



Fruit and vegetables liking among European elderly according to food preferences, attitudes towards food and dependency



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ABSTRACT

As the population ages and dependency for food-related activities increases, it becomes crucial to better understand food expectations of elderly consumers. Fruit and vegetables (F&V) are generally appreciated by elderly people. However, few studies have investigated elderly peoples' F&V liking, taking into account their dependency and countries' specificities. The present study aims to identify the liking of F&V, eating styles and food selectivity depending on the country of residence and levels of dependency. A European survey was conducted with 420 elderly people delegating meal-related activities, living at home or in nursing homes. Based on general food preferences, three eating styles were identified. Results showed that F&V liking is a segmenting variable. Elderly people from the style 1 ($n = 145$) do not really appreciate fruits nor desserts. On the contrary, elderly people from style 2 ($n = 121$) are really fruit lovers. Finally, elderly people from style 3 ($n = 126$) liked desserts, fruits, and even more vegetables. Results showed that elderly people were not selective towards F&V, even if there were some exceptions as exotic fruits (disliked by 19%) and fennel (disliked by 33%). Fruit and vegetables selectivity was significantly different between countries ($p < 0.001$), but not between men and women, or between categories ($p > 0.05$ in both cases). Selectivity for F&V was very variable and could reach 32 vegetables among 42 and 28 fruits among 34. The most selective participants were from Finland and the least ones, from the UK. These results can be used to design and/or adapt F&V-based products according to elderly consumers' liking, taking into account their country of origin and their dependency.

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1. Introduction

In Europe, population is aging: between 2010 and 2060, the part of the population over 65 years will grow from 16% to 29%, and also for elderly people aged over 80 years old, rising from 4% to 11% in the same time period (Eurostat., 2011; WHO, 2012). Beyond sociological, psychological and physiological factors, elderly appetite and food intakes also vary with their attitudes toward foods and preferences. Edfors and Westergren (2012) emphasised that: "Meeting the need for optimal nutritional status for older people living at home requires knowledge of individual preferences and habits, from

both their earlier and current lives". That is why proposing innovative food solutions has to be more personalised, taking into account elderly people's liking. It is relatively easy to tailor food offers according to personal preferences for autonomous elderly people. However, this is more difficult to achieve when elderly people become more dependent and delegate food related activities to caregivers (purchasing, meal preparation, etc.), and very difficult in a collective context (more dependent elderly people, living in nursing homes). Maitre et al. (2014) studied elderly people with different levels of dependency (living at home with either no help, help for non-food-related activities (cleaning, etc.), help for food-related activities (purchasing, cooking, etc.) or living in nursing homes). They highlighted that more dependent elderly people (living in nursing homes) were more selective and more at risk of mal-

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nutrition than autonomous ones (living at home without help). In a collective context, selective elderly people are harder to satisfy. Thus, a question can be raised: How could we characterise likes and dislikes of dependent elderly people? No previous comparative study about food liking and preferences has been carried out at the European level with different categories of dependency. No specific questionnaire has been developed to measure selectivity for a specific type of food.

Aging is also associated with insufficient intake of proteins (Hébel, 2012; Rousset, Patureau Mirand, Brandolini, Martin, & Boirie, 2003) and micronutrients (Elmadfa et al., 2009); which can lead to sarcopenia (Cruz-Jentoft et al., 2010), frailty and dependency (Cederholm et al., 2014; Raynaud-Simon & Lesourd, 2000). Some other studies deal with dependency, highlighting the importance of food in this population group and the fact that the elderly are more at-risk of malnutrition (D'Antoni, Sucher, & Coulston, 1996; Gollub & Weddle, 2004).

To fight against this phenomenon, enriched and nutritionally-dense foods were conventionally developed for elderly people from functional and nutritional points of view. The sensory quality of these products and the pleasure to consume them were not considered as a priority in their development. The European project OPTIFEL (optimised foods for elderly people) aims at tackling malnutrition by developing protein enriched products which are nutritionally relevant for elderly people and well appreciated (and so, consumed with pleasure). Studies concluded that maintaining pleasure while eating is positively associated with a higher food intake or a better nutritional status (Lesourd, Raynaud-Simon, & Mathey, 2001; Maitre, 2014). Thus, it is important to choose appreciated products and to take into account elderly people's liking. On the one hand, fruit and vegetables were chosen because they are sources of vitamins, minerals and fibre (EUFIC, 2012). They are also a solution to maintain a good level of hydration. A higher consumption of fruit and vegetables is correlated to a lower risk of stroke (see He, Nowson, & MacGregor, 2006 for complete review). Fruit and vegetables are also well appreciated (Baker & Wardle, 2003) and well consumed by the elderly (Billson, Pryer, & Nichols, 1999; Juan & Lino, 2007; Monceau, Blanche-Barbat, & Echampe, 2002). However, the consumptions still remain insufficient for elderly people all over Europe (Elmadfa et al., 2009; Ruokatiето., 2015) and below the portion of 400 g per day, recommended by the WHO (WHO, 2007). Moreover, bibliographic data do not indicate which fruit and vegetables are appreciated by elderly people. A better knowledge of fruit and vegetables' liking will allow adapting the offers to elderly people's appreciations.

On the other hand, fruit and vegetables represent an important part of the diet. The texture of processed fruits and vegetables can be adapted to chewing and swallowing problems of dependent elderly people. Thus, fruit and vegetables can be a good vector for protein and nutrient enrichments. A better knowledge of elderly people's fruits and vegetables liking would reach two final objectives: (1) Better matching of fruit and vegetables with elderly people's liking in order to increase fruit and vegetables consumption and (2) Help to propose appreciated fruit-based and vegetable-based products, enriched in proteins and nutrients, in order to reduce protein and nutrients deficiencies.

This study contributes to identify fruit and vegetables liking in dependent elderly people. Despite studies on consumption frequency, to our knowledge, no previous study has investigated elderly people's liking for specific fruits and vegetables, including questions like: which fruit and vegetables are appreciated? How to cook/prepare vegetables for elderly people?

The aim of the present paper is to study attitudes towards food, eating habits, and fruit and vegetables likes and dislikes of elderly people with different levels of dependency (living at home and delegating food purchasing, living at home and delegating meal

preparation and living in nursing homes, where everything is delegated). Then, this paper provides recommendations about which fruit and vegetables are appreciated in Europe. Therefore asking, can consensual products be found, according to country and dependency differences? Are there more appreciated cooking methods for vegetables?

2. Material and methods

2.1. Ethics

All participants were volunteers and gave their written agreement by signing a consent form to participate to the survey. Ethic approval was obtained from the Faculty Ethics Committee at the University of Leeds (MEEC 13-019) for the UK. All the experimental procedures used for the UK participants followed the rules and guidance set by the University of Leeds, the UK.

2.2. Participants

In 2009, Elmadfa et al. divided Europe in four regions (North, Central East, West and South) and showed that fruit and vegetables are more available in the South region. Thus, culture or availability across Europe may affect fruit and vegetables liking. So, in our study, data was collected from five countries to represent each region: Finland for North, Poland for Central East, France and UK for West and Spain for South.

Participants were recruited following three inclusion criteria: the age, the level of food dependency and the cognitive status. Regarding the age, elderly people between 65 and 98 years old were recruited (see Fig. 1). Three categories of food dependency, inspired from Sulmont-Rossé et al. (2015) were defined. The first category involved participants living at their home and needing help for food purchasing. In the second category, participants lived at home and needed help for meal preparation. Data from the Aupalesens survey showed that a category including delegating meal preparation and meals-on-wheels was homogenous enough to be significantly different from people needing help but not for

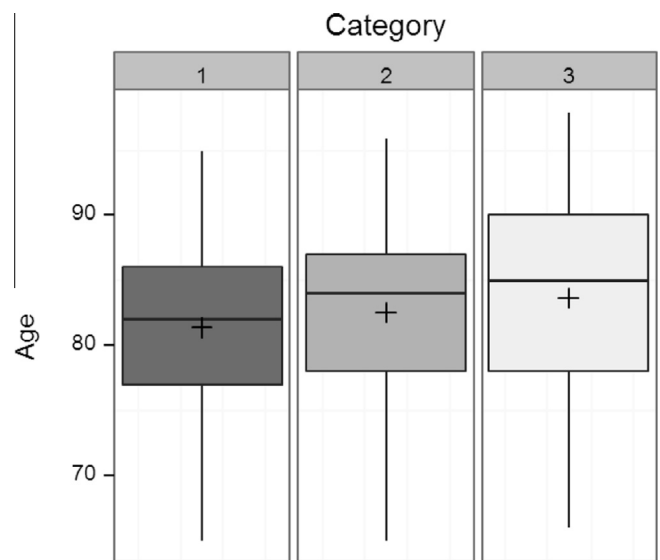


Fig. 1. Boxplots for age, detailed by dependency category. Category 1: participants living at home, with help for food purchasing. Category 2: participants living at home, with help for meal preparation or people with meals-on-wheels. Category 3: people living in nursing homes. Inside boxplots, crosses represent means while horizontal bars represent medians. No mean age difference (ANOVA: $F_{(2, 405)} = 2.992, p > 0.05$).

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