are you a vegetarian?* (Answers No, Semi, Yes) (Table 2). The respondents' experience of vegetarianism was assessed by a question in Booklet A, which asked them how long they had been vegetarians, if at all (Table 3).

The influence of family and peers was examined in two sections. One question asked about the numbers of vegetarians known to the respondent (Table 4). Another asked whether various members of the immediate household were vegetarian (Table 5). The second section asked "how much support would (or do) your family give you if you became (are) vegetarian" (Table 7).

Food consumption was assessed by a 36-item food-frequency inventory (Table 8). The items and response scales were selected from Baghurst's Food Frequency Questionnaire (Baghurst *et al.*, 1994). The responses were coded over a 2-month period and included Daily (coded as 60), Several times a week (40), Weekly (9), Fortnightly (5), Monthly (2) and Rarely or Never (1).

Finally, Wright and Howcroft's scales were adapted to examine the respondents' motivations for becoming or not becoming vegetarian (Table 9).

Procedure

The booklets were self-administered among all the classes of students. To minimize social desirability bias, students were instructed "not to talk to anyone or look onto anyone else's work—everyone is entitled to their privacy", and to "think about each question and answer as it applies to *you*". All respondents were assured that the survey was anonymous and that no-one at their school would see their answer booklet. To ensure anonymity students were asked to "place your questionnaire in the envelope (provided) and *seal it*". Two researchers were present in each classroom at all times to answer any questions and to ensure that the instructions were followed.

The booklets were inspected and any that had three or more pages of information missing, or had obvious patterns of responses that indicated questions had been answered without serious consideration, were omitted from the sample. The booklets were then coded and entered into computer files using the SPSS Data Entry II program.

Data Analysis

This extensive data set was analysed by a variety of descriptive and inferential methods. Simple frequency analyses were conducted on the reported vegetarian behaviours and contingency table analyses were used to compare the reported behaviours and attitudes of key groups of respondents such as males and females, vegetarians and non-vegetarians, and groups of respondents from different socio-

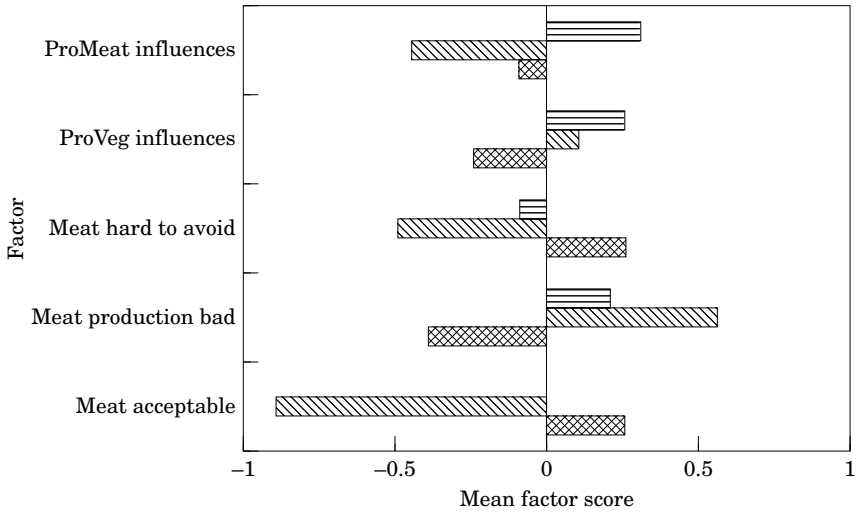

FIGURE 1. Attitudes to meat/vegetarianism of adolescent men and vegetarian and non-vegetarian women. ▨, all males; ▧, female vegetarian; ▤, female non-vegetarian.

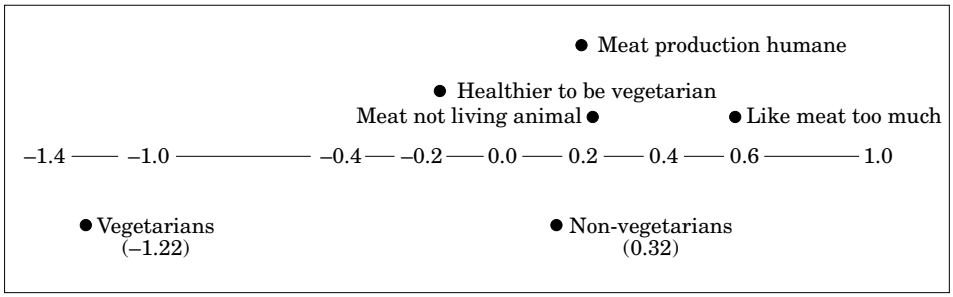

FIGURE 2. Key attitudes of female full and semi vegetarians and non-vegetarians. Standardized canonical discriminant function coefficients are shown with group centroids ($p<0{\cdot}00001$, Wilks lambda = 0·72, eigenvalue = 0·39).

economic backgrounds. It should be noted that the *p*-values reported in the tables in which the results of these comparisons are reported are based on Pearson's chi-square tests.

Analyses of variance were used to compare the means of factor scores derived from principal components analysis of the respondents' attitudes towards meat and vegetarianism (Fig. 1). Finally, discriminant analysis was used to identify the main vegetarian attitudes items which discriminated between vegetarian and non-vegetarian females (Fig. 2).

RESULTS

Prevalence of Teenage Vegetarianism

The percentages of students who identified themselves as "vegetarian" varied according to the particular question asked (Tables 1 and 2). Clearly vegetarianism,

however defined, is a female rather than a male phenomenon, though not exclusively so. Almost half the women students had thought at some time or other of becoming vegetarian and about one in six would like to be one. More than one-fifth of the students had tried vegetarianism in the past for varying periods of time (Table 3).

The problem with classifying adolescents as vegetarians is exemplified in the results shown in Table 2. Initially all students were given a "Yes/No" response option to the question "Are you currently a vegetarian?" (Q1) and this yielded a vegetarian prevalence of 8% amongst adolescent females and 3% among adolescent males. These self-reported numbers changed when adolescents were given a third option of "semi" vegetarian (Q2).

Measures of reported meat consumption provided alternative measures of prevalence. Adolescents who reported eating meat on less than two occasions in 2 months were classified as vegetarians, and as semi-vegetarians if they consumed meat less than five times in the 60-day period. When all meat consumption was examined, that is, consumption of steak, roast beef/veal, mince meat, crumbed veal, lamb, sausage rolls, meat pies/pasties, pork, stews/casseroles (not chicken), bacon, cold meats, beef sausages, hamburgers and chicken, the prevalence of vegetarianism for teenage women was 8%, while for teenage men it was 1%. However, when pollo-vegetarianism (i.e. chicken-eating vegetarians) was allowed, the prevalence for adolescent women became 10% and for adolescent men, 2%. Hence, we can conclude that the prevalence of vegetarians (i.e. those who do not consume red meat) is 8–10% amongst teenage women and 1–2% amongst teenage men (Table 2). Few adolescents were found to be vegans, though around one in six women appeared to have had long lasting commitments to vegetarianism of at least 6 months duration (Table 3).

Prevalence of Teenage Semi-vegetarianism

The self-reports suggested that some adolescents were not sure if they should label themselves as vegetarians or semi-vegetarians (Table 2). From measures of meat consumption (above), however, the prevalence of vegetarian tendencies (full and "semi"-vegetarians) ranged from 32 to 37% for teenage women, and from 11 to 12% for teenage men. Thus at its widest definition, about one-third of adolescent women are in some way "vegetarian" or avoiding, or restricting, the consumption of red meat. In contrast, only 21% of adolescent women and 7% of adolescent men described themselves as being either a vegetarian or a semi-vegetarian.

There were no differences, in either sex, between the vegetarian involvement of teenagers from the different social economic status areas, with one exception—more adolescent women from high SES areas *had thought* about becoming vegetarians (SES1: 35%, SES2: 34%, SES3: 38%, SES4: 55%, $p<0{\cdot}01$).

Many of the students reported that they had thought about becoming a vegetarian, and would like to be one, even though currently they were not.

More adolescent women than men also reported that they *would like* to be vegetarians (women: 15%, men: 2%, $p<0{\cdot}00001$) and that they *had thought* about becoming a vegetarian (women: 40%, men: 9%, $p<0{\cdot}00001$).

The reasons given by these adolescents for not becoming vegetarians are summarized in Table 4. Nearly one-quarter of them said that they liked meat too much, and some had missed it when they had tried vegetarianism. About one-fifth of them gave health reasons for not becoming a vegetarian, for example: dieticians/doctors had advised them to eat meat, they had become ill while on a vegetarian diet, iron

TABLE 1

Percentages of teenage men and women and socio-economic categories reporting their vegetarian status

	% Women ($N=536$)	% Men ($N=416$)	p	% SES1 ($N=181$)	% SES2 ($N=213$)	% SES3 ($N=333$)	% SES4 ($N=184$)	p
Currently vegetarian	8	3	0·004	6	3	6	7	*NS*[a]
Have been a vegetarian	13	2	0·00001	8	9	7	10	*NS*
Like to be a vegetarian	15	2	0·00001	9	11	9	8	*NS*
Have thought about it	40	9	0·00001	21	23	24	36	0·01
I am a vegetarian	5	1	0·00001	4	3	3	4	*NS*
I am a semi-vegetarian	16	6	0·00001	14	9	12	12	*NS*

[a] *NS*, not significant; SES, socio-economic status.

TABLE 2
Prevalence of adolescent vegetarianism

Question	Response	% Females	% Males
Q1. Are you currently vegetarian?	Yes	8	3
Q2. Are you a vegetarian?	Yes	5	1
	Semi	16	6
Meat consumption categories			
Vegetarian	Consume all meats less than twice in 2 months	8	1
Quasi-vegetarian	Consume all meats less than five times in 2 months	24	10
Pollo-vegetarian	Consume red meat less than twice in 2 months	10	2
Quasi-pollo vegetarian	Consume red meat less than five times in 2 months	27	10

TABLE 3
Adolescents' reports of their vegetarian experiences

	% Women ($N=536$)	% Men ($N=416$)
Never been a vegetarian	78·0	94·0
Vegetarian up to 6 mths	4·0	1·0
Vegetarian 6 mths–1 yr	3·0	0·5
Vegetarian 1–2 yrs	2·0	0·5
Vegetarian 2–5 yrs	2·0	0·7
Vegetarian for over 5 yrs	2·0	0·0
Always been a vegetarian	1·0	1·0
Tried it once	8·0	2·4

and protein from meat was necessary, and "sport requires meat". Several students (mainly adolescent women) gave unsolicited pro-vegetarian responses in this section (Table 4). They advocated vegetarianism in terms of animal welfare, weight loss and meat aversion.

Vegetarian Associates

Again the femininity of teenage vegetarianism is illustrated by the finding that the women students claimed to know more vegetarians that the men did (Table 5). Almost half of them knew two or three and one in six knew between four and eight "vegetarians". Table 6 suggests that not many of these vegetarian acquaintances were within the family of origin—fewer than 3% of teenage women had immediate family members who were "vegetarian".

TABLE 4
Reasons given by non-vegetarian adolescents for not becoming or becoming a vegetarian

	Females ($N=536$)	Males ($N=416$)
Reasons given for not becoming a vegetarian	(%)	(%)
Pressured by others to eat meat (by peers, parents, meat-eating household)	20	16
Vegetarianism unhealthy (have become ill; need meat nutrients etc.)	19	23
Like meat too much (missed it, like it)	23	23
Don't like alternatives (veg meals disliked, hard to prepare, boring and limited in choices)	9	18
Killing for meat is OK	1	4
Unsolicited reasons for becoming vegetarian	(number)	(number)
Weight loss	2	8
Feel sorry for animals	3	29
Aversive effects of meat (e.g. sickening)	0	13
Pressure from others	0	2

Female vegetarians reported knowing more people who were vegetarians than did non-vegetarians (Table 5). They were more likely to describe themselves as vegetarians if their mothers or sisters were vegetarian (Table 6).

Social Support for Vegetarian Practices

Over half the respondents expected support from their mothers, and over two-thirds of the women expected strong support from their best female friend, followed by boyfriend, classmates and eldest sisters (Table 7). Less support, or downright opposition, could be expected from fathers, eldest brothers, other relatives and neighbours. Generally, teenage men expected less support from their friends than their female peers. In contrast to non-vegetarians, more female vegetarians reported support for their practices from their mothers and classmates (Table 7).

Food Intakes of Vegetarians, Semi-vegetarians and Meat Eaters

Comparisons were made (via crosstabulation analyses) of the percentage of female (self-reported) non-vegetarians (NV), and full and semi-vegetarians (FSV) who ate 36 foods "often" or "sometimes" (i.e. weekly or more often). Full and semi-vegetarians tended to eat red meats significantly less often than meat eaters (NV) (Table 8).

In addition, FSV ate oranges, rice, low-fat milk, carrots, beans/soyabeans/lentils and lettuce more often than NV. No statistical differences were observed between the two groups in their consumption of apples, bananas, potatoes, peas or bread, pasta, cereal, egg, cheese, cakes, chocolate, sweet biscuits and savoury chips.

Reasons For and Against Being Vegetarian

Principal components analysis of the ratings of the items based on the reasons for being or not being vegetarian derived five components which accounted for

TABLE 5

Percentages of teenage men and women and socio-economic categories reporting number of friends and acquaintances known to be vegetarian

How many vegetarians do you know?	% Women ($N=536$)	% Men ($N=416$)	% SES1 ($N=181$)	% SES2 ($N=213$)	% SES3 ($N=333$)	% SES3 ($N=184$)	% Female non-veg ($N=495$)	% Female veg ($N=41$)
None	13	39	30	24	24	19	14	5
One	20	25	24	27	22	16	24	8
Two or three	44	24	35	32	38	33	45	39
Four to eight	17	10	7	14	12	25	13	34
Nine to 12	3	1	1	2	1	4	3	4
More than 12	3	2	3	1	2	4	1	10

Sex differences $p<0{\cdot}000001$; socio-economic status (SES) differences $p<0{\cdot}0002$; female vegetarian status $p<0{\cdot}000001$.

TABLE 6

Percentages of teenage men and women reporting vegetarian family members

Members of family who are vegetarian	% Women ($N=536$)	% Men ($N=416$)	p	% SES1 ($N=181$)	% SES2 ($N=213$)	% SES3 ($N=333$)	% SES4 ($N=184$)	p	% Female non-veg ($N=495$)	% Female veg ($N=41$)	p
Mother/female guardian	3	4	*NS*	6	4	2	2	*NS*	2	6	0·04
Father/male guardian	0	2	0·01	1	2	1	2	*NS*	0	1	*NS*
Brothers	1	2	*NS*	1	3	2	0	*NS*	1	1	*NS*
Sisters	3	6	*NS*	5	7	2	5	*NS*	2	6	0·01
Other people in household	3	1	*NS*	1	3	1	4	*NS*	2	3	*NS*

SES, socio-economic status; *NS*, not significant.

TABLE 7
Social support for teenage vegetarian practices (percentages supportive or very supportive)

	Female ($N=536$)	Male ($N=416$)	*p*	SES1 ($N=181$)	SES2 ($N=213$)	SES3 ($N=333$)	SES4 ($N=184$)	*p*	Female non-veg ($N=495$)	Female veg ($N=41$)	*p*
Mum/female care giver	54	57	*NS*	60	52	55	53	*NS*	52	78	0·008
Dad/male care giver	38	41	*NS*	46	36	38	32	*NS*	37	43	*NS*
Eldest brother	28	28	*NS*	38	22	25	25	*NS*	29	18	*NS*
Eldest sister	43	45	*NS*	56	39	38	45	*NS*	42	53	*NS*
Best female friend	69	52	0·000001	67	61	59	66	*NS*	70	67	*NS*
Best male friend	56	32	0·000001	54	47	40	40	0·01	56	52	*NS*
Classmates	43	20	0·000001	38	37	27	33	0·04	42	50	*NS*
Neighbours	30	28	0·006	37	29	25	28	0·04	29	48	0·05
Relatives	42	41	*NS*	44	44	39	38	*NS*	42	45	*NS*

NS, not significant; SES, socio-economic status.

TABLE 8
Differences between female non-vegetarians and full or semi-vegetarians in the consumption of foods (percentages)

Eat often/sometimes	Full/semi-veg ($N=241$)	Non-veg ($N=815$)	p
Steak	35	75	0·000001
Roast beef/veal	34	67	0·000001
Beef sausages	16	39	0·000001
Crumbed veal	24	52	0·000001
Lamb	35	76	0·000001
Pork	23	53	0·000001
Bacon	16	34	0·000001
Chicken	69	84	0·000001
Mince meat	45	80	0·000001
Sausage roll/pies	40	60	0·000001
Stew/casserole (not chicken)	27	49	0·000001
Hamburger	27	40	0·001
Cold meats	50	77	0·000001
Fish	43	41	*NS*
Low-fat milk	78	69	0·006
Full-cream milk	36	45	0·02
Egg	47	54	0·04
Bean/soya bean	48	37	0·009
Lentils/split peas	50	39	0·007
Carrots	92	89	0·006
Lettuce	94	85	0·000001
Rice	80	75	0·001
Oranges	65	55	0·02
Cakes	57	65	0·06

NS, not significant.

63·1% of the correlation matrix variance. These were interpreted fairly easily and named as follows: *Meat Acceptance, Meat Production is Bad, Meat is Hard to Avoid, ProVegetarian Influences* and *ProMeat Influences* (Table 9). The first two factors are essentially evaluations of meat. The first emphasizes the willingness of many respondents to separate the images of the living animal from its slaughter, the second deals with the perceived evil effects and immorality of meat production.

The last three factors relate to the social and other influences which make meat restraint/consumption easy or difficult.

Analyses of the individual items (crosstabulations) and of the factor scores showed that teenage women tended to find meat eating more objectionable than teenage men. Inspection of the mean factor scores (Fig. 1) suggests that vegetarian women were most different in their views of vegetarianism from teenage men; non-vegetarian women appeared to occupy a middle position.

However, there were statistically significant differences between full or semi-vegetarian and non-vegetarian women on the items that made up the vegetarian attitudes factors (Table 9), as well as in their factor scores.

Thus vegetarians tended to deny that meat is acceptable [$F(1,479)=58·7$, $p<0·0001$], agree that meat production is bad (it is morally wrong and harms the environment [$F(1,479)=18·5$, $p<0·0001$], disagree that meat eating is difficult to

TABLE 9
Attitudes to meat eating (+ agree, − disagree)

Item	Fact loading	%F		%M		*p*	%F non-veg		%F veg		*p*
		+	−	+	−		+	−	+	−	
Factor 1: "Meat acceptance" Eigenvalue: 6·05 Cronbach alpha: 0·88 28·8% of variance											
Eating meat and animal cruelty are separate issues in my mind	78	47	24	60	13	0·000001	52	18	22	51	0·00001
I am not bothered that meat comes from animals	74	34	32	65	15	0·00001	38	27	17	51	0·00001
I don't think it's wrong to kill animals for food	73	30	32	54	18	0·00001	34	26	13	54	0·00001
I don't see the meat I eat as once having been an animal	72	34	33	49	24	0·00001	39	27	12	57	0·00001
I think meat production is done humanely	68	26	29	46	17	0·00001	30	23	11	52	0·00001
I think you need meat for good health	55	69	11	81	7	0·001	76	6	43	30	0·00001
I think it is wrong to kill animals for food	–36	45	27	20	55	0·00001	40	26	66	10	0·00001
I think animals are treated cruelly	–38	51	20	28	44	0·00001	47	24	66	10	0·00001
Factor 2: "Meat production is bad" Eigenvalue: 2·83 Cronbach alpha: 0·87 (0·90 if item † omitted) 13·9% of variance											
I think animal slaughtering is awful	84	57	17	26	47	0·00001	53	19	74	8	0·0001
I think it is wrong to kill animals for food	81	45	23	20	55	0·00001	40	26	66	10	0·00001
I think animals are treated cruelly	79	51	20	28	44	0·00001	47	24	66	10	0·001
I think meat production harms the environment	70	15	47	9	67	0·00001	13	52	25	27	0·00001
† I think it is healthier to be one (vegetarian)	59	23	31	20	58	0·05	19	56	36	31	0·00001

(continued)

TABLE 9 *(continued)*
Attitudes to meat eating (+ agree, − disagree)

Item	Fact loading	%F		%M		*p*	%F non-veg		%F veg		*p*
		+	−	+	−		+	−	+	−	
Factor 3: "Meat is hard to avoid" Eigenvalue: 1·81 Cronbach alpha: 0·78 8·6% of variance											
It is difficult not to eat meat with my friends around	79	22	50	34	37	0·00001	24	46	11	65	0·001
It is hard to think of other things to eat	79	19	62	30	46	0·00001	21	59	10	74	0·01
It is difficult not to eat meat when I am at school	76	9	72	21	53	0·00001	9	68	8	85	0·001
It is too expensive not to eat meat	60	5	75	11	65	0·0001	5	75	5	76	*NS*
It is difficult not to eat meat at home	59	63	20	64	19	*NS*	69	15	42	36	*NS*
Factor 4: "ProVegetarian influences" Eigenvalue: 1·40 Cronbach alpha: 0·64 (0·68 if item † omitted) 6·7% of variance											
My religious beliefs specify vegetarianism	79	33	39	28	48	0·01	33	36	34	45	*NS*
My family are vegetarian	75	15	59	12	68	0·05	16	61	14	54	*NS*
I don't like the taste of meat	64	56	26	37	46	0·00001	54	28	62	16	*NS*
† My friends are vegetarian	35	6	75	6	77	*NS*	6	77	6	70	*NS*
Factor 5: "ProMeat influences" Eigenvalue: 1·06 Cronbach alpha: 0·53 5·1% of variance											
I like meat too much	57	68	11	78	10	0·001	75	5	38	35	0·00001
It is difficult not to eat meat at home	48	63	29	64	19	*NS*	68	15	41	36	0·00001
My friends are vegetarian	–67	6	75	6	77	*NS*	6	77	6	70	*NS*
I think you need meat for good health	31	69	11	81	7	0·0001	76	6	43	29	0·00001
My family are vegetarian	–40	15	60	12	68	0·001	16	61	14	54	*NS*

NS, not significant.

TABLE 10
Key attitudes which predict vegetarianism and meat eating in teenage women

Variable	Lambda
I think you need meat for good health	0·93
I don't see the meat I eat as once having been a living animal	0·91
I think meat production harms the environment	0·90
My friends are vegetarian	0·89
I think it is healthier to be one	0·88
I like meat too much	0·88
I don't like the taste of meat	0·88
I think meat production is done humanely	0·87

$p<0·0001$.

avoid [$F(1,479) = 20·3$, $p<0·0001$] and dismissed proMeat influences [$F(1,479) = 29·1$, $p<0·0001$]. Fewer of them agreed that "meat is good for health" or that they "like meat too much". Surprisingly, there was no difference between the two groups in their responses to the item "My friends are vegetarian", nor were there any statistically significant differences in their responses to items about their experiences of pro-Vegetarian influences.

The females' opinion ratings were used in a discriminant function analysis which showed that non-vegetarian and full or semi-vegetarian were discriminated most by the item: "I like meat too much" followed by items to do with denial of the living animal, healthiness of vegetarianism, and humane meat production (Table 10).

Twenty-eight percent of the variation in the grouping variable (vegetarianism vs. meat eating) was accounted for by these attitudinal variables. The statistically significant discriminant function (Fig. 2) represents a contrast between those women who like meat and believe meat production to be humane, and those who believe vegetarianism is good for health and who do not separate meat from the living animal (and *vice versa*).

DISCUSSION

The reported prevalence of vegetarianism appears to depend on the definitions used. However, measures of reported meat consumption provide some validation for self-reported vegetarianism. Adolescents who report that they are full vegetarians rarely or never consume meat (at the most, twice in 2 months).

The present findings suggest that the prevalence of "determined" vegetarianism among South Australian teenagers is similar to that observed by Wright and Howcroft (1992) in the United Kingdom. Two to three times as many teenage women, however, regard themselves as semi-vegetarians or as meat avoiders/restrainers. Although vegetarianism does occur among teenage men, it is predominantly a female phenomenon; about one in three teenage girls appear to regard themselves in some way as vegetarians. It is noteworthy that few statistically significant differences were observed between respondents from different socio-economic areas; vegetarianism appeals to teenage girls from all socio-economic categories.

This gendered, feminine interpretation of vegetarianism is supported by the respondents' social influences and their experiences and expectations of social support. Female vegetarians tended to have mothers and sisters who were also vegetarian. Generally teenage women received or expected to receive higher levels of support from their families and friends, particularly females. Interestingly, female vegetarians from working-class areas reported higher levels of support from all sources than those from higher SES areas. This may reflect either greater tolerance and/or greater involvement among working-class families and communities.

The other possible source of social influence was other vegetarians. Female vegetarians claimed to know more people who were vegetarians but they did not have more vegetarian friends. This suggests that vegetarian women were more likely to recognize similar habits in others but did not form exclusive friendships with vegetarians. There was no evidence that type of school influenced these friendship patterns. Whilst the picture we have drawn here appears to suggest that parents, families and friends were tolerant of vegetarian practices, qualitative data from the survey indicated that many vegetarians found at least some opposition to their habits. For example, pressures to eat meat in spite of their own wishes were relatively common. Around one-third of vegetarians agreed that it was difficult to avoid eating meat at home (Table 8).

Inspection of the dietary differences between full and semi-vegetarians and non-vegetarians confirmed their stated preferences—vegetarians ate meat less often. However, it is clear that this was not an all-or-none affair; some full and semi-vegetarians ate red meat on occasion. In this respect adolescent vegetarians differ little from adult vegetarians. Woodward (1988) found some kind of meat consumption was common in about half of the adults who classified themselves as vegetarians. In addition, the dietary habits of the vegetarians suggest that at least some knew about the need to find replacements for meat; vegetarians ate lentils and beans more often, as well as oranges and carrots. However, they also drank more low-fat milk which suggests that they may be more concerned about body weight, a finding which was confirmed from the analysis of their dieting patterns and attitudes to body weight (Worsley & Skrzypiec, 1997).

Findings from the analyses of the vegetarian opinions data suggest that up to one-third of teenage women experience difficulties divorcing the image of the living animal and its production and slaughter from meat products. Inspection of the food-frequency data suggests that these animals tend to be higher sentient beings like cows, pigs and lambs rather than "less sentient" animals like fish and chickens. This suggests that the social representations (Moscovici, 1984) or definitions of animals are important for an understanding of both meat eating and meat avoidance. Mammals, like cows and lambs, may be viewed more anthropomorphically than fish and chickens. This may make them more difficult to consume.

In contrast, the non-vegetarians had little difficulty in divorcing the product from the living animal, and saw meat as healthy and tasty; vegetarianism was seen as less healthy.

These different views are difficult to explain easily. The vegetarian women appeared to hold quite different views of animals (and health), compared to non-vegetarian women, and especially, to teenage men. Where do these different social representations arise from? Further analyses of other parts of this survey (Worsley & Skrzypiec, 1997) showed that vegetarians held different views of the wider world too. For example, they were more concerned and more pessimistic about environmental issues

and placed less trust in scientific solutions to environmental problems; they valued equality more in relationships between the sexes, they were more concerned with being slim, they tended to restrict their energy intake more, and they had different views of food in general. Vegetarian females are more likely to look to television for behavioural guidance, i.e. they were more likely to agree that they "diet/exercise to be more like some people on television", and "pick up ideas on how to dress/behave by watching television". They are also less likely to "find the best way to relax is to watch television".

It seems, then, that teenage vegetarians and non-vegetarians live in different worlds. They subscribe to differing degrees to prevailing social ideologies like environmentalism and feminism as well as vegetarianism and animal rights. As noted by sociological commentators on vegetarianism such as Adams, (1990), Fiddes (1991) and Turner (1982), these are anti-establishment, even anti-patriarchal views.

The question arises as to how some young women (and a few young men) come to hold views about meat that diverge from the mainstream. We suggest that from a psychological viewpoint, two approaches may help provide answers. First, adherence to these social ideologies or representations may be due to individuals holding different sets of personal values (personal ideals, or guiding principles). Schwartz (1992) has shown that self-expressive values such as hedonism and power tend to oppose community-fostering values such as universalism, benevolence and harmony. Indeed, red meat eating has been associated with traditional and power values (Norman, Note 1), both of which have been noted by sociologists to be values associated, along with meat eating, with patriarchal Western societies (Adams, 1990; Fiddes, 1991). Recently Forgas and Jolliffe (1994) have argued that anti-establishment ideologies such as environmentalism come to the fore during periods of increasing conservatism. Thus, in the context of teenage identity negotiation, vegetarianism may be one way of expressing community-oriented, radical values. These may appeal more to some teenage women whose life choices may be relatively constrained by family and society.

A second approach is to consider the personality traits of meat eaters and vegetarians. Previous research suggests that personality traits such as openness to new information and emotional instability may be important predictors of meat avoidance (Falconer, Baghurst & Rump, 1993). Empathy is a trait which is valued more for women than for men (Helgeson, 1994). Thus empathetic individuals may be more open to new information about food, much of which is negative about meat. Due to prevailing social influences on women to link food intake to body appearance, teenage women's greater interest in food may make them more aware of the negative connotations of meat eating.

Conclusions

(1) Self-reported vegetarianism was more common among teenage women. About one-quarter can be considered to be at least partially vegetarian.
(2) Social support for vegetarianism was greater among teenage women than men—vegetarianism appeared to be a feminine phenomenon.
(3) Vegetarian beliefs predicted vegetarian habits substantially, particularly beliefs about the animal origin of meat, health and taste consequences of meat ingestion and avoidance.

(4) More research is required into ideological associations of adolescents' vegetarian beliefs and practices.

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