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Short Communication

## Organics unpacked: The influence of packaging on the choice for organic fruits and vegetables

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### ABSTRACT

In many supermarkets throughout Europe, it has become common practice in the fruit and vegetable department to offer options in plastic packaging. Recent trends, however, move towards the removal of packaging. The current study examines whether offering fruit and vegetables without primary packaging increases the likelihood that consumers choose these products. This is especially relevant for organic fruit and vegetables, given that plastic may be perceived as contrary to the sustainable nature of these products. A first experiment, using a student sample and an immersive 3D virtual supermarket environment, shows that choice for organic fruit and vegetables indeed increases when organics are offered without packaging. A second experiment with the virtual supermarket generalizes these findings to a sample of supermarket patrons, additionally showing that unpacked fruit and vegetables are preferred over packed options overall, both for organic and non-organic products. We conclude that removing the primary packaging of organic fruit and vegetables appears to be a promising intervention in attempts to increase organic sales.

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## 1. Introduction

In recent years, new supermarket concepts have appeared in many markets, offering products without packaging. Examples are Original Unverpackt in Berlin (Germany), Bag&Buy in Utrecht (the Netherlands), and Biocoop in Paris (France). Consumers buy or bring their own bags and jars and (re)fill these. The introduction of these new supermarket concepts and the interest they have raised indicate that despite obvious advantages of packaging, consumers may not always prefer products that are packaged. Well-established supermarket chains likewise adapt to consumer concerns about packing by leaving out packaging where possible (for instance the Albert Heijn in the Netherlands; [te Pas, 2015](#)).

The current study will examine consumer choice for packaged and unpacked products in the fruit and vegetable category. For various reasons, the fruit and vegetables category offers an opportune possibility to study the influence of packaging. Consumers are accustomed to finding options in this category both with and without packaging, ensuring that responses to packed/unpacked options are not due to novelty of the packaging but represent

learned preferences. Furthermore, the category is highly relevant as fresh food, of which fruit and vegetables are part, accounts for a large portion of consumer spending on food, grocery and personal care items, ranging from 32% in the US to 53% in Europe and 60% in Asia ([Karst, 2013](#)). But what is perhaps most intriguing, is the common practice to offer organic options *with* and non-organic options *without* packaging, as a way to ensure that these are not mixed up and are traceable. For instance, the frequently asked questions page about the organic program of producer Dole ([www.doleorganic.com](http://www.doleorganic.com)) mentions: "Many retailers prefer to merchandise organic bananas in plastic bags so that they can be clearly distinguished from conventionally grown bananas and ensure that the consumer purchases the product at the correct price. Additionally, some supermarkets also prefer the plastic bags to guarantee the organic integrity of the product. The organic claim is, in fact, about how the product is grown, however, supermarkets are responsible for maintaining separation of organic from conventional fruit in order to avoid cross-contamination". As consumers tend to view packaging as wasteful and many consumers prefer more environmentally friendly packaging ([Kassaye & Verma, 1992](#); [Rokka & Uusitalo, 2008](#); [Thøgersen 1999](#)), this results in the counterintuitive situation in which more sustainable options are offered in what at least appears to be a less sustainable format and vice versa. It has enticed consumer protests, as evidenced by

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initiatives to protest the use of plastic to package organic produce (e.g., the blogpost <http://myplasticfreelife.com/2009/06/organic-food-in-plastic-packaging-isnt/> and the recent change.org petition in Australia (Law 2015)). This implies that there may be a missed opportunity to increase the sales of organic products by offering these products unpacked.

Unpacked offering of fruit and vegetables on the store shelves concerns what is known as 'primary packaging': the immediate container of the product itself (Wu & Dunn, 1995). Secondary and shipping packaging, which are needed for storage, identification, and transport, and which are discarded before the product is placed on the store shelves, are not the topic of the current investigation. The main objective of the current study is to examine if offering organic fruit and vegetables without primary packaging increases their choice likelihood. We assess this in two controlled experiments, using students (experiment 1) and a sample of supermarket patrons (experiment 2), and employing immersive 3D virtual technology in both experiments.

### 1.1. The functions and costs of packaging

How a food product is packaged can influence consumers' taste impressions (Becker, van Rompay, Schifferstein, & Galetzka, 2011), generate emotional responses (Liao, Corsi, Chrysochou, & Lockshin, 2015), and predispose consumers to purchase (Murray & Delahunty, 2000). Packaging has many functions and prior research has proposed various categorizations for these functions (Marsh & Bugusu, 2007; Prendergast & Pitt, 1996; Rundh, 2005). Three overarching categories recur throughout the literature related to (1) containment and handling, (2) protection and preservation, and (3) information and communication. First, packaging has a containment function, keeping the product together and facilitating handling both throughout the supply chain and by the end-consumer (Marsh & Bugusu, 2007). This includes logistical convenience in terms of ease in storing the product and moving it through the supply chain (Prendergast & Pitt, 1996). Some of the packaging involved, such as pallets and wrapping to allow bulk handling, never reaches the consumer. A second main function of packaging is its ability to protect the product from outside influences and preserve the quality of the product itself. Packaging acts as a barrier to safeguard a product from physical influences (e.g., crushing during transport), chemical influences (e.g., exposure to moisture) and biological influences (e.g., micro-organisms) (Marsh & Bugusu, 2007; Rundh, 2005). At the same time, packaging can help preserve product quality by helping to maintain favorable product aspects, such as preserving the carbon dioxide in carbonated soft drinks. A third main function of packaging is communication and information provision. Packaging can help consumers identify products and brands, draw attention to a product, and provide relevant information about the product itself and its use (Prendergast & Pitt, 1996; Underwood, Klein, & Burke, 2001; Van Herpen & Pieters, 2007; Wells, Farley, & Armstrong, 2007). Because food products are often characterized by a homogeneous appearance of the unpacked product, this function is especially relevant as a means to differentiate and position these products (Simms & Trott, 2010).

Packaging can perform these functions, but this comes at a cost. This entails both the monetary cost of the packaging material itself and the environmental burden that packaging causes (Kassaye & Verma, 1992; Simms & Trott, 2010). Packaging can reduce food losses throughout the supply chain, and this has been argued and shown to outweigh the packaging waste itself in various cases (Williams & Wikström, 2011), especially when packages can be recycled or reused. In consumer perception, however, packaging often represents wastefulness, and is seen as a symbol of the 'throwaway society' (Roper & Parker, 2013). The current study

examines how packaging influences consumer choice, as important input for managerial decision making. We do not study whether packaging has positive or negative overall environmental consequences nor do we take a normative stance on whether packaging is or is not wasteful. We examine how packaging affects consumer choice for fruit and vegetables so that manufacturers and retailers can use this information in their decision on whether to use packaging, alongside other relevant information.

### 1.2. Main hypothesis

Although packaging clearly has distinct advantages for consumers in terms of convenience, food safety, and information, there is also empirical evidence that consumers dislike packaging. In the context of fruit and vegetables, prior research indicates that consumers' ideal fruit and vegetables are unpacked (van der Pol & Ryan, 1996). There may be various reasons for this preference: it is easier to touch the product, which is both rewarding by itself and a way to check quality (Peck & Childers, 2006; van der Pol & Ryan, 1996), consumers do not need to buy a preset amount but are free to choose any number of items, and consumers may perceive less environmental impact of packaging. The latter might be especially important for organic options, where unpacked products may fit better with the environmental product image of the product, as we will examine.

The main hypothesis underlying this study is that unpacking organic fruit and vegetables will increase their choice likelihood. We will test this hypothesis in two experiments. Additionally, we examine whether the effect of unpacking is larger for organic than for non-organic products, and whether consumers with a more positive attitude towards organics respond more strongly to unpacking, to explore whether the unpacking is especially impactful for organic products.

## 2. Experiment 1

This experiment provides a first test of the hypothesis, using a controlled environment and a convenience sample of students. To increase realism of the task and a feeling of being present in the choice environment, we used a representation of a brick-and-mortar supermarket in an immersive 3D virtual environment.

### 2.1. Method

#### 2.1.1. Participants and design

Participants were 100 undergraduate and graduate students at a Dutch university (68% female, mean age 22 years), who were recruited around campus. They were randomly assigned to one of the conditions of a two group design. They either saw an assortment of fruit and vegetables in which the organic products were packed (and non-organic unpacked) or an assortment in which the non-organics were packed (and the organics packed). Packaging consisted of plastic material, with the product clearly visible. Plastic was chosen because it is a common packaging material in the fruit and vegetable category, and the use of plastics has increased due to the low cost of materials and functional advantages (Marsh & Bugusu, 2007). A check in the INNOVA database, a food and beverage product database that includes packaged products from over 70 countries worldwide ([www.innovadatabase.com](http://www.innovadatabase.com)), supports the prevalence of plastic packaging for fresh fruit and vegetable. We calculated the percentage of packaged fresh fruit and vegetables for which plastic was used as packaging material across five European countries (the Netherlands, the UK, the Czech Republic, Denmark, and Spain), resulting in percentages ranging from 87% to 95%. Plastic is thus the most commonly used packaging material for packaged fresh fruit and vegetables throughout Europe.

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