



## Does time constrain affect consumer intention to purchase? A case study with orange/pomegranate juice

F. Reis<sup>1\*</sup>, L. Machín<sup>2</sup>, A. Rosenthal<sup>3</sup>, R. Deliza<sup>3</sup>, G. Ares<sup>2,4</sup>

<sup>1</sup> Departamento de Tecnologia de Alimentos, Instituto de Tecnologia, Universidade Federal Rural do Rio de Janeiro, BR 465 km 7, CEP 23890-000 Seropédica, RJ, Brazil – email: felipereis86@yahoo.com.br

<sup>2</sup> Centro de Investigación Básica en Psicología. Facultad de Psicología. Universidad de la República. Tristán Narvaja 1674. CP 11200. Montevideo, Uruguay.

<sup>3</sup> Embrapa Agroindústria de Alimentos, Av. das Américas, 29501, CEP 23.020-470, Rio de Janeiro, RJ, Brazil

<sup>4</sup> Sensometrics & Consumer Science, Instituto Polo Tecnológico de Pando, Facultad de Química, Universidad de la República. By Pass de Rutas 8 y 101 s/n. C.P. 91000, Pando, Canelones, Uruguay

**ABSTRACT** – The influence of time pressure on consumer perception may be particularly relevant for the design of food packages. The aim of the present work was to evaluate the influence of time-constraint on results from a rating-based conjoint task, using pomegranate/orange juice as case study. One hundred consumers evaluated the intention to purchase of images of juice bottles, which were designed by manipulating the following variables: bottle design, front-of-pack nutritional information, nutrition claim and processing claim. They were randomly divided into two experimental conditions: control and time-constraint. Consumers with a time-constraint gave significantly higher intention to purchase scores than those in control condition, but time-constraint did not largely modify the way in which consumers evaluated their intention to purchase. In both experimental conditions consumers gave higher intention to purchase scores for bottles with traditional design, which included processing claim and front-of-pack nutritional information. Result suggests that graphic design could help consumers to make healthier food choices.

**KEYWORDS:** consumer research; decision making; label design; nutrition information.

### 1. INTRODUCTION

Decision-making is determined by two systems: System 1, which is characterized by intuitive decisions and quick and automatic access to information, and System 2, which is responsible for effortful and rational decisions (Kahneman, 2011). System 1 relies on heuristics, which are simplified strategies that usually ignore part of the available information (less-is-more) to make decision in a fast way, frugally and more accurately (Gigerenzer & Gaissmaier, 2011). The extent to which the two systems are used for decision-making is influenced by individual characteristics, the personal relevance of the decision, mood, as well as situational factors (Bettman, Luce, & Payne, 1998; Evans, 2008).

One of the situational factors that encourage heuristic processing is time pressure (Samson & Voyer, 2014). Time pressure can be defined as the amount of information, which can be considered and processed during a certain period of time (Ben Zur & Breznitz, 1981). When people have limited time to take decisions they tend to change the way in which they acquire information, to ignore important information and to base their decisions on heuristics (De Paola & Gioia, 2016; Gigerenzer & Godstein, 1996; Rieskamp & Hoffrage, 2008). In this situation, consumers have been reported to make conservative or safer choices in order to avoid potential negative consequences of wrong decisions (Ben Zur & Breznitz, 1981).



Feelings of time pressure are increasingly common as modern lifestyle makes people feel that they do not have enough time to do all they want to do in a day (Godbey, Lifset, & Robinson, 1998). These feelings affect the amount of time people invest for purchasing, preparing, and consuming foods (Jabs & Devine, 2006). The influence of time pressure on consumer perception may be particularly relevant for the design of food packages, which are increasingly used to convey several product benefits to consumers. Studies have shown that consumers do not usually process all the available information on packages for making their food choices, particularly when making their decisions under time pressure (Varela, Antúñez, Cadena, Giménez, & Ares, 2014; Zellman & Kaye-Blake, 2010). In several instances label design can override written information, suggesting that it may be an effective strategy to communicate product benefits (Oliveira et al., 2016). In this sense, package and label design has been reported to have a large impact on consumers' perception of food products (Ares et al., 2011; Deliza & MacFie, 1996; Fiszman, Carrillo, & Varela, 2015; Skaczkowski, Durkin, Kashima, & Wakefield, 2016; Smith, Mogelvang-Hansen, & Hyldig, 2010).

It can be hypothesized that imposing a time-constraint in consumer studies may increase the ecological validity of the results. The aim of the present work was to evaluate the influence of time-constraint on the consumer intention to purchase, using pomegranate/orange juice bottles as case study.

## 2. MATERIALS AND METHODS

### 2.1. Participants

One hundred fruit juice consumers (72% female; 18-45 years old) participated in the study. They were recruited among students and workers at the Psychology Faculty (Universidad de la República, Uruguay), according to their interest and availability to participate in the study. Participants signed an informed consent form and received a small gift for their participation.

### 2.2. Stimuli

Sixteen images of orange/pomegranate juice bottles were designed according to a 2<sup>4</sup> full factorial experimental design with the following variables: bottle design (traditional vs. minimalistic), front-of-pack nutritional information (absent vs. traffic-light system), nutrition claim (absent vs. "Rich in antioxidants"), and processing claim (absent vs. "Developed using high hydrostatic pressure, a process that guarantees product quality and safety"). The nutritional composition of the juices was similar to the commercial fruit juices available in the Uruguayan market, and corresponded to high sugar content (Calories: 105 Kcal; Sugar: 25g; Fat and Saturated Fat: 0g; Sodium: 1mg). All compulsory information was included on the labels. Bottles did not correspond to products available in the Uruguayan market to avoid any influence of consumers' previous knowledge.

### 2.3. Experimental Procedure

Consumers had to look at each of the 16 images presented in a computer screen and rate their intention to purchase using 7-point scales (1=definitely not, 4=maybe yes, maybe not, 7=definitely yes). The order of images presentation was balanced.

Participants were randomly divided into two groups of 50, each of which evaluated the bottles using two experimental conditions: control and time-constraint. They were given instructions to imagine they are at the supermarket to buy food for their breakfast. One of the groups evaluated the images without time constraint (control group) and was allowed to look at each of the bottle images as



long as they wanted to. When they made a mouse click the scale appeared on the screen and they had to rate their intention to purchase. The second group evaluated the bottles with a time-constraint: they had to look at each image for the pre-determined period of time (3s). After that time the scale appeared on the screen and they had to rate their intention to purchase. The time-constraint was selected based on pilot testing.

## 2.4. Data Analyses

Consumers' intention to purchase scores were analyzed using a mixed linear model considering subjects as a random effect and the four design variables, time constraint and their interaction as sources of variation (Naes, Kubberod, & Sivertsen, 2001). The relative importance of the conjoint variables for each variable was estimated following the procedure proposed by Green & Srinivasan (1978). Data were also analyzed separately for each experimental condition considering design variables and their interaction as fixed sources of variation and consumer as random effect.

All statistical analyses were performed with the software R language (R Core Team, 2014) using the lmerTest package (Kuznetsova, Brockhoff, & Christensen, 2015).

## 3. RESULTS AND DISCUSSION

Intention to purchase scores were significantly affected by the experimental condition ( $p < 0.001$ ). Consumers who completed the task with a time-constraint gave significantly higher intention to purchase scores than those in the control condition (without time-constraint) (5.0 vs. 4.7). In both experimental conditions, intention to purchase scores were significantly affected by bottle design, processing claim and front-of-pack nutritional information ( $p < 0.001$ ).

When data from each experimental condition were analyzed separately, conclusions regarding the influence of bottle design did not largely differ (Table 1). In both experimental conditions consumers preferred bottles with traditional design which included processing claim and front-of-pack nutritional information. The F-value of bottle design was markedly larger than those of the other design variables, suggesting that bottle design was the most relevant variable for consumer purchase intention. The average intention to purchase score for traditional bottles was 4.6, whereas it was 3.1 for minimalistic bottles.

The F-values of the main effect of bottle design tended to be larger when consumers completed the task with a time constraint, whereas the opposite effect was observed for processing claim and nutrition claim (Table 1). This suggests that the relative importance attributed to bottle design tended to be higher in the time-constraint condition than in the control condition, whereas the relative importance given to processing claim and front-of-pack information tended to be lower.

Besides, the interaction between bottle design and processing claim, which was marginally significant in the global ANOVA ( $p = 0.055$ ), was only significant when consumers evaluated bottle images without time-constraint. For this consumer group, the influence of processing claim was larger when the minimalistic bottle design was considered (3.5 vs. 2.7) compared to the traditional bottle design (4.4 vs. 4.1).

Table 1 – F -values of the mixed linear model performed on intention to purchase scores for the conjoint analysis task performed under two experimental conditions: with and without time-constraint.

Source of variation	Without time-constraint	With time constraint
Processing claim	30.50***	10.91**



Bottle design	145.94***	187.02***
Front-of-pack nutritional information	15.95***	5.21*
Nutrition claim	1.91	0.83
Processing claim * Bottle design	7.62**	0.11
Processing claim * Front-of-pack nutritional information	1.18	0.91
Processing claim * Nutrition claim	0.00	0.08
Bottle design * Front-of-pack nutritional information	0.41	0.02
Bottle design* Nutrition claim	0.04	0.11
Front-of-pack nutritional information * Nutrition claim	0.16	0.47

\*, \*\* and \*\*\* indicate significant effects at 0.05, 0.01 and 0.001 significance level, respectively

In both experimental conditions consumer intention to purchase for orange/pomegranate juice was significantly affected by bottle design, processing claim and front-of-pack nutrition information. Bottle design was the most relevant variable affecting consumer intention to purchase, in agreement with previous studies that show the impact of package and label design on consumer perception (Ares et al., 2011; Fiszman et al., 2015; Skaczkowski Durkin, Kashima, & Wakefield, M., 2016; van Rompay, Deterink & Fenko, 2016). Similar results have been previously reported by Ares, Besio, Giménez, & Deliza (2010). According to these authors package colour and the presence of a picture on the label were more important than the addition of antioxidants in shaping consumer intention to purchase chocolate milk desserts. Similarly, Oliveira et al. (2016) reported that when consumers evaluated regular and probiotic milk labels, health-related associations were generated by graphic design and not by the functional aspect of the products.

High hydrostatic pressure was positively perceived by consumers, as they tended to give significantly higher scores for juice bottles that claimed to be produced using this technology. Although consumers may have not been familiar with the technology, as it is still not being commercially used in Uruguay, they reacted positively to the processing claim included on the packages, in agreement with several studies showing a positive attitude towards this processing technology (Olsen et al., 2011; Romano, Rosenthal, & Deliza et al., 2015; Lee, Lusk, Miroso, & Oey, 2015, 2016).

Several studies have shown that the traffic-light system is one of the most effective systems under experimental conditions (Borgmeier & Westenhoefer, 2009; Drescher, Roosen, & Marette, 2014; Sonnemberg et al., 2013). However, in the present study the inclusion of the traffic-light system indicating that the juices had high sugar content, significantly increased consumer intention to purchase scores. This result could be explained considering the positive hedonic expectations generated by high sugar content. Other studies have shown that the traffic light system did not significantly modify consumption of unhealthy products (Borgmeier & Westenhoefer, 2009; Sacks, Rayner, & Swinburn, 2009; Elbel, Gyamfi, & Kersh, 2011; Tandon et al., 2011; Dodds et al., 2014).

## 4. CONCLUSIONS

Results from the present work suggest that the consideration of a time-constraint in a rating conjoint did not largely modify the way in which consumers evaluated their intention to purchase. However, a trend towards a more superficial evaluation of the labels that skipped complex information was observed.

Bottle design was the variable with the largest relative importance regarding the influence of product characteristics on consumer intention to purchase orange/pomegranate juice, overriding the influence of nutritional or processing characteristics. This result suggests that the industry could use graphic design to help consumers to make healthier food choices.



## 5. ACKNOWLEDGEMENTS

The authors are indebted to Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq, Brazil) and Comisión de Investigación Científica (Universidad de la República, Uruguay) for financial support.

## 7. REFERENCES

- Ares, G., Besio, M., Giménez, A., & Deliza, R. (2010). Relationship between involvement and functional milk desserts intention to purchase. Influence on attitude towards packaging characteristics. *Appetite*, 55, 298-304.
- Ares, G., Piqueras-Fiszman, B., Varela, P., Morant Marco, R., Martín López, A., & Fiszman, S. (2011). Food labels: do consumers perceive what semiotics want to convey? *Food Quality and Preference*, 22, 689–698.
- Ben Zur, H., & Breznitz, S. J. (1981). The effect of time pressure on risky choice behavior. *Acta Psychologica*, 47, 89–104.
- Bettman, J. R., Luce, M. F., & Payne, J. W. (1998). Constructive consumer choice processes. *Journal of Consumer Research*, 25, 187–217.
- Borgmeier, I., & Westenhoefer, J. (2009). Impact of different food label formats on healthiness evaluation and food choice of consumers. A randomised-controlled study. *BMC Public Health*, 9, 184.
- De Paola, M., & Gioia, F. (2016). Who performs better under time pressure? Results from a field experiment. *Journal of Economic Psychology*, 53, 37–53.
- Deliza, R., & MacFie, H. J. H. (1996). The generation of sensory expectation by external cues and its effect on sensory perception and hedonic ratings: a review. *Journal of Sensory Studies*, 11, 103-128.
- Dodds, P., Wolfenden, L., Chapman, K., Wellard, L., Hughes, C., & Wiggers, J. (2014). The effect of energy and traffic light labelling on parent and child fast food selection: a randomised controlled trial. *Appetite*, 73, 23-30.
- Drescher, L.S., Roosen, J., & Marette, S. (2014). The effects of traffic light labels and involvement on consumer choices for food and financial products. *International Journal of Consumer Studies*, 28, 217-227.
- Elbel, B., Gyamfi, J., & Kersh, R. (2011). Child and adolescent fast-food choice and the influence of calorie labeling: a natural experiment. *International Journal of Obesity*, 35 493–500.
- Evans, J.S. (2008). Dual-processing accounts of reasoning, judgment and social cognition. *Annual Review of Psychology*, 59, 255–278.
- Fiszman, S., Carrillo, E., & Varela, P. (2015). Consumer perception of carriers of a satiating compound. Influence of front-of-package images and weight loss-related information. *Food Research International*, 78, 88–95.
- Gigerenzer, G., & Goldstein, D.G. (1996). Reasoning the fast and frugal way: Models of bounded rationality. *Psychological Review*, 103, 650–669.
- Gigerenzer, G., & Gaissmaier, W. (2011). Heuristic Decision Making. *Annual Review of Psychology*, 62, 451–482.
- Godbey, G., Lifset, R., & Robinson, J. P. (1998). No time to waste: An exploration of time use, attitudes toward time, and the generation of municipal solid waste. *Social Research*, 65(1), 101–140.
- Green, P. E., & Srinivasan, V. (1978). Conjoint Analysis in Consumer Research: Issues and Outlook. *Journal of Consumer Research*, 5, 103–23.
- Jabs, J., & Devine, C.M. (2006). Time scarcity and food choices: An overview. *Appetite*, 47, 196-204.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2015). *Package 'lmerTest'*. Available at: <https://cran.r-project.org/web/packages/lmerTest/lmerTest.pdf>. Last accessed January 3rd, 2016.



XXV Congresso Brasileiro de Ciência e Tecnologia de Alimentos

Alimentação: a árvore que sustenta a vida

X CIGR Section IV International Technical Symposium

Food: the tree that sustains life

24 a 27 de outubro de 2016 • FAURGS • GRAMADO/RS

- Lee, P. Y., Lusk, K., Miroso M., & Oey, I. (2015). Effect of information on Chinese consumers' perceptions and purchase intention for beverages processed by High Pressure Processing, Pulsed-Electric Field and Heat Treatment. *Food, Quality and Preference*, 40, 16–23.
- Lee, P. Y., Lusk, K., Miroso M., & Oey, I. (2016). Effect of information on Chinese consumers' acceptance of thermal and non-thermal treated apple juices: A study of young Chinese immigrants in New Zealand. *Food Quality and Preference*, 48, 118–129.
- Næs, T., Kubberød, E., & Sivertsen, H. (2001). Identifying and interpreting market segments using conjoint analysis. *Food Quality and Preference*, 12, 133–143.
- Oliveira, D., Machín, L., Deliza, R., Rosenthal, A., Walter, E. H., Giménez, A., & Ares, G. (2016). Consumers' attention to functional food labels: Insights from eyetracking and change detection in a case study with probiotic milk. *LWT - Food Science and Technology*, 68, 160–167.
- Olsen, N. V., Menichelli, E., Grunert, K.G., Sonne, A.M., Szabó, E., Bánáti, D., & Næs E. (2011). Choice probability for apple juice based on novel processing techniques: Investigating the choice relevance of mean-end-chains. *Food Quality and Preference*, 22, 48–59.
- R Core Team. (2014). R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing.
- Rieskamp, R., & Hoffrage, U. (2008). Inferences under time pressure: How opportunity costs affect strategy selection. *Acta Psychologica*, 127, 258–276.
- Romano, K. R., Rosenthal, A., & Deliza, R. (2015). How do Brazilian consumers perceive a non-traditional and innovative fruit juice? An approach looking at the packaging. *Food Research International*, 74, 123–130.
- Sacks, G., Rayner, M., & Swinburn, B. (2009). Impact of front-of-pack 'traffic-light' nutrition labeling on consumer food purchases in the UK. *Health Promotion International*, 24, 344–352.
- Samson, A., & Voyer, B. G. (2014). Emergency purchasing situations: Implications for consumer decision-making. *Journal of Economic Psychology*, 44, 21–33.
- Skaczkowski, G., Durkin, S., Kashima, Y., & Wakefield, M. (2016). The effect of packaging, branding and labeling on the experience of unhealthy food and drink: A review. *Appetite*, 99, 219–234.
- Sonnenberg, L., Gelsomin, E., Levy, D. E., Riis, J., Barraclough, S., & Thorndike, A. N. (2013). A traffic light food labeling intervention increases consumer awareness of health and healthy choices at the point-of-purchase. *Preventive Medicine*, 57, 253–257.
- Tandon, P. S., Zhou, C., Chan, N. L., Lozano, P., Couch, S. C., Glanz, K., Krieger, J., & Saelens, B. E. (2011). The Impact of Menu Labeling on Fast-Food Purchases for Children and Parents. *American Journal of Preventive Medicine*, 41, 434–438.
- van Rompay, T. J. L., Deterink, F., & Fenko A. (2016). Healthy package, Healthy product? Effects of Packaging Design as a Function of Purchase Setting. *Food Quality and Preference*, In press: doi: <http://dx.doi.org/10.1016/j.foodqual.2016.06.001>.
- Varela, P., Antúnez, L., Cadena, R. S., Giménez, A., & Ares, G. (2014). Attentional capture and importance of package attributes for consumers' perceived similarities and differences among products: a case study with breakfast cereal packages. *Food Research International*, 64, 701-710.
- Zellman, E., & Kaye-Blake, W. (2010). Identifying consumer decision-making strategies using alternative methods. *Qualitative Market Research: An International Journal*, 13, 271–286.