



Mediation and moderation in food-choice models: a study on the effects of consumer trust in logo on choice



R. Zanolì^{a,*}, S. Naspètti^a, M. Janssen^b, U. Hamm^b

^a Università Politecnica delle Marche

^b University of Kassel

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ABSTRACT

The paper introduces a way to analyse the influence of mediating and moderating variables on willingness to pay in a simple way. Using data on 427 Italian consumers regarding different organic logos, mediation and moderation analysis is applied for the first time in a discrete choice setting. We tested the hypothesis that trust in logo mediates the relationship between the logo and consumer choice for organic labelled food products. Results do not allow rejecting the hypothesis that trust in logo totally mediates the effect of the logo. Therefore, the willingness for organic products could be interpreted as “cost for trust”: the higher the trust the higher the perceived value-for-money. The mediation effect of trust in logo does not vary across points-of-purchase or regions. Our novel approach is susceptible of various applications when analysing choice data and can be extended further.

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1. Introduction

Mediation analysis is a means of testing hypothetical processes and mechanisms through which an independent variable, Z , might have an indirect effect over a dependent outcome variable, Y , through one or more *mediators*, M , sometimes called *intervening* or *process variables* [1–4].

Usually mediation analyses are applied in the framework of simple OLS multiple regression or other methods of estimation e.g. logit, multilevel modelling, and structural equation modelling (SEM) (among others: MacKinnon [5], Hayes [6], Hayes [7], Valeri & VanderWele [8]).

Moderation refers to the effects of a qualitative or quantitative variable “that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable” [2]. It is a very different concept from mediation. For example, gender differences may exist in the impact of, say, brand awareness on actual purchase intention. In this case, the variable gender interacts with the variable brand awareness in predicting the outcome of purchase intention. We say that gender is a *moderator* of the impact of brand awareness on purchase intention.

In this paper, we apply mediation and moderation analysis to discrete choice data to analyse the role of trust in logo in mediating willingness-to-pay (WTP) for organic labelled products, by adapting the original Baron & Kenny’s [2] approach to discrete choice models¹. We also investigate the moderating role of the point-of-purchase on this mediation, while accounting for regional variation.

Our results show that overall trust in the organic logo completely mediates consumers’ choice of organic apples and eggs. In other words, since organic logos are cues to trustworthy organic quality, trust in these logos completely explains (causes) consumer choice and related WTP. This causality is moderated by the point-of-purchase, since exposure to (and awareness of) different logos varies in different types of shops. That trust in organic quality is a key factor in purchase decisions for organic products is not a new finding (see e.g. Naspètti & Zanolì [9]). The novelty of our analysis is to directly relate trust in logo with WTP, hence rendering the

¹ Recently, mediation researchers have criticized the original seminal work of Baron & Kenny [2] and focused more on the estimation of the indirect effect of M on Y [6]. These works criticize the “joint significance” approach of Baron & Kenny on the following grounds: a) its supposed low power in detecting the effect of the mediator variables, b) the fact that the indirect effect is not tested directly but “inferred logically by the outcome of a set of hypothesis tests” [6]. Some of these critiques have been retracted [12] and are not very relevant in our case, since in this paper we focus on the mediation effect ($M \rightarrow Y$) and *not* on the indirect effect ($X \rightarrow M \rightarrow Y$).

* Corresponding author.

E-mail address: zanoli@agrecon.univpm.it (R. Zanolì).

perceived product price as an indicator of “cost for trust”. Dually, the more the trust embedded in a specific (organic) logo, the higher the perceived value for money. Given perceived customer value is a function of perceived benefits and perceived sacrifices [10,11], we believe that our findings are relevant since allow to directly relate a higher level benefit (trust) to an attribute (price), being logos (extrinsic attributes) just a visible cue of higher quality, which in turn increases the perceived value.

Finally, this paper introduces a way to analyse the influence of mediating and moderating variables on WTP in a simple way, using random parameter estimation or mixed logit model. Coefficient estimates for attributes that are fully mediated by other variables should, in principle, be zero. Moderation is handled by decomposing any heterogeneity observed within the random parameters.

The rest of the article is organised as follows. Section two describes the choice data. In section three we illustrate the method of investigation and the different types of models used for testing for mediation and moderation effects. Section four reports the results and their discussion, while the last section concludes.

2. Data

We use partial data from the Janssen & Hamm’s [13] survey that analysed the impact of different organic certification logos on consumer’s WTP. This study focussed on 6 EU countries and two products (apples and eggs) and analysed how the logo choice is influenced by consumer awareness and perception of different organic logos and by consumer characteristics regarding the buying behaviour for organic food.

Choice experiments were conducted to elicit the WTP for different organic certification logos. In subsequent structured interviews, data was collected on factors that might influence consumers’ WTP.

2.1.1. Choice experiment

The data we use here refer to the choice experiment in apples. Recruited participants needed to buy organic apples at least once per month. The choice of the product obviously influences the WTP, though the scope of our study was not to observe differences between the WTP in relation to the organic category, as in Krystallis and Chrysoschoidis [14].

The hypothetical choice experiment was designed to resemble a real buying situation and to be incentive-compatible. Unlike in other studies with choice experiments (e.g. Loureiro & Umberger [15], Lockshin *et al.* [16], Lusk & Schroeder [17]), we used real organic apples instead of pictures or descriptions of products. Typical product information was shown on the price tag, which was identical across the alternatives (variety, domestic origin). Furthermore, the participants were paid a cash incentive and were instructed that they would have to pay for the chosen apples just like in a real shop to reduce the hypothetical bias [17]. For tax reasons, at the end of the choice experiment, the participants were informed that they could not be given the apples they had chosen and they could keep the money.

Each participant completed two choice sets for organic apples. Each choice set contained four products, which looked identically but were marked with different organic logos and prices (Figure 1). Four different organic logos were tested: three organic logos plus an alternative without a logo. In addition, the participants could also choose not to buy any of the offered alternatives (“no-buy option”). The no-buy option was included to make the buying decision more realistic. Furthermore, previous studies showed that forced choice might lead to biased results [18]. The logos were chosen to represent the most frequently available logos in all distribution channels (supermarkets and specialised organic shops); they were



Fig. 1. Choice experiment setting.

chosen on the basis of previous focus groups and a survey in retail shops. The old voluntary EU logo was used in the experiments, since the survey was conducted prior to the introduction of the new mandatory EU logo. The other logos used were CCPB (Certificazione e controllo prodotti biologici), the most common private organic certification logo in Italian supermarkets, and DEMETER, a worldwide private organic certification logo for biodynamic products. The logo awareness was specifically tested for by a means of Likert-type scale (1= completely unknown 7 = well-known, with awareness threshold rating above 4): the EU logo had an awareness of 83.4%, the other two logos lower (50.5% and 46.5% respectively, in the total sample). Indeed the CCPB logo is mainly found in brands sold in supermarkets (awareness; 51.9%), while the DEMETER one in specialised shops (awareness: 63.8%). Figure 2.

Four different price levels were tested. One month before the experiments were conducted, the average market price of organic apples/eggs was determined, based on which the tested prices were chosen (Table 1).

An orthogonal fractional factorial experimental design with 16 different choice sets was used for the systematic variation of the price levels across the organic labels. The sample was divided into eight blocks. Although it was not designed to minimize d-efficiency, the design was evaluated post-hoc using Ngene 1.1 (d-efficiency = 1.94).



Fig. 2. Choice sets with labels and prices.

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