

# Vegetarian Diets: A Way towards a Sustainable Society

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## Abstract

We wanted to find out how Finnish university students (n = 210) assess their ability to adopt vegetarianism and their dietary behaviour. Participants assessed 36 aspects of sustainable development with an eight-step scale. They were also invited to write free comments about their assessments. We applied Triandis' Theory of Interpersonal Behaviour (1977). The importance of vegetarian diets was rated lower than that of any other of the 36 items assessed. However, the feasibility of vegetarian diets was considered to be relatively good. We identified two types of barriers to a vegetarian diet: social groups and habits. However, the participants were 6 percent more likely to favour a vegetarian diet than predicted by the calculated Rational Behaviour Expectancy (RBE) based on the rated importance and feasibility of vegetarian diets. The RBE of vegetarian diets was the second highest of all of the 36 items of sustainability rated. The gap between importance and behaviour was also narrowest in the case of vegetarian diets. Our study showed that Finnish university students are in the process of adopting a more sustainable way of food consumption. They need, however, supporting information about the beneficial effects of vegetarian diets on health, environment, global food security and animal welfare to overcome barriers raised by social groups and their own habits.

**Keywords:** vegetarian diet, sustainable development, sustainability, behaviour change, sustainable society

## 1. Introduction

*"Nothing will benefit human health and increase chances for survival of life on Earth as much as the evolution to a vegetarian diet."*

—Albert Einstein

We are still on the way towards a sustainable society where diverse life forms flourish—and can continue to do so over the long term. One essential step on the way seems to be a large-scale shift from meat-eating towards vegetarianism.

The benefits of vegetarian diets (Note 1) are remarkable, whether it be in terms of human health, environment, global food security or animal welfare. This makes vegetarianism a rational way of promoting sustainable development. However, meat and seafood are the two most rapidly growing ingredients in the global diet (Halweil & Nierenberg, 2008). The global average for vegetable consumption is only 2.7 percent of the daily energy intake (not including vegetable oils). It is highest in North Africa, the Middle East, parts of Asia, the USA and Cuba, and in the southern part of Europe (World Cancer Research Fund, 2007).

In the study reported in this article, the research focus was on complex individual decision making and behaviour change processes affected profoundly by values, attitudes and social structures. We wanted to find out how Finnish university students rate the importance and feasibility of the vegetarian diet and their own dietary behaviour. We were also interested in discovering what obstacles they felt there were in the way of switching to a vegetarian diet.

Our article proceeds as follows. We start by summing up the benefits of vegetarian diets. Second, we describe Harry Triandis' theory of interpersonal behaviour and the factors it identifies as leading to or preventing behavioural change. We then move on to a presentation of our study and its results. We end our article with a discussion about the implications of these results for sustainable development.

## 2. Vegetarian Diets and Sustainable Development

There are four main factors that make vegetarian diets a recommendable means for transitioning to a sustainable society. They are: human health, environment, global food security and animal welfare.

*Human health.* A worldwide shift towards a diet high in fat and processed foods and low in fiber corresponds to increases in degenerative diseases (Michels et al., 2005; Popkin, 1993; Tukker et al., 2011; 1785). Diseases related to imbalanced diets, especially insufficient vegetable and fruit consumption, are among the top mortality risk factors all over the world (Ezzatiet et al., 2003; Guet et al., 2010; Norat et al., 2010; Taylor et al., 2009). According to the World Cancer Research Fund (2007) the evidence shows that most diets that protect against cancer mainly consist of foods of plant origin. A decrease in meat consumption may also improve weight management because energy derived from vegetables fattens less than the equivalent amount of energy from meat (Vergnaud et al., 2010).

According to long-term follow-up studies vegetarian diets, regular exercise, moderate alcohol use and non-smoking together can increase life expectancy on average by 9 to 15 years. These four factors significantly reduce the risks of serious illnesses and substantially reduce premature mortality both in women and men. (Anderson et al., 2011; van den Brandt et al., 2011; Fraser & Shavlik, 2001; Funget et al., 2010; Sinha et al., 2009; Khaw et al., 2008; Kvaaviket et al., 2010; Li et al., 2011).

*Environment.* Food production and consumption are the most important contributors to the global warming potential in Europe (31%). Their share is greater than the climate change potential caused by housing (23.6%) and transport (18.5%) (Carlsson-Kanayama et al., 2003; Tukker et al., 2006). Livestock accounts for up to 18 percent of the global warming effect (Steinfeldt et al., 2006). Red meat is around 150 percent more greenhouse gas intensive than chicken or fish (Weber & Matthews, 2008). The social costs of carbon dioxide emissions currently total some 700 euro per ton (Ackerman & Stanton, 2011). People living in the Global South suffer the most from climate change (Wheeler, 2011), and 99 percent of the 350,000 deaths per year due to climate change are children. They suffer from malnutrition, diarrhoea, and malaria (DARA, 2010). "If the damages per ton of carbon dioxide are that high, then almost anything that reduces emissions is worth doing" (Ackerman & Stanton, 2011).

In Scotland it was found that the ecological footprint of an ovo-lacto vegetarian diet is 40% lower than the footprint of people who favour omnivore diets (Frey & Barrett, 2007). According to an evaluation of the climate impacts of agricultural production in Germany, people who were vegetarians and preferred organic food produced carbon dioxide equivalent to a 281 km trip by car (Figure 1). People who preferred an omnivore diet based on factory farming produced carbon dioxide equivalent to driving 4758 km by car in a year (Hirschfeld et al., 2008). In the Amazon region, animal husbandry is the biggest reason for deforestation (Kaimowitz et al., 2004).

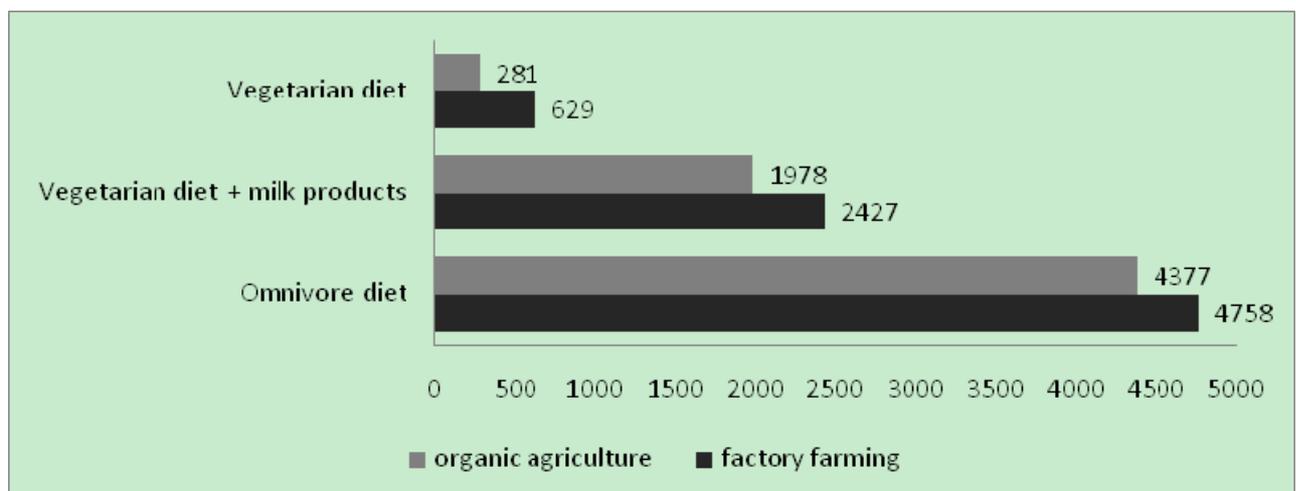


Figure 1. Greenhouse effect of different diets and forms of agriculture expressed as kilometres travelled by car per capita and per year in Germany, according to the Institute for Ecological Economy Research (Foodwatch, 2008)

*Animal welfare.* The status of animals has been a subject of philosophic discussion for hundreds of years. The general conclusion is that humans should not treat production animals the way they usually do (Pollan, 2006; Vinnari, 2010). On a practical level this means that we should refrain from inflicting pain, frustration or deprivation on any animal at any stage of its life. According to Peter Singer (1975) human beings do not have any moral justifications for oppressing other species. He applies utilitarian ideas as an argument for vegetarianism: the pleasure gained by humans when eating animals does not compensate for the suffering of animals in food production, especially in factory farming (Singer, 2002).

All domesticated animals are social animals. Their normal behaviour is disrupted or thwarted by modern farming methods that force animals to live either in extreme overcrowding or in complete isolation. Overcrowding, for example, leads to abnormal behaviour (Keeling & Gonyou, 2001; Nierenberg, 2005; Mench & van Tienhoven, 1986). Organic stock farming, on the other hand, respects high standards of animal welfare and meets animals' species-specific behavioural needs. Animal health management is based on disease prevention and particular attention is paid to living conditions, husbandry practices and stocking densities (Council of the European Union, 2007).

*Global food security.* Cereals and leguminous grains consumed by the world's animals equal roughly one-third of the global harvest of these crops. They contain enough energy to feed more than 3 billion people (Smil, 2002a; 2002b). In other words, a theoretical global transition to vegetarianism would support about 10 billion people on planet Earth, providing 2,350 calories a day of food for every person, as recommended by the Food and Agriculture Organization of the United Nations. The production of a typical Western diet requires up to 4,000 m<sup>2</sup> of agricultural land per capita. Were the entire Earth population on the Western diet, more agricultural land would be needed than what the existing total is (Smil, 2002a).

Worldwide, about 2 billion people live on an animal based diet and some 4 billion on a plant-based diet (De Boer et al., 2006). According to the American Dietetic Association (2009) "well-planned vegetarian diets are appropriate for individuals during all stages of the life cycle, including pregnancy, lactation, infancy, childhood, and adolescence, and for athletes".

### **3. Individual Decision Making and Behaviour Change**

According to an Aristotelian view a good person acts in accordance with good reasons. Also in everyday life, people often refer to their (good) values when they need to explain or justify their behaviour and their daily choices. The difference between values and attitudes is slight, but values are generally perceived to be more solid. Values are relatively general appropriate premises, based on the needs of individuals and communities (Schwartz, 1992) while attitudes are evaluative ratings of objects (Ajzen, 2005). We assume that human beings look for balance between their values, attitudes and behaviour (e.g. Schultz et al., 2005).

Triandis' Theory of Interpersonal Behaviour (TIB) offers a useful and versatile model of behaviour change (see Darnton, 2008; Jackson, 2005). According to Triandis human beings are neither fully autonomous – affected by personal factors only – nor entirely social – affected by contextual factors only. He argues that behaviour is a function of the intention, of the habitual responses and of situational conditions. The intention is influenced by rational thinking, social limits and affective factors. In other words, our behaviour is influenced by moral beliefs, but the impact is moderated both by emotional drives and cognitive limitations (Triandis, 1971; 1977). These elements draw legitimacy from social psychological theories of self and identity (Mead, 1934).

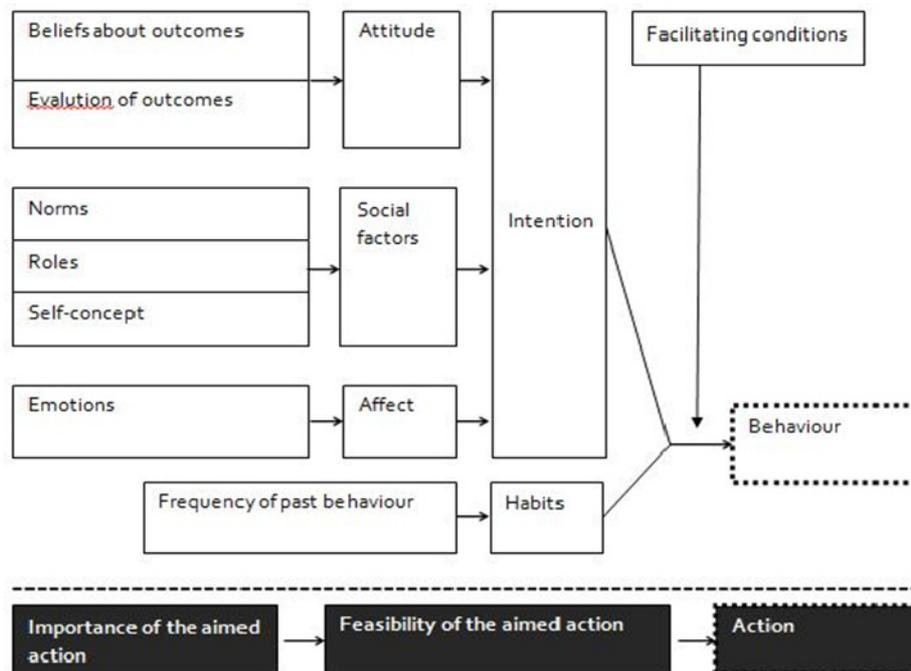


Figure 2. Triandis' (1977) Theory of Interpersonal Behaviour (TIB) and its application in our study (boxes with a black background)

TIB takes into account both personal factors and external or situational constraints. Personal factors include habits, roles and emotions. The influence of habits increases over time, and the more often a behaviour is repeated, the more automatic and less deliberative it becomes. Facilitating conditions include contextual factors such as legal and regulatory requirements, material costs and rewards, and encouragement (Figure 2).

Attitudes consist of beliefs and of the evaluation of outcomes (Triandis, 1977). Behaviour change is more likely if people can rely on the benefits of their new behavior to be more significant than its harmful effects. Further, people are ready to change their behaviour if they can be sure that the new behaviour will prevent problems in the future. Uncertainty prevents behaviour change (Weinreich, 1999). However, a discrepancy between attitudes and behaviour has been identified in several studies (e.g. Blake, 1999; Diekmann & Preisendörfer, 2003; Jurin & Fortner, 2002; Kollmuss & Agyeman, 2002).

*Social factors.* Include norms, roles and self-concepts. Norms are social rules about what should and should not be done (Triandis, 1977). Therefore a sense of good and bad plays a role in decision making (Frank, 1992; Klöckner & Preißner, 2006). Roles are "sets of behaviours that are considered appropriate for persons holding particular positions in a group" (Triandis, 1977). These social groups, such as families and peer groups, typically have a great effect on our behavior. We are members of households, social networks and communities. Social groups determine what is "normal" for us. Because of social pressure most of us want to be loyal to these groups even if being "normal" is e.g. ecologically or socially an irresponsible way to act (Barnett et al., 2011). Self-concept refers to personal identity. It includes goals that the person finds appropriate to pursue and established cognitive frames that the person is engaged in or discards (Triandis, 1977).

Behaviour is also influenced by affects. Affects have a more or less unconscious input to decision-making. Emotional responses to a decision are supposed to be distinct from rational evaluations of consequences (Triandis, 1977).

Habits and routines guide our behaviour more than conscious choices (Stern, 2008), because they are often automatic functions (Bargh & Chartrand, 1999). Even if behavioural routines are relatively hard to modify, they can be changed (Maio et al., 2007). For example, 44 percent of Californians smoked tobacco in 1965, whereas by 2010 only 9.3 percent did (Palmer, 2010).

Figure 3 shows in more detail how we apply Triandis' theory in our measurements. Importance of the aimed behaviour depends on our worldview, which consists of beliefs, norms, roles, self-concept and emotions. Feasibility refers to a belief that an action is achievable without too strenuous an effort. It includes both personal

and contextual factors of desired behaviour. In this research we assume that if an action is important for us and we feel that barriers are easy to overcome, we behave accordingly.

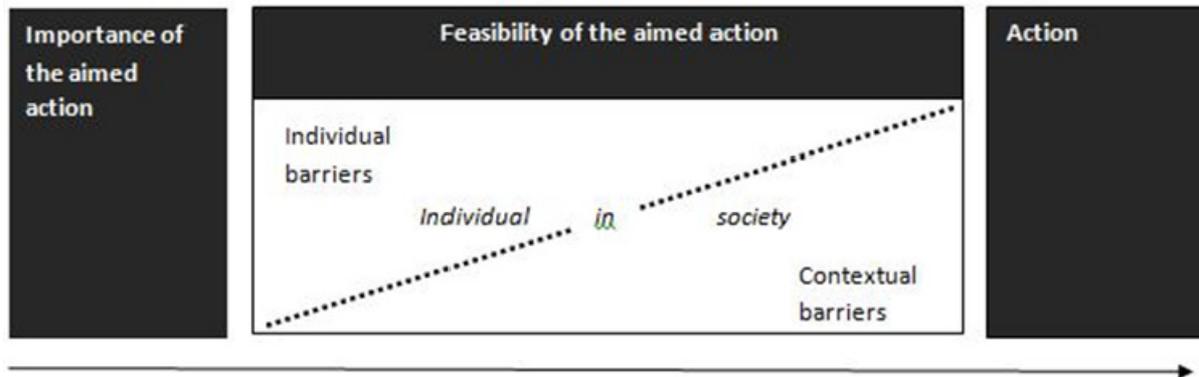


Figure 3. Importance, feasibility and barriers to behaviour change

#### 4. Material and Methods

In our study, then, we wanted to find out how Finnish university students assess their ability to adopt vegetarianism and their dietary behaviour. The specific research questions were:

- (a) How do participants assess the importance of vegetarian diets?
- (b) How do participants assess the feasibility of vegetarian diets?
- (c) Do participants favour vegetarian diets in their daily life?
- (d) What kind of personal and contextual barriers do participants have to favouring a vegetarian diet in their daily life?

The data were collected during 2008–2009 by applying a semantic differential technique (Osgood, 1957; Åhlberg, 1988), which is a popular and simple method for measuring participants' ways of thinking (Fishbein & Ajzen, 2010). The sample consisted of Finnish university students ( $n = 210$ ) in the Helsinki Metropolitan area. Their ages ranged from 18 to 40 years.

Participants rated 36 statements about sustainable development (see Table 1) with an eight-step scale (1–9) according to the importance, feasibility and actual implementation of the items as follows:

- (a) Importance. Importance of the item (not important – extremely important).
- (b) Feasibility. Possibility to implement the item in the participant's own everyday life (impossible – extremely easy).
- (c) Behaviour. Actual implementation of the item in the participant's own everyday life (not at all – always, perfectly).

The measurement instrument, developed by Arto Salonen (2010) for a larger research project, balanced variables of ecological, economic, and social sustainability. Each of these three dimensions of sustainable development consists of 12 variables, and they were all evaluated by participants. One of these variables was vegetarian diet. The 36 variables were based on sustainable development strategies such as Agenda 21, a United Nations environment and development programme (UN, 1992), the European Union Strategy for Sustainable Development (Council of the European Union, 2006), Agenda 21 for the Baltic Sea Region (Baltic 21, 1998), Sustainable Development – New bearings for the Nordic Countries (Nordic Council of Ministers, 2009), and Towards Sustainable Choices – A Nationally and Globally Sustainable Finland (Prime Minister's Office, 2006). Also the following indicators were taken into consideration: The Sustainable Society Index (van de Kerk & Manuel, 2006), the Genuine Progress Indicator (Cobb et al., 2007), the Ecological Footprint (Wackernagel, 1994), the Wellbeing of Nations (Prescott-Allen, 2001), and the Happy Planet Index (Marks et al., 2006).

The 36 assessments of sustainability formed the quantitative data. We first calculated the means and standard deviations of the rated variables, and then computed the Rational Behaviour Expectancy (RBE) as follows (see Åhlberg, 1982):

$$Importance \times Feasibility = RBE$$

Importance, feasibility and actual realization of the aim are presented as probabilities 0.00–1.00. In order to transform the original ratings from 1–9 to probabilities 0.00–1.00, the original value, feasibility and implementation ratings were divided by 8. Calculations of RBE were made according to the following formula:

$$RBE = \frac{Importance - 1}{8} \times \frac{Feasibility - 1}{8}$$

The difference between real action (behaviour) and RBE was calculated as follows:

$$\frac{Behaviour - 1}{8} - \left[ \frac{Importance - 1}{8} \times \frac{Feasibility - 1}{8} \right]$$

If the difference is positive the real action of a participant is stronger than the behaviour predicted by the RBE. A negative difference means that the real action is weaker than the predicted action. Thus we were able to compare the probability of a behaviour – based on the importance and feasibility of the item – with the participants' assessments of their real behaviour.

The participants were also asked to comment on their assessment freely. We assumed that the participants would provide comments if they felt that their assessments needed to be clarified. These 47 comments yielded the data for a classical content analysis. The aim was to obtain additional research material for interpreting how the participants thought about the items they rated. This is particularly important because mathematic models, such as RBE, cannot alone frame problems or develop new alternatives.

## 5. Results

The results were interesting. They show that of the 36 sustainability items under evaluation the vegetarian diet was the least important: the mean of the ratings was 5.6. The standard deviation of importance was large (2.4) indicating that the participants' ratings are distant from the mean (Table 1).

The importance of the vegetarian diet was lower than its feasibility, which was relatively high (7.0). The gap between importance and feasibility is -1.4 indicating that it would have been relatively easy to favour the vegetarian diet even if it had not been important for the participants (Figure 4). The standard deviation was relatively large (2.0). The narrowest gap between importance and behaviour among the 36 sustainability items was seen in the vegetarian diet (0.65).

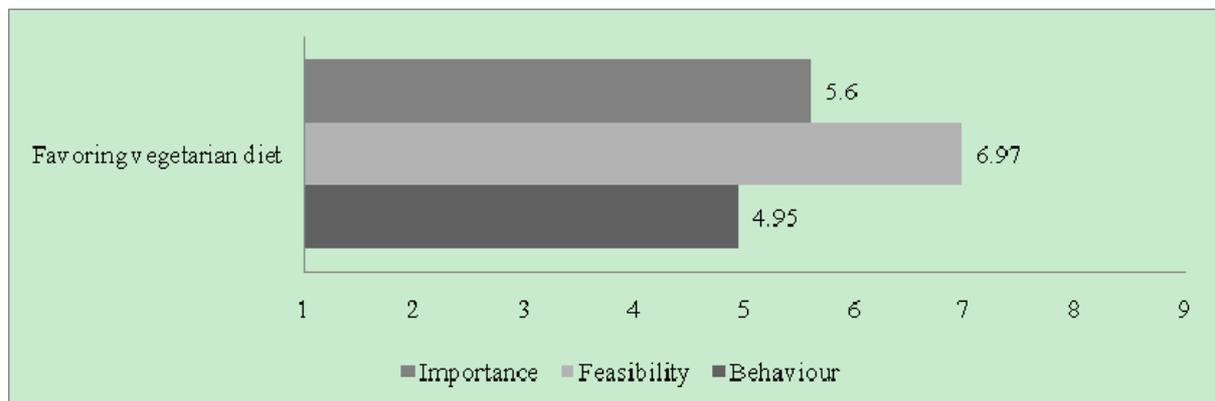


Figure 4. Assessments of the participants concerning the item “Favouring vegetarian diet”

Table 1. Rated items, means, standard deviations (SD) and Rational Behaviour Expectancy (RBE)

	Importance (A1)			Feasibility (A2)			Behaviour (B)			RBE		B – RBE
	Mean	SD	$\frac{MeanA1-1}{8}$	Mean	SD	$\frac{MeanA2-1}{8}$	Mean	SD	$\frac{MeanB-1}{8}$	$\frac{MeanA1-1}{8} \times \frac{MeanA2-1}{8}$		
<b>Environmental sustainability</b>												
1. Recycling	8.45	.907	0.93	7.81	1.380	0.85	6.48	2.050	0.69	0.79	-0.10	
2. Taking care of hazardous waste	8.44	.977	0.93	7.40	1.637	0.80	6.58	2.328	0.70	0.74	-0.04	
3. Favours walking, cycling and public transport	8.18	1.139	0.90	7.81	1.739	0.86	7.39	1.993	0.80	0.77	+0.03	
4. Composting	8.14	1.318	0.89	7.88	1.988	0.86	6.03	3.054	0.63	0.68	-0.05	
5. Saving energy	7.88	1.231	0.86	7.93	1.109	0.87	6.60	1.781	0.70	0.74	-0.04	
6. Use of renewable energy sources in the household	7.66	1.558	0.83	4.26	2.460	0.41	2.91	2.293	0.24	0.34	-0.10	
7. Organic food	7.52	1.745	0.82	5.85	1.804	0.60	3.94	1.830	0.37	0.49	-0.12	
8. Replacing goods and equipment only when broken	7.35	1.521	0.79	7.67	1.510	0.83	6.35	1.929	0.67	0.66	+0.01	
9. Indoor temperature max. 21C	7.00	1.855	0.75	7.26	2.054	0.78	6.43	2.382	0.68	0.59	+0.09	
10. Water conservation	7.00	1.621	0.75	7.31	1.743	0.79	4.94	1.878	0.49	0.59	-0.10	
11. Local food	6.87	1.649	0.73	5.51	1.689	0.56	4.24	1.851	0.41	0.41	0.00	
12. Vegetarian diet	5.60	2.362	0.58	6.97	1.961	0.75	4.95	2.430	0.49	0.43	+0.06	
<b>Economic sustainability</b>												
1. Product longevity and durability	8.20	1.145	0.90	7.41	1.542	0.80	6.76	1.804	0.72	0.72	0.00	
2. Favours eco-labelled products	7.95	1.301	0.87	6.99	1.485	0.75	5.53	1.882	0.57	0.65	-0.08	
3. Quantity and quality of packaging	7.87	1.304	0.86	6.47	1.695	0.68	5.35	1.954	0.54	0.58	-0.04	
4. Product recyclability	7.81	1.386	0.85	6.57	1.512	0.70	5.23	1.944	0.53	0.60	-0.07	
5. Favours products and services of forerunner companies	7.48	1.623	0.81	5.83	1.719	0.60	4.43	1.837	0.43	0.49	-0.06	
6. Thriving local business	7.18	1.588	0.77	6.00	1.703	0.63	4.81	1.930	0.48	0.49	-0.01	
7. Thriving small business	7.10	1.612	0.76	5.71	1.530	0.59	4.36	1.745	0.42	0.45	-0.03	
8. Quality of the materials in commodities	7.02	1.697	0.75	6.18	1.649	0.65	4.45	1.879	0.43	0.49	-0.06	
9. Products that can be repaired	7.00	1.818	0.75	6.09	1.759	0.64	4.97	2.048	0.50	0.48	+0.02	
10. Quantity and type of waste from product manufacture	6.90	1.889	0.74	5.42	1.811	0.55	3.90	1.950	0.36	0.41	-0.05	
11. Use of services instead of ownership of goods	6.80	1.846	0.73	6.22	1.663	0.65	4.67	2.053	0.46	0.47	-0.01	
12. Energy efficiency in product manufacture and use	6.71	2.002	0.71	5.38	1.800	0.55	3.66	1.880	0.33	0.39	-0.06	
<b>Social sustainability</b>												
1. Communitary	8.61	.678	0.95	7.15	1.445	0.77	6.40	1.664	0.68	0.73	-0.05	
2. Equality and tolerance	8.47	1.054	0.93	7.22	1.512	0.78	6.63	1.813	0.70	0.65	+0.05	
3. Health-promoting lifestyle	8.41	.915	0.93	7.36	1.335	0.80	6.10	1.841	0.64	0.74	-0.10	
4. Social inclusion	8.38	.932	0.92	6.58	1.489	0.70	5.61	1.733	0.58	0.53	-0.05	
5. Global poverty reduction	8.33	1.068	0.92	5.63	1.836	0.58	4.01	1.880	0.38	0.23	-0.05	
6. Elimination of public health risks	8.32	1.006	0.92	7.67	1.238	0.83	6.36	1.761	0.67	0.62	+0.05	
7. Consumer's social responsibility	8.29	.951	0.91	6.00	1.707	0.63	4.80	1.978	0.48	0.43	+0.05	
8. Intergenerational link	8.19	.997	0.90	6.80	1.767	0.73	5.80	2.075	0.60	0.54	+0.06	
9. Maintaining of civil society	8.03	1.194	0.88	6.56	1.583	0.70	5.45	1.887	0.56	0.49	+0.07	
10. Volunteering	7.97	1.225	0.87	6.16	1.861	0.65	3.80	2.299	0.35	0.30	+0.05	
11. Use of study opportunities	7.92	1.075	0.87	6.92	1.488	0.74	6.27	1.886	0.66	0.57	+0.09	
12. Low perceived value of ownership	7.76	1.462	0.85	6.78	1.493	0.72	5.83	1.741	0.60	0.51	-0.09	

The participants' assessments of their behaviour indicate that they favoured vegetarian diets relatively often – the mean is 5.0. However, there was a lot of variability in their ratings (2.4). The fluctuation was the second largest of all 36 items rated.

There were 47 written comments to the statement “Favouring vegetarian diet”. In them, two categories of obstacles to a vegetarian diet could be identified:

(a) Social groups

(b) Habits

The constraints of situational social factors such as the realities of family life became apparent in several comments, such as: “It is difficult to have balance in eating habits because my spouse is a meat eater and both of us are students with a low budget (134).” Respondents also referred to generally held beliefs about the necessity of meat-eating: “Growing kids need versatile nutrition (178)”.

Habits were also identified as obstacles to vegetarian diets in several comments, as well as how a person is used to defining herself: “I am not partial to vegetables (154).” At the same time many of the respondents also questioned their own behaviour, which may be due to changing social norms: “Meat is so delicious... I know well that a vegetarian diet should be preferred (190)”. “It is important to decrease factory farming but for me it is impossible to be vegetarian (60).”

Several practical obstacles to adopting a vegetarian diet were also put forward, such as availability, high costs, allergy, inconvenience and poor quality of vegetables. The difference between behaviour and RBE was 0.06, indicating that the participants were 6% more likely to favour a vegetarian diet in their everyday life than the importance and feasibility of their action would lead one to expect (Figure 5). Some respondents found the transition from meat-eating to vegetarianism easy: “It is easy because I live together with vegetarian (166)”. “I will in the long run adopt a vegetarian diet but I feel that it is not important just now. However, it will be easily done (41)”.

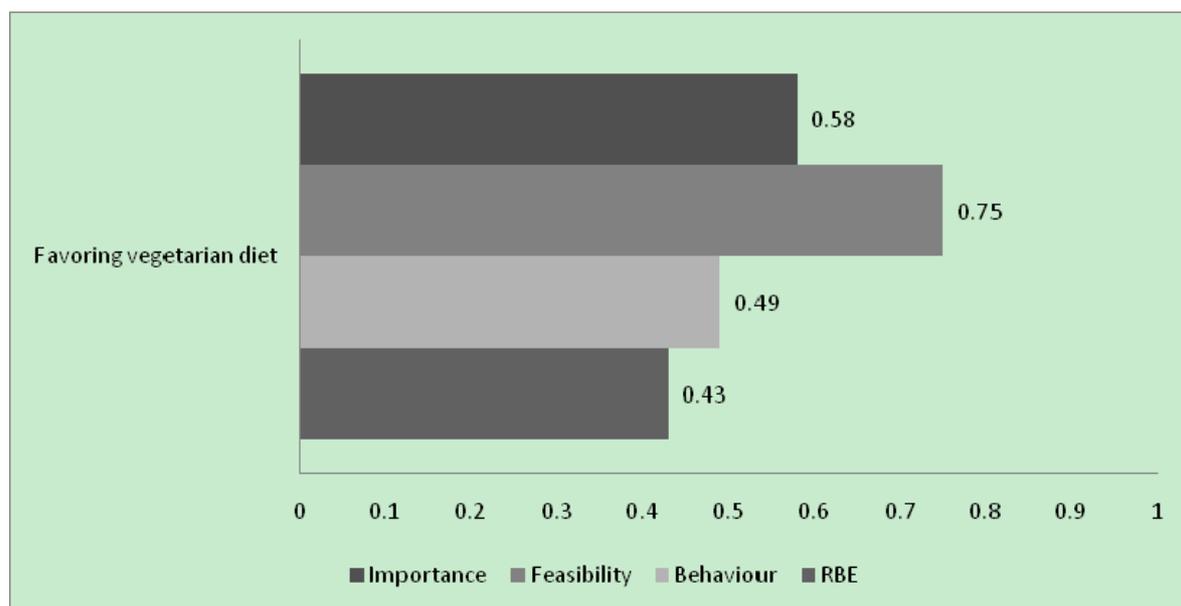


Figure 5. Probabilities of importance, feasibility, behaviour and RBE (0.00-1.00)

In their free comments, 3.8 percent (8) of the participants called themselves vegetarians and 8.1 percent (17) mentioned that they had limited their meat intake, especially red meat.

## 6. Discussion: Calling Eating Habits into Question

Social factors play an essential role in human behaviour. This was evident in our study as well: social groups and their habits created major barriers to adopting a vegetarian diet. This was apparent in many comments, for example in the explanation that eating vegetarian food is impossible because “my husband thinks it is food for

rabbits (185)". On the other hand, social groups can support vegetarian diets: "It is easy because I live with a vegetarian (166)".

There were also signs of cognitive dissonance and mental incoherence in the comments. One of the participants commented that "I know it is good to prefer a vegetarian diet, but meat is still an important part of my diet. I do not want to kill animals. I have a conflict in my mind (164)". This anxiety may indicate that social norms are changing (see Ajzen, 1991; Barnett et al., 2011; Frank, 1992; Heath & Gifford, 2002) and that we are witnessing the birth of a more ethical relationship to what we eat. The large standard deviation of the data, too, may reflect that we are at a watershed in relation to eating meat.

Most of the participants who identified their habits as a barrier to adopting a vegetarian diet were confirmed meat-eaters. This became apparent in comments such as "I am not partial to vegetables (154)" or "Meat-eater! (177)". These kinds of attitudes create an essential barrier on the road towards vegetarianism. On the other hand, we have lately seen relatively rapid societal changes in Finland. For example smoking has decreased rapidly. If Finns decrease their smoking at current pace, there will be few smokers in Finland by 2030 (Raisamo et al., 2011). According to a Finnish health study (Peltonen et al., 2008) 4.8 percent of the people living in Southern Finland (Helsinki-Vantaa) are vegetarians. The proportion of vegetarians has risen from 0.9 percent in 1991 to about 3 percent in the United States (Palmer, 2010). Various forms of vegetarianism are practised by up to 10 percent of the Western population (Smil, 2002a). Quite a few Finns – especially in the younger generations – are already convinced of the beneficial effect of vegetarianism in terms of health, environment, animal welfare and global food security, and there is no reason why their share should not increase in the future. In general, younger people are also less set in their habits than older generations (Fien et al., 2008; Goleman, 2010).

High prices have in several studies turned out to pose a formidable barrier to adopting a more sustainable way of life on a general level (e.g. Kollmuss & Agyeman, 2002; Swim et al., 2009). In view of this result, the future looks bright for the transition towards vegetarian diets, since they are generally cheaper than diets containing meat. The result also gives support to the argument that meat should be more expensive. Its price does not reflect its environmental consequences in terms of the loss of biodiversity implicit in land use, the enormous consumption of freshwater, or the losses associated with the industrial production of feed grains. According to Jeffrey Sachs (2008) meat is "dramatically underpriced relative to plant products if we take into account the environmental costs of producing it". Mainstreaming of vegetarian diets would be easier if the price of food included environmental, social and economic costs incurred in its production (Hawken, 2010; Meadows et al., 2004). As this is not the case, meat-eating leads to market failures. A market failure occurs when the market does not allocate scarce resources in a way to generate the greatest social welfare within the limits of the environment (Shogren & White, 2007; Jackson, 2009).

Policy making and governmental guidance are factors that are crucial to sustainability. Fujii and Gärling (2003) state that people's commuting habits changed voluntarily for the better when public transport was compulsory for a relatively short period. Compulsory vegetarian days have lately been introduced in some Finnish schools. This has fostered a lively debate, as people have felt that their freedom is being limited. However, actions like this might help to adopt a new way of behaviour in the long run.

According to Ilona Kickbusch (2008) the generation of children born at the turn of the 21st century could be the first to have weaker health and a shorter life expectancy than their parents in Western societies. The benefits of a large scale reduction in the rates of obesity, diabetes, cardiovascular diseases or cancer are, naturally, sufficient justifications for eating less meat. Yet in the long run, moderate changes towards healthier diets will not be enough to reduce the environmental impacts of food consumption drastically (Tukker et al., 2011). However, when combined with better waste food management, the impact could be remarkable. At present, about a third of every animal slaughtered is not consumed for human food—it is mainly the boneless parts without fat that are used (Foodwatch, 2008). In addition one-third of the food produced for human consumption is lost or wasted globally. In the developing countries this happens due to poor roads and storage facilities and in the developed countries due to leftovers and discards (Gustavsson et al., 2011; Reganold, 2010). According to Lorryne Ventour (2008), 61 percent of the food which we throw away could have been eaten if it had been managed better.

Among the 36 sustainability items, the gap between importance and behaviour was narrowest in the assessment of "favouring a vegetarian diet". In addition, RBE was 6 percent lower than the participants' own behaviour ratings. This means that participants favour vegetarian diets more than could be assumed from their assessed importance and feasibility. Therefore we did not identify a typical gap between importance, feasibility and behaviour (see Blake, 1999; Diekmann & Preisendörfer, 2003; Jurin & Fortner, 2002; Kollmuss & Agyeman,

2002; Uusitalo, 1986). When all the 36 sustainability items assessed were compared, importance, feasibility and behaviour were associated more closely only with the use of study opportunities.

All things considered, we argue that the mainstreaming of vegetarian diets is a potential way to reach sustainability among Helsinki Metropolitan Area university students. The fact that these university students are currently questioning their eating habits may also be a factor contributing to societal change: these same students will be the parents, decision-makers and consumers of tomorrow. Changes are taking place on the national level as well: according to Markus Vinnari (2010) the possibilities for transition towards vegetarian diets are “better than ever before” in Finland. Interest in reduced intake of animal foods has also grown on the global level (Smil, 2002a). This is because “some people have changed for health reasons; some are concerned about the environmental costs of meat production; some are horrified by the way animals are raised and do not want to support that kind of brutality; others simply feel they should not eat anything they would not be prepared to kill themselves. The net result has been a steady shift towards less meat-eating – balanced diet. This shift in values is coming about because people are beginning to understand and think more deeply about the world” (Laszlo et al., 2003, 61). Deeper thinking is indeed what we need to ensure a safe and just operating space for humanity.

### 7. Steps towards a Sustainable Society

Our study showed that Finnish university students are in the process of adopting a more sustainable way of food consumption. They need, however, to overcome barriers raised by social groups and their own habits.

In the future it would be interesting to know whether the distinctly low priority given to vegetarian diets in our study is attributable to a lack of knowledge about the prerequisites of sustainable development. This is where education steps in: because knowledge is a factor in behaviour change, behaviour change can be supported by education. A key challenge is its role in helping people to see the big picture in which food security, vital ecosystem services, good human health and animal welfare are linked and correlative. In other words, we need what Daniel Goleman (2010) has called “ecological intelligence”: an understanding of the ecosystem and its interrelationships and the capacity to apply this knowledge. When joined to social intelligence, we might call this wisdom. What we need, then, is lifelong learning – both individual and cultural – on our long and winding road towards a sustainable society.

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### Note

Note 1. “Vegetarian diet” and “vegetarianism”, in everyday parlance, can refer to ovo, lacto and ovo-lacto vegetarianism as well as to veganism. In this article, we use these terms to cover all the above meanings unless otherwise specified.