

# An Empirical Examination of the Perceived Quality of Fruits

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**Abstract.** *This paper deals with the issue of analyzing quality fruit consumer preferences in order to determine the effects of intrinsic versus extrinsic clues in the perceptions of quality. The author built and developed a Perceived Quality Model. It shows a quantitative estimation of the Perceived Quality Model in the analysis of quality perception of food such as fruit.*

## Introduction

Today's firms must act within markets whose degree of complexity is continually increasing. This complexity is due, among other things, to the phenomenon of globalisation and internationalisation that these markets are currently undergoing.

The profiles of consumers and firms have evolved over time with a shift from a reactive to a more proactive approach. This phenomenon has led to new policies of differentiation, among which QUALITY stands out.

Based on the study of how consumers behave with respect to quality, it can be concluded that individuals often have a very limited idea of this characteristic, and hence imperfect information can be said to be the basis of the problem of quality. It is imperative for individuals to develop strategies that will allow them to have a greater knowledge of the quality of different products, thus the importance of searching. Nelson completed this assessment in 1970 by categorizing products as "search goods" or "experience goods", depending on which methods for data collection consumers prefer.

Such a classification has helped us to lay the background of our study, as it relates to the category of experience goods. A perishable product was chosen, and it was deemed important for the consumer to acquire the necessary tools for information gathering on its quality.

## I. Methodology for Building a Perceived Quality Model

### 1. Empirical Proof

The most relevant *theoretical model of the quality perception process* for this study is that of Olson (1972), due to its framework and conceptual contributions.

The predictive value of the attribute or cue (PV), the confidence value of the cue (CV) and the intrinsic or extrinsic (I-E) value of the cue, all have great theoretical potential for explaining attribute, effect or the quality perception process.

Intrinsic cues were defined by Olson & Jacoby in 1972 as those attributes "that cannot be experimentally changed or manipulated without at the same time, modifying the physical characteristics of the product itself". Therefore, whether or not a cue is intrinsic or extrinsic depends on its relationship with the physical product. If the latter changes when the cue is modified, that cue is called intrinsic; if it does not change, it is extrinsic.

The relevance of the intrinsic-extrinsic dichotomy is apparent in the large number of research papers it has generated (Rudell, 1979; Purwar, 1982; Steenkamp *et al.*, 1986; Steenkamp, 1990). Also it serves as a system for interpreting and understanding the results obtained in different studies. Intrinsic cues are generally more important in the quality perception process than those which are extrinsic. This is pivotal in the present research and seems as an initial hypothesis to test.

A review of the empirical literature available on the subject revealed that concern for increased knowledge of the "quality perception approach" goes back more than

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half a century. Numerous proposals and attempts appear in the literature at finding a more suitable definition of the concept of quality.

Having analyzed different conceptual models attributed to "perceived quality" that have surfaced over the years, the following definition was deemed more appropriate for the purpose of this study:

• "The overall global or multidimensional evaluation that a consumer makes of a product that will create certain expectations based on certain cues conditioning his/her choice, which will differ from the evaluation made by another consumer considering the situational moment, the type of product and the socio-demographic profile characterizing him/her."

Of all possible questions that "perceived quality" could raise, researchers of consumer behaviour have focused their work on how consumers evaluate quality. Much effort has been devoted to uncover the indicators or signs of quality used by consumers in their judgments regarding this concept. However, after several decades of research on this topic, the results have culminated in a "small consensus as to its magnitude, universality and statistical consistency". We would venture to say that this is fundamentally due to the difficulties involved in achieving a certain universality when varying behaviors are compared at least partially, or according to the category of product chosen in each study, the geographical disparity or the lack of homogeneity in the methodology used in each research work.

With this multidimensional conceptualization as a starting point, perceived quality can be measured using:

- a single cue (e.g. price),
- multiple cues (e.g. brand, type of establishment and advertising),
- variables which affect the cues in question (e.g. the container affects freshness).

By emphasizing the multidimensional nature of quality, it becomes evident that studies on individual attributes are considered to be less suitable than studies involving multiple attributes for investigating the effect of quality attributes on the quality perception process because the former generate greater biases and have many limitations.

Furthermore, a review of a large number of articles<sup>1</sup> reveals that consumers use a limited number of cues when perceiving quality, ranging from 4 to 7. As will be seen, our research corroborates this fact. The use of a specific cue depends on the type of product in question and on personal and circumstantial factors. Accordingly, price can be considered a sign of quality which certain consumers

generally trust, in the case of certain product price is fundamentally perceived as a sign of quality and more so when other cues are lacking.

Most of the empirical evidence relating to perceived quality uses extrinsic attributes of long-lasting and technologically complex consumer products, while fewer studies refer to perceived quality based on the intrinsic attributes of perishable products of frequent consumption. This constituted a further justification for choosing the food and agricultural sectors for our empirical study.

## 2. Perceived Quality Model

All of these considerations were taken into account in the *Perceived Quality Model* we propose (from now on termed the CALPER Model). Given the impossibility of including all the variables such as different purchase situations, types of products and consumer characteristics, only certain factors affecting the process of perceived quality by the consumer will be retained.

More specifically, from the set of variables forming part of our model, two groups of variables were distinguished because of the perishable nature of *food and agricultural products*: intrinsic and extrinsic.

As *intrinsic* variables, and following the definition given by Olson & Jacoby, the intrinsic variables taken into account are: *the feel, the colour, the flavour, the smell, the vitamin content, the size, the texture, the shape, the familiarity with the product and the freshness*. These ten intrinsic cues were chosen over others because documentary analysis carried out has shown their relevance at the moment a consumer defines quality when evaluating a food product via sensory perceptions.

*Extrinsic* variables include packaging, whether or not the product was sold loose, advertising, brand, promotion, origin, price, sales force, opening hours, proximity, parking facilities and variety. These extrinsic cues were selected following the same criteria as in the case of intrinsic variables. We took into account those which were not only included in the more than one hundred articles reviewed, but also proved to have a significant effect on the measurement of quality.

The model includes the different relationships between the variables considered and some intermediate variables affecting the perception of quality. Therefore to reach such a concept, it is necessary to add successive levels, given the peculiarity of a construct about which no direct information is available. This accumulation of levels is what constitutes the most original part of our work.

Thus, at a *first level* of the model we identified the intrinsic and extrinsic cues which define two variables, specifically: the tangible nature of the product and the intangible image of the product.

1. Research carried out by Sulé (1998) offers a complete view of the empirical evidence existing on Perceived Quality.

The *second level* is made up of those variables obtained at the first level which were found to be directly related to the construct of "Perceived Quality".

The peculiarities of this model combined with the deep interest shown recently by researchers in Marketing and the immense vacuum existing in this area, led us to choose structural equation systems as the method for estimating the relationships established among the variables pertaining to the two levels of aggregation, thus determine the hypotheses to be tested.

This typical methodology of structural equation systems fits our model perfectly and allows for its validation. Our in depth study reveals that it suited our objectives, since we believe that consumers acquire an expectation when demanding a product which is based on personal experience, beliefs, and on objective attributes. In the language of structural equation models are identified with observable variables. Consequently, an abstraction is produced which accounts for the consumer subjective expectation from the product, and which in this type of model is identified with non-observable latent variables that is giving rise to the construct of "Perceived Quality".

### 3. Empirical Research

Our empirical research focused on fruit, as a product of the food and agricultural sectors but also typical of the Mediterranean diet. It was chosen because of the small amount of research being devoted to this product compared with most popular products as cheese, meat products, wine, etc.

It is obviously a generic product with all the singularities and limitations involved in a perishable good meant for immediate consumption; its purchase involves a little reflection, but nevertheless is influenced by a series of variables inherent in the product and to the consumers themselves.

The general objectives of this study are therefore:

- To learn the cues consumers use in their perception of the quality of this generic product and the variables that identify these cues.
- To weigh or investigate the relative importance of each cue in the evaluation of quality.
- To be able to measure and conceptualize the perceived quality based on the results obtained from the empirical research.

In order to reach these objectives, field work was carried out which began with a pretext given to 40 individuals, followed by a structured personal questionnaire which collected information on Castilian-Leonese consumers' habits when buying fresh fruit; it then became feasible to measure attitudes and classify the sample of the study.

The definitive questionnaire consisted of eleven questions, only three of which were considered in multivariate analysis.

Due to the fact that qualitative data was used, a problem arose when it was time to decide what to ask and how to measure the response. The lack of academic consensus made it difficult to select the number of categories to be used in the scales for measuring the variables. For our purposes, we decided to use an ordinal scale of five categories, where the number one was equal to "very important" and number five "not important at all".

The personal questionnaire was given to 420 purchasers of food products. After eliminating 20 biased or incomplete questionnaires, the final sample consisted of 400 consumers, as can be seen in Table 1.

Using probability sampling, the sample units were selected randomly at the entrance and exit doors of establishments. This type of sampling is scientifically based on statistical theory, and allows us to demarcate the errors committed or to evaluate precision. Thus we can affirm that there was a sampling error of  $\pm 5\%$  with a confidence level of 95.5%.

Within probability sampling, our procedure for selecting the sample can be classified as multistage, since it was necessary to proceed by stages and then stratify according to type of city, age and type of establishment with proportional allocation.

Habitat or city, age, level of studies, number of persons living in the home and occupation were the socio-demographic variables used to identify the profile of fruit consumers, thus providing us information on different quality attributes.

In order to analyze the information, the data collected from the sample chosen were then codified and tabulated and a data base was made from which the empirical study was carried out. A matrix of 400\*22 was obtained, that is, 400 rows corresponding to the individuals surveyed, and 22 columns representing the variables used in the analysis.

TABLE 1	
TECHNICAL SPECIFICATIONS OF THE SURVEY	
POPULATION	BUYERS OF FOOD PRODUCTS
SAMPLE UNIT	PERSONS OVER 18 YRS. OF AGE WHO MAKE DECISIONS ABOUT FAMILY PURCHASING
FIELD	THE CITIES OF BURGOS, LEÓN, SALAMANCA AND VALLADOLID (SPAIN)
TYPE OF SURVEY	PERSONAL, AT THE ENTRANCES AND EXITS OF ESTABLISHMENTS
SAMPLE SIZE	400 VALID QUESTIONNAIRES
SAMPLE ERROR	$\pm 5\%$ , FOR A CONFIDENCE LEVEL OF 95.5% ( $K = 2$ ), IN THE MOST UNFAVOURABLE CONDITION ( $P = Q = 0.5$ )
TYPE OF SAMPLING	MULTISTAGE WITH STRATIFICATION ACCORDING TO CITY, AGE AND TYPE OF ESTABLISHMENT WITH PROPORTIONAL ALLOCATION. RANDOM SELECTION OF INDIVIDUALS TO BE SURVEYED
PERIOD OF FIELD WORK	MARCH AND APRIL, 1996

## II. Estimation of the CALPER Model

The specification of the model made it necessary to follow three stages in order to model "Perceived Quality":

1st stage. *Preparation of the data matrix*: The matrix consisted of 400 consumers who gave their opinion of 22 quality cues, and had to be purified in order to achieve a normalized sample to work with that respected the assumption of normality.

2nd stage. *Exploratory Factor Analysis (EFA)*: this allowed us to specify the factorial links between the latent variables and the observed variables used to measure them, thus insuring the reliability of each construct when estimating causal relations (Viswesvaran & Ones, 1995).

3rd stage. *Confirmatory Factor Analysis (CFA)*: this multivariate technique analyses and confirms a relationship previously established by exploratory factorial analysis by specifying the causal relations established between the latent variables or constructs through a path diagram and the equations defining the model.

Confirmatory Factor Analysis allows to estimate the proposed model in order to contrast it empirically using a procedure of maximum likelihood available in major structural analysis programs such as Lisrel, Amos and EQS.

When working with continuous or interval variables, both the maximum likelihood method and the unstandardized least squares method (ULS) are fitting procedures habitually used for estimating the parameters. An important difference between these methods is that the maximum likelihood method is based on the assumption that the variables follow a normal multivariable distribution, while the ULS method is not based on this assumption (Bisquerra, 1989: 508). Therefore, the most advisable method, whenever possible, is that of maximum likelihood.

Furthermore, it has the advantage of providing reliable estimators of the goodness of fit and of calculating errors and Student's *t* statistics in such a way that they can be interpreted directly; the ULS method does not allow, for this because the errors are not standardized. The latter procedure would be used only if there were colinearity among the variables, since the determiner of the matrix would be zero, meaning that the inverse matrix could not be calculated, and therefore neither could the estimators (Lévy, 1997).

These three stages, which follow a logical sequence, gradually eliminated from the 22 observable variables chosen those which either violated the normality of the sample and caused duplicates of information and multicollinearity, had factorial loading under 0.40 (Bagozzi & Baumgartner, 1994), or hindered the obtaining of good fit indices (Hair *et al.*, 1995). Consequently, of the 22 initial variables chosen for measuring the Perceived Quality of

fruit, only 6 ultimately formed part of the model.

The relations established in the CALPER Model constituted the hypothesis intended for contrast in our research.

The following hypotheses were formulated among those previously tested in the literature (Zeithaml, 1988 & Steenkamp, 1989) and which we attempted to ratify:

H1: Quality is a multidimensional concept which is perceived based on both intrinsic and extrinsic cues.

H1I: Intrinsic cues affect the perceived quality of food products more so than extrinsic cues.

These two hypotheses constitute the general objective and starting point of our research. Below are listed the remaining hypotheses to be tested with the model of perceived quality and which form part of our specific objectives. As such, they link variables and establish relations which first arose from reasoning and subsequently from the empirical method.

The hypotheses expressed at the second level of the CALPER Model would be the following:

H1A: The intrinsic cues which determine the tangible nature of the product, exert a positive effect on the perception of quality.

H1B: The extrinsic cues which determine the intangible image of the product, exert a positive effect on the perception of quality.

With these two hypotheses we intended to test the idea that evidently the better each cue (intrinsic or extrinsic) of the product is perceived by the consumer, the higher the perceived quality of this product will be.

The relationships established at the first level of the model proposed are expressed in the following hypotheses:

H2A: A positive relation exists between size, texture, shape and the tangible nature of the product.

H2B: A positive relation exists between sales force, opening hours, parking facilities and the intangible image of the product.

This list of hypotheses reflects the relations established between the two levels of aggregation that make up the CALPER Model of Perceived Quality.

Each of the stages described previously together with the evaluation of the model by means of the fitting indices, led us to the estimation of the second level Confirmatory Factor Model on Perceived Quality or *CALPER Model*, which permitted the modeling of perceived quality using structures of covariance. This led to the definition of the final construct and to the test of our starting hypotheses.

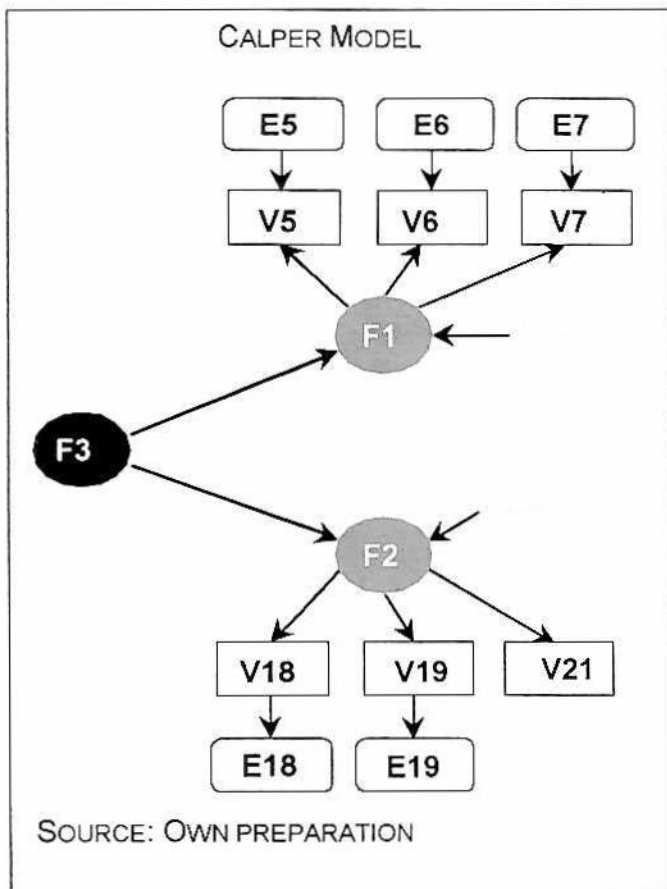
As can be seen, the model has been specified based on six observable variables: size (V5), texture (V6), shape (V7), sales force (V18), opening hours (V19) and parking facilities (V21); two latent independent variables: tangible nature (F1) and intangible image of the product (F2) and the construct of perceived quality (F3).

TABLE 2

RESULTS OF THE CALPER MODEL

2ND LEVEL CONSTRUCT	1ST LEVEL CONSTRUCT	STANDARD FACTORIAL LOAD	CUES	STANDARD FACTORIAL LOAD	STUDENT'S T TEST	STANDARD ERROR
PERCEIVED QUALITY (F3)	TANGIBLE NATURE OF THE PRODUCT (F1)	0.29	SIZE (V5)	0.87	12.52	(0.08)
			TEXTURE (V6)	0.58	10.83	(0.06)
			SHAPE (V7)	0.82	*	*
	INTANGIBLE IMAGE OF THE PRODUCT (F2)	0.21	SALES FORCE (V18)	-0.44	-8.12	(0.06)
			OPENING HOURS (V19)	0.61	*	*
			PARKING FACIL.(V21)	1	14.96	(0.11)

GOODNESS OF FIT INDICES  
 $\chi^2(9) = 17.101$ ;  $P = 0,047$   
 GFI = 0.98; AGFI = 0.96 RMR = 0.05 CFI = 0.99



The results obtained from the estimation of the model are shown in Table 2.

It is evident from these results that we were able to obtain certain significant variables by means of covariance structures. These variables serve to measure directly the tangible nature and the intangible image of the product, in other words, its intrinsic and extrinsic cues. Furthermore, we were also able to obtain the second level construct, or Perceived Quality, after second level Confirmatory factorial analysis.

The CALPER Model allows us to measure quality according to indirect effects by using six cues. Our study can thus corroborate that consumers use an average of between 4 and 7 cues when forming their perceptions of quality, as suggested by research with different types of products carried out by Olson & Jacoby.

All the statistics obtained in the estimation of this model are highly significant and therefore the definition of the *tangible nature of the product* (IN) based on the size (TAM), texture (TEX) and shape (FOR) of the fruit can be considered very acceptable. As to the *intangible image of the product*, (EX), the cues considered to be determinant after confirmatory factorial analysis are: sales force (VTA), opening hours (HOR) and parking facilities (APAR).

The results obtained allowed us to contrast the hypotheses previously formulated and they are shown in Table 3.

As can be seen in the first structural equation, perceived quality is the result of the combination of intrinsic and extrinsic cues after estimation of the model with the AMOS statistical package. The estimator of the tangible nature of the product is higher than the structural parameter representing the intangible image of the product. These positive effects of the two constructs considered in our model of perceived quality show that the two main hypotheses (HI, HII) are confirmed and therefore correspond to the general of the research.

Underlying the acceptance of both hypotheses is the positive relation between the tangible nature of the product and perceived quality, on the one hand, and on the other, the positive effect the intangible image of the product has on perceived quality. Thus hypotheses H1A and H1B are corroborated at the same time.

The tangible nature of the product was the result of the positive effect exerted by the combination of size, texture

TABLE 3

STRUCTURAL EQUATION SYSTEM OF THE CALPER MODEL. AMOS ESTIMATORS ACCORDING TO THE MAXIMUM LIKELIHOOD PROCEDURE. CONTRAST OF HYPOTHESES		
HIPOTHESES	STRUCTURAL EQUATIONS	
HI	H1A H1B	CALPER = 0.29 IN+0.21 EX
HII	H2A H2B	IN = 0.87 TAM + 0.58 TEX + 0.82 FOR
		EX = -0.44 VTA + 0.61 HOR + 1 APAR

and shape, with size and shape being the two intrinsic cues that had the most influence on the construct mentioned. Hypothesis H2A is therefore accepted.

As to the extrinsic attributes consumers considered most relevant when buying fruit, we were surprised to find the negative effect obtained for the variable "sales force". Our interpretation coincides with the current trend in the commercial distribution system. Changes in consumer habits on the verge of a new millennium mean that strategies must be developed that take quality into account where self-service establishments offer longer opening hours and parking facilities and whose sales force plays a merely advisory and not essential role in the sale of fruit. Therefore, H2B is partially accepted, since a positive effect was obtained solely for the attributes opening hours and parking facilities as being the intangible image of the product.

## Conclusions

The best way to reach a consumer with a product is to have that product meet the consumer's expectations. If what

is expected of a product is quality, then it is essential to know what is understood by quality. However, it would be a mistake to ask consumers directly for a definition of quality because of the difficulties that this would entail. For this reason we preferred to use a less direct means of finding out what consumers expect to find when looking for a fruit namely, by measuring quality using a sequential process with indirect effects. It is therefore necessary to convert the objective scoring given by consumers into subjective constructs.

We consider our empirical research to be an original attempt at explaining consumer behaviour with regard to Perceived Quality. Our research shows that firms in the fruit sector should use a *strategy of quality differentiation* for competing on the market. While the quality expected of fruit will depend on the perception of both intrinsic and extrinsic quality, the latter is of lesser importance. The intrinsic characteristics of size, texture and shape, together with the extrinsic attributes of sales force, opening hours and parking facilities should all be taken into account in a firm's policy decisions, since these are the quality indices used preferably by today's consumers. ☺



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