

Exploring the role of parents in sustainable school food procurement

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Abstract: This paper aims at assessing whether and how to involve parents in public school food procurement. In Italy parents provide financial support to the school canteen service but they have a marginal role in decision-making and food education at school. The study assesses families' willingness to participate in school catering decision making, their accuracy in predicting food preferences and choices for their children, their ability to find the right food compromises with their children and their propensity to consume sustainable foods. The results contribute to (i) the ongoing discussion about how to help children eat a more sustainable diet at school and how to help parents support their children in this effort and (ii) the duty of policy makers to design proper strategies to involve parents in choices relating to food in public catering. In particular this relates to procurement of fresh trout from local and organic aquaculture as a more sustainable substitute for frozen fish from heavily fished species such as cod and plaice.

Keywords: school catering, parents, children, food choices, education, involvement

1 Introduction

In Italy, the school meal has long been used for the pursuit of social and environmental purposes. After the Second World War, the school canteen served as a tool to combat widespread malnutrition among the population and promote the principles of proper nutrition (Helstosky, 2006). More recently, school canteens have been places to promote fresh, organic and local foods¹ and to prevent diseases related to poor diet such as children obesity². In the last twenty years the quality of food and the sustainability of the service have grown much, thanks to increasingly careful and sensitive public procurement (Morgan and Sonnino, 2008). Education programs on sustainable and healthy food multiply (Lambiase and Bisagni, 2014). Yet the amount of food waste produced in school canteens is still huge (Falasconi et al., 2015). Food neophobia and pickiness- that is the avoidance or reluctance to eat unfamiliar foods- reaches high levels among children (Laureati et al., 2015; Finistrella et al., 2012). The population of children overweight or obese continues to increase. According to the Italian nutritional school-based surveillance system, called "Eye on health" (*Okkio alla salute*), 20,9% of Italian children are overweight and 9,8% obese (Italian Ministry of Health, 2014).

Children's eating habits at home are different from their habits at school, where they are influenced by the behaviour of schoolmates and teachers (Birch, 1980, Clenden et al., 1994, Herman et al., 2003), nevertheless children's food acceptance and choice are largely driven by taste preferences and liking (Baxter et al., 2000, Caporale et al., 2009). Parents can have a direct influence on their children's eating habits by increasing exposure to certain foods, making them more familiar at home and by supporting the choices made in school canteens (Salvy et al., 2008, Lytle and Achterberg, 1995, Contento et al., 1992, Contento et al., 1995).

Italian families participate in public food procurement by paying the cost of the meal (on average around € 5,00, according to Pagliarino et al., 2013, p. 105), in whole or in part, on the basis of family income. For the

¹ The Italian Government issued Finance Law n. 488, 1999 establishes a direct and explicit link between quality, organic and local food and public sector catering. As stated in art. 59, comma 4, "Measures to facilitate the development of organic and quality agriculture": "To guarantee the promotion of organic agricultural production of quality food products, public institutions that operate school and hospital canteens will provide in the daily diet the use of organic, typical and traditional products as well as those from denominated areas (omitted). The awarding of catering contracts will be based (omitted) on the quality of agricultural products offered." [WWW] <http://www.camera.it/parlam/leggi/994881.htm> (accessed on 29/2/2016).

² With its programs "Gaining health" (*Guadagnare salute*; guadagnaresalute.it) and "Eye on health" (*Okkio alla salute*; okkioallasalute.it), Italy joins the European JANPA "Joint Action on Nutrition and Physical Activity" program (janpa.eu/) aimed to foster healthy food habits at school. All websites were accessed on 29/2/2016).

poorest families the municipalities cover the entire cost of the service. Families also participate through the school canteen committees (in Italian “*commissioni mensa scolastica*”), that are representative bodies dedicated to monitoring activities (for further detail, see Galli et al., 2014; and <http://www.foodinsider.it/commissioni-mensa/ruolo-commissari-mensa/>).

At the moment, the actions taken to increase the relationships between schools and families go in two directions: (i) to encourage the training of parents, with their children or for themselves, and (ii) to design participatory menus that take into account parents' suggestions. If 74% of the Italian schools includes courses in food education and 66% extra-curricular food activities, the schools that involve parents in such activities are only 35% (Italian Ministry of Health, 2014).

The role of parents in food education programs or in procurement decisions is highly neglected by the government. Their greater involvement would make parents more aware of public choices and valuable allies in achieving shared educational goals.

The study has two main objectives. First, it wants to understand parents' perception about sustainable choices made by the administration and their interest in being involved in the decision making process. This first objective is pursued through a survey with questionnaire given to a sample of 500 parents. The second objective aims to explore the relationships between parents' and children' food preferences and choices, the ability of parents to predict consumption behaviors of their children at school, the capacity to serve (at home) and recommend (at school) healthy and sustainable foods even if unwelcome. All these elements are analyzed on a sample of 138 parent/child couples, called to express preferences, choices and predictions with respect to all food provided in a weekly school menu. The behaviors reported by parents and children are compared with the actual behaviour acted in the refectory, measured in terms of the amount of waste of individual dishes.

2 Methodology

In order to determine whether parents are interested in taking part in the Public Food Procurement (PFP) decision making process and keen on supporting innovative and sustainable choices by the public administration, a structured questionnaire was administered to a sample of 500 parents. In particular, they were asked whether they were willing to become members of the canteen committee. Furthermore, after presenting the hypothesis of introducing changes to their children' usual school menu so as to make it more sustainable – i.e. introducing fresh fish from organic aquaculture to replace frozen fish of heavily fished species –, the parents were asked whether they would be willing to pay a higher price for the school meal.

In order to assess the parents' ability to predict their children' food preferences and choices, the influence of both parents' and children' personal taste on food habits at home and school, the role of the familiarity with various kinds of food, as well as the degree of responsible consumption by both parents and children, an experiment was carried out involving 138 parents-children pairs.

Before illustrating the research design in detail, it should be pointed out that 74% of Italian schools provides a school canteen service (Italian Ministry of Health, 2014). Therefore, most Italian children lunch at school, at kindergarten (children under the age of 3 years), nursery school (3-5 years), primary school (6-10 years) and middle school (11-13 years). The canteen service offers a mid-morning snack (usually fruit) and lunch, for five days a week from Monday to Friday, from mid-September to mid-June, for a total of around 200 days per year. Younger children have approximately one hour to eat their lunch while primary and middle school children generally have only half an hour. According to teachers, this reduction in time is one of the causes of the large amount of food wastes in the dishes. Typically, an Italian meal includes a first course of complex carbohydrates (pasta or rice), a second course that serves as a source of protein (meat, fish, eggs, cheese, legumes) together with a side dish (salad or cooked vegetables) and, as a final course, a fruit or dessert. Each item contributes to the overall nutritional quality of the meal.

The children have no choice as to what to eat, since there is only one option for everybody. Special diets are available for ethical, religious or health reasons. Also the portions are pre-determined depending on the children' age and the pupils cannot refuse a course or get a second helping. Obviously, they can leave what they do not like, even though the teachers, who eat with their pupils until primary school and are then replaced by educators, tend to encourage the children to eat their entire meal. In general, the menu varies depending on the season of the year, as there are a spring-summer menu and an autumn-winter menu. The menus are differentiated also depending on the children' age (kindergarten, nursery, elementary and middle school). In the

course of a week, the menu changes every day and the same weekly menu is repeated every 3-4 weeks. This system guarantees a great variety of recipes, to meet the pupils' diverse taste and support a high-quality diet.

The research started from the school menu of a specific week (13th-17th April 2015), which featured all the usual recipes served in the canteen and only one innovative recipe (included due to its sustainability but unusual for the children and their parents). The parents were asked to express their opinion about each recipe (a total of around 20 recipes for each child, with a certain amount of variation because the menu changes depending on the pupils age), on a 4-point Likert scale (*not at all, not much, sufficiently, a lot*) regarding:

- appreciation of the recipe by their children;
- recipe consumption by their children, when the recipe was then served the following week;
- their own appreciation of the recipe;
- the frequency with which the recipe is prepared at home (familiarity).

Lastly, the parents were asked whether they wanted to keep the recipe or eliminate it from their children' school menu.

The answers were collected through a questionnaire, handed out by the teachers to the parents and filled in at home, without involving the children, during the week preceding the time when the menu was actually served to the pupils.

Every day of the week in which the recipes were served and immediately after lunch, the children were asked to assess each recipe through a similar questionnaire using the same Likert scale (*not at all, not much, sufficiently, a lot*) in relation to:

- appreciation of the recipe;
- recipe consumption.

Lastly, the children were asked whether they wanted to keep the recipe or eliminate it from the school menu. The items on the questionnaire were read aloud to the younger pupils, while middle-school children were deemed more autonomous and asked to personally fill in the questionnaire.

Moreover, the actual amount of food consumed by each child was measured for each recipe every day throughout the week at the end of each meal, by observing the leftovers on the plate and estimating consumption on the basis of the aforementioned Likert scale. The data provided by the parents and by their respective children were matched and kept as individual sets.

The investigation was carried out in the municipality of Moncalieri (province of Turin, Italy), in the "Nasi" School, a comprehensive institute which includes nursery, primary and middle level students, and it involved two nursery school classes, an elementary school class and a group of students from different middle school classes.

The data were elaborated by means of a descriptive statistical analysis, including pairwise correlation (r), as well as through the estimation of multiple regression models.

3 Findings

The questionnaire aimed at assessing the families' interest and willingness to take part in the decision making process of the PFP was administered to a sample of 500 parents whose children have lunch at school. It was filled in by the mother in 83% of the cases and by the father in 17% of the cases (60% of the families have 2 children, 17% one child, and the remaining families have between 3 and 5 children).

3.1 Importance attributed to the introduction of sustainable innovative food into the school menu

Most families (54%) are not willing to pay extra to modify the school menu so as to make it more sustainable (the scenario presented to the families concerned the introduction of fresh fish of local varieties from organic fish farms instead of frozen fish of heavily caught species), since they believe that the current price of the lunch should cover the additional costs for sourcing high quality and more sustainable foods. The figures indicated as potential price increase options correspond to a truthful estimate of the price increase of each lunch price if the school canteen offered fresh fish costing respectively € 1,00, € 2,00, € 3,00 or € 4,00 more than the frozen fish normally served (data calculated by Pagliarino et al., 2013). In particular, 54% were not prepared to pay anything extra, while 24% were willing to pay 12 euro cent extra and 6% 3 euro cents extra.

Table 1. Willingness to pay an extra price for the introduction of an innovative sustainable recipe in the school menu

Extra price (€)	Percentage of families willing to pay the extra price (%)
0,03	6
0,06	7
0,09	9
0,12	24
0,00	54
Total	100

3.2 Interest in taking part in the decision making process

The school canteen committee is the body through which parents can monitor the service and influence the decisions (for instance, recipes, suppliers, etc.). Most parents (75%) are not interested in being members of the canteen committee; hence, they are not willing to be actively involved in the management of the school canteen service of their children. 23% of parents are interested, whereas 2% of them are already members.

3.3 Parent/child relations

The investigation concerning the parent/child relations involved 138 pairs, of which 47 were nursery school parents and children aged 3-5 years, 23 were primary school parents and children aged 8-9 years and 68 middle school parents and children aged 11-13 years. The gender distribution was: 80 girls and 58 boys; 117 mothers, 14 fathers and 7 respondents who did not indicate gender.

Table 2. Parent/child distribution in terms of age and gender.

Children school		Children gender		Parents gender	
Nursery school	47	Girls	80	Mothers	117
Primary school	23	Boys	58	Fathers	14
Middle school	68			No response	7
TOTAL	138	TOTAL	138	TOTAL	138

Considering the set of results of the analysis carried out on the different variables describing the food choices of each parent/child dyad, this article discusses only the data which might affect the PFP system, i.e.: (i) the criterion according to which the parents decide to keep a recipe or eliminate it from the school menu; (ii) the parents' ability to predict which recipes their children will appreciate at school, with specific focus on different patterns of behavior in the case of traditional recipes vs. innovative and sustainable recipes.

A multiple linear regression model permits analysis of the direct relationship that binds the variable *elimination_choice* - that measures the parental choice of maintaining vs eliminating a recipe from their children weekly school menu - to a set of potential explanatory variables regarding children's age and gender and food attitude (squeamishness³), parents' conjecture around their children's preferences and choices (liking and consumption) and parents' attitude regarding the recipes in the school menu (familiarity and liking).

³ The squeamishness variable measures the children's attitude to refuse a food if it does not perfectly meet their taste. In our database this variable quantifies the *real* children's squeamishness and not the parents' conjecture around children squeamishness. It will be more extensively used in data analysis exploring children's real food attitudes at school.

$$\text{elimination_choice} = \alpha_{\text{age}} + \beta_{\text{gender}} + \delta_{\text{liking}} + \eta_{\text{consumption}} + \pi_{\text{adaptivity}} + \rho_{\text{familiarity}} + \Omega_{\text{parent_liking}} + \varepsilon$$

Model 1a. Parental recommending choice on weekly school menu recipes

Variable	Coefficient	Std. Err.	t	P>t	[95% Conf. Interval]	
Age	0.014	0.005	2.760	0.007	0.0039416	0.0241542
Gender	-0.007	0.032	-0.230	0.817	-0.0700555	0.0553955
Prediction of children liking	0.010	0.064	0.150	0.879	-0.1170261	0.01365264
Prediction of children consumption	-0.156	0.055	-2.860	0.005	-0.2644378	-0.0479962
Squeamishness	-0.047	0.048	-0.970	0.332	-0.1422331	0.0484499
Parent familiarity	-0.061	0.037	-1.660	0.100	-0.1332872	0.0118253
Parent liking	-0.021	0.044	-0.480	0.632	-0.1074623	0.0655225
Constant	0.699	0.152	4.600	0.000	0.3973622	1.000251

$N = 115$; $R\text{-squared} = 0.3292$; $Adj\ R\text{-squared} = 0.2853$

From Regression Model 1a, it emerges that the most relevant explicatory variable in driving the parents' food choices is the parents' conjecture around their children's food consumption at school. Parents are more likely to recommend for their children those recipes they believe their children would eat more at school. Regression Model 1a reveals even a moderately significant relationship between the food choices that parents make for themselves and their children at home (familiarity) and the food choices they recommend for their children at school. Parents' familiarity with school menu recipes, measured according to the recipes cooking frequency at home, is moderately significantly and negatively correlated with the probability of a recipe rejection choice from the school menu.

As the age of the children increases, the frequency with which the parents eliminate recipes from the school menu rises considerably. Indeed, there is a positive and significant correlation between the variable measuring the age of the children and the frequency with which the parents decide to remove an innovative, sustainable recipe from the weekly school menu.

Model 1b. Parental recommending choice on innovative recipe

Variable	Coefficient	Std. Err.	t	P>t	[95% Conf. Interval]	
Age	0.050115	0.019805	2.53	0.014	0.0104852	0.089745
Gender	0.07602	0.09652	0.79	0.434	-0.1171173	0.269156

Prediction of children consumption	-0.10181	0.048713	-2.09	0.041	-0.1992817	-0.00433
Parent familiarity	-0.07912	0.057715	-1.37	0.176	-0.1946047	0.036369
Parent liking	-0.15007	0.049697	-3.02	0.004	-0.2495105	-0.05062
Constant	0.690619	0.236175	2.92	0.005	0.2180333	1.163205

$N = 65$; $R\text{-squared} = 0.3857$; $Adj\ R\text{-squared} = 0.3336$

When presented with an innovative recipe in the school menu (Model 1b) – the parents’ decision to keep the said recipe or eliminate it from their children’s school menu is mostly guided by their predictions about whether their children are going to appreciate the recipe. In our project, this was trout from organic aquaculture, an unusual product in collective catering services, where the most commonly used species are those which can be easily transformed into frozen slices or fillets, already portioned and boned, such as cod, plaice, etc., Parents are more likely to recommend for their children a new recipe if they believe their children will eat a lot of it at school. As expected, the “familiarity” variable becomes less important in the case of this decision, while the variable measuring the parents’ appreciation of the recipe takes on greater significance. As indicated in Model 1b, the parents are more inclined to keep an innovative recipe in their children’s school menu if they themselves appreciate it. The parents’ tendency to be more selective as their children’s age increases remains unchanged. The great relevance of consumption predictions on parents’ choice of maintaining vs eliminating the recipes from their children weekly school menu means that it is crucial to understand whether parents are good at predicting their children’s food consumption choices at school.

As a first step, the parents’ ability to make predictions about their children’s food consumption at school was analysed by means of pairwise correlation (r) between the variables concerning the parents’ predictions and the actual consumption by the children at school⁴. As shown in Table 2, the parents’ ability to predict their children’s choices decreases in the case of an innovative recipe (r equal to 0.52 vs. 0.36) and, in general, it is not characterised by greater accuracy than the level generally indicated in the literature (Hoch, 1987, Davis et al., 1986, Mata et al., 2008) for what concerns the ability to predict attitudes, interests and purchase behaviour of peers ($r=0,53$) and spouses ($r=0,51$) or the spouses’ average accuracy of predicting each other’s preferences towards new product concepts ($r=0,27$).

Table 3. Correlation between children consumption and their parents predictions on children consumption

	Pairwise correlation
Weekly school menu recipes	$r = 0,52$
Innovative and sustainable recipe	$r = 0,36$

After that, a multiple linear regression model was estimated in order to determine which factors have a greater impact on the parents’ ability to make predictions about their children’s food consumption choices at school. In particular, we analysed the relationship between mistakes made by the parents in predicting their children’s food consumption choices at school and a set of potential explanatory variables, concerning children’s and parents’

⁴ The actual amount of food consumed by each child was measured, for each recipe, every day at the end of each meal by observing the leftovers on the plate and estimating consumption on the basis of a 4-point Likert scale (*not at all, not much, sufficiently, a lot*). These data were matched to the data provided by the parents – which consist in a conjecture around their children consumption - and kept as individual sets.

personal characteristics and parents' attitudes. Specifically, the variable *consumption prediction* is measured in terms of distance, in absolute value, between the food consumption declared by the children and the consumption predictions made by their parents.

$$\text{consumption_prediction} = \alpha\text{age} + \beta\text{gender} + \delta\text{parent_age} + \Omega\text{parent_liking} + \rho\text{familiarity} + \eta\text{liking_prediction} + \varepsilon$$

Model 2a. Parental prediction on their children consumption of school menu recipes

Variable	Coefficient	Std. Err.	t	P>t	[95% Conf. Interval]	
Age	-0.0088716	0.0094813	-0.94	0.352	-0.0276712	0.009928
Gender	0.0005896	0.0545964	0.01	0.991	-0.1076649	0.108844
Parent age	0.0072212	0.0047207	1.53	0.129	-0.0021391	0.016582
Parent liking	-0.12134	0.0693446	-1.75	0.083	-0.2588375	0.016157
Parent familiarity	-0.2052011	0.0625126	-3.28	0.001	-0.3291519	-0.08125
Prediction of liking	0.7083512	0.0780897	9.07	0	0.5535137	0.863189
Constant	1.040563	0.3097389	3.36	0.001	0.4264077	1.654718

N = 112; *R-squared* = 0,5269; *Adj R-squared* = 0,4999

As Model 2 clearly shows, the element most likely to cause mistakes in the parents' predictions about their children's food consumption is the parents' inaccuracy in predicting the level of appreciation. The more the parents are unable to predict whether their children are going to appreciate a recipe, the more inaccurate they are in predicting consumption. If the parents know their children's tastes well, then they are able to predict their children's consumption choices. What emerges from Model 2 is also that parents are better at predicting consumption at school in relation to types of food which are more regularly cooked at home. In fact, the prediction mistakes made by the parents concerning their children's canteen food choices decrease as the parents' familiarity with the types of food in question increases. Moreover, the frequency of prediction mistakes drops when the parents themselves appreciate the foods in question. In brief, parents are better at making predictions on consumption in relation to types of food which they themselves like and cook at home.

Model 2b. Parental prediction on their children consumption of an innovative and sustainable recipe.

Variable	Coefficient	Std. Err.	t	P>t	[95% Conf. Interval]	
Age	-0.0190192	0.0457199	-0.42	0.679	-0.1111039	0.073066
Gender	0.2699757	0.1566207	1.72	0.092	-0.0454745	0.585426
Parent age	0.0067821	0.0141406	0.48	0.634	-0.0216986	0.035263
Parent liking	-0.0738171	0.0820699	-0.9	0.373	-0.2391144	0.09148
Parent familiarity	0.1578939	0.0954028	1.66	0.105	-0.0342572	0.350045
Prediction of liking	0.6984663	0.0875601	7.98	0	0.5221111	0.874821

Constant	0.0514797	0.6100236	0.08	0.933	-1.177171	1.28013
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$N = 52$; $R\text{-squared} = 0,6373$; $Adj\ R\text{-squared} = 0,5890$

The introduction of an innovative recipe seems to follow the same trends detected in the case of traditional recipes: the more the parents are able to formulate good predictions about their children’s appreciation of a certain type of food, the more they are able to make accurate predictions concerning actual food consumption by their children. As expected, the variable “familiarity” becomes less significant, and the same is true for the variable measuring the parents’ personal appreciation.

Table 4. Comparison between children effective food consumption and parents conjectures.

VARIABLE	CHILDREN BEHAVIOR		PARENTS CONJECTURE ON CHILDREN BEHAVIOR	
	N	AVERAGE	N	AVERAGE
Total recipes consumption	135	3.49	119	2.87
Total recipes liking	135	2.83	118	2.88
Total recipes elimination choice	135	0.39	119	0.15
Innovative recipe consumption	60	3.67	75	2.53
Innovative recipe liking	80	3.03	72	2.57
Innovative recipe elimination choice	80	0.41	75	0.28

When reading Table 4 above, it is important to keep in mind that the level of consumption and the level of appreciation of a given recipe – with a range of 4 equidistant values on a Likert scale: *not at all*, *not much*, *sufficiently*, *a lot* – are translated into a numeric scale ranging between 1 and 4 and that the decision to keep a recipe or eliminate it from the school menu is represented by a dummy variable, which is 0 when the recipe is kept and 1 when the recipe is eliminated from the menu.

It emerges that the schoolchildren chose the innovative recipes more often (3.67 vs. 3.49) and also appreciate them more (3.03 vs. 2.83) than other recipes included in the weekly school menu. Nonetheless, the frequency with which they decide to eliminate innovative recipes is higher than in the case of other, more traditional recipes (0.41 vs. 0.39).

Conversely, the parents believe that their children will eat and appreciate the traditional recipes more than the innovative recipes. The parents’ predictions on appreciation and consumption are pessimistic when compared to the actual food behaviour of their children, as confirmed by the fact that the prediction values are always lower than the corresponding values describing the actual food behaviour of the children at school. Nevertheless, the parents are much more reluctant to eliminate recipes from the school menu than their children. However, they too eliminate the innovative recipes more frequently than other recipes (0.28 vs. 0.15).

4 Conclusions

The results of the study highlight the fact that the parents’ greatest concern is that their children eat enough when they are at school. This is the factor which guides their decisions about whether to keep a recipe or eliminate it from the school menu. They keep a recipe if they believe that their children will eat plenty of it. These choices are confirmed by their behaviour at home, where they cook with higher frequency the same recipes which they tend to keep at school. When an innovative recipe is introduced, the parents are guided by

the same concern, i.e. abundant consumption by their children at school. But in this case, unable to rely on their familiarity with the food, the parents use their personal taste as decision-making tool.

In general, it emerges that the parents tend to indulge their children's food preferences, selecting recipes on the basis of predictions about consumption and appreciation. As the age of the children increases, this selection process becomes more stringent.

Reducing the amount of leftovers at school is a concern shared by both parents and school staff. Therefore, a higher level of parent involvement in the decision-making process would be extremely useful in designing successful school menus especially when the parents are good at predicting their children's food choices. When compared to the values reported in the literature, the results of this study show low-medium reliability in relation to the children's actual consumption. Furthermore, they point to a negative attitude towards innovative recipes, since the parents believe that their children will eat and appreciate innovative dishes less than other recipes and, as a consequence, tend to eliminate them. The children display the opposite behaviour: on average, they eat and appreciate the innovative recipes more than the other, more traditional ones. Overall, the parents are in most cases unwilling to eliminate recipes from the school menu, which confirms their trust in the nutritional choices made by the public administration. This might also be a reason for their limited interest in becoming members of the participatory decision-making body, i.e. the canteen committee.

The parents base their school menu recommendations on their children's preferences (which they do not seem to know so well!) and on their own cooking habits and, at the same time, they formulate pessimistic predictions about innovative recipes. This is why the parents of schoolchildren do not seem to be crucial actors to be involved in the designing of more sustainable school menus. What might be desirable instead is their involvement in food education actions, so far almost completely neglected, so that the parents of schoolchildren can become precious allies in the innovation process pursued by the public administration aimed at making the supply chain more sustainable and at reducing food waste.

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Acknowledgments

The research presented in this paper has been carried out in the Sanpei 2 R&D project, funded by the Italian Crea (Council for research in agriculture and analysis of agricultural economy), the National Research Council of Italy and the Italian Ministry for Agriculture, Food and Forestry Policies. The funders have no role in study design, data collection and analysis, decision to publish or preparation of the manuscript. The authors thank all the participants in the Sanpei 2 project, in particular the city of Moncalieri (Turin), the “Nasi” School and Dussmann Service.