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Fat tax, subsidy or both? The role of information and children's pester power in food choice

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Abstract: Using a discrete choice experiment with real economic incentives, this paper studies how food fiscal policies and external influences (such as pestering and information) can affect parental choice of food for their child. Using pairs of a parent and child, the experimental design varies the food prices of healthier and unhealthier alternatives of food products for children as part of specific food fiscal policies. We then examine the interplay of children's pester power as well as information about the fiscal policies. The results from our lab experiment suggest that (a) implementing a fat tax and a subsidy simultaneously can shift parental behavior to healthier food products to a greater degree than a fat tax or a subsidy alone, (b) providing information regarding the food fiscal policies can further increase the impact of the intervention, and (c) child pestering is one of the causes of the moderate effectiveness of the policies as it strongly affects parents in making unhealthier choices.

Keywords: Choice experiment; Fat tax; Subsidy; Information; Pester power

JEL codes: C9; D12; I10

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1 Introduction

Overconsumption and excessive intake of sugar and fats along with sedentary lifestyles have been partly blamed for the worldwide obesity prevalence trend. Individual food choices are influenced by a wide variety of biological and environmental variables. Biological variables include hunger, taste, and appetite, while environmental variables include economic determinants (cost, availability, and income), social determinants (socio-cultural status, meal patterns, peer and social networks), psychological determinants (mood, stress, guilt) and perceived nutrition determinants (knowledge about food, beliefs, attitudes) (The European Food Information Council (EUFIC), 2005). Individuals place different levels of importance on each of these dimensions.

However, when transferring this framework from adults to children, an additional dimension must be taken into account. The food environment created by parents for children likely plays a more important role. This is because although adults have the freedom to make their own choices regarding energy intake and expenditure, the child's choice set is limited by the environment created by their parents (Barlow and Dietz, 1998). In this respect, Cawley (2006) stresses that parental control and bounded rationality are of great importance for childhood obesity. Thus, nudging parents toward healthier behavior could play an important role in helping children develop healthy eating habits at a young age. This is very important given the evidence that habits are formed early on in life and are retained throughout adulthood (Kelder et al., 1994; Resnicow et al., 1988; Singer et al., 1995). Therefore, interventions that focus on parental food choice behavior may help in this regard.

Due to the substantial negative externalities for society involving increasing obesity rates, several governments worldwide have intervened with various policies with the goal of influencing dietary habits. These include but are not limited to fiscal (OECD, 2012), marketing/informational (Beaudoin et al., 2007; Maes et al., 2012), and educational policies (Cross-Government Obesity Unit, 2008; New York City Department of Health and Mental Hygiene, 2008) that aim to encourage people to make healthier food choices. In the respective literature, fiscal policies (i.e., those that limit access and provide price incentives and disincentives) have received great attention with respect to their effectiveness in improving dietary patterns (Thow et al.,

2010). Generally, three types of price strategies have been applied: increasing unhealthy food prices (fat tax), decreasing healthy food prices (often called a thin subsidy) and a combination of both (Waterlander et al., 2012).

However, the literature provides contradictory results on the efficacy of these policies as a health intervention tool. In fact, although fiscal policies may encourage people to make healthier choices, they may not be sufficient in themselves to alter long-term overall purchasing behavior. This is because any reduction in purchases of taxed products may be offset by the consumption of calories from other sources (Fletcher et al., 2010). The results from a number of studies suggest that increasing the price of a good through taxation or decreasing its price through subsidy could be an effective means of shifting food consumption away from unhealthy food toward healthier alternatives, not only among adults (Andreyeva et al., 2010; Dong and Lin, 2009; Epstein et al., 2012; French, 2003; Goldman et al., 2011; Powell and Chaloupka, 2009; Waterlander et al., 2012) but also among young children and adolescents (French et al., 2001; French et al., 2003; Hannan et al., 2002).

The evidence on the effectiveness of health related food price incentives and disincentives is from three sources: natural experiments, controlled trials of price changes in closed environments, and modeling studies (Mytton et al., 2012). To our knowledge, there are only a handful of studies that performed controlled experiments over food purchases under different fiscal policies, and these studies have several caveats. For example, two such studies (Epstein et al., 2010; Nederkoorn et al., 2011) lack enforcement of real monetary incentives because both the purchases and the budget for the purchases were hypothetical. An additional set of studies (Epstein et al., 2006; Epstein et al., 2007) lacks sufficient statistical power because they employed small sample sizes (10 and 47 couples of mother-child). Our emphasis on experimental economics research is based on the fact that causal knowledge requires controlled variation. The laboratory can mimic real-world markets and simultaneously allow tight control of decision environments in ways that are hard to duplicate using naturally occurring settings, and hence, it can isolate factors that affect human behavior.

Our aim in this study is to identify some factors, either inside or outside the home environment, that can either weaken or enhance the expected outcomes of fiscal policies on food choices, through a controlled laboratory experiment. First, our

experiment contributes to the literature by providing an empirical examination of parent choices between healthier and unhealthier alternatives in regard to food products for their children under different fiscal pricing policies. While nutritional considerations are the most important determinants of parental food purchasing decisions, the preferences of their children are the second most important determinant of parental food choice (Spungin, 2004). Thus, we also evaluate how factors such as the provision of information on fiscal policies and child pestering may influence parental food choices.

While there is an extensive literature on the impact of information on demand for food, there is scant literature on the causal effect of information on the effectiveness of food fiscal policies. It is well established that information can help consumers better evaluate the value of goods and services they are interested in, resulting in more appropriate purchases. It can also significantly help buyers to choose which market to participate in, and it can affect the elasticity of demand (Johnson and Myatt, 2006; Lewis, 2011; Tadelis and Zettelmeyer, 2011). Ashraf *et al.* (2013) examined information and subsidy as complements in health interventions and found that information can significantly increase the impact of price subsidies on purchases of healthy products (the impact of price subsidies was 60% larger among the informed households).

In addition to our knowledge, this is the first study to examine children's power (commonly referred to as "pester power" or "pestering") to influence parents' purchasing behavior (Gunter and Furnham, 1999; McNeal and Mindy, 2003; Nicholls and Cullen, 2004) in the context of a lab experiment on real food choices. Thus, we contribute to the behavioral economics and health economics literature by examining how fiscal policies and external influences (such as pestering and information) can affect food choice behavior. Food shopping usually constitutes the first experience children in the Western world have of consumer activity, often in conjunction with their parents (Cook, 2003). More recent research has also observed that children are active participants and influencers in the food decision-making process (Carey et al., 2008) and that the parent-child conflict is fairly high in supermarket shopping environments (Nicholls and Cullen, 2004). A recent survey examined children's pester power in the supermarket environment through intercept interviews and concluded that parents often purchase the food that their children demand while in

supermarkets despite the fact that the majority of the children's requests are unhealthy (Campbell et al., 2014).

The question we ask in this paper is whether certain factors can have a moderating role on the monetary incentives that food fiscal policies create with respect to parental food choice behavior. We examined these effects through the recruitment of 189 parent-child pairs in a controlled laboratory choice experiment in which we created an experimental market with real food products in which parents actually had the opportunity to purchase products presented under different pricing schemes. Our sample consisted of four within-subjects treatments and four between-subjects treatments. In the *within-subjects* treatments, each participant faced 12 food choice tasks.[1] In each choice task, we displayed two food-for-children products, of the same brand and size, with different levels of healthiness (percentage of sugar and fat) and a no-buy option. The participants (parents) chose their preferred alternative in each choice task. Between choice tasks, the prices varied according to a base level (which was selected to reflect the average of market prices) and three different fiscal policies levels (i.e., fat tax, subsidy, fat tax and subsidy at the same time). To induce real economic incentives, one of the choice tasks was randomly drawn as binding at the end of the experiment, and the participant had to buy the food product chosen in the binding task or leave with no product if s/he had chosen the no-buy option. In addition to the within-subjects treatments, there were four *between-subjects* treatments. The control treatment was as described above. The second treatment (the information treatment) was similar to the control treatment but with the addition of information regarding the food fiscal policies.[2] The third treatment (the pester treatment) was similar to the control treatment, but now the parent chose *together* with their child in each choice task. The fourth treatment was similar to the pester treatment except that

[1] To cover up the aim of the study and preclude subjects from potentially succumbing to experimenter demand effects, two additional non-food categories were added to the list of choice tasks. We used stationery products (colored markers, pens/pencils) as decoy products. Consequently, participants faced 20 choice tasks in total (12 food- and 8 stationery-choice tasks).

[2] The word tax or subsidy, especially as they relate to food, includes a normative message rather than just giving plain information regarding the direction of the price change (upwards or downwards). More generally, when fiscal policies are applied, the purchasing behaviour cannot be explained solely in terms of a price effect. The nature of the intervention itself could also influence consumer preferences (Hilton et al., 2014). The announcement of the implementation of a specific policy to participants reflects the nutritional content of the product subject to this policy, i.e., a fat tax for product "X" means that the "X" product is probably unhealthy, and this is why it is being taxed. However, this is exactly what this study attempts to examine. We provided information about the price change at the time of purchase to remind participants about the healthiness of each product alternative.

we also offered information to the participants about the food fiscal policies (pester *plus* information treatment).

Our results make three substantive contributions to the literature. We find that the fiscal policy intervention by itself has a moderate effect on parental food choices. In particular, we find that a fat tax or a subsidy can increase healthier choices and that the simultaneous implementation of both a fat tax and a subsidy can further improve healthier choices among parents. Our second result is that when information regarding the applied food fiscal policies is available, healthier choices can increase the impact of the intervention even further. Therefore, it appears that the lack of proper provision of information is one of the causes of the policy's moderate effectiveness. Third, we find that child pestering strongly affects parents in making unhealthier choices.

The rest of the article proceeds as follows: First, we present the design of the experiment and the experimental procedures as well as information about our sample and products used in the study (section 2). Section 3 illustrates the results drawn from the descriptive and econometric analysis. Section 4 concludes with the importance and the implications of the findings.

2 Experiment

2.1 Experimental Design

Table 1 exhibits the four within- and four between-subjects treatments of our experiment, along with the number of parent-child pairs that participated in each treatment. Each cell in the table represents a between-subjects treatment. Within each cell, the four within-subjects treatments are listed that correspond to the price variations induced by each of the four fiscal policies: (1) a baseline scenario of market prices, (2) a fat tax, (3) a subsidy, and (4) a fat tax and subsidy applied simultaneously (the "Both" treatment). The between-subjects treatments vary the decision environment (the parent goes through the choice tasks with or without the presence of the child, which corresponds to the "Pester" and "No Pester" treatments) and information provision (whereby the parent is provided with information about the fiscal policies or not, hereafter referred to as the "Info" and "No Info" treatments). All

sessions were conducted by a single experimenter, i.e., one of the authors, and the experiment was conducted using the z-Tree software (Fischbacher, 2007).

Table 1. Experimental design

	No information for fiscal policy	**Information for fiscal policy**
Pester power	47 Market price, Fat tax, Subsidy, Both	47 Market price, Fat tax, Subsidy, Both
No Pester power	47 Market price, Fat tax, Subsidy, Both	48 Market price, Fat tax, Subsidy, Both

2.1.1 The role of food fiscal policies

Our experiment allows us to study the role of food fiscal policies as a tool that can influence healthier food purchasing behavior. We varied within subjects the posted prices of the products according to four within-subjects treatments. The market price (MP) treatment was always displayed first to create a common reference point to all subjects so that comparisons can be made with respect to fiscal policy treatments. In this treatment, the healthier and unhealthier versions of a product on any given choice task were set to the same level. The price level was set to the average value of market prices we found in major supermarket chains a few days prior to the experiment. Participants were explicitly told that in the first round, they will see the products in their average market price (the average price was the same within a product category but, naturally, varied between product categories). After the MP treatment, the three food fiscal policies (three treatments) followed in random order to avoid order effects. The only thing that was varied in these treatments was prices for the products (see Table 2). One of the treatments imposed a fat tax on the price of the unhealthier product (as judged by the fat or sugar content) while keeping the price of the healthier product constant at market price (FT treatment). An additional treatment imposed a subsidy on the price of the healthier product, keeping the price of the unhealthier product constant at the market price (SB treatment). The third treatment combined a fat tax on the price of the unhealthier product with a subsidy on the healthier product (BO treatment). The full list of choice tasks displayed in the four within-subjects treatments is listed in Appendix A.

Table 2. Overview of the within-subjects treatments

Treatment	Description
Control Treatment	Prices are set to the average value of market prices of major supermarket chains prior to the experiment. The prices of the healthier and unhealthier alternatives are equal.
Fat tax (FT) Treatment	Fat tax on the unhealthier alternative (25% increase on the market price)
Subsidy (SB) Treatment	Subsidy on the healthier alternative (25% decrease on the market price)
Both (BO) Treatment	Fat tax on the unhealthier alternative and subsidy on the healthier alternative at the same time (a 25% increase in the market price of the unhealthier product and a 25% decrease in the market price of the healthier product)

2.1.2 The role of provision of information

Our rationale for including a (between-subjects) provision of information treatment was that information regarding the price change can signal the relation of a price change with the healthiness of a product. This in turn can potentially alter purchase behavior. Such information provision can be enacted using several methods, including mass media, governmental/community-level agent announcements and informative labels on the shelves next to the price. In the context of our laboratory experiment, a labeling scheme was deemed more realistic when combined with a hypothetical governmental announcement. The design tries to mimic the real process of implementing a food policy. In Denmark in 2011, the media announced the implementation of a fat tax on products with high fat content to address rising obesity rates among the Danish and the relatively lower life expectancy. We adopted this procedure because we wanted the results of this experiment to be more relevant for policy makers. Thus, during the experiment, subjects were asked to imagine a case in which the health minister was about to implement a policy to address alarming obesity rates among children in the country (see Appendix B). However, we also added one more element. We made taxes more salient in terms of the visibility of the applied tax. Therefore, in the information treatment, subjects were informed of the actual reason for which a price change occurred (e.g., implementation of a fat tax or a subsidy or both) using a descriptive label on the top of the screen. We conducted this study in Greece, where, as in many other European countries, sales tax is applied to all food products (in contrast to many states in the US, where food and non-alcoholic

beverages are exempt from sales tax), and the sales tax is included in the posted price depicted on the sales tag (that is, one uniform final price is displayed). Therefore, the information treatment simulates an environment in which the consumer is informed of the price change of the product at the point of purchase through an informative tag. In the no-information treatment, subjects were not informed of the actual reason for the price increase/decrease.

2.1.3 The role of children's pester power

Our second between-subjects treatment examined the effect of parents making joint decisions with their child. While a parent may rationally choose to purchase a healthier product for their child, going to the supermarket with their child could adversely affect purchase decisions if the parent decides to give in to the child's demands (which are likely motivated by factors other than nutrition). To vary the child's ability to potentially pester the parents on their choices (hereafter referred to as pester treatments), we allowed children in half of the sessions to participate in the experiment with their parent by letting the child sit next to his/her parent.

In the no-pester treatments, the parent-child pair entered the lab together; however, the child stayed in the lobby of the lab and had no knowledge of what happened in the main area of the lab where the experiment took place and where the products were on display. Parents were told that the child will be kept engaged in the lab's lobby, where the child could watch cartoons or draw using paper and colored pencils. The child was told that s/he could watch cartoons or engage in drawing and that her/his parent was going to sit close by and within eye-contact distance. All the children were therefore restricted to being in the lab lobby, and none was allowed in the lab. Hence, parents decided on their own during the experiment without any external influence from the child, and the child did not participate in the experiment at all.

On the other hand, in the pester treatments, the parent-child pairs entered the main area of the lab together. The experimenter then instructed both the child and the parent to take a good look at the products in the exhibition shelf. They then sat together in front of the computer. Because there were no other distractions in the lab, the parent-child pairs were focused on the experiment and the choices they had to make. The child and the parent could freely communicate and discuss the choice options they had

to make.[3] In addition, the experimenter indeed observed that there were interactions between each parent-child pair.[4] The children regularly expressed their opinion when the choice alternatives appeared on the computer screen. The experimenter also observed that in several cases in the pester treatments, the parents tried to convince their child to choose the healthier alternative but that at the end, the child's nagging caused the parents to give in to their child's demands.

2.2 Participants

A random sample of families (one adult who is the primary grocery shopper and makes the household meal decisions and one child) from the general population of Athens, Greece was recruited by a market recruitment research company. The research company ensured that the interested families met the following study criteria: (1) the child in the family was between the ages of 6 and 10 (if there was more than 1 child in the family in this particular age range, the company randomly picked one child)[5] and (2) the family consumed the products used in the study moderately or more often.[6] Subjects were offered a fixed fee of 30€ per family to participate in a "preference survey for snack and stationery products for children" conducted in the experimental economics laboratory of the Agricultural University of Athens. A total of 189 families participated in the experiment.[7] Subjects participated in one of the four between-subjects treatments, and they were randomly assigned to a time slot between July 2012 and September 2012. Experimental sessions were split between morning (97 sessions) and afternoon (92 sessions) snack time hours, i.e., from 9:00-

[3] We observed that, in the pester treatments, all the children interacted with their parent. None of the children interacted with their parents in the No-Pester treatments.

[4]The experimenter systematically recorded on a sheet of paper whether the pair interacted in any way that signalled coordination in the choice made by the parent. This behaviour occurred in every single interaction.

[5] We chose this specific age range because, on the one hand, children of this age range have almost no pocket money and are totally dependent on what their parents purchase for them, while, on the other hand, they are old enough to accompany parents at the supermarket.

[6] Parents were screened for consumption patterns from a large list of food and stationery products, which included the products used in our study, so that we would avoid any prior associations with the aims of the study.

[7] A total of 195 parent-child pairs were recruited by the research company. Four of them did not show up. Two more pairs were excluded from all further analysis because, on one occasion, the parent refused to let us take anthropometric measurements from both the chid and the parent; on the other occasion the child entered the lab while his mother was making choices for the experiment despite several warnings that the child should remain in the lab's lobby.

13:00 and 16:00-20:00 each day of the week except Sundays.[8] Each parent-child pair participated in only one treatment/session. All subjects were given a short orientation and training before the experiment begun.

2.3 Experimental procedures

Each experimental session consisted of four tasks. It included a real choice experiment (RCE), a manipulation check questionnaire, a socio-demographic questionnaire and anthropometric measurements. In each session, a single parent-child pair participated, which lasted approximately 40 minutes. Depending on the treatment, the child could have an active role in the choice experiment or not.

In the RCE task, participants faced different choice tasks for which they had to choose between two (similar) products of the same brand (e.g., cheese) differentiated by their healthiness status (healthier vs. unhealthier alternative) and price (three levels). The healthiness or unhealthiness status was not explicitly labeled as such. Choices also included a no-buy option in the event that subjects did not prefer any of the products.[9]

The experiment was conducted as follows: First, each parent was assigned a unique ID number to guarantee his/her anonymity, and s/he was informed that their fixed participation fee of 30€ would be given to them at the end of the experiment.[10] In addition, subjects could examine the products offered for sale in a display section in the lab. They were given a sufficient amount of time to see and inspect all products. Subjects were then seated in front of a computer, and they were informed that they would go through 20 choice tasks displaying various combinations of the products on display in the lab.[11] They were also informed that when they complete all choice

[8] Lunch and dinner time in Greece are usually later than in other parts of Europe and North America. Lunch is usually served between 13:30 and 15:00, while dinner is served between 20:00 and 21:30. Two parent-child pairs participated in the experiment at 14:00 and 14:45 because they were late and early.

[9] According to Louviere and Street (2000), it is not realistic to force participants to choose one of the available options, and therefore including a no-buy option is to be preferred.

[10] The fixed fee of 30€ per family reflects the opportunity cost of time of 2 people commuting from their residence to the university lab to participate in the experiment (round trip tickets for public transportation at the time of the experiment cost 5.60€ for 2 persons). This leaves the parent-child pair with approximately 25€ of net income, which is comparable to what professional research companies use to compensate subjects in the surveys they undertake. Furthermore, because the fixed fee of 30€ did not vary across treatments, it should not explain the differences in observed behavior between treatments.

[11] Note that only 12 of 20 choice tasks involved food items. Eight choice tasks involved decoy stationery products.

tasks, one of these would be chosen as binding, and they would have to purchase the product of their choice at the indicated price. The price of the product would be deducted from their participation fee. To determine the binding round, subjects had to draw a number from a jar with folded papers listing numbers from one to twenty (as many as the choice tasks). To make sure parents were choosing food products for their child, they were explicitly told that the binding product would be opened and given to their child right away, to be consumed while s/he was filling out a socio-demographic questionnaire.[12] We emphasized to subjects that actual payment would occur for the binding choice task and that they should evaluate each choice task carefully because all tasks were equally likely to become binding. Subjects were also told that choosing the "none of these" option (i.e., the no-buy option) is an acceptable choice and that, if they had chosen the no-buy option in a binding task, no purchase would be made and they would keep their full endowment. The exact instructions given to the participants are displayed in Appendix B.

To confirm that our experiment worked well, i.e., that there was no experimenter demand effects and participants adhered to the experimental instructions, we incorporated a manipulation check questionnaire right after the choice experiment was finished (see Appendix C for more details).[13] The socio-demographic questionnaire, which elicited parental perceptions about their child's weight status, family dietary habits, and family socio-demographics, was filled out by the parents.

Each session concluded with anthropometric measurements of the parent and the child. Physical measurements of body weight and height were obtained from all children and their parents (light summer clothing, no shoes). Body weight was measured on a leveled platform scale with a beam and movable weights, and body height was measured with a wall-mounted stadiometer, to the nearest 0.5 kg and 0.5 cm, respectively. Body Mass Index (BMI) was computed as weight (in kilograms)

[12] In many cases, when the binding product was a food product, it was consumed by the child while the parent was filling in the questionnaire. In a few cases in which the questionnaire was filled out before the child had the chance to fully consume the food product (this only happened with the cheese sticks, for which the package included 6 pieces individually wrapped), we did let the children take the rest of the product home. However, the participants were not informed of this beforehand.

[13] The results of the manipulation check questionnaire reinforced the validity of our experimental results. All subjects in the information treatment responded that their responses were based on the information given at the beginning of the session along with what s/he and/or their child wanted and were not based on what they thought the experimenter wanted from them. All subjects in the No-Info treatment responded that the purpose of the study was to examine consumption patterns for food and/or stationery products for children.

divided by height (in meters squared), and it was used to classify participants as either normal-weight, overweight or obese (Cole et al., 2000; Cole et al., 2007; WHO, 1995).

2.4 Products and choice tasks

The food products chosen were products commonly purchased by Greek families as snacks for children. In each product category (choco milk beverage, cheese, and yogurt), there were two products of the same size and weight that differed only on the basis of percentage of calories, fat and sugar, and so it was easy for parents to distinguish between the healthier and the unhealthier alternatives (for example, all healthier products carried nutritional claims such as "free", "2%", "light"). However, we did not explicitly mention to the participants if a product would be considered more or less healthy. We also did not label any of the products as such. Each choice task depicted the alternative products using photo stimuli. To mute any brand effects, we chose products of the same brand in each product category; that is, each pair of healthier and unhealthier products were of the same brand. One week before the official start of the experiment, the experimenter visited the supermarkets of the four largest chain stores in the city and collected price information for the products of the experiment. The average of these prices was used in the baseline control (market price) treatment, and prices for the other within-subjects treatments varied accordingly.[14]

Furthermore, we purposely chose products for which the healthier and unhealthier alternatives in each choice task were packages of different colors. The visual elements of a brand, such as the colors and illustrations, are the first elements understood and memorized by children rather than the specific name of the brand (Kapferer, 1985; Richard, 1990). In a study conducted with children from 6 to 11 years old, who were asked to draw the cornflakes packages they knew, Rossiter (1976) indicated that

[14] The products were: milko vs. milko free, babybel vs. babybel light, delta yogurt vs. delta yogurt 2%. The dairy product category was chosen for our experiment because there are only small price differences among the healthier and less healthy options. For well known attributes such as fat and calories, dairy manufacturers in Greece no longer price their "healthier" products more expensive than their "regular" ones. The Greek dairy market is not an exception. Rao et. al.,(2013) conducted a systematic review and meta-analysis of prices of healthier versus less healthy options within a single food category and concluded that in the case of dairy products, the price differences are very small ($0.004). In addition, the purpose of the control treatment was to give a common reference point to participants so that comparisons can be made with respect to the fiscal policy treatments.

children more easily retained the visual elements of the brand rather than the brand name itself. Rossiter (1976) concludes that, while the brand name is an important recognition sign, it is intimately associated with children's age and to the development of their verbal memory. In addition, Burros (2005) concludes that television advertisements largely influence the food preferences of children under 12 years of age. The products used in the experiment were commonly advertised during children's TV programs. Thus, we spent a great deal of time and were careful in choosing the specific products for our experiment (illustrating pictures of the products can be found in Appendix D).

To cover up the aim of the study and preclude subjects from potentially succumbing to experimenter demand effects, two additional non-food categories were added to the list of choice tasks. We used stationery products (colored markers, pens/pencils) as decoy products. The prices of the decoy products in the market price (baseline) treatment were the average of the range of prices observed in the same supermarkets we surveyed for the food items. Decoy products were selected so that their price range lied between the lowest and the highest price of the market prices of food products, to avoid exposing subjects to any irrelevant price anchors. Prices did not change for the decoy products under the fat tax, subsidy and both treatments because the fiscal policies were irrelevant for stationery products.

In all, the real choice experiment incorporated 20 different choice tasks [4 within-subjects treatments (MP, FT, SB and BO) $\times$ 5 product categories (3 food and 2 non-food)]. The choice tasks pertaining to the stationery products will not be further analyzed. Appendix D displays the sample choice screens from the market price treatment. In the rest of the within-subjects treatments, prices were adjusted accordingly.

3 Results

3.1 Descriptive analysis

Before proceeding with testing our hypotheses, insights can be gained by looking at some descriptive statistics. We first explore whether randomization to treatment

worked by testing whether the observable characteristic are balanced across the between-subjects treatments (see Table 3).

With respect to the socio-economic status of families, results indicate that our between-subjects treatments do not differ in terms of parent/children age and gender, income level, education level, working status, family geographical location residence and marital status. Furthermore, given that parent-children pairs would have different compositions (i.e., father-son, father-daughter, mother-son, and mother-daughter), a question that might arise is whether the proportions of parent-child gender combinations differ across the treatments. We cannot reject the null of no difference between treatments (Pearson's χ^2 =10.85, p-value=0.29). We also classified individuals according to parental weight status using Body Mass Index (WHO, 1995). The results of whether the distribution of weight status differs between treatments do not reject the null hypothesis, and we obtain a similar null effect if we use the raw BMI measurements instead of the BMI categories. As far as child's weight status is concerned, we used the International Obesity Task Force (IOTF) cut offs (Cole et al., 2000) to categorize children into weight categories, and this does not differ significantly between treatments. None of our results changes when we use Centers for Disease Control (CDC) cut offs (CDC, 2009) because the distribution of weight categories did not significantly change. The results from the use of the raw BMI (instead of BMI categories) support the above tests.

Table 3. Test statistics comparing the between-subjects treatments and means of the characteristics (standard deviation in parenthesis) for each treatment.

Observable Characteristics	**Tests**	
Parents' age	ANOVA [Trt.1. mean=41.21 (0.72)] [Trt.2. mean=40.91 (0.72)] [Trt.3. mean=39.55 (0.60)] [Trt.4. mean=40.25 (0.91)]	p-value=0.41
Parents' gender	Pearson's χ^2=2.51 [Trt.1. mean=0.53 (0.07)] [Trt.2. mean=0.57 (0.07)] [Trt.3. mean=0.45 (0.07)] [Trt.4. mean=0.44 (0.07)]	p-value=0.47
Children's age	ANOVA [Trt.1. mean=8.32 (0.21)] [Trt.2. mean=8.11 (0.18)]	p-value=0.86

	[Trt.3. mean=8.09 (0.21)] [Trt.4. mean=8.15 (0.21)]	
Children's gender	Pearson's χ^2=2.35 [Trt.1. mean=0.59 (0.07)] [Trt.2. mean=0.49 (0.07)] [Trt.3. mean=0.45 (0.07)] [Trt.4. mean=0.48 (0.07)]	p-value=0.50
Income level	Kruskal Wallis χ^2=1.15	p-value=0.77
Education level	Kruskal Wallis χ^2=1.37	p-value=0.71
Occupation	Pearson's χ^2=7.35	p-value=0.83
Geographical residence	Pearson's χ^2=6.95	p-value=0.96
Marital status	Pearson's χ^2=9.66	p-value=0.38
Smoking status	Pearson's χ^2=5.51	p-value=0.79
Gender of parent-child pairs	Pearson's χ^2=10.85	p-value=0.29
Parental weight status *(Healthy=31%, Overweight=37%, Obese=32%)*	Pearson's χ^2=3.86	p-value=0.69
Parental BMI	ANOVA/Kruskal Wallis [Trt.1. mean=28.13 (0.67)] [Trt.2. mean=27.86 (0.85)] [Trt.3. mean=28.55 (0.78)] [Trt.4. mean=27.63 (0.76)]	p-value=0.85/0.78
Child's weight status (CDC) *(Healthy=59%, Overweight=22%, Obese=19%)*	Pearson's χ^2=4.29	p-value=0.64
Child's weight status (IOTF) *(Healthy=61%, Overweight=28%, Obese=11%)*	Fisher's exact test	p-value=0.61
Child's BMI	ANOVA/Kruskal Wallis [Trt.1. mean=18.23 (0.45)] [Trt.2. mean=17.45 (0.43)] [Trt.3. mean=18.68 (0.45)] [Trt.4. mean=18.12 (0.54)]	p-value=0.33/0.19

Before moving to the econometric analysis, it is also important to have a first look at the raw choices of subjects. Subjects had to choose among three alternatives in each choice set. They could select the unhealthier alternative, the healthier alternative or none of the two alternatives. Our priors are that if parents are aware that a product for children has been taxed because it is unhealthier compared to others, it may discourage purchases of it; or if they are aware that a product has been subsidized because it is considered healthier than other products, it may enhance purchases of it.

Overall, we expect that when information is provided about products for which the price has been changed according to some fiscal policy, the purchasing behavior of parents would shift to healthier product choices. This hypothesis is confirmed by a proportions test when we test for differences in choices when information about fiscal policies is provided. For example, while 36% of choices are allocated to the healthier alternative in the "No Pester - No Info" treatment, the proportion rises to 72% in the "No pester - Info" treatment. This difference is statistically significant when we test using a proportions test (p-value<0.001). Similar behavior is observed in the "Pester" treatments, in which the choices shift from 21% to 58% to the healthier alternative when information about fiscal policies is provided. This is clear-cut evidence that communicating the nature of the fiscal policy has a positive and significant effect on healthier choices because, in both cases, the percentage of healthier choices more than doubles. In fact, from the observed interactions recorded by the experimenter between parent-child pairs, the provision of information seems to have given parents an argument to present to their children that would support their parental choice of the healthier alternative.

On the other hand, children's pester power has a negative effect on healthier choices. In the "No Info" treatment, which allows the child to be able to communicate preferences to the parent, results in a significant decline in healthier purchases from 36% to 21% (p-value<0.001). Similarly, in the "Info" treatment, healthier choices decline from 72% to 58% (p-value<0.001) when children can exercise pester power. In summary, we find that information about fiscal policies and pester power can have opposite effects. The proportion of healthier choices increases when information is provided and children cannot exercise their pester power.

To illustrate this further, Figure 1 graphs the proportion of healthier and unhealthier choices by treatment. The graphs ignore non-choices given the low number throughout our experiment (only 20 choices were non-choices of the 2268 choices that the 189 subjects made in our experiment).

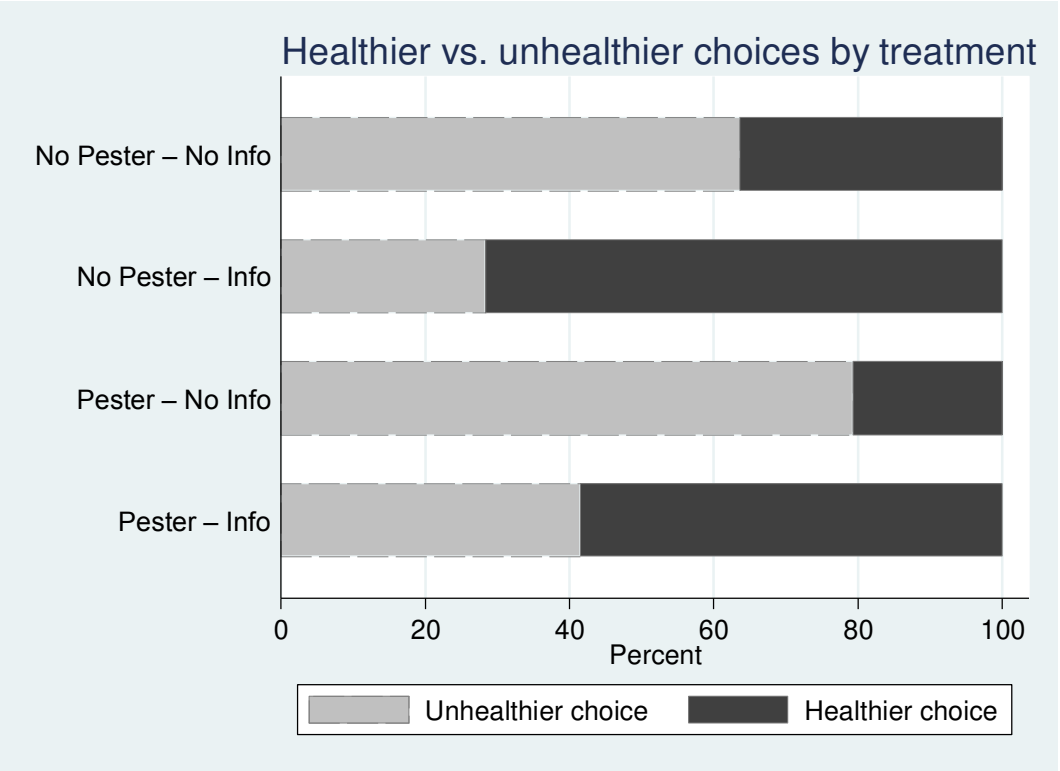

Figure 1. Healthier and unhealthier choices by (between-subjects) treatments

To examine the effect of specific fiscal policies (i.e., fat tax, subsidy or both) on healthier choices, Figure 2 displays the proportions of healthier and unhealthier choices by fiscal policy. The market price treatments are the benchmark (control treatments). It is clear that a) imposing the fat tax *or* subsidy leads to increased healthier choices and b) imposing the fat tax *and* subsidy at the same time can further improve healthier choices. We should emphasize that healthier choices can reach as high as 83% of all choices when a fat tax and a subsidy are combined, when subjects receive information about fiscal policies, and when children cannot exercise pester power. In the case in which information about fiscal policies is provided and there is pester power, healthier choices fall to 71%. Finally, it is important to mention that even when information is not available and the child is present (the two factors that favor unhealthier purchases), the combination of a fat tax and a subsidy produce the largest percentage of healthier choices when compared with the other fiscal policies (which amounts to 28%).

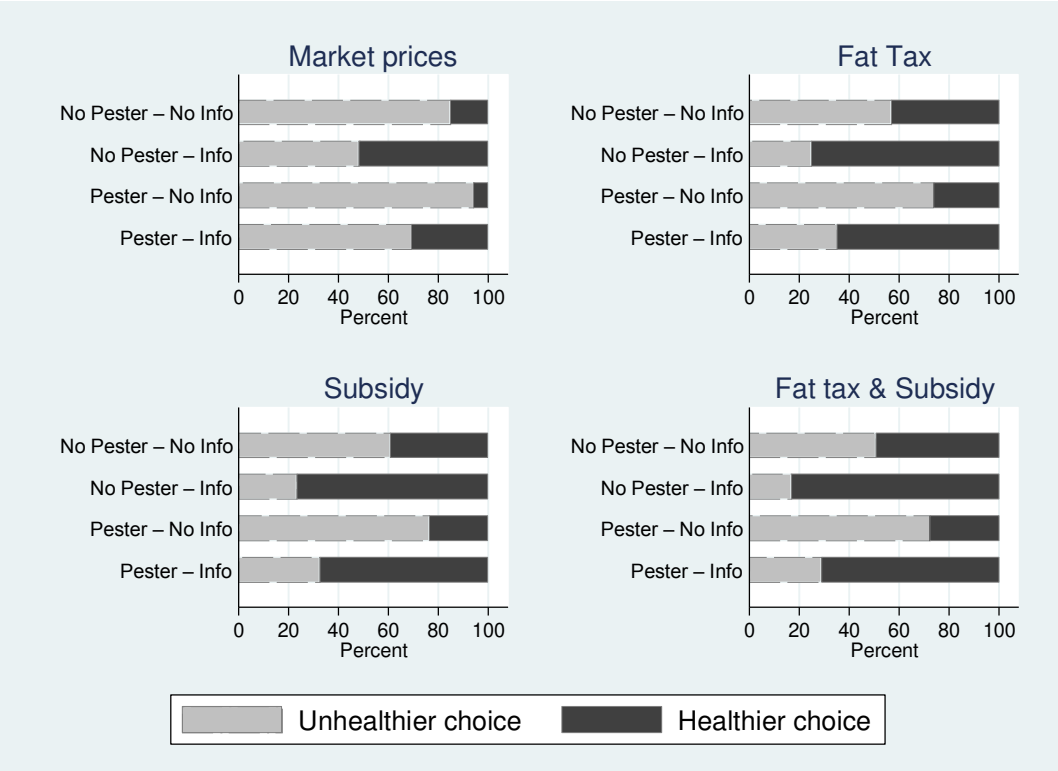

Figure 2. Healthier and unhealthier choices by (within-subjects) treatments

We do not observe large differences in the purchasing behavior between the subgroup of fathers and the subgroup of mothers (Figure 3). We hypothesized that fathers give in to child nagging more easily than mothers, even when information regarding the healthiness of a product is provided. However, the results do not support this hypothesis.[15]

[15] When splitting our sample into subsamples according to different weight household combinations (i.e., parent of any weight status with normal weight child *versus*: (a) obese parents with obese children, (b) obese parents with overweight children and (c) overweight parents with overweight children; obese parents with obese children *versus* normal weight status parents with normal weight children; obese and overweight parents with obese and overweight children *versus* normal weight status parents with normal weight status children) to test if different subgroups behave differently among the within- and between- subjects treatments, the proportion tests indicate no significant differences. The linear probability models we estimated also did not produce statistically significant interaction terms.

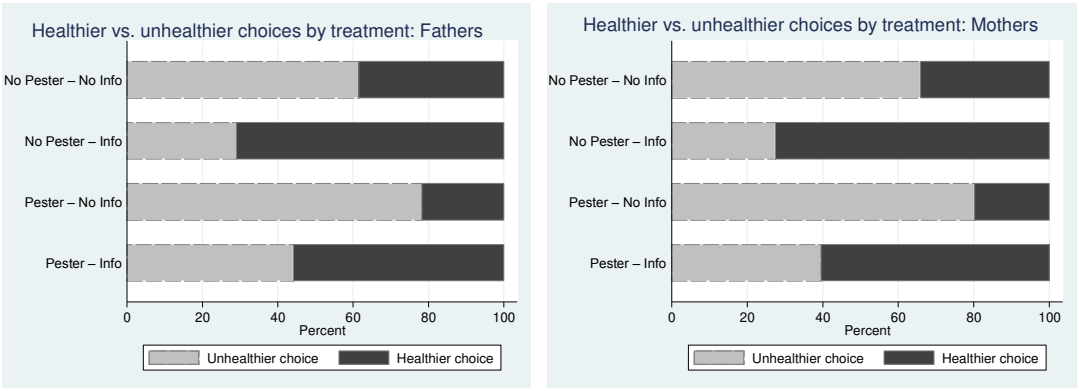

Figure 3. Healthier vs. unhealthier choices: fathers and mothers subsamples

3.2 Econometric analysis

To check whether the insights gained from the descriptive analysis above hold under the scrutiny of conditional analysis, we estimated a mixed logit model (also referred to as the "random parameter logit model" or "mixed multinomial logit model" (Hensher et al., 2005)). The mixed logit model solves three primary limitations of the standard logit model. It allows for random taste variation, unrestricted substitution pattern, and correlation in unobserved factors over time (Train, 2003). McFadden and Train (2000) indicated that under mild regularity conditions, a mixed logit model can calculate to any degree of accuracy any random utility model of discrete choice.

We assume that a sampled individual ($n = 1,\ldots, N$) faces a choice among i alternatives in each of s choice tasks. The utility associated with each alternative i, as evaluated by each individual n in choice task s, is represented by the following model:

$$U_{nis} = \beta_n' x_{nis} + \varepsilon_{nis} \tag{1}$$

where x_{nis} is the full vector of explanatory variables that are observed by the analyst; β_n' is a vector of fixed and random coefficients across individuals parameters; and ε_{nis} is an i.i.d. extreme value error term.

In our experiment, the participants were asked to make 12 choices between dairy products offered at various pricing levels. The choices can be analyzed using the following mixed logit model:

$$U_{nis} = \beta_{0ni} + \beta_1 ChocoMilk + \beta_2 Cheese + \beta_{3i} Price + \beta_{4ni} Info + \beta_{5ni} Pester + \varepsilon_{nis} \tag{2}$$

where β_{0ni} is the alternative specific constant (ASC) for alternative *i*; *ChocoMilk* and *Cheese* are product dummies (*Yoghurt* is the excluded category); *Price* is the price of the products; *Info* is a dummy variable for when information about the fiscal policies are provided to subjects; and *Pester* is a dummy variable indicating the treatment for which the parent-child pair choose together (allowing the child to exercise pester power).

The coefficient β_{0ni} captures parent sensitivity to the health attribute, and we model this as a random parameter that is triangularly distributed.[16] The coefficients of *Info* and *Pester*, which capture consumer sensitivity to information provision and child pester power, are modeled as random and triangularly distributed as well. The parameters β_1, β_2, and β_3 are non-random and capture consumer sensitivity toward product category and price changes. Finally, the alternative-specific constant for the "none-of-these" alternative is normalized to zero.

Table 4 displays the estimated coefficients of the parameters and respective standard errors from the estimated model of equation (2) (the column labeled "mixed logit (1)"). For comparison, a multinomial logit model is also displayed as well as a mixed logit model for which only the alternative specific constants are modeled as random (the column labeled "mixed logit (2)"). We can see that both the mixed logit models (LL= -1127.017 and LL= -1126.947) are an improvement to the more restrictive multinomial logit model (LL=-1394.050). Likelihood ratio tests indicate that the mixed logit model (1) is to be preferred to the multinomial logit model (χ^2=534.07, p-value<0.001). A similar result is obtained when we compare the mixed logit model (2) with the multinomial logit model (χ^2=534.21, p-value<0.001). On the other hand, the two mixed logit models do equally well (χ^2=0.14, p-value=0.998). AIC values support these conclusions. Note that the two mixed models are qualitatively and quantitatively indistinguishable in terms of the estimated coefficients.[17]

[16] We tried several other distributions for the random coefficients of our model such as the normal and the uniform distribution. Differences between models with different distributions for the random coefficients are negligible. We only report results from the models with triangular distribution because it is a limited distribution, and therefore, it does not imply that anyone has an unlimited willingness to pay (Alfnes et al., 2006). See Hensher and Greene (2003) for a discussion on the various distributions in mixed logit models.

[17] We also estimated models that included a time of the session dummy (morning vs. afternoon sessions) to control for time-of-day differences. The dummy for time of the sessions was not statistically significant and of small magnitude. In addition, likelihood ratio tests indicate that the model with the time-of-day dummy does not significantly improve the fit of the model (χ^2=0.928, p-

The alternative specific constants represent the utility of the alternatives (unhealthier-healthier) at the base level, and the alternative with the highest utility on the base level is the unhealthier alternative, namely, ASC_U, which is significantly higher than the healthier alternative (Wald test-statistic: χ^2=46.69, p-value<0.001). The product dummies have no effect on the utilities of the alternatives. Furthermore, the coefficient of the *Price* variable for both the healthier and unhealthier alternatives is negative, as one would normally expect.

The coefficient of the information variable for the healthier alternative is positive and statistically significant at the 1% level, while for the unhealthier alternative, it is not statistically significant and of small magnitude. This means that providing information about fiscal policies affects the utility of the healthier alternative much more than the utility of the unhealthier alternative. A similar pattern in terms of statistical significance is observed for the child pester power coefficients. The pester power dummy has a negative statistically significant effect for the healthier alternative but is not significant and is of small magnitude for the unhealthier alternative.

value=0.629). Furthermore, we also estimated a mixed logit model that specifies the model so that error components in different choice sets from a given individual are correlated (correlated random parameters model). However, estimated covariances of random parameters were not statistically significant in this model indicating the absence of correlation between random parameters. In addition, AIC and Log-Likelihood measures indicated a worse fit than the model without correlated random parameters.

Table 4. Estimated parameters for the multinomial logit and mixed logit models

Multinomial logit			Mixed logit (1)			Mixed logit (2)		
Variable	**Coefficient**	**S.E.**	**Variable**	**Coefficient**	**S.E.**	**Variable**	**Coefficient**	**S.E.**
ASC_U	8.251***	1.056	$ASC_{U\ (R)}$	10.388***	1.120	$ASC_{U\ (R)}$	10.434***	1.121
ASC_H	7.040***	1.054	$ASC_{H\ (R)}$	8.197***	1.121	$ASC_{H\ (R)}$	8.196***	1.125
ChocoMilk	-1.621	1.052	ChocoMilk	-1.235	1.060	ChocoMilk	-1.237	1.060
Cheese	0.121	1.074	Cheese	1.566	1.099	Cheese	1.562	1.099
$Price_U$	-2.178***	0.179	$Price_U$	-3.505***	0.249	$Price_U$	-3.504***	0.249
$Price_H$	-2.348***	0.217	$Price_H$	-3.756***	0.294	$Price_H$	-3.755***	0.294
$Info_U$	0.970	0.631	$Info_{U\ (R)}$	0.662	0.703	$Info_U$	0.606	0.694
$Info_H$	2.683***	0.632	$Info_{H\ (R)}$	3.803***	0.742	$Info_H$	3.781***	0.743
$Pester_U$	0.061	0.456	$Pester_{U\ (R)}$	0.210	0.540	$Pester_U$	0.201	0.540
$Pester_H$	-0.673	0.459	$Pester_{H\ (R)}$	-1.239**	0.603	$Pester_H$	-1.238**	0.593
Log likelihood	-1394.050			-1127.017			-1126.947	
AIC	2808.100			2286.034			2277.894	
N	2268							

Note: ***, **, * denote statistical significance at the 1%, 5% and 10% level, respectively.
(R): Denotes random coefficient for the respective variable.

Given that the estimates of the coefficients from the mixed logit model are hard to interpret quantitatively, we also calculated the effect of changes in prices on the choice probabilities for each of the alternatives and for each of the between-subjects treatments (see Table 5). Because previous analysis indicated little in the way of a product-specific effect, we pooled across the products in this table. The results from the within-subjects treatments indicate that changing the food fiscal policy from a basic level of market price to imposing a 25% fat tax increases choices of the healthier alternative by 16.16% and decreases choices of the unhealthier alternative by nearly 18%, *ceteris paribus*. The results from a corresponding subsidy of the healthier alternative indicate a 14.5% increase in the probability of selecting the healthier alternative and a 14% decrease in the unhealthier alternative, *ceteris paribus*. The combined effect of a fat tax and a subsidy results in even larger changes. The results from the between-subjects treatments indicate that the effect of fiscal policies is even stronger in increasing the probability of selecting the healthier alternative when combined with information. For example, when information regarding the policies is provided, a 25% subsidization of the price results in a 49% increase in the healthier choice share, and the equivalent fat tax imposed on the unhealthier alternative results in a 50% increase in the healthier choice share. This indicates that the fiscal policies are more effective if coupled with information carrying a normative messaging.

Our results also indicate that children can influence parents negatively in choosing the healthier alternatives. We observe that even when both fiscal policies are applied (the treatment for which we have the larger shares for the healthier alternatives) and parents make choices together with their child, the probability of selecting healthier products does not exceed 13%, *ceteris paribus*. However, based on the percentages from the Pester – Info treatment, we can see an increase of up to 47% in healthier choices when information is provided. When we compare differences between the effectiveness of a fat tax and a subsidy, we conclude that these are rather small, at least in the context of our experiment.

Table 5. Scenario of fiscal policies (25% increase – 25% decrease) and their effects on choice probabilities (%) compared to the control (market price) treatment

	MARKET PRICE	**FAT TAX**	**SUBSIDY**	**BOTH**
No Pester – No Info				

U	BASELINE	-17.91	-14.01	-30.75
H		16.16	14.52	30.49
N		1.74	-0.51	0.26
No pester - Info				
U	-36.95	-48.96	-47.73	-55.82
H	38.08	49.97	48.96	57.02
N	-1.13	-1.01	-1.23	-1.20
Pester – No Info				
U	14.23	-1.95	2.92	-14.34
H	-14.53	-1.10	-2.74	13.02
N	0.30	3.05	-0.18	1.32
Pester - Info				
U	-20.16	-35.79	-33.66	-46.10
H	21.15	36.47	34.80	47.14
N	-0.99	-0.68	-1.14	-1.04

Note: H: Healthier alternative, U: Unhealthier alternative, N: None of these
Fat Tax: 25% Increase in price of unhealthier alternatives from market price, SB: 25% decrease in price of healthier alternatives from market price, BO: Change in price from market price for both policies.

4 Conclusion

Given the rapid rise in obesity rates, especially among children, policymakers and academics have proposed a large number of policy measures to halt or reverse this trend. Some of the most well-known mechanisms are food fiscal policies, which may be used to encourage consumers to adopt a healthier way of eating. In this paper, we studied how food fiscal policies and external influences (such as pestering and information) can affect parental choice of food for their child. This is important given that adult eating habits are acquired during childhood (Birch, 1988; Kelder et al., 1994; Lien et al., 2001). Thus, children are more likely to adopt healthier eating behavior if they grow up under a healthy parental food "umbrella". We focused on parental food choices because young children's choices are normally constrained by what their parents provide them. In this study, we perceive food fiscal policies as a promising incentive mechanism that could create a parental environment that supports

healthy eating in the family. However, specific factors that influence the effectiveness of food fiscal policies have to be taken into account.

From an economics perspective, this study tries to simulate the choices parents face in real world settings using a real choice experiment. Choice experiments are an incentive-compatible method that is easy for consumers to understand. In our experiment, subjects were tested in a "closed environment" as they could only choose between three alternatives: a healthier and an unhealthier version of the same product category, brand and size or the no-buy option. Although in real life, a far greater number of options (brands, sizes, substitutes) are available in a grocery store, which can create more complex substitution patterns resulting from fiscal policies, our small-scale choice environment provides a clean illustration of the effects of these policies.

In terms of policy making, our study illustrates that the magnitude of the effect of any fiscal policy can be weakened or enhanced by several other factors. For example, our study demonstrates the significant (negative) influence that children exert on parental choice decisions (i.e., with pestering) in regard to healthier foods. On the other hand, our findings suggest that if proper provision of information regarding the cause of the price increase/decrease is provided (e.g., posted information tags regarding the applied policy on the shelf close to the price), the effect of a food fiscal policy can be enhanced. This finding implies that food fiscal policies are more effective if coupled with information (that may carry normative messages) directly on the product so that the policy becomes more salient at the time of purchase. Furthermore, our results indicate that, although there is an impact on healthier choices after the implementation of a fat tax or a subsidy, the simultaneous implementation of the fat tax and subsidy can further encourage healthier choices.[18]

[18] We acknowledge that a different experimental design in which the subject overall income is adjusted by a certain percent after a fat tax or a subsidy would have allowed us to control for income effects and would have given us the opportunity to present income adjusted results for the within-subjects treatments. Furthermore, experimenter demand and house money effects may be present as in many experiments. However, we did everything in our power (including anonymity and manipulation checks) to avoid these potential sources of bias. Even if the effects on the tendency to purchase unhealthier options are at the lower bounds, we are for the most part interested in the between-subjects comparisons of these effects. Thus, the pestering effect (which was identified on the basis of a between-subjects design) does not necessarily reflect a lower bound. As for the house money effect, although there is much evidence of the house money effect in bargaining games, it is not clear how these results would extend to market games and more importantly to market choice experiments. All in all, this paper's purpose was to identify the factors that enhance or decrease food fiscal policy

Overall, one of the ways to gain public acceptance for a fiscal policy that involves price increases is to convince consumers that revenues from the difference in the payable price will be returned to them. This could be done with the implementation of subsidies to products considered healthier, ensuring that food taxes are not regressive; through educational programs related to healthy eating behavior among adults and children; through public information campaigns and fitness equipment/parks available to the public; as well as through funding of the public health system. For example, Reger et al. (1999) reported that after a six-week mass media campaign and implementation of media public relation strategies in East Virginia to encourage consumers to switch from whole-fat milk (2%) to low-fat milk (1%), there was a 17% rise in low-fat milk purchases. This effect lasted at least six months after the intervention ended.

Given the context upon which this study was conducted (i.e., in Greece), future research should test the robustness of our findings in other countries where parenting styles, family structures, and eating culture might differ.

effectiveness. Thus, these caveats do not affect the between-subjects comparisons of the treatments and, hence, the results regarding the information and pestering treatments.

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Appendix A: Full list of choice tasks

	Price of unhealthier alternative	Price of healthier alternative	No-Buy Alternative	Product category
Choice task 1:	1.3	1.3	None of these	Choco Milk Beverage
Choice task 2:	1.62	1.3	None of these	
Choice task 3:	1.3	0.98	None of these	
Choice task 4:	1.62	0.98	None of these	
Choice task 5:	2	2	None of these	Cheese
Choice task 6:	2.5	2	None of these	
Choice task 7:	2	1.5	None of these	
Choice task 8:	2.5	1.5	None of these	
Choice task 9:	1	1	None of these	Yogurt
Choice task 10:	1.25	1	None of these	
Choice task 11:	1	0.75	None of these	
Choice task 12:	1.25	0.75	None of these	
Choice task 13:	1.5	1.5	None of these	Decoy Markers
Choice task 14:	1.5	1.5	None of these	
Choice task 15:	1.5	1.5	None of these	
Choice task 16:	1.5	1.5	None of these	
Choice task 17:	1.2	1.2	None of these	Decoy Pencils
Choice task 18:	1.2	1.2	None of these	
Choice task 19:	1.2	1.2	None of these	
Choice task 20:	1.2	1.2	None of these	

Appendix B: Experimental Instructions

[This is an English translation of the original instructions written in Greek. Text in brackets was not shown to subjects.]

Thank you for taking the time to participate in this survey. This study is a preference survey for snack and stationery products for children.

You have been randomly assigned a participant identity number (ID). You will use this ID to identify yourself. The ID must be written on the computer screen and on all papers handed in today. All information collected is strictly confidential and will only be used for this specific project.

Your participation fee is 30€. You will receive a voucher with a value of 30€. The voucher can be exchanged for money when you have completed all parts of the study. During the study, you will be able to make real purchases if you wish to. I will give you more details on this part later on. The cost of any purchases you make will be deducted from the 30€ participation fee.

If you have any questions, you may ask the moderator.

[Depending on the treatment, the experimenter enters the computer lab with the parent only or with the parent and the child together. Children that are not participating in the real choice experiment in treatments 1 and 3 spend their time in the lobby of the computer lab within eye-contact distance from their parents. These children can watch cartoons or draw using paper and pencils.]

The first thing I want you to do is to examine all the products in this product display. You can see 5 product categories: milk drink, cheese, yogurt, pencils and markers. As you can see, the products within a product category are of the same size and of the same brand.

[For treatments 2 and 4, for which fiscal policy information was made available, the following paragraph was read to the participants while they were examining the products:]

"As you can see, there are five product categories, and each category has two products of the same size and brand but with different fat and sugar ingredient content. Now imagine that the health minister makes the following announcement in the mass media: Due to the alarming obesity prevalence rates among children in our country, we decided to apply the following food fiscal policies on dairy products that are commonly consumed by children. Beginning next week, we will impose 3 different fiscal policies. The first, which is called the fat tax, will increase the price of the product that is considered unhealthier by 25%; the second, which is called the subsidy, will decrease the price of healthier products by 25%; and the third will combine a fat tax with a subsidy, i.e., there will be a simultaneous increase in the price of the unhealthier product of 25% and a 25% decrease in the price of the healthier product.]

[Subject is then seated in front of a computer]

The products that were on display are going to appear on your screen in dyads. In total, you will go through 20 choice tasks. Between tasks, different products will appear, but you might also see the same products at various price levels. In each choice task, you can choose between any of the two products, or you can choose the no-buy option by selecting the "none of these" alternative.

When you complete all choice tasks, one of the choice tasks will be randomly selected as a binding task, and you will have to purchase the product/alternative that you chose in this choice task. The price of the purchased product will be deducted from your participation fee. If you chose the "none of these" option in the binding choice task, you will not purchase any product, and the full participation fee will be given to you. The random draw for the binding task will be performed in front of you using this jar. The jar contains folded papers listing numbers from one to twenty (as many as the choice tasks). That is, each choice task has a one-out-of-twenty chance (5%) of being

binding. More importantly, all tasks are equally likely to be selected as binding. Today, you will purchase at most one product. The purchased product will be given to your child to be consumed while you participate in the second part of this survey, which is a socio-demographic questionnaire.

Are there any questions?

[If there are no questions, the experimenter proceeds with starting the computerized treatment, and the subject is instructed to proceed with the choice task.]

Appendix C: Manipulation Check Questionnaire

1. Did you enjoy participating?

2. Were you bored at any point?

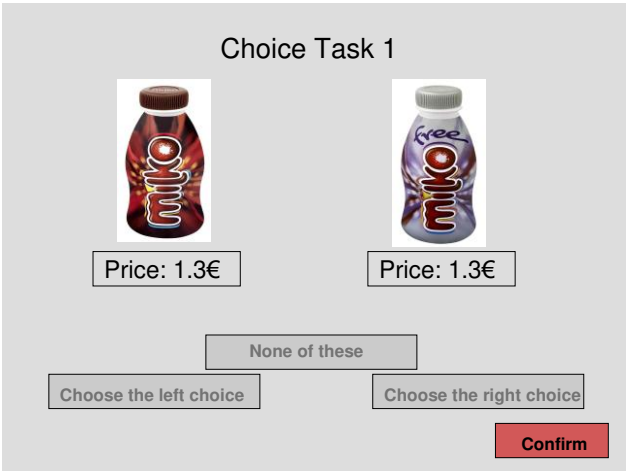
3. Do you have an idea about what was the purpose of the experiment?

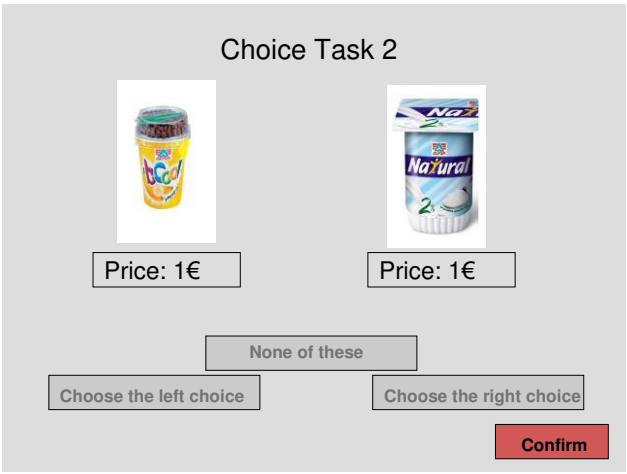
4. Did you choose based on the information provided to you at the beginning of the experiment?

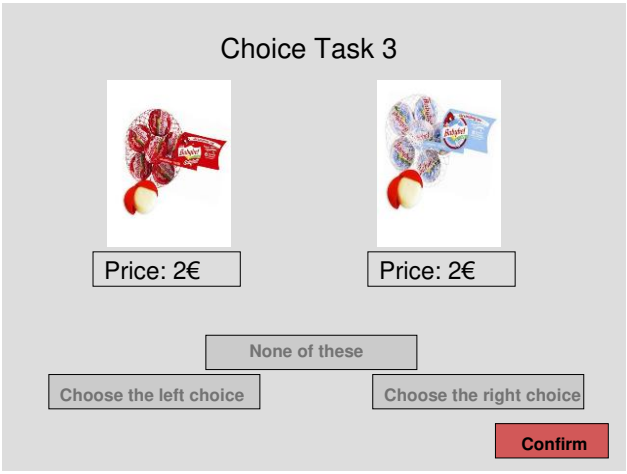
5. Did you respond based on what you think the experimenter wanted from you because you think that the experimenter could see your answers?

Appendix D: Example decision tasks for the market price treatment.

[This is an English version of the original screens that appeared in Greek for the market price treatment. Similar screens were displayed for the fat tax, subsidy and both treatments with appropriate price adjustments.]







Choice Task 4

Price: 1.5€

Price: 1.5€

None of these

Choose the left choice

Choose the right choice

Confirm

Choice Task 5

Price: 1.2€

Price: 1.2€

None of these

Choose the left choice

Choose the right choice

Confirm