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FOOD DECISION, INFORMATION AND PERSONALITY

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Abstract: This study introduces measures of personality traits in an experiment which associate willingness to pay for food and sensory analysis tools in order to explore potential links between personality and food decisions. Measure of personality traits comes from experimental economics (risk aversion and time preference) and from psychology (sensation seeking and impulsivity). We introduce them in the analysis of behaviours of participants in their food decisions (purchase intent, willingness to pay, reaction to new information), and underline some significant links.

Keywords: food decision, information, experimental methods, risk aversion, time preference, personality traits

JEL Codes: C91, D12

----- First draft, please do not quote -----

1. Introduction

Two hundred food decisions are daily taken (Wansink and Sobal, 2007) and are the issue of interactions between information (internal and external) and consumer personality. These decisions that could appear relatively natural are very complex and could change even if the alternatives are the same. This complexity is due to interactions between physiology and psychology, and interaction between environment and information. It is not possible to study jointly all these complex interactions for food decision process. Thus, in this paper, we are interested by the interaction between food information and personality traits. In order to explore this topic, we conduct an experiment that combines tools from sensory evaluation, experimental economics and psychological evaluation.

Some recent papers show significant links between personality traits and behaviours in various experiments: risk aversion reduces the probability of willing to eat, to buy, to accept and of having eaten GMO food (Lusk and Cobble, 2005, USA); drug users are less risk averse than non drug users with the same socio-demographic characteristics (Blondel et al., 2007, France); self-employed workers are less risk averse than salaried workers (Masclat et al., 2009, France); fishermen are less risk averse and more patient than other (Nguyen, 2009, Vietnam); male smokers have a higher preference for present than male non-smokers (Harrison et al., 2009, Denmark), for instance. Previous experimental studies on effect of information on food decision

(e.g. Lange et al., 2002; Noussair et al., 2004; Stefani et al., 2006) did not find strong links between consumers' reactions and their socio-demographic characteristics. In this paper, our hypothesis is that food decision mechanisms could be related to personality traits which are not usually taken into account in consumer behaviour studies (e.g. risk aversion, time preferences, sensation seeking, and impulsivity). In order to test this hypothesis, we conducted a two-stage experimental study. As we introduce "real people" in a laboratory, it is an "artefactual field experiment" (Harrison and List, 2004). In the first stage, consumers' reactions to nutritional and health information on a common product (orange juice) were measured through willingness-to-pay elicitation. In the second stage, some personality traits were evaluated through games and questionnaires. Personality traits were then linked with observed purchase behaviours and reactions to food information.

Our hypotheses about correlations between personality traits and food decision are that: (H1) risk aversion could be linked with a higher sensitivity to information on nutrition and health compared to risk seeking; (H2) preference for present could be linked with no impact of information on nutrition and health, whereas preference for future could be linked with a high sensitivity to this type of information; (H3) impulsivity could be linked with preference for immediacy and with action while ignoring information; and (H4) sensation seeking could be linked with risk taking and low sensitivity to information on nutrition and health. In order to test these behavioural hypotheses, we use the data from the two stages of the experiment. Through econometric estimations and by controlling for socio-demographics variables, we analyse the effect of personality traits on: (1) the likelihood of purchasing a product; (2) the level of willingness to pay; and (3) variation in purchase intent and in willingness to pay due to new information, notably on nutrition and health.

We describe our experimental design and methodologies in section 2. We present and discuss our experimental and behavioural results in section 3, and conclude and open the discussion in section 4.

2. Design and methodologies

2.1. General design

In spring 2005, we conducted eleven experimental sessions which lasted about two hours. All the sessions took place in a sensory room equipped with separated booths, where the temperature was controlled ($23\pm 1^{\circ}\text{C}$). After explanations about the different parts of the session and about WTP method (including incentive system), participants who agreed signed an informed consent form and they began the experiment by answering to a quiz relating to orange juice. After, participants were faced to four products and five information conditions. In each twenty cases, they gave their hedonic score (HS) for the product, their purchase intention (PI) and their willingness to pay (WTP) to get the product. In a second part, participants were asked to perform five behavioural choice tasks with real incentives and to complete two personality questionnaires. In a third part, participants had to answer some questions about their socio-demographic characteristics and orange juice consumption habits. Lastly, each participant received a fixed fee of 20 euros for her/his participation (plus gains from behavioural choice tasks).

2.2. Participants

The recruitment protocol used for this study was the same as the one used by Lange et al. (2002). It was conducted in order to recruit naïve consumers of all socio-economic classes. This procedure consists of a random selection of phone numbers by districts (INSEE areas) of the town where the study was performed (Dijon, France) in order to obtain a large range of socio-economic classes.

420 letters were sent to inform people that we will call them about a consumer study. Individuals contacted by phone were selected if (1) they drank orange juice at least one time by week, (2) they consumed more than one litre (for a household > 2) per week, (3) they consumed orange nectar, orange juice made with concentrate or pure orange juice, and (4) they regularly participated in food purchasing for their household. Seventy-four consumers who satisfied all the conditions and who agreed to participate in this orange juice tasting where they could buy juice were recruited (17.62% of mailing), plus fifteen consumers from INRA who satisfied the

same conditions (they were recruited for a pilot which was successful and then introduced in the sample).

Information obtained by phone and from the questionnaire filled in during the session gave us details about individual characteristics of the participants. Table 1 presents summary statistics for the socio-economic variables describing the sample used in this paper. For the analysis, we excluded some consumers: one who never bought anything, one who did not want to purchase product but write a purchasing price, and subjects who exhibit inconsistency in measurement of personality trait. Last, one consumer did not give us his usual purchase price (we excluded him from analysis only when this variable matter).

Table 1. Summary statistics of the sample (N=77)

Variable	Mean	(S.D.)
Female	66.2%	
Age (years)	36.2	(13.5)
Age: less than 25	25.9%	
Age: 25-35	29.9%	
Age: 35-45	19.5%	
Age: 45-55	13.0%	
Age: more than 55	11.7%	
Household monthly income (euros)	2655.8	(1931.6)
Income: less than 1000	19.5%	
Income: 1000-2000	23.4%	
Income: 2000-3000	22.1%	
Income: 3000-4000	20.7%	
Income: 4000-5000	6.5%	
Income: more than 5000	7.8%	
Household: 1 adult	22.1%	
Household: 2 adults	61.0%	
Household: more than 2 adults	16.9%	
Household: no child	61.0%	
Household: 1 child	16.9%	
Household: 2 children	14.3%	
Household: more than 2 children	7.8%	
Occupation: student	24.7%	
Occupation: without activity / job search	5.2%	
Occupation: mid-time/full-time job	63.6%	
Occupation: retired	6.5%	

2.3. Products

Orange juice was chosen for its large and frequent consumption, and its long shelf-life. In a first time, we selected twelve orange juices which are representative of the market, for product type (four nectars, four juices made with concentrate and four pure juices) and price. We conducted preliminary sessions of sensory evaluation with these products where participants (N=20) tasted a sample of each orange juice in blind condition and gave their hedonic score for it. The results of this test led us to choose: one nectar first price brand (low hedonic mean), one nectar distributor brand (medium hedonic mean), one pure juice first price brand (low hedonic mean), and one pure juice distributor brand (medium hedonic mean) which gave us a well balanced set of product types and prices (table 2).

Table 2. The four orange juice, one litre each (spring 2005)

Orange juice	Type	Brand	Package	Market prices (Euros)
NFP	Nectar	First price	Card pack	0.31
ND	Nectar	Distributor	Glass bottle	1.00
PJFP	Pure juice	First price	Glass bottle	0.63
PJD	Pure juice	Distributor	Plastic bottle	1.51

At each tasting (nine in the whole experiment), 40ml of orange juice was presented in a plastic glass at the temperature of $6\pm 1^{\circ}\text{C}$ and consumers were asked each time to drink the whole sample.

2.4. Information conditions

In this experiment, consumers were faced with five conditions (named “Phases”) with increasing/cumulative information. In previous studies (Lange et al., 2002; Stefani et al., 2006), there were three conditions (blind, label, full information). Here, we introduced more details in the “label” condition by adding some nutritional/health information. Table 3 presents these 5 conditions. In all conditions, presentation of the four samples followed a Williams Latin Square balanced for order and first-order carry-over effects (MacFie et al., 1989).

Table 3. The 5 conditions of information

Phase A – Blind	Here, the unique source of information for the consumer was his senses. 1) First, a dummy product was presented. Consumer only gave a hedonic score (it was an orange juice made with concentrate). 2) After, consumer tasted the four other samples.
Phase B – Labels	Consumers only saw on their screen a colored picture of the product (bottle with visible label) on grey background.
Phase C – Definitions	1) The three orange juices were defined (see appendix A) 2) Colored picture presented in Phase B were newly presented with the appropriate definition written near the picture.
Phase D – Nutritional / health information	1) Began by an informative text about nutrition (see appendix B) 2) After, consumer saw same picture as in Phase C (colored picture of product and his definition) with his ingredients as written on the bottle. Ingredients can give indication about origin, composition, energetic value and nutritional value.
Phase E – full information	Included Phase D and a taste of four products.

2.5. Purchase intention (PI) and willingness to pay (WTP) elicitation ¹

At the beginning of the experiment, we explained the WTP procedure and gave some examples to underline the importance to report the real maximum price (or reservation price) that they were ready to pay for a product. During the experiment, each time they had to give their WTP (twenty times: four products and five conditions), participants took a price-card and report if they wanted to purchase or not the product (PI). If they did not want to buy the product, they reported “no” and did not write any price for this orange juice in this condition. If they reported “yes”, they were invited to report the maximum price they were willing to pay for one litre of the orange juice (WTP).

During the explanation of the incentive system, participants were informed that only one condition out of the five, randomly chosen by one of them at the end of this part of the session, would become effective (for all the present participants). This procedure was chosen to avoid “endowment effect” and to have “isolation effect” (Kahneman and Tversky, 1979). In this situation, consumers considered each product in each condition independently, they had the same probability to be effectively in each condition, and thus there was no strategy in this “game”. For choosing the product on which we applied the real incentive, we used the same procedure, but here, each consumer randomly chose one product out of the four.

¹ - We do not use hedonic scores in this paper.

We had the choice between two types of incentive system: an auction where the participants with the highest prices can purchase the product as in a second price Vickrey auction (Vickrey, 1961) or the Becker-DeGroot-Marshack (noted BDM) procedure (Becker et al., 1964). If we hypothesize that auctions introduce competition between participants, then it is not the good procedure for the evaluation of a good which is regularly consumed and available without restriction on the market (see Lohéac and Issanchou, 2007, for a discussion, and Lusk and Shogren, 2007, for methodologies and applications). Thus, we applied the BDM procedure to elicit participants' WTP. If a participant reports that he did not want to purchase the product, the procedure stops. If he reports that he wants to purchase the product, he draws a "seller price" in a bag containing sixty-one tokens, representing the price market distribution, and compares it with his "buyer price". If the "seller price" is higher than the "buyer price", the participant does not purchase the product. If the "seller price" is equal or lower than the "buyer price", the participant really purchases the product at the "seller price".

2.6. The behavioural part of the experiment

In the second part of the experiment, which includes four subparts, we present the task before each of them to the participants.

First, participants are exposed to two series of ten choices (situations) between lotteries replicated from Holt and Laury (2002) and Lusk and Coble (2005). Between the two series, we introduce a scaling effect (x5) as in Holt and Laury (2002) which conduct us to have the same task as Lusk and Coble (2005). This method to elicit risk aversion is based on choices between two lotteries with real gains in euros as presented in Appendix 1a and 1b. The incentive system for these games consists on the drawing by subjects of one amongst twenty situations, and of a one token numbered from 1 to 10 to determine the monetary gain. This method allows us to measure an individual degree of risk aversion for relatively low gains.

Second, participants are exposed to three series of ten choices (situations) between two options based on Mitchell (1999): a low immediate reward and a delayed reward. Between the two first series, the delay comes from 15 days to 90 days and the delayed reward stay at 10 euros. Between the last two series, gains are growing from 10 to 20 euros with the same delay (90 days). These series are presented in Appendix 2a, 2b and 2c. The incentive system for these games consists on the drawing by subjects of one amongst thirty situations. The participant

receives his choice at the indicated date (as in Blondel et al., 2007): now if it is immediate reward or by bank transfer if it is a delayed reward. This method allows us to measure an individual time preference for relatively low reward and for relatively short delays.

Third, participants are invited to answer to 20 choices between two alternatives linked with their point of view on their way of life. These choices are two subscales of Sensation Seeking Scale V (SSS-V, Zuckerman, 1994), validated in their French version by Carton et al. (1992). Due to some characteristics of this scale, we conserve only two subscales between four: “Experience seeking” (ES) dimension (10 choices), and “Boredom susceptibility” (BS) dimension (10 choices). The ES factor addresses the preference for mentally arousing activities and a nonconforming lifestyle, and the BS factor measures aversion to routine in one’s life and intolerance of boring people. The two other dimensions are “disinhibition” (non-conformity with standards of acceptable social behavior and includes drinking, gambling, and sex) and “thrill and adventure seeking” (preference for the thrills inherent in risky activities such as parachute jumping).

Fourth, participants are invited react to 30 situations from the Barratt Impulsivity Scale 11 (BIS-11, Patton et al., 1995) for which they answer by “rarely/never”, “occasionally”, “often” or “always”. The French version was validated by Baylé et al. (2000)². The three subscales of the BIS-11 are “Non-planning activity” (NPA) dimension (11 situations), “Motor impulsivity” (MI) dimension (11 situations), and “Cognitive impulsivity” (CI) dimension (8 situations). The NPA factor addresses lack of “futuring” and forethought, MI factor involves acting without thinking, and CI factor addresses making quick decisions (Barratt, 1985).

These two scales and their sub-scales provide us some instruments to identify personality traits of the subjects who participate to this experiment.

3. Experimental and behavioural results

3.1. Some results about personality traits measurement³

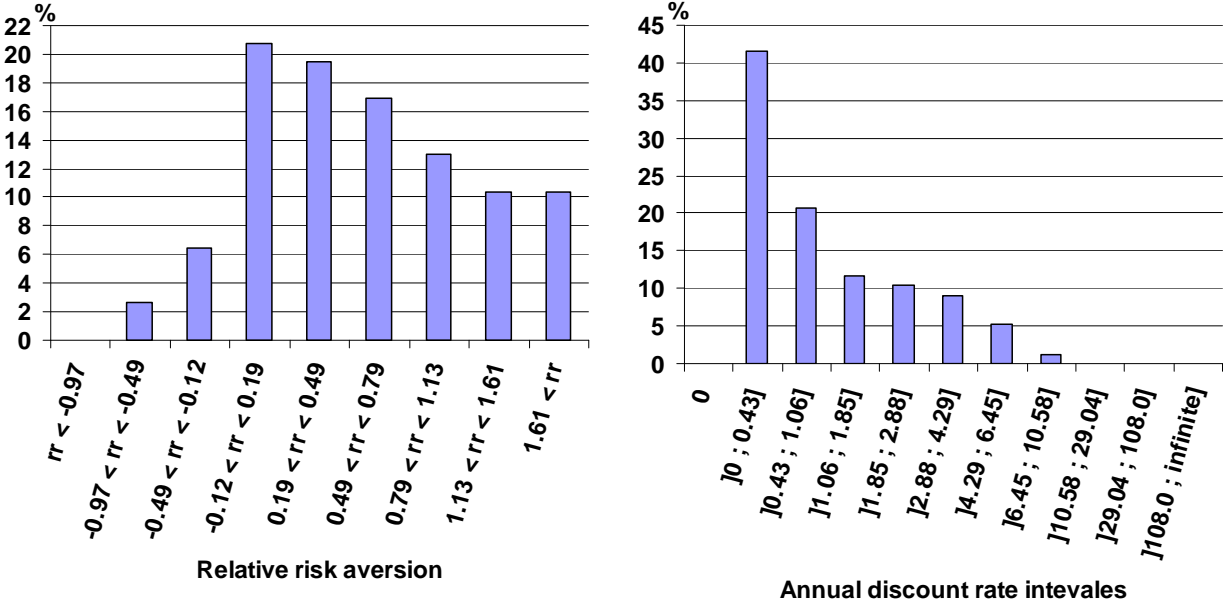
² - This paper validated the BIS-10, we know from the author (Hervé Caci) that BIS-11 is validated too and that they wait for publication of these new results.

³ - Detailed analysis of these measures and their interactions are analysed in Lohéac et al. (2010). We can underline that there are no strong correlation between the various personality traits measured.

In a first time, it is necessary to briefly present the various measures used for personality traits. In order to obtain the more discriminant measurement for risk aversion and time preference, we choose the risk aversion series with the highest gains (appendix 1b; Lusk and Coble, 2005) and the time preference series with the lowest gain and highest delay (appendix 2b). A first step in the use of these scales is to avoid inconsistent profiles of answers. We keep participants who switch only one time between the two options proposed in the game. By extension, we consider as consistent participants who made only one error. Thus, there are 89.5% consistent participants in the risk aversion scale and 98.8% in the time preference scale. Only consistent participants are kept in the analysis (the sample of 77 participants presented in Table 1).

Figure 1.a presents the profiles of risk aversion in our sample. 70% are risk averse, they choose safe choice more than 4 times in the series. This figure is relatively comparable with Lusk and Coble (2005)'s sample even if the socio-demographic structure is not the same (50 American students). Figure 1.b presents the profiles of time preference in the same sample. 41.6% choose the present option only one time (when rewards are equals).

Figure 1. Risky and time profiles (N=77)



a. Risky profile by relative risk aversion (rr) level

b. Time profile by annual discount rate

Table 4 presents the scores for the 2 SSS-V subscales and the 3 BIS-11 subscales. These scores are comparable with Eckel and Wilson (2004)'s score obtained from students and with Stanford et al. (2009)'s scores obtained from students and healthy adults.

Table 4. Scores for subscales of SSS-V and BIS-11

Subscale	Our sample N=77		Eckel & Wilson (2004) N=232		Stanford et al. (2009) N=1577	
	Mean	(S.D.)	Mean	(S.D.)	Mean	(S.D.)
SSS-V. "Experience seeking" (ES)	5.2	(1.3)	5.4	(2.1)		
SSS-V. "Boredom susceptibility" (BS)	4.4	(1.0)	3.4	(1.9)		
BIS-11. "Non-planning activity" (NPA)	23.3	(3.6)			23.6	(4.9)
BIS-11. "Motor impulsivity" (MI)	20.4	(3.5)			22.0	(4.0)
BIS-11. "Cognitive impulsivity" (CI)	15.8	(2.9)			16.7	(4.1)

3.2. Results about purchase and WTP

We use these measures in order to explore their added value comparing with traditional individual characteristics in a food decision context. First of all, it is necessary to describe our data about food decision.

Figure 2 presents the purchase rate for each product in each condition of information (Phase).

Figure 3 presents the mean WTP for each product in each condition of information (Phase).

Figure 2. Purchase rate by Phase and product (N=77)

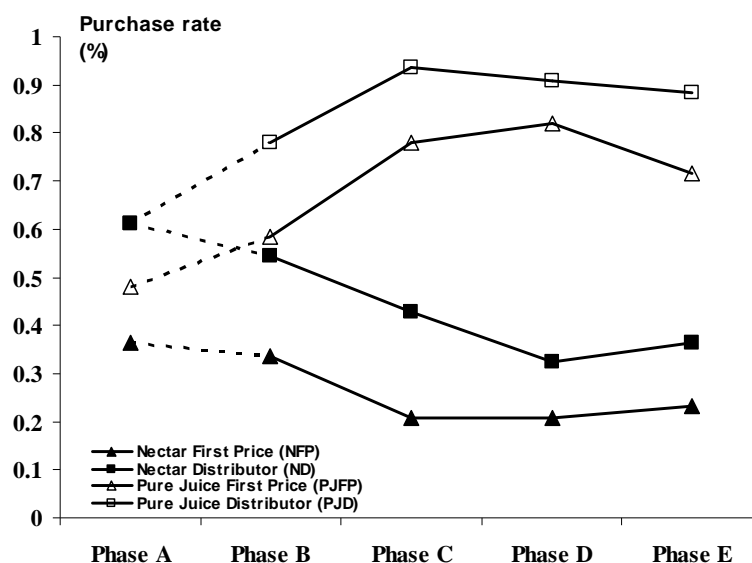


Figure 3. mean WTP by Phase and product (euros)

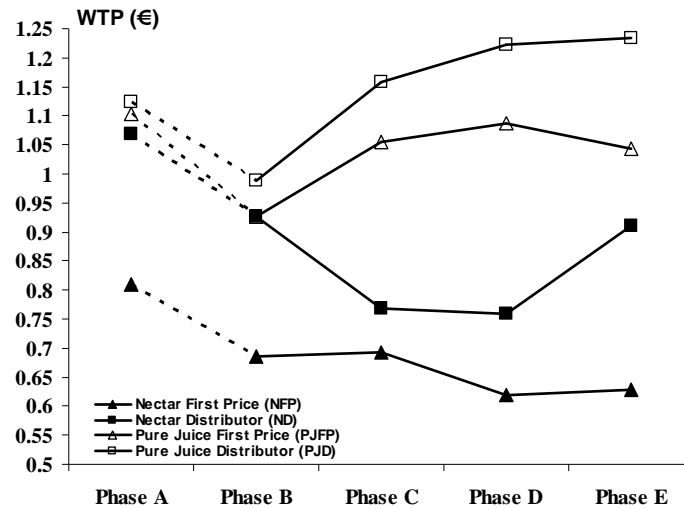


Table 5, 6, 7 and 8 presents the effect of personality traits on decision of purchase for nectars and pure juices and on the buyers' WTP. As it is possible to observe it in Figures 2 and 3, in all the estimations the distributor brand increase the probability of purchase and increasing in information (from Phase B to Phase E) decrease the value of nectars and increase the value of pure juices.

Without detailed comments at this level, we can observe that our new individual characteristics could have a significant effect on the observed behaviours: (1) a higher "BIS-11. NPA" decreases the probability of purchase for nectars; (2) a higher "BIS-11. CI" increases this probability; (3) a higher discount rate increases the probability of purchase for pure juices; (4) a higher "BIS-11. NPA" decreases the WTP for pure juices; (5) a higher "BIS-11. CI" increases this WTP.

Table 5. Probability of purchase for Nectars (marginal effects presented)

Probit	(1)		(2)	
Variable	ME	SE	ME	SE
Risk aversion			-0.020	(0.022)
Time preference			-0.46	(0.028)
SSS-V. ES			-0.052	(0.034)
SSS-V. BS			-0.017	(0.040)
BIS-11. NPA			-0.03***	(0.015)
BIS-11. MI			0.019	(0.012)
BIS-11. CI			0.044**	(0.018)
Female	-0.096	(0.085)	-0.095	(0.082)
Age: less than 25	0.283*	(0.145)	0.138	(0.144)
Age: 25-35	Ref.			
Age: 35-45	-0.102	(0.097)	-0.051	(0.126)
Age: 45-55	0.219	(0.182)	0.263	(0.189)
Age: more than 55	-0.155	(0.106)	-0.101	(0.118)
Income: less than 1000	-0.113	(0.146)	-0.031	(0.142)
Income: 1000-2000	Ref.			
Income: 2000-3000	-0.021	(0.123)	-0.062	(0.117)
Income: 3000-4000	0.002	(0.135)	-0.041	(0.138)
Income: 4000-5000	-0.059	(0.196)	0.051	(0.185)
Income: more than 5000	-0.078	(0.155)	-0.084	(0.139)
Household: 1 adult	0.111	(0.134)	0.123	(0.141)
Household: 2 adults	Ref.			
Household: more than 2 adults	-0.034	(0.129)	-0.068	(0.128)
Household: no child	Ref.			
Household: 1 child	0.013	(0.119)	0.091	(0.124)
Household: 2 children	-0.254**	(0.086)	-0.302***	(0.068)
Household: more than 2 children	0.223	(0.169)	0.277	(0.197)
Occ.: student	-0.147	(0.134)	-0.146	(0.122)
Occ.: without activity / job search	-0.152	(0.111)	-0.264***	(0.064)
Occ.: mid-time/full-time job	Ref.			
Occ.: retired	0.484**	(0.194)	0.436*	(0.201)
Distributor brand	0.218***	(0.035)	0.239***	(0.037)
Phase A	0.051	(0.046)	0.057	(0.050)
Phase B	Ref.			
Phase C	-0.132***	(0.034)	-0.144***	(0.035)
Phase D	-0.186***	(0.029)	-0.201***	(0.031)
Phase E	-0.153***	(0.041)	-0.163***	(0.042)
Predicted probability	32.8%		31.3%	
N	770		770	
Log pseudolikelihood	-416.06		-378.52	
Wald chi2	Chi2(23) = 145.15		Chi2(30) = 213.12	

Occ. = Occupation

Robust Standard Error adjusted for 77 clusters in subject.

Table 6. Probability of purchase for Pure juices (marginal effects presented)

Probit	(1)		(2)	
Variable	ME	SE	ME	SE
Risk aversion			0.001	(0.014)
Time preference			-0.028*	(0.016)
SSS-V. ES			-0.023	(0.019)
SSS-V. BS			0.011	(0.027)
BIS-11. NPA			-0.008	(0.009)
BIS-11. MI			-0.001	(0.011)
BIS-11. CI			0.008	(0.012)
Female	0.097*	(0.058)	0.112**	(0.055)
Age: less than 25	0.182**	(0.064)	0.148*	(0.071)
Age: 25-35	Ref.			
Age: 35-45	0.087	(0.077)	0.107	(0.088)
Age: 45-55	0.091	(0.084)	0.080	(0.091)
Age: more than 55	0.003	(0.089)	-0.007	(0.091)
Income: less than 1000	0.163**	(0.063)	0.171**	(0.057)
Income: 1000-2000	Ref.			
Income: 2000-3000	0.210***	(0.054)	0.205***	(0.051)
Income: 3000-4000	0.083	(0.069)	0.092	(0.071)
Income: 4000-5000	0.176***	(0.041)	0.186***	(0.039)
Income: more than 5000	0.029	(0.109)	0.059	(0.089)
Household: 1 adult	0.115*	(0.057)	0.134**	(0.056)
Household: 2 adults	Ref.			
Household: more than 2 adults	-0.097	(0.105)	-0.108	(0.103)
Household: no child	Ref.			
Household: 1 child	0.009	(0.065)	0.051	(0.064)
Household: 2 children	-0.009	(0.101)	-0.038	(0.102)
Household: more than 2 children	0.062	(0.109)	0.066	(0.123)
Occ.: student	-0.163	(0.109)	-0.144	(0.109)
Occ.: without activity / job search	-0.392***	(0.113)	-0.469***	(0.092)
Occ.: mid-time/full-time job	Ref.			
Occ.: retired	0.150	(0.069)	0.165	(0.059)
Distributor brand	0.157***	(0.039)	0.159***	(0.039)
Phase A	-0.127***	(0.045)	-0.130***	(0.046)
Phase B	Ref.			
Phase C	0.161***	(0.027)	0.160***	(0.026)
Phase D	0.167***	(0.028)	0.166***	(0.027)
Phase E	0.106***	(0.034)	0.105***	(0.034)
Predicted probability	79.3%		79.8%	
N	770		770	
Log pseudolikelihood	-360.34		-352.87	
Wald chi2	Chi2(23) = 156.67		Chi2(30) = 208.41	

Occ. = Occupation

Robust Standard Error adjusted for 77 clusters in subject.

Table 7. Buyers' WTP in euros for Nectars

MCO	(1)		(2)	
Variable	Coef.	SE	Coef.	SE
Risk aversion			0.007	(0.038)
Time preference			-0.001	(0.038)
SSS-V. ES			-0.002	(0.057)
SSS-V. BS			-0.016	(0.065)
BIS-11. NPA			-0.026	(0.021)
BIS-11. MI			0.014	(0.020)
BIS-11. CI			0.018	(0.024)
Female	0.045	(0.123)	0.018	(0.136)
Age: less than 25	0.357**	(0.166)	0.249	(0.172)
Age: 25-35	Ref.			
Age: 35-45	0.354	(0.240)	0.341	(0.245)
Age: 45-55	-0.086	(0.182)	-0.082	(0.232)
Age: more than 55	0.476**	(0.196)	0.537***	(0.198)
Income: less than 1000	0.072	(0.151)	0.120	(0.155)
Income: 1000-2000	Ref.			
Income: 2000-3000	0.300**	(0.135)	0.261	(0.167)
Income: 3000-4000	0.312*	(0.165)	0.282*	(0.156)
Income: 4000-5000	-0.233	(0.175)	-0.238	(0.235)
Income: more than 5000	0.112	(0.196)	0.069	(0.210)
Household: 1 adult	0.079	(0.185)	0.061	(0.197)
Household: 2 adults	Ref.			
Household: more than 2 adults	0.052	(0.144)	0.022	(0.183)
Household: no child	Ref.			
Household: 1 child	0.176	(0.121)	0.194	(0.184)
Household: 2 children	0.288	(0.228)	0.276	(0.277)
Household: more than 2 children	-0.273	(0.298)	-0.189	(0.300)
Occ.: student	-0.294	(0.196)	-0.269	(0.214)
Occ.: without activity / job search	0.046	(0.177)	-0.019	(0.207)
Occ.: mid-time/full-time job	Ref.			
Occ.: retired	0.001	(0.196)	-0.079	(0.225)
Distributor brand	0.171***	(0.043)	0.181***	(0.041)
Phase A	0.114**	(0.055)	0.123**	(0.057)
Phase B	Ref.			
Phase C	-0.106**	(0.045)	-0.111**	(0.044)
Phase D	-0.108**	(0.043)	-0.125**	(0.047)
Phase E	-0.011	(0.054)	-0.006	(0.061)
Constant	0.384*	(0.196)	0.477	(0.570)
N	279		279	
R2	0.3356		0.3594	
F	F(23, 60) = 6.06		F(30, 60) = 7.24	

Occ. = Occupation

Robust Standard Error adjusted for 61 clusters in subject (16 subjects never purchase nectars).

Table 8. Buyers' WTP in euros for Pure juices

MCO	(1)		(2)	
Variable	Coef.	SE	Coef.	SE
Risk aversion			-0.008	(0.033)
Time preference			0.019	(0.035)
SSS-V. ES			-0.031	(0.047)
SSS-V. BS			0.010	(0.063)
BIS-11. NPA			-0.063***	(0.020)
BIS-11. MI			0.015	(0.017)
BIS-11. CI			0.055**	(0.022)
Female	-0.156	(0.117)	-0.141	(0.115)
Age: less than 25	0.323**	(0.149)	0.197	(0.147)
Age: 25-35	Ref.			
Age: 35-45	0.543*	(0.304)	0.737**	(0.284)
Age: 45-55	-0.086	(0.201)	0.017	(0.191)
Age: more than 55	0.157	(0.183)	0.355*	(0.184)
Income: less than 1000	0.001	(0.159)	0.089	(0.170)
Income: 1000-2000	Ref.			
Income: 2000-3000	0.247	(0.161)	0.258*	(0.143)
Income: 3000-4000	0.351	(0.309)	0.316	(0.250)
Income: 4000-5000	0.267	(0.229)	0.371	(0.246)
Income: more than 5000	0.340	(0.159)	0.254	(0.218)
Household: 1 adult	-0.139	(0.162)	-0.096	(0.190)
Household: 2 adults	Ref.			
Household: more than 2 adults	-0.106	(0.195)	-0.187	(0.165)
Household: no child	Ref.			
Household: 1 child	-0.011	(0.185)	-0.081	(0.186)
Household: 2 children	-0.342	(0.238)	-0.420*	(0.221)
Household: more than 2 children	-0.749*	(0.406)	-0.796**	(0.379)
Occ.: student	-0.273	(0.184)	-0.211	(0.194)
Occ.: without activity / job search	0.074	(0.230)	-0.165	(0.252)
Occ.: mid-time/full-time job	Ref.			
Occ.: retired	-0.311	(0.297)	-0.485*	(0.261)
Distributor brand	0.115***	(0.041)	0.129***	(0.042)
Phase A	0.131**	(0.058)	0.115*	(0.059)
Phase B	Ref.			
Phase C	0.161***	(0.031)	0.161***	(0.032)
Phase D	0.209***	(0.038)	0.213***	(0.038)
Phase E	0.192***	(0.046)	0.199***	(0.045)
Constant	0.871***	(0.175)	1.250**	(0.545)
N	577		577	
R2	0.2117		0.3115	
F	F(23, 76) = 3.40		F(30, 76) = 3.34	

Occ. = Occupation

Robust Standard Error adjusted for 77 clusters in subject.

3.3. Results about nutritional and health information

In the previous Figures and Tables, we observe that the change in informational environment have an effect on purchase intent and on willingness to pay. In order to analyse the correlation between individual characteristics and behaviours, we are interested by the introduction of information between the Phase B (participants only see the labels) and the Phase D (participants see the labels, know the definitions of products and have health and nutritional information). This information effect is measured through the variation of WTP between these two Phases.

Figure 4. Distribution of variation in percent of the WTP between Phase D and Phase B by product (n=77)

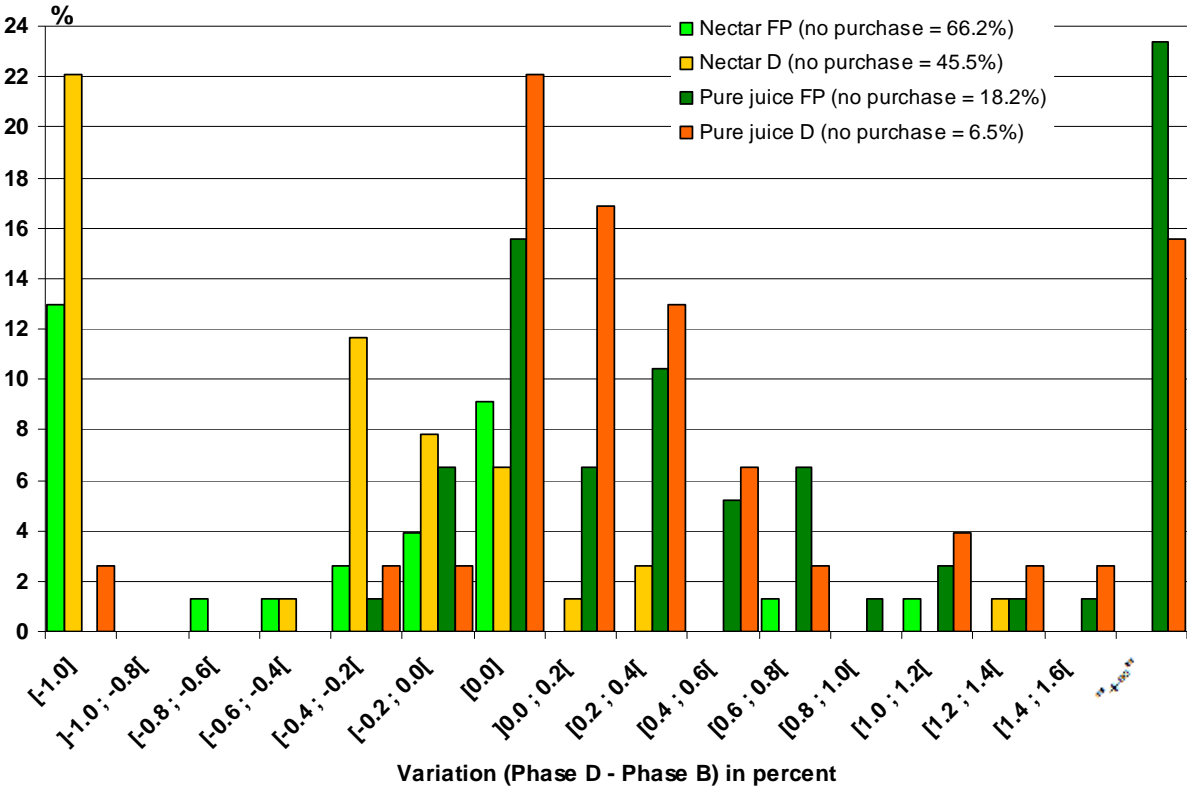


Figure 4 presents the individual change in percent. First, this figure shows us six types of behaviours: (1) participants who never buy the product, 6.5% for the Pure juice distributor brand; (2) participants who do not change their WTP for a product between the two Phases ($\Delta=0.0$), 22% for the Pure juice distributor brand; (3) participants who leave the product when they have additional information ($\Delta=-1.0$), 2.5% for the Pure juice distributor brand; (4) the reverse behaviour: participants who buy the product in Phase D even though they do not want

it in Phase B ($\Delta=+\infty$), 15.5% for the Pure juice distributor brand; (5) participants who increase their WTP ($0.0 < \Delta < 1.6$); and (6) participants who decrease their WTP ($-1.0 < \Delta < 0.0$).

By products, we observe that the information about them and about nutrition and health decrease the value attributed to the nectars (many participants leave these two products). Reversely, they increase the value attributed to the pure juice, with participants who become buyers.

In order to analyse the effect of the new characteristics on the behaviours, we construct six possible behaviours when the information change: “no purchase at all” (reference group), “stop to purchase”, “decrease the WTP”, “no change in WTP”, “increase in WTP, and “began to consume”. We estimate the effect of the new characteristics on the probability of adoption of each behaviour through a multinomial logit estimator. Preliminary results show that some characteristics have a significant effect that could be explained. By instance, risk aversion increases the probability of increasing the WTP for pure juices, “BIS-11, MI” decrease the probability of stability in WTP for pure juices, etc.

4. Conclusion and discussion

As a short conclusion, the new individual characteristics introduced in order to increase the explanation of behaviour regarding food seem to have some significant effects, even if it is not general. It is necessary to discuss about the strength of the information and the risky issues in orange juice consumption. Perhaps the level significance would be higher if we conduct an experiment with risky products and with more salient information.

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Appendix

Appendix 1a. First series of binary choices between lotteries (Game 1)

	Option A	Choice A	Option B	Choice B
Situation 11	2,00 € if the token is 1 1,60 € if the token is 2-10	<input type="radio"/>	3,80 € if the token is 1 0,20 € if the token is 2-10	<input type="radio"/>
Situation 12	2,00 € if the token is 1-2 1,60 € if the token is 3-10	<input type="radio"/>	3,80 € if the token is 1-2 0,20 € if the token is 3-10	<input type="radio"/>
Situation 13	2,00 € if the token is 1-3 1,60 € if the token is 4-10	<input type="radio"/>	3,80 € if the token is 1-3 0,20 € if the token is 4-10	<input type="radio"/>
Situation 14	2,00 € if the token is 1-4 1,60 € if the token is 5-10	<input type="radio"/>	3,80 € if the token is 1-4 0,20 € if the token is 5-10	<input type="radio"/>
Situation 15	2,00 € if the token is 1-5 1,60 € if the token is 6-10	<input type="radio"/>	3,80 € if the token is 1-5 0,20 € if the token is 6-10	<input type="radio"/>
Situation 16	2,00 € if the token is 1-6 1,60 € if the token is 7-10	<input type="radio"/>	3,80 € if the token is 1-6 0,20 € if the token is 7-10	<input type="radio"/>
Situation 17	2,00 € if the token is 1-7 1,60 € if the token is 8-10	<input type="radio"/>	3,80 € if the token is 1-7 0,20 € if the token is 8-10	<input type="radio"/>
Situation 18	2,00 € if the token is 1-8 1,60 € if the token is 9-10	<input type="radio"/>	3,80 € if the token is 1-8 0,20 € if the token is 9-10	<input type="radio"/>
Situation 19	2,00 € if the token is 1-9 1,60 € if the token is 10	<input type="radio"/>	3,80 € if the token is 1-9 0,20 € if the token is 10	<input type="radio"/>
Situation 20	2,00 € if the token is 1-10	<input type="radio"/>	3,80 € if the token is 1-10	<input type="radio"/>

Appendix 1b. Second series of binary choices between lotteries (Game 2)

	Option A	Choice A	Option B	Choice B
Situation 21	10 € if the token is 1 8 € if the token is 2-10	<input type="radio"/>	19 € if the token is 1 1 € if the token is 2-10	<input type="radio"/>
Situation 22	10 € if the token is 1-2 8 € if the token is 3-10	<input type="radio"/>	19 € if the token is 1-2 1 € if the token is 3-10	<input type="radio"/>
Situation 23	10 € if the token is 1-3 8 € if the token is 4-10	<input type="radio"/>	19 € if the token is 1-3 1 € if the token is 4-10	<input type="radio"/>
Situation 24	10 € if the token is 1-4 8 € if the token is 5-10	<input type="radio"/>	19 € if the token is 1-4 1 € if the token is 5-10	<input type="radio"/>
Situation 25	10 € if the token is 1-5 8 € if the token is 6-10	<input type="radio"/>	19 € if the token is 1-5 1 € if the token is 6-10	<input type="radio"/>
Situation 26	10 € if the token is 1-6 8 € if the token is 7-10	<input type="radio"/>	19 € if the token is 1-6 1 € if the token is 7-10	<input type="radio"/>
Situation 27	10 € if the token is 1-7 8 € if the token is 8-10	<input type="radio"/>	19 € if the token is 1-7 1 € if the token is 8-10	<input type="radio"/>
Situation 28	10 € if the token is 1-8 8 € if the token is 9-10	<input type="radio"/>	19 € if the token is 1-8 1 € if the token is 9-10	<input type="radio"/>
Situation 29	10 € if the token is 1-9 8 € if the token is 10	<input type="radio"/>	19 € if the token is 1-9 1 € if the token is 10	<input type="radio"/>
Situation 30	10 € if the token is 1-10	<input type="radio"/>	19 € if the token is 1-10	<input type="radio"/>

Appendix 2a. First series of binary choices between immediate and delayed rewards (Game 3)

	Option A	Choice A	Option B	Choice B
Situation 31	0,01 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 32	0,25 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 33	1,50 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 34	2,75 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 35	4,00 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 36	5,25 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 37	6,50 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 38	7,75 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 39	9,00 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>
Situation 40	10,00 € immediately	<input type="radio"/>	10,00 € in 15 days	<input type="radio"/>

Appendix 2b. Second series of binary choices between immediate and delayed rewards (Game 4)

	Option A	Choice A	Option B	Choice B
Situation 41	0,01 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 42	0,25 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 43	1,50 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 44	2,75 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 45	4,00 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 46	5,25 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 47	6,50 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 48	7,75 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 49	9,00 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>
Situation 50	10,00 € immediately	<input type="radio"/>	10,00 € in 90 days	<input type="radio"/>

Appendix 2c. Third series of binary choices between immediate and delayed rewards (Game 5)

	Option A	Choice A	Option B	Choice B
Situation 51	0,02 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 52	0,50 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 53	3,00 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 54	5,50 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 55	8,00 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 56	10,50 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 57	13,00 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 58	15,50 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 59	18,00 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>
Situation 60	20,00 € immediately	<input type="radio"/>	20,00 € in 90 days	<input type="radio"/>