Psychological and economic determinants of the WTP for organic products

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Abstract:

48 students participated in collective goods games, evaluated products in Vickrey auctions and completed several psychological questionnaires. They evaluated two types of apples (conventional and organic) and three types of pencils (conventional, ecological, and ergonomic). Subjects had to indicate their willingness to pay for each type of product according to three different treatments (image display, information on characteristics and then the samples). The questionnaires concerned: food consumption values, personality traits, emotions; social desirability and self-regulation. Two categories of organic food consumers were analyzed: the environmentally concerned and the health-conscious. The assumption that environmentalist consumers have altruistic behaviors and therefore contribute to welfare was validated. On the other hand, consumers buying organic food for their health properties depicted a more egoistic behavior. Finally, we were able to draw distinct psychological profiles relative to the two types of organic consumers.

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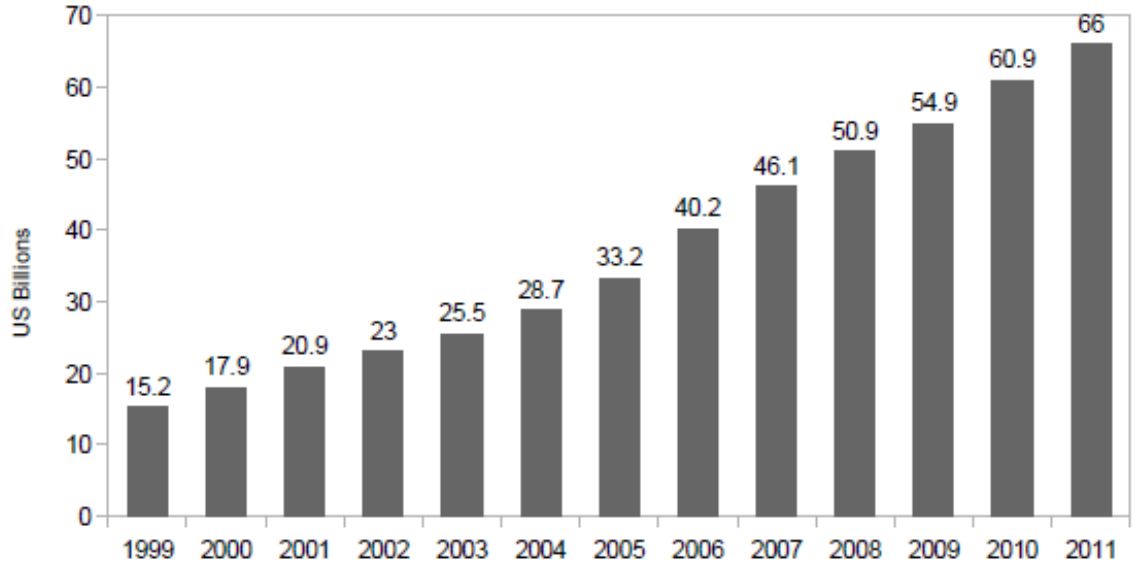
1. Introduction

1.1 Organic market evolution

According to Lentschner and Huijgen (2013), the French organic market was not affected by the 2008 economic crisis. In fact, sales showed an increase of 5% from 2010 to 2011. The figure 1 shows the steady growth of the organic food market.

Figure 1.
Evolution of the worldwide organic food market since 1999 (Agence Bio)



The increasing development of this market (both production and consumption) leads us to question its determinants. Researchers study the driving force behind organic food consumption, in order to be able to adjust marketing techniques and public policies. Pino, Peluso and Guido (2012) argue that the development of an organic market is the consequence of an increase in the general population's awareness of this market. However, this does not prove to be a sufficiently important factor for the explanation of consumer organic brand fidelity, while other consumers search for the lowest prices. Indeed, Loureiro and Hine (2002) cited in He and Bernard (2001) were able to prove that organic food comes at a premium, that some categories of consumers are willing to pay. The difficulty is to understand the characteristics of organic food consumers. Indeed, the specificity of organic production entails two important characteristics.

The first production characteristic is a significant quality control carried out on the final product before it enters the market. According to the European Commission (2007), cited in Pino et al. (2012), such products are grown without the use of synthetic pesticides or fertilizers attention le bio utilise aussi « chemical pesticides » le terme pour différencier est « synthetic » ou “man-made” and do not contain: artificial substances, preservatives or genetically modified ingredients. Several researchers hypothesize that organic food is healthier than its conventional counterpart, since the absence of the listed chemical components and control for natural elements of the product is inclined to increase the level of vitamins, and diminish the risk of allergies or other diseases.

The second characteristic is that organic labels certifies the production conditions. The AB (in French “Agriculture Biologique”, i.e. organic farming) label states that farming should respect the normal balance of nature as well as the well-being of animals and the environment. To this environmental concern is added the goal to sustain local producers in the community, expressed by the ideas of fair trade and ethical consumerism. Pour moi cette section à besoin plus de précision des labels bio, de dire que le label AB est français par exemple

These two aspects are summarized by the literature as having two factors which motivate consumers to purchase organic food: environmental, on the one hand, and health, on the other. The aim of our study is to distinguish between consumers who buy organic food and those who do not, through their psychological and behavioral characteristics via experimental methods.

1.2 Organic consumers

Grunert and Juhl (1995) stated that the environmentally concerned, socially conscious, ethical, or “green consumer” made his appearance in the 70's. In their view, this new class of consumer appeared due to a growing distrust in the capacity of the society, the industry and technology to impact positively on people’s general well-being. Such consumers are aware of the negative externalities that might occur during production, distribution, and disposal of goods; and how they must modify their behavior in order to minimize them. The behavioral modifications

include a tendency to buy environmentally friendly products and as predicted, organic food. Consumers purchase products cultivated without the use of synthetic chemicals, due to their concern to minimize pollution and preserve natural resources. As Grunert and Juhl (1995)'s results indicate, consumers with high environmental concern present a positive attitude toward organic food, and consume organic food more regularly than other consumers (including the health concerned). This indicates that it is possible to use organic food consumption frequency as a determinant, in order to categorize a consumer as to his or her environmental concern.

Zagata and Lostak (2012) provide a description of the health-conscious consumer, stating that such individuals will mostly be concerned with their personal well-being. Furthermore, these individuals' main motivations will be to improve their health and quality of life while also preventing illness . Indeed, over the last few years, disease out breaks such as bovine spongiform encephalopathy (BSE) (commonly known as mad cow disease), or the foot-and-mouth epidemic, have resulted in a widespread anxiety among consumers about the quality of food (Miles & Frewer, 2001). The number of health scares amongst consumers seems to be directly linked to the intensification of agricultural production and food industrialization, leading to strong preoccupations about the safety of these goods (Siegrist, 2008). As a consequence, the trust procured from organic food products may be a driving force of their consumption. Van Ravenswaay (1988) emphasizes that the key economic question in food safety research is to determine individuals' willingness to pay (WTP) for perceived reduced risk.

Some might interpret health-conscious consumers as behaving egoistically, through pure self-interest and buying organic food for their personal well-being; while green-consumers would be concerned about the well-being of the society, displaying altruistic behavior. This assumption will be developed later with the use of the public goods game in our experiment.

Several researches provide a socio-demographic profile of the general organic consumer. Multiple factors seem to be influential such as: age (young adults and households with young children favor organic produce to a greater extent); level of education; gender (women are greater

consumers), and the environment (urban areas are more influenced than rural ones). An important point is that young adults often provide high WTP for organic products in researches, due to their greater environmental conscience; however their demand might be lower than expected due to stronger budgetary constraint.

1.3 Organic specificity

Three factors influence organic food studies. The first factor is the consumer's product awareness, the second the available alternatives, and finally the taste.

Hamzaoui-Essoussi, Sirieix and Zahaf (2013) show that French consumers' knowledge about organic food production practices is high. However French consumers have a low awareness of the new European organic label introduced in 2002, and mandatory across the EU since July 2010 even if it satisfies strict regulations (European Commission, 2010), but they trust the "AB" (organic farming) French label introduced in 1984 (Thorgersen, 2010). The target population of this current experiment being French individuals, one might expect their WTP for organic food to be the same before and after getting information about the organic labels.

Past research (Wolf 2002; Lin, Smith & Huang 2008; cited in He & Bernard 2011), reveals that consumers are willing to pay a price premium for organic fruits and vegetables ranging from a 15% to a 60% premium according to the type of good. Kasteridis and Yen's (2012) article focuses on the possible substitution between organic and non-organic vegetables. The final outcome of the research was that even with the organic premium, conventional carrots and potatoes can be substituted by organic ones. Glaser and Thompson's (1999) results, cited in Kasteridis and Yen (2012), were similar, but analyzed frozen vegetables. The expenditure for organic vegetables is very price elastic (around -1.81. The average annual expenditures for organic vegetables are low, from $3 to $11 according to the type of vegetable; contrary to the annual average of conventional vegetable expenditure ranging from $9 to $56. These results indicate that it would be possible to substitute conventional foods with organic , and the best way to do so would be to carry out price campaigns.

Furthermore, taste is an important part of the purchasing decision. Consequently, it may significantly modify the WTP for a product (Lund, Jaeger, Amor, Brookfield & Harker, 2006).

From this brief introduction of the market and demand of organic goods, we present psychological and behavioral variables, supported by our theoretical background, which are thought to influence one's WTP for organic goods.

→ plan

2. Theoretical background

2.1 Public goods game

Our first assumption relies on the altruistic nature of organic consumers; we selected a public goods game task in order to test our predictions. This procedure is used to study social dilemmas and the problem of free-riding. The issue encountered is that the predicted Nash equilibrium would be to not contribute to the collective account (free-riding), while the Pareto-optimum occurs when everyone contributes. The theory states that the rational behavior is the opposite of the social optimum. There is a clear distinction between a self-interested behavior, trying to maximize one's own utility and an altruistic behavior, focused on maximizing society's well-fare. Our study will focus on explaining why some individuals choose to behave altruistically, increasing their contributions to the collective account. From our assumptions, having environmental values should be a great determinant. Since health concerned individuals are more focused on material needs~~,~~ and don't invest in communal goods, it is predicted that they would have a low contribution in a public goods game. One of the main goals of the research will be to observe the participation of environmentally concerned individuals vs. health concerned ones in a public goods game. Liebe, Preisendörfer, and Meyerhoff (2011) compared several theories explaining WTP for public environmental goods. With the altruistic model and Schwartz's norm activation model, we are not reduced into thinking of WTP in terms of income and frequency of consumption, since psychological factors are introduced. This is exactly what will be undertaken in our

experiment, where rent budget, income (participants' total budget), and frequencies of consumption of organic fruit and vegetables will be used as controlled variables.

2.2 Social desirability

Since we are analyzing environmental values and WTP in our study, it seems important to observe the influence of social desirability in our dependent variables. Social desirability is a phenomenon observed in social psychology associated with the "under reporting" of negative behaviors and the "over reporting" of positive attitudes. In the present study it would translate into depicting a high environmental concern value and increase one's WTP according to the characteristics of the good. In our study we interpret social desirability as a personality trait (Crowne and Marlowe (1964) cited in Fleming and Zizzo (2011)), giving the following reasons: social desirability is stable over time and very similar to the measurement "need of approval". Overall this particular personality trait should rely on: the desire to make a good impression the use of lies, the need for social approval, and dissimulation. As Fleming and Zizzo described in Crowne & Malowe's (1964) studies, individuals presenting social desirability could also be assimilated with highly conformist individuals, who are influenced by context and situations. During experiments, conformist individuals are more likely to agree with the wrong perceptual judgments (ex. Asch experiment), provide good scores for boring tasks, and modify their behavior. Tournois, Mesnil and Kop (2000) propose the measuring of social desirability by comparing two dimensions: self-deception (the individual was unconsciously falsifying reality) and others-deception (the individual deception was intentional). Our study focuses on an ethical matter (organic consumption), which increases the probability of having biased behaviors emerging from the desire to depict a good reputation. As Costanigro, McFadden, Kroll and Nurse (2011) highlighted, the Hawthorne effect might be very salient in experiments where product characteristics are linked to socially desirable outcomes. The overestimation of social desirable outcomes (such as environmental concern, altruistic attitudes etc...) might occur to provide a good reputation.

In Fleming and Zizzo (2011)’s experiment, the participants providing the highest public good investment were the ones with low social desirability, contrary to expectations. However, Charness and Rabin (2002), cited in Fleming and Zizzo (2011), were able to validate their hypothesis that high levels of social desirability should be a predictor of high public good contributions. Such different results indicate that the relationship between social desirability and pro-social behavior should be further investigated. The conclusion drawn by Fleming and Zizzo (2011) was that *" People high in Social Desirability Responding may have a greater willingness to adjust their responses to present themselves in a more socially acceptable way, despite having the same underlying beliefs as those low in Social Desirability Responding" (p. 261).*

2.3 Psychological background

Furthermore, values, personality traits, and emotions; represent a portion of psychological factors that might predict the emergence of a specific organic consumer group. In our present experiment, we measured all of those factors predicting that environmentally concerned individuals and health concerned individuals would not share the same results.

a) Food values

Food values lead to identify why consumers prefer one ~~a~~ product over another. Previous research has shown that safety and nutrition are among the most important values for ~~to~~ organic food consumers (Schifferstein & Oude Ophius, 1997; Lusk and Briggeman, 2009). Also, ethical and environmental motivations are identified as meaningful purchase motivations (Magnusson, Arvola, Hursti, Åberg & Sjödén, 2003). All in all, consumers concerned about a healthy diet and environmental preservation are the most likely to buy organic food and are willing to pay a premium (Gil, Gracia, & Sanchez, 2011).

b) Personality traits

The Big-Five framework (McCrae and Costa, 1990) distinguishes between five personality traits that everyone possesses to a greater or lesser degree: neuroticism, conscientiousness, agreeableness, extraversion and openness to new experiences.

Conscientiousness and neuroticism have emerged as being important predictors of health values (Booth-Kewley & Vickers, 1994). *Neuroticism* refers to a high sensitivity to situations that may involve danger or threat to the individual. It is associated with being likely to experience unpleasant emotions such as anxiety, depression, insecurity or anger. *Conscientiousness* refers to a desire for achievement under conditions of control, discipline, and carefulness. Combined with a high level of neuroticism, it might translate the anxiety into hyper vigilance and enhance the awareness of the consequences of one's actions (Turiano, Mroczek, Moynihan, & Chapman, 2013).

In contrast, *agreeableness*, *extraversion* and *openness to new experiences* are commonly associated with a great concern for others (Olver & Mooradian, 2003) and for the role of human beings in the society and in the environment (Carter & Hall, 2008). Agreeableness refers to being compassionate, altruistic, and cooperative towards others; extraversion refers to seeking the company of others, the sensations and the stimulations; and openness to experiences is associated with flexibility of thought, imagination, and creativity. As a consequence, environmental, ethical and ecological concerns are commonly associated with extraversion (Carter & Hall, 2008), openness to experiences (Carter & Hall, 2008; Hirsh, 2010) and agreeableness (Hirsh, 2010).

c) Regulatory focus

Self regulation (Regulatory Focus Theory; Higgins, 1996) defines two systems by which individuals select means to attain and avoid desired and undesired end-states (Carver & Scheier, 1990). Everyone possesses both systems, but different socialization experiences may make one system predominate. *Promotion focus* is represented as pursuing hopes and aspirations and achieving positive outcomes (rewards): it involves maximizing the presence of positive outcomes and

minimizing their absence. In contrast, *prevention focus* is represented as upholding responsibilities and obligations that are necessary to ensure security and protection from negative outcomes (punishments): it involves maximizing the absence of negative outcomes and minimizing their presence. Some organic consumers' motivations seem to align with a prevention-orientation (De Boer, Boersema, & Aiking, 2009), such as wanting control over all aspects of their lives (Homer & Kahle, 1988), being inclined to reflection (Torjusen, Lieblein, Wandek & Francis, 2001) and perceiving food risks as less likely ~~scarier~~ than others would (Leikas, Lindeman, Roininen, & Lähteenmäki, 2007). Also, Carver, Sutton and Scheier (2000) stated that stable personality traits such as extraversion and neuroticism may be associated with a general orientation towards promotion focus versus prevention focus, respectively. As a consequence, promotion focus might be related to high environmental concerns while prevention focus might be associated with strong health safety concerns.

d) Emotions

In recent years, research has shown that specific personality traits can be associated with specific emotions. It is known that the duration, frequency and intensity of positive and ~~of~~ negative emotions are the strongest predictors of extraversion and neuroticism, respectively (Verduyn & Brans, 2012).

From those findings, we would be able to draw two distinct groups, one motivated by environmental concerns, while the other would be concerned about pro-health attitudes.

2.4 Generalization

A common issue, when studying attitudes towards organic goods, is that we are restricted in analyzing food. As previously observed, food valuation is very subjective since it is influenced by taste, and it might be difficult to predict preferences. Furthermore, it seems strange to see the

emergence of a demand for organic products and not to find a great variety in the market. The idea of distinguishing environmentally concerned and health concerned consumers was one of the main goals of our study, on the extrinsic and intrinsic characteristics of the goods. We needed to choose a common good, with a similar price range and availability in the market, so we used apples. We focused on pencils, with the environmental group represented by pencils with certified wood ; and the health-conscious group represented by ergonomic pencils

3. Hypotheses

Table 1 provides a summary of our hypotheses.

Table 1.

Values	**Pro-health consumers**: Nutrition, Safety	**Pro-environment consumers:** Environment, Origin, Fairness
Altruism	H1a: Have a low contribution to public goods games	H1b: Have a high contribution to public goods games
Personality traits	H2a: Are neurotic, conscientious, risk averse, and prevention-oriented	H2b: Are extrovert, open to experiences, agreeable and promotion-oriented
Emotions	H3a: Experience negative emotions	H3b: Experience positive emotions
Generalization	H4a: Provide higher WTP for ergonomic pencils	H4b: Provide higher WTP for ecological pencils

4. Methodology

48 students, of 22 women and 26 men, from the University of Angers (France) were asked to participate in our experiment. Their average age was 20 years old. The majority of the participants were enrolled in their first or second year in university and their average budget spent on rent was €250. The experiment started with a 15 minutes instruction period, in which participants received

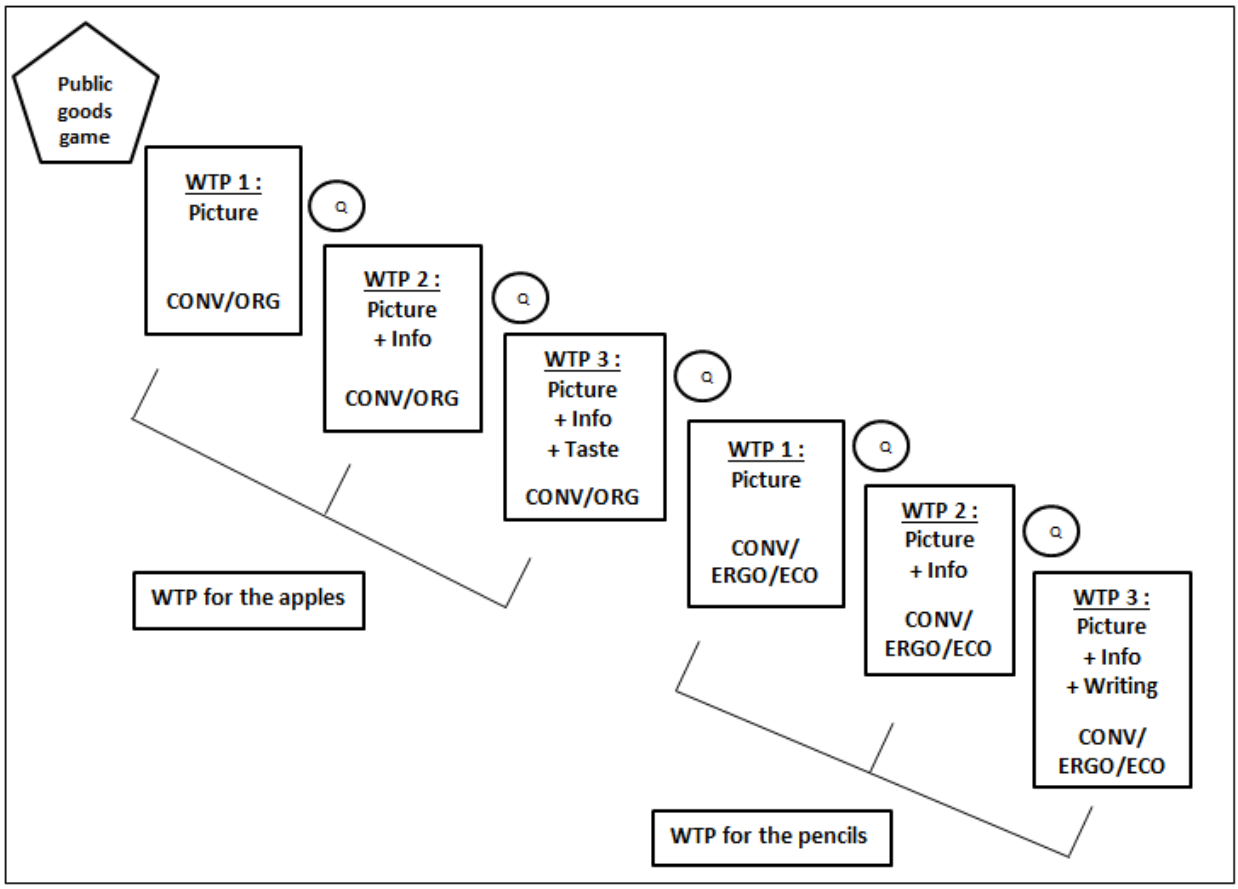
explanations and illustrations on Vickrey auction procedures and on the public goods game. They were able to ask questions and practice the experimental auction (provided by a training period with a chocolate bar). Following this presentation, participants started to answer the questionnaires in a paper format. They evaluated two types of apples (conventional and organic ones) and three types of pencils (conventional, ecological, and ergonomic ones). The presentation order of the products was counterbalanced in order to avoid any serial position effect. Subjects had to provide their WTP for each of the five products according to three different treatments:

At step 1 the participants were shown photographs of the product. The photograph of the organic apples included the French organic label "AB" (organic agriculture) and the new European Union organic label.

At step 2 the participants were shown the photographs of the product along with its characteristics. The characteristics involved the variety and the size of the apples: for both types of apples, we offered the apple Gala, a variety frequently sold in France, and each one had a weight of around 160 grams. Also, the information included a comment stating that the organic production excludes the use of synthetic chemicals . This statement was provided in order to test whether or not people were aware of the meaning of the organic food labels. The characteristics for pencils stated if they were produced with certified wood (ecological pencils) or if they reduced the risk of having muscular pains (ergonomic pencils). Details about the characteristics of the products are provided in appendix 3.

At step 3 the participants were shown photographs of the product along with its characteristics and they were asked to taste freshly cut conventional and organic apples, and to write with all the provided pencils.

Diagram 1.
Scheme of the procedure of the experiment.



Our three steps allow us to control for learning and awareness ~~knowledge~~ effects, and also provided an actual tasting experience, which is very important in the food domain as previously explained. Participants were told only one of the three treatments would be randomly chosen for the biding. This prevented anyone from winning more than one unit of any product, and eliminated the experimental threat of receiving low bids derived from participants' fear of having to spend too much money at the end of the experiment. We are avoiding an endowment effect and creating an isolation effect.

Six groups of 8 participants were created to engage in two collective goods game. In both games the participants had to decide how to invest 2 euros. In the first game 1/4 of the collective account returned to all the participants, and in the second game the ratio changed to 1/2. A diagram of the game is provided in appendix 1a. The same groups were used to determine the winners of the Vickrey auctions. An example of a public goods game and of a Vickrey auction is provided in appendix 1b.

On average, participants received 14.90€, which included their public good game performance and experiment remuneration.

Furthermore, participants completed questionnaires between each valuation task in order to avoid any automatic behavior or memory influence:

The *Food Values* questionnaire (Lusk and Briggeman, 2009) was used to measure 5 values associated with organic consumption: origin, environment, fairness, nutrition, and safety. The participant had to rate each value and say how important it is for him/her when he/she is purchasing food, on a five-point Likert scale.

The 45-item *Big Five Inventory* (BFI; Costa & McCrae, 1985) was used to measure the five personality traits detailed above: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experiences. Participants had to indicate on a five-point Likert scale if a number of statements may or may not apply to them.

The 11-item *Regulatory Focus Questionnaire* (Higgins et al., 2001) was used to measure promotion focus and prevention focus. Participants had to indicate on a 5-point Likert scale how frequently specific events occurred in their life.

The *Brief Mood Introspection Scale* (BMIS; Mayer & Gaschke, 1988) was used to measure 16 trait emotions: active, calm, caring, content, drowsy, fed up, gloomy, grouchy, happy, jittery, lively, loving, nervous, peppy, sad and tired. Each participant had to indicate how often he/she felt this emotion in the past few months. Four scales were obtained for each participant by combining some of the emotions: pleasant mood, arousal mood, positive mood, and negative mood scales.

Finally the *DS-36* (Social Desirability; Tournois, Mesnil, & Kop, 2000) was also provided in order to measure participants' self-deception and others-deception on a 5-point Likert Scale.

In addition to income and frequencies of consumption of organic food, the variables level of hunger, frequency of grocery shopping and risk-aversion were used as controls. More precisely, the

participants' risk aversion was assessed by asking them at what time they would reach the train station if they have not yet booked their train ticket. Another control measure included the participants' beliefs regarding organic food production. The participants had to declare how much they agree with four statements. Two statements focused on the health aspects of organic food consumption, such as *vitamin* content (i.e., organic food contains more vitamins and minerals than convention food) and the restriction in the use of *chemical additives* that could be harmful to health. Two other statements focused on the impact of organic production on the environment, such as *sustainable development* and the restriction in the use of *pesticides* that could damage the environment. Both statements regarding chemical additives and pesticides use directly tackled the consequences on the health and the environment, respectively.

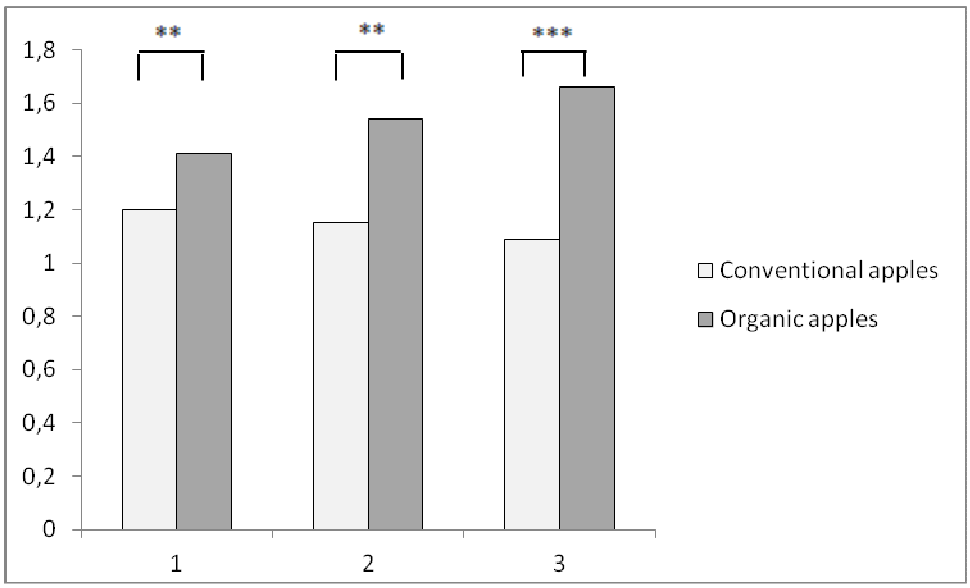
A table listing the variables that will be used in the statistical analysis is presented in appendix 2.

5. Results

5.1 Descriptive results

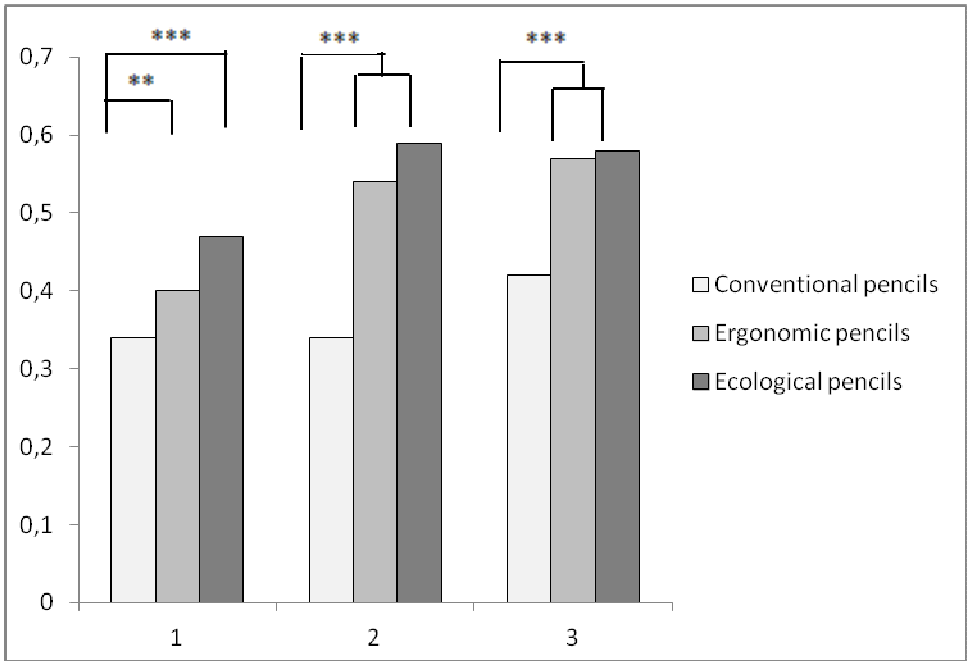
We were able to observe that the average amount placed in the first public good account "game1" (1/4 return) was 0.79€. In the second collective account "game2" (1/2 return) the average contribution increased to 1.03€. These results show that participants are ~~were~~ behaving in a rational way, increasing their contribution when the rate of return increased. It is also important to note ~~notice~~ that some participants chose to free ride (minimum: 0€).

Figure 1.
Average of the WTP for conventional apples (in light grey) and for organic apples (in dark grey) across the three steps (1; 2; 3).



The average WTP for organic apples was superior to that of conventional ones, as depicted in Figure 1. We used the T-TEST Procedure to verify if the difference in WTP between the two types of apples was significant, and the results supported the idea that the organic apples ~~were~~ always had a significantly higher value than conventional ones in all three treatments. However, when analyzing the differences in WTP between the three different treatments we obtained no significant result, due to large standard deviations, as depicted in appendix 2.

Figure 2.
Average of the WTP for conventional pencils (in light grey), for ergonomic pencils (in medium grey) and for ecological pencils (in dark grey) across the three steps (1; 2; 3).



Finally, the WTP for ecological pencils and ergonomic pencils seem to have very similar distributions. In Figure 2 the average WTP for each type of pencil is provided according to the three treatment stages. The results from the T-TEST indicated that the difference between the first and the third treatment was significant. These results support the idea that the conventional goods are cheaper.. Also there was a significant difference between the valuation of conventional pencils and the valuations of ergonomic and ecological ones. However, the discrepancy between ergonomic and ecological pencils was not significant.

It is important to note the high correlation level between: jeu1 and jeu2 (.89); ecological and ergonomic pencils (.88); conventional and ecological pencils (.89); conventional and ergonomic pencils (.88); and organic and conventional apples (.94). These correlations were expected since participants were evaluating the same type of product each time, and it shows that a good categorization of pencils, apples and public goods game, categorization of participants was achieved. We observe that peoples' valuation methods for organic apples share correlations with valuation methods for pencils, with the highest being with conventional pencils (.48) rather than ecological ones (.35) as our predictions suggest.

Supporting our hypothesis, environmental values were positively correlated with extraversion (.34), promotion focus (.51), pleasant emotions (.34), and were inversely correlated with negative emotions (-.32). In contrast, health values were correlated by (.24) with conscientiousness and by (.16) with risk aversion. These findings support the hypothesis of the existence of two groups of consumers with distinct values and personality traits. Interestingly, environmental values were highly correlated with promotion focus, thus suggesting an important relationship between achievement needs and the support for environmental values.

Furthermore the difference in WTP between organic apples and conventional apples was

correlated with environmental values (.26), promotion focus (.30), and pleasant emotions (.31), suggesting that environmental concerns might play an important role in organic consumption.

5.2. Apples regressions

A regression of the general WTP (regardless of the type of apples) was first run. It shows that there was no significant effect of the treatment and that the participants were prepared to spend on average 0.39€ more on the organic apples than on the conventional ones.

Number of observations: 276
R^2=.38
Adjusted R^2=.35

Table 2.
Regression results: variables predicting the difference between organic apples WTP and conventional ones.

	Coef.	Std. Err.	t	p>|t|
Self- deception	.1277	.0397	3.22	.001
Environmental values	.0444	.0207	2.14	.033
Health values	.0963	.0213	4.51	.000
Conscientiousness	-.1778	.0304	-5.84	.000
Positive emotions	.2699	.0426	6.34	.000
Sex	-.1363	.0431	-3.15	.002
Chemical contents	.2117	.0274	7.73	.000
Public goods game	.0881	.0336	2.63	.009
Level of studies	.1623	.0400	4.06	.000
Rent budget	.0008	.0001	5.92	.000
Age	-.0654	.0129	-5.08	.000
cons	-.9612	.3085	-3.12	.002

The final regression chosen to explain the difference in WTP between organic apples and conventional ones (Table 2) shows that the variables public goods game and self-deception were positively significant, influencing the variance of the difference between organic and conventional apples valuation by .09 and .13, respectively. The environmental values and health values were also significant predictors, supporting the hypothesis of there being two types of organic consumers. Also, the variance of the difference in WTP was predicted by positive mood (coeff=.26) and awareness of pesticide residues (coeff=.21). There was no significant treatment effect, which justifies the absence of such variables in the regression. Furthermore women, younger adults, higher

levels of education, and an income effect were also found in this model; confirming previous findings about the organic consumers. 38% of the variance of the difference between the two goods is explained by this model.

To support our set of hypotheses we had to observe the differences between environmentally concerned and health concerned individuals. To do so we first analyzed two regressions focusing on environmental and health values; and then moved on to analyzing the WTP models for ecological and ergonomic pencils.

Number of observations: 276
R^2=.61
Adjusted R^2=.60

Table 3.
Regression results: variables predicting environmental values.

	Coef.	Std. Err.	t	p>|t|
Promotion	.6264	.0982	6.38	.000
Chemical contents	-.1253	.0558	-2.25	.025
Chocolate wtp	.3011	.0757	3.97	.000
extraversion/Openness	.3487	.0801	4.35	.000
Negative emotions	-3698	.0607	-6.09	.000
Public goods game	.2954	.0702	4.21	.000
Level of studies	.5176	.0805	6.08	.000
Freq. of consumption organic apples	.1368	.0339	4.03	.000
Freq. of consumption junk food	-.5383	.0478	-11.24	.000
Rent budget	.0011	.0002	4.32	.000
Age	-.1923	.0324	-5.94	.000
cons	5.7334	.7042	8.14	.000

The regression of the environmental-concern value (which includes the concern for buying products relative to their origin, fairness and environmental characteristics) revealed a significant positive impact of: public goods game (coeff=.30; p<.0001), promotion focus (coeff=.62; p<.0001) and extraversion (coeff=.34: p<.0001); while negative mood had a negative impact (coeff=-.37; p<.0001). This supports the assumption that pro-environmental participants are altruistic, concerned about others and the society, and are promotion-oriented. We can conclude that when one increases his contribution in the collective account of the public goods game, one will positively influence the variance of his environmental value.

This idea is even more strongly depicted by the results shown in Table 4.

Number of observations: 276
R^2=.58
Adjusted R^2=.56

Table 4.
Regression results: variables predicting health values.

	Coef.	Std. Err.	t	p>|t|
Public goods game	-.099	.0730	-1.36	.175
extraversion/Openness	-.1759	.0758	-2.32	.021
Sex	.7121	.0941	7.56	.000
Neuroticism	.2614	.0449	5.82	.000
Positive emotions	-.3401	.0884	-3.85	.000
Agreeableness	-.7180	.0831	-8.64	.000
Age	.1006	.0203	4.95	.000
Pesticide contents	.1116	.0511	2.18	.030
Sustainable management	-.1746	.0368	-4.74	.000
Chemical contents	-5656	.0655	-8.63	.000
Vitamin contents	.4062	.0448	9.05	.000
Rent budget	-.0010	.0002	-3.88	.000
Risk aversion	.0199	.0029	6.85	.000
cons	6.2152	.6316	9.84	.000

Indeed, this time, when trying to predict the variance of health values, the public goods game was not a significant predictor (p>.05), while extraversion (coeff=-.18) and positive emotions (coeff=-.34) were negative significant predictors. Nevertheless, health values were positively predicted by neuroticism (coeff=.26) and risk aversion (coeff=.02), supporting our hypothesis.

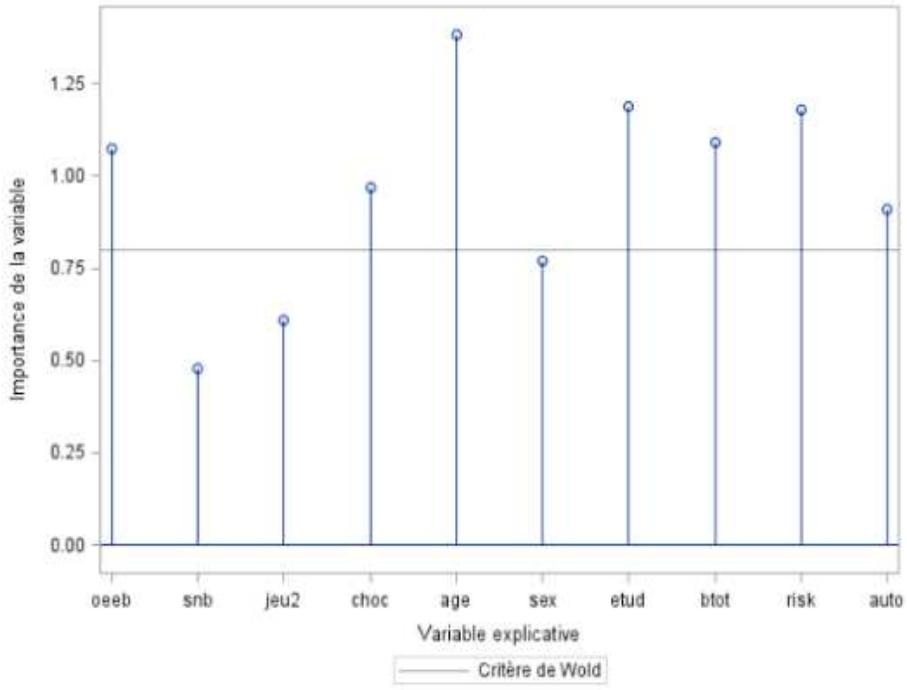
We can conclude that contributing to the public goods game (interpreted as being altruistic), and being extraverted and promotion-oriented are predictors for sharing an environmental concern; but not for being health conscious. In contrast, being neurotic and risk-averse are exclusive predictors for health concerns. The risk aversion factor is particularly relevant since, by definition, a health conscious consumer will be looking to prevent diseases.

5.3. Pencils regressions

To provide a generalization of the distinct organic consumers found with apples regressions,

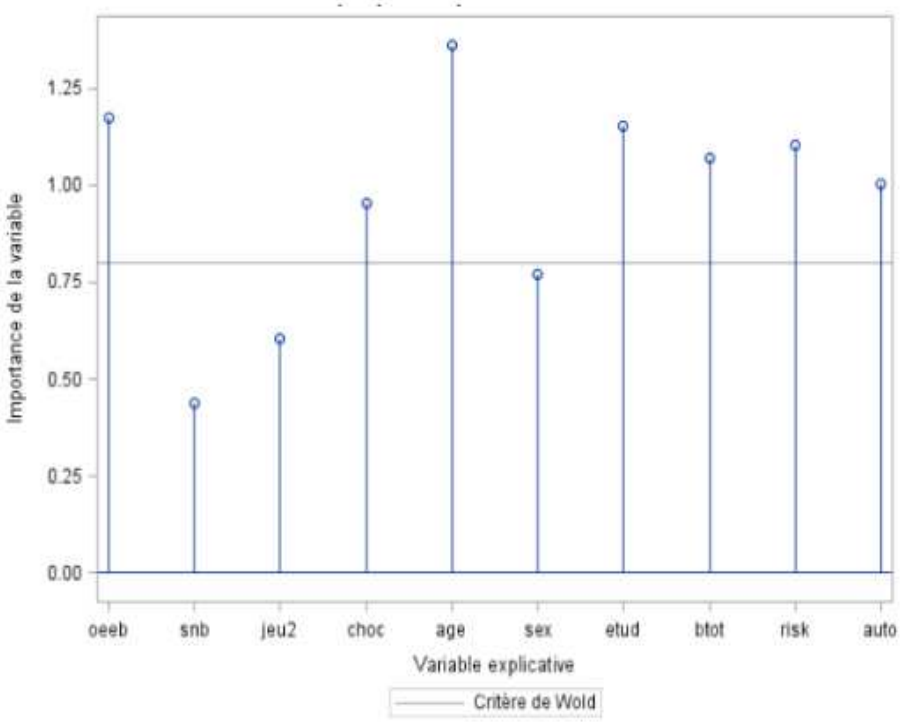
we observed the results on the pencils evaluations. To analyze the WTP for ecological and ergonomic pencils we will refer to figure 3 and figure 4.

Figure 3.
PCR ecological pencils



In Figure 3 (ecological pencils), we observe that environmental concern, self-deception, age, level of studies, risk aversion and income, are significant predictors. Nevertheless when comparing Figure 3 to Figure 4 we observe that the differences are very small between both models (quasi-inexistent). This suggests that the distinction between ecological pencils and ergonomic ones is not clear enough to divide the data into two different categories of consumers (environmentally conscious and health conscious). But the environmental values continued to be a great determinant in both models, while the outcome of the public goods game is irrelevant. From these results we can conclude that our third hypothesis is not validated.

Figure 4.
PCR ergonomic pencils



6. Discussion and Conclusions

The assumption that contribution in a public goods game is a predictor of organic apples consumption and of environmental concern values was significantly proven. We are inclined to interpret organic consumption as an altruistic behavior for the environmental consumer; and the next step would be to study the possibility of other collective repercussions. In this study we tried to extend the findings to another category of product, the pencils, but it was unsuccessful. There was definitely a problem in the categorization of the pencils, inhibiting the emergence of the two distinct organic consumers.

Pencils are known to have a large amount of substitutes (pens and mechanical pencils) and also require complements (erasers and sharpeners). Such properties are not found in apples. Furthermore, there was a context effect since participants entered the experiment knowing they would have to evaluate apples while pencil evaluation was a surprise. The pencils valuation occurred at the end of the experiment: by this time, participants might have been biased into

behaving as consumers differentiating two major types of products, one type being more worthy than the other one. Participants might thus have opposed conventional pencils to ergonomic and ecological ones, thus confusing the two latter. It would be interesting to reproduce the experiment by placing the pencil valuation before the apple one and observe if there is any significant difference. Also, the characteristics provided to describe the pencils were more numerous and more positively-oriented for ergonomic and ecological pencils than for conventional pencils, thus enhancing the confusion between ergonomic and ecological pencils.

There were other limitations in our research. For instance we were only able to focus on apples. Organic food is a luxury good, but organic apples are one of the least expensive organic products. The consumers of organic apples might thus be different from the consumers of other organic products, which should be studied in future research. Furthermore our target population was selected from Angers and it has been shown that consumers' perceptions of organic food might be different across regions and across countries (Bartels & Reinders, 2010). This should be taken into account in future studies. Finally, our risk aversion measurement concerned an everyday situation and might be considered as superficial. As Weller and Tikir (2010)'s study suggested, risk taking and personality traits relationship can be domain-specific. Future research should include questions related to risk taking in the specific domain of health.

From the results we observe that self-deception was significantly responsible for increasing the value of organic apples and ecological pencils. But it did not prove to be a predictor of the environmental values. It is possible that self-deception was not a determinant of pro-social attitudes, as suggested by Fleming and Zizzo (2011). From our results, social desirability would be more activated by social norms (increasing one's WTP), rather than by individual values (increasing one's environmental values score). We advise further researchers to keep using this psychological factor as a control variable.

Interestingly, promotion focus was a better predictor of environmental concerns than extraversion. This finding may help to find appropriate policies to encourage pro-environmental behavior. However, contrary to our hypotheses, prevention focus was neither significantly related to health values nor to the difference in WTP. Overall, our results showed that the variance of health values is positively predicted by negative emotions; but prevention focus is, by definition, not specifically related to negative emotions (Regulatory Focus Theory; Higgins, 2002). Indeed, prevention-oriented individuals who successfully avoid negative outcomes may experience calmness and relief, which are pleasant emotions. This may explain why prevention focus did not significantly predict the variance of health values.

Finally, we demonstrated a clear link between organic consumption and the public goods game . A more in-depth analysis of altruism and impure altruism (warm glow giving)

1. Andreoni, James (1990). "Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving". *Economic Journal* **100** (401): 464–477. JSTOR 2234133. **2.** Andreoni, James (1989). "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence". *Journal of Political Economy* **97** (6): 1447–1458. in participants should be undertaken in order to provide a better support for the findings of the public goods game.

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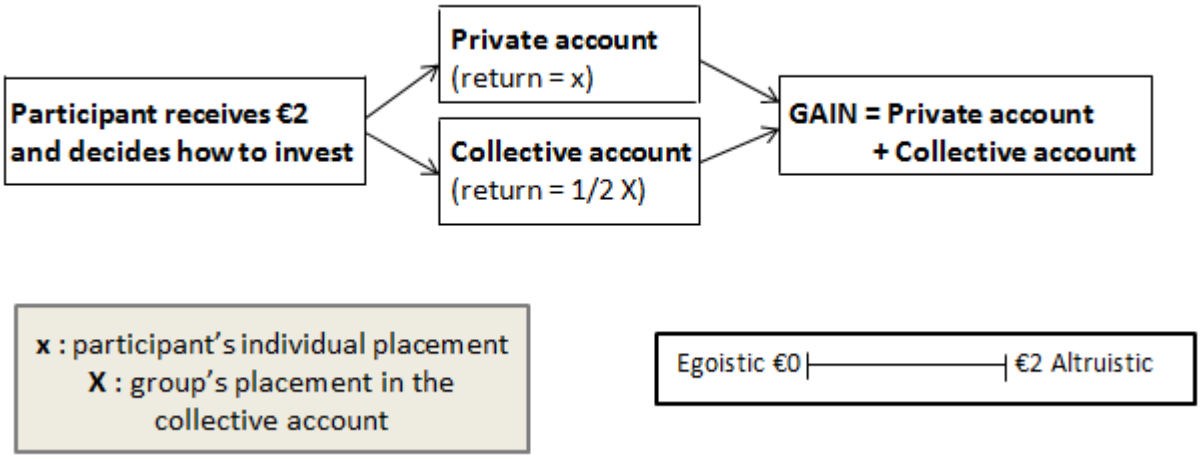
Appendix:

Appendix 1a.



Appendix 1b.

Participants	Vickrey auction		Public goods game	
	WTP	Payoffs	Investments in the public good	Payoffs
1	€1.2	0	€1.1	€4.75
2	€1	0	€0.7	€5.05
3	€1.3	0	€0.1	€5.65
4	€0.8	0	€1.9	€3.85
5	€1.4	Apples-€1.3	€1.6	€4.15
6	€1.1	0	€0.9	€4.85
7	€0.9	0	€1	€4.65
8	€1.2	0	€0.2	€5.55
	The winner is: Player 5. He buys the apples at the 2d highest price: €1.3.		Total investment = **€7.5**	

€4.75=(€2-€1.1)+(1/2)* €7.5

Appendix 2. List of variables, means and standard deviations

Variables	Definitions	Mean	S.D.
WILLINGNESS TO PAY			
Chocolate	WTP for chocolate (training phase)	0.96	0.57
Conventional apples		1.14	0.62
Organic apples		1.53	0.85
Organic – conventional apples	WTP organic apples – WTP conventional apples	0.39	0.35
Conventional pencils		0.36	0.32
Ergonomic pencils		0.5	0.4
Ecological pencils		0.52	0.49
VALUES			
Environmental values	Origin, fairness, environment	3.81	0.96
Health values	Surity, nutrition	3.67	1.03
PUBLIC GOODS GAMES			
Game1	Contribution in the collective account (1/4 return)	0.79	0.61
Game2	Contribution in the collective account (1/2 return)		0.63
		1.03	0.53
			0.57
SOCIAL DESIRABILITY			
Self-deception		3.10	0.53
Others-deception		3.19	0.57
PERSONALITY TRAITS			
Extraversion, openness		3.48	0.55
Agreeableness		3.88	0.54
Conscientiousness		3.30	0.70
Neuroticism		2.84	0.98
SELF-REGULATION			
Promotion focus		3.57	0.44
Prevention focus		3.45	0.73
EMOTIONS			
Positive emotions		3.33	0.48
Pleasant emotions		3.45	0.41
Negative emotions		2.52	0.68
Arousal emotions		3.03	0.41
ORGANIC KNOWLEDGE			
Vitamins	Organic products are rich in vitamins	3.68	1.08
Chemical contents	Organic products have less chemical residues	4.64	0.69
Pesticides	Organic production does not use synthetic pesti-	4.08	1.01
Sustainable management	cides	3.35	1.28
	Organic production allows sustainable management		
CONTROLS			
Risk aversion		27.22	14.1
Age		20.43	2.12
Sex		0.55	0.49
Level of studies		1.63	0.63
Income		577.8	354
Rent budget		251.6	168
Level of hunger	Level of hunger at the beginning of the experiment	2.27	0.93
FREQ. OF CONSUMPTION			
Organic apples		2.14	1.13

Organic fruit and vegetables		2.56	1.33
Grocery shopping	Frequency of grocery shopping	2.54	1.15

Appendix 3. Informations about the products

Conventional apples	Organic apples
Variety: Gala 160 grams	Variety: Gala 160 grams Excludes the use of synthetic chemical additives and synthetic pesticides

Conventional pencils	Ergonomic pencils	Ecological pencils
Devised in order to satisfy everyday needs.	Devised in order to satisfy everyday needs. Reduces muscular pains.	Devised in order to satisfy everyday needs. Wood originated from sustainable forest management