



Convenience food with environmentally-sustainable attributes: A consumer perspective



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ABSTRACT

The use of chemicals in agriculture poses risks on both human health and the environment. Regulatory measures, both mandatory and voluntary, have been introduced to promote a reduction in the use of pesticides. The proliferation of such standards is related to the gradual shift of consumer preferences towards food with reduced negative health and environmental impacts. Beside consumer demand for sustainable food products, convenience food is also assuming an increasingly important role in developed countries. Among such products, minimally-processed vegetables are showing a growing positive trend, but their production has also negative effects on the environment.

The goal of this study is to investigate the interaction between environmentally-friendly and healthy convenience food, and to investigate the determinants behind the purchase of healthy convenience food products with environmentally-sustainable attributes, focusing on minimally-processed vegetables labelled with voluntary standards related to integrated agriculture.

To do so, we started from the Theory of Planned Behaviour and tested the efficacy of an extended model by considering also other variables which were found to affect significantly food choices. Data were collected by means of face-to-face interviews with 550 consumers in charge of grocery shopping in the metropolitan area of Milan, in northern Italy. Structural equation modelling was performed to analyse the relative importance of the constructs on consumer behaviour. Results confirm the relations of Ajzen's theory and reveal positive relations with consumer food shopping habits, food-related environmental behaviour, gender, income and knowledge. A negative relation with agricultural practices concern also emerges, highlighting that the most concerned consumers may prefer other more stringent environmental certifications.

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1. Introduction

Convenience foods are assuming an increasingly important role in developed countries (Brunner, van der Horst, & Siegrist, 2010; Buckley, Cowan, & McCarthy, 2007; de Boer, McCarthy, Cowan, & Ryan, 2004). Time-saving foods are a large part of every-day food consumption both in the USA and Europe (Sheely, 2008). Among the reasons for such an upward trend, literature suggests consumer propensity towards quality, healthy and easy-to-consume attributes (Scholliers, 2015). Among convenience food, minimally-processed (MP) vegetables (fresh pre-packed vegetables) have been developed to meet consumer needs to manage time and still

benefit from the healthy characteristics of fruit and vegetables. The European industry of minimally-processed vegetables has shown a rapid growing positive trend, and data suggests that the market for minimally-processed fruit and vegetables has still promising margins of growth (Freshfel, 2015). Notwithstanding the fact that prices are higher than those for traditional fresh vegetables, in Italy, for example, the consumption of minimally-processed vegetables has increased by 380% in the last ten years (Sillani & Nassivera, 2015).

The analysis of market trends regarding the sector of minimally-processed vegetables raises the issue about the environmental sustainability of such economic activities. Indeed, convenience food has been largely criticized for the negative burden imposed on the environment compared to home-made products because of its use of water, energy, other resources, and waste production (Daniels, Glorieux, Minnen, van Tienoven, & Weenas, 2015; Rivera, Orias, & Azapagic, 2014). In the case of fresh minimally-processed fruit and vegetables, the negative environmental impacts refer mainly to

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the agricultural phase - in relation to the chemicals used - and to the processing stage, especially for what concerns the washing and packing phases (Fusi et al., 2016). Focusing on the risks and impacts related to the use of chemicals in the agricultural phase, these can be mitigated both by mandatory and voluntary standards.

At the mandatory level, in 2009 a set of European pesticide reduction policies have been enacted, imposing a more sustainable use of chemicals in agricultural production in all member States (Reg. 1107/2009; Directive 2009, 2009/128 EC/127 EC; Reg. 1185/2009). The so-called 'pesticides package' emphasises the importance of adopting integrated pest management (IPM) systems in agricultural production, i.e., a group of environmental-friendly practices like, for example, crop rotation, alternative cultivation techniques, the use of resistant/tolerant cultivars, balanced fertilization, and the protection of important beneficial organisms.

Besides these mandatory measures, different voluntary standards have also been developed. Organic certification is the most well-known instrument used to strictly limit the use of chemical pesticides, fertilizers and antibiotics in agricultural production (Reg. 834/2007). Moreover, many other voluntary standards have arisen both at the public and the private level within the EU. These imply stricter rules compared to the mandatory normative framework on pesticides (Banterle & Stranieri, 2013). 'Vergers écoresponsable' in France, 'Producción integrada' in Spain, 'Responsibly fresh' in Belgium, 'Qualità controllata' and 'Agriqualità' in Italy are some examples of European public standards for fruit and vegetables. Private standards refer mainly to retailer initiatives aimed at differentiating their private label products (Bazoche et al., 2014). Such standards are widely used within European countries and refer mainly to fresh and perishable products (Gil, Gracia, & Sánchez, 2000). In Italy, there are labels like, for example, 'Naturama' and 'Coop' that indicate the use of integrated pest management practices.

The proliferation of such standards is related to the gradual shift of consumer preferences towards food with reduced negative health and environmental impacts (Banterle & Ricci, 2013; Caracciolo et al., 2016; Cavaliere, Ricci, Solesin, & Banterle, 2014; Falguera, Aliguer, & Falguera, 2012). Indeed, agriculture-induced pollution - especially in relation to the use of pesticides and fertilizers - and its impact on human health are among the main concerns of European citizens (European Commission, 2014). While consumer preferences for organic food have been widely studied (Arvola et al., 2008; Bryła, 2016; Mauracher, Tempesta, & Vecchiato, 2013; Padilla Bravo, Cordts, Schulze, & Spiller, 2013; Shafie & Rennie, 2012; Yadav & Pathak, 2016), the investigation of attitudes towards other sustainable practices, like agricultural production based on integrated pest management systems, is still scarce in the literature, even if it is one of the main systems used to foster the sustainability of agricultural production in the EU (Bazoche et al., 2014; Govindasamy & Italia, 1998; Loureiro, McCluskey, & Mittelhammer, 2001; Scarpa & Spalatro, 2001). Moreover, consumer research on convenience food-eaters has explored mostly the determinants towards the consumption of this kind of products but it has not yet analysed environmental preferences during food purchase. Indeed, there is a growing segment of consumers that live in cities and suffer from time constraints. For this reason, they seek convenience food, but they can also be concerned with environmental issues, even though they are not primarily guided by ethical and environmental principles when making everyday food choices.

Our goal is to focus on convenience-food eaters that try to take into account environmental-related issues during food purchases. More precisely, the aim of our work is to investigate the determinants behind the purchase of healthy convenience food products with environmentally-sustainable attributes, focusing on

minimally-processed vegetables labelled with voluntary standards which refer to integrated pest management production systems.

To reach our goal, we started from the Theory of Planned Behaviour (TPB) as a framework to study consumer behaviour towards integrated pest management minimally-processed vegetables and tested the efficacy of an extended model by considering other variables which have been found to affect significantly food choices.

The paper is organized as follows. The next section will introduce the conceptual framework. The methodology follows. Then, the results are presented. Conclusions and implications are at the end of the paper.

2. Conceptual framework

The analysis takes the cue from Theory of Planned Behaviour (Ajzen, 1985) to study the determinants behind the purchase of healthy convenience food products with environmentally sustainable attributes. The conceptual framework considers the following variables based on Ajzen's theory: consumer attitudes towards integrated pest management minimally processed (IPM MP) vegetables, perceived availability of IPM MP vegetables, intention to buy IPM MP vegetables and purchase of IPM MP vegetables. Our analysis did not take into consideration subjective norms, as their efficacy in explaining consumer food choices is still highly debated in the literature (Armitage & Conner, 2001; Saba & Di Natale, 1998). Indeed, several food-related studies do not consider such variable or ascribe it as a poor predictor (Blanchard et al., 2009; Honkanen, Olsen, & Verplanken, 2005; de Bruijn, 2010).

Although the basic Theory of Planned Behaviour model has been successfully applied for predicting behaviour in many fields, it may not be a complete framework to capture all the determinants of food choice (Menozzi, Halawany-Darson, Mora, & Giraud, 2015). Indeed, the inclusion of other factors could help to increase the understanding of environmental behaviour (Steg & Vlek, 2009). On the basis of the existing literature, we extended the Theory of Planned Behaviour model with the following variables: food shopping habits, agricultural practices concern, food-related environmental behaviour, and consumer individual characteristics (Fig. 1).

Food shopping habits are found to be positively associated with the intention to buy health-related products, like fruit and vegetables (Brug, de Vet, de Nooijer, & Verplanken, 2006; Guillaumie, Godin, & Vézina-Im, 2010; Lien, Lytle, & Komro, 2002; Menozzi & Mora, 2012). This entails that food purchasing refers not only to reasoned behaviour based on a rational decision making process. According to Verplanken and Aarts (1999), when a strong habit is present, the expression of an intention might be guided by past behaviour rather than by attitudes. Several contributions have highlighted that habits influence intentions over and above attitudes (Bamberg, 2003; Köster, 2009; van't Riet, Sijtsema, Dagevos, & De Bruijn, 2011). For many food products, like vegetables, purchase is performed on a daily or almost daily basis, i.e., it is habitual. In such situations, people tend to make decisions on the basis of repeated actions. Looking for extrinsic product quality attributes during food shopping has been shown to contribute to consumer decision making. Scarpa and Del Giudice (2004) analysed the effects of protected designation of origin (PDO) and protected geographical indication (PGI) labels on consumer attitudes towards extra-virgin olive oil products in Italy. Bond, Thilmany, and Bond (2008) highlighted the role of different organic logos on consumer preferences towards fresh products. Van Loo, Caputo, Nayga, and Verbeke (2014) examined the role of different sustainability labels on consumer evaluation of meat products. Ragaert, Verbeke, Devlieghere, and Debevere (2004) studied the influence of shelf life

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