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Assessing parental traits affecting children's food habits: an analysis of the determinants of responsible consumption

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This paper focuses on the aspects able to encourage healthier and more responsible food habits. In particular, it explores the effects of different parental characteristics on children's food habits and lifestyle. The study findings reveal a positive effect of parental socio-demographics characteristics (i.e., education and occupation), diet awareness, and lifestyle on children's food habits and lifestyle, offering practical insights for regulators on how to promote healthier and more sustainable food habits among children.
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Abstract

Over the last decades, economic, social, and environmental changes have profoundly affected citizen-consumer's lifestyle and food habits. Current food habits encourage people either to eat more outside home or to a massive use of convenience foods. The consequence is the increasing rate of overweight and obesity through the population and in particular among children. The resulting social and environmental costs are huge. Indeed, it increases government health expenditure as well as environmental pollution due to the large amount of water, fertilizers, and chemicals involved in the production process. The study focuses on these issues aiming at uncovering the aspects able to encourage healthier and more responsible food habits. Specifically, it explores the effects of different parental characteristics on children's food habits and lifestyle. The study findings reveal a positive effect of parental socio-demographic characteristics (i.e., education and occupation), diet awareness, and lifestyle on children's food habits and lifestyle, offering practical insights for regulators on how to promote healthier and more sustainable food habits among children.

Keywords: Lifestyle, Food habits, Responsible consumption, Overweight, Obesity

Introduction

Over the last decades, deep economic, social, and environmental changes have encouraged the raise of new consumers' requests towards food. On the one hand, the increasing consumers' awareness about food and the effects it has on citizen-consumer's health and life has spur consumers' interest and consumption towards healthier food products, more respectful of the environment and of all actors involved in the production process, namely, more sustainable (Marotta and Nazzaro 2012; Ohe et al. 2014; Lombardi et al. 2015; Lerro et al. 2016; Marotta et al. 2017). On the other hand, the consumption of unhealthy foods has grown among broad segments of society, consequence of the adjustments in citizen-consumer's lifestyles resulting from the economic and social changes affecting modern society (McKenzie 1986). For instance, longer and stressful working days have reduced the time available for meal preparation affecting citizen-consumer's eating habits too (Buckley et al. 2007). The result is the reduction of meat, fruit, and vegetables consumption, in favor of a higher demand of tastier high-fat foods such as convenience food, salty snacks, and take-away foods (Somogyi 1990; Traill 1997; Wansink et al.

2003; De Boer et al. 2004; Kandiah et al. 2006; Zellner et al. 2006; Groesz et al. 2012). A further aspect to consider is the new structure of family, smaller than the past and mainly consisting of single (Buckley et al. 2007). The effects, similar to those previously observed, are the lower propensity to meal preparation at home and the growing demand for convenience foods, often single-serving (Gofton 1995; De Boer et al. 2004). The increasing rate consumption of convenience foods, mostly high in fat, as well as the lower propensity to meal preparation at home are acknowledged as causes of overweight and obesity (Mancini et al. 2012), in particular among children. The resulting negative externalities are both in terms of social and environmental costs (Banterle and Cavaliere 2014; Mancini et al. 2015; Telese et al. 2016). The former (social costs) are estimated at about €70 billion per year in Europe (Brambila-Macias et al. 2011) and €9 billion per year in Italy (EASO 2015). Further, it is expected to dramatically increase as the steady growth of overweight and obese population, growing up to 20% among adults and up to 15.5% among children leaving in OECD countries (OECD 2017). The environmental costs, instead, are difficult to determine as they are mainly indirect costs. The latter are either due to the depletion of natural resources (e.g., environmental exploitation and water pollution) or to the use of chemicals and fertilizers to boost crop production. Further, food transportation from field to fork and a diet based on a large consumption of animal proteins are both responsible to put large amount of carbon dioxide (CO_2) in the atmosphere, which has detrimental effect on the environment too (Telese et al. 2016). To address these issues and promote a more sustainable and responsible consumption, a strategic approach aimed at investigating citizen-consumer's characteristics able to encourage specific food habits and lifestyles is needed.

The current study explores the effects of parental socio-demographics characteristics, diet awareness, and lifestyle on children's food habits and lifestyle, to uncover those factors more likely to affect the rate of overweight and obesity among children. The study was carried out in Italy and involved children. Although Italy has one of the lowest rates of overweight and obese people among the OECD countries, it has also recorded an increase in the last years that is expected to affect up to 13% of Italians by 2030 (OECD 2017). Children involvement in the study, instead, is due to both the impact they are going to have in the future in terms of food consumption, as well as their willingness to easily adapt to the changes and conform to the surrounding environment. Therefore, the study aims to identify parental characteristics able to create positive spillover effects among children in terms of healthier and more sustainable and responsible food habits.

The paper is structured as follows. The following section provides the conceptual framework of the study highlighting the relevant literature on the topic. The methodology implemented in the study as well as sample characteristics is outlined in the "Methodology and data description" section, while the study findings are presented and fully discussed in the results section. Finally, the study conclusions are summarized in the last section of the manuscript.

Literature review

Parental characteristics and children's food habits

Parental characteristics have a profound impact on children's food habits (Campbell et al. 2013). Previous studies have shown the strong influence that the surrounding

environment, and in particular the domestic one, has on children's food habits and the development of their food behavior (Patrick and Nicklas 2005; Rodenburg et al. 2012). Literature on the topic is broad and identifies several variables affecting this relationship. Most of previous research highlighted the effect of family income on food habits. Specifically, high-income families adopt a healthier diet, characterized by a high intake of fruit, vegetables, fish, and dairy products; further, they prefer—for their children—foods rich in protein, polyunsaturated fats, folic acid, calcium, and iron (Neulinger and Simon 2011). Conversely, low-income families consume, in large amount, meat products, whole milk, fats, sugars, potatoes, and cereals, while the consumption of fruit and vegetables is smaller (Patrick and Nicklas 2005). Although the highest rate of overweight and obese children is observed in low-income families (Boles et al. 2014), recent studies have pointed out a reversal in this trend (McCurdy et al. 2014). The explanation may be twofold: (i) the greater presence of parents during meals which is also linked to a greater control over the food taken by their children; (ii) the effect of low income that is tied with a greater attitude to plan meal at home (Morin et al. 2013; Ziegler et al. 2006).

Another potential aspect affecting—along with income—food habits is the education. Previous studies exploring this relationship have identified a positive effect of parental level of education on children consumption of healthy foods such as fruit, vegetables, and fish (see among others Rodenburg et al. 2012; Jones et al. 2010). More deeply, as parental level of education increases, children intake of calcium, carbohydrates, proteins, fibers, folic acid, and vitamin A increases too (Patrick and Nicklas 2005; Reicks et al. 2011). To this extend, more educated mothers provide a more balanced diet to their children (McCurdy et al. 2014) compared to those less educated which tend to prefer a diet richer in added sugars (Patrick and Nicklas 2005).

Healthier food habits are also detectable in the habit of eating food at home (Leech et al. 2014). Indeed, children's food habits are positively influenced by parental food behavior (Fulkerson et al. 2014; Nuvoli 2015). For instance, a parent diet poor in fruit and vegetables turns out in a low attitude to eat these foods by children (Gross et al. 2010). Parent food habits, indeed, are used as models by children who may decide either to conform to, or distance from these models (Guidetti and Cavazza 2008). This matching process varies with age and, even though it is stronger in the early years of children life (Hannon et al. 2003), it remains quite stable over the life (Lau et al. 1990). The habit of eating food at home enables also to bring children closer to meal preparation, which is known to affect both: healthy food habits and physical activities (Berge et al. 2012). The effects on the latter are enhanced when the whole family is involved (Davison and Birch 2001; Dowda et al. 2007; Trost et al. 2003).

Lastly, literature also acknowledges the effect of parental awareness about the nutritional characteristics of foods and children's food habits (McCullough et al. 2003). More specifically, higher parental awareness about nutritional characteristics of food is more likely related to healthier children's food habits (McCullough et al. 2003). Parental awareness of food nutritional characteristics, indeed, decreases the purchase and consumption of salty snacks and soft drinks, increasing, conversely, the expenditure in fruit and vegetables (Blanchette and Brug 2005; Gibson et al. 1998; Campbell et al. 2013).

To sum up, although the literature analyzes and identifies several parental characteristics related to specific children's food habits, few studies have only marginally investigated those able to encourage children to consume more fruit and vegetables, to do physical

activity and, reduce the consumption of unhealthy food. In light of the above and of the importance, recognized by many parties, of parenting models (lifestyle and diet awareness) in the education and training of responsible food behaviors of children, this study wants to propose a deeper analysis to investigate how specific parental characteristics able to promote healthier, more sustainable, and responsible children's food habits.

Methodology and data description

Data collection

Data collection was carried out from January to April 2017 by face-to-face interviews with secondary school students (aged between 11 and 13 years) and their parents, in South of Italy (i.e., Campania region[1]). The study took part in the public school[2] of Fortore Tammaro area in the province of Benevento, a hilly rural district. Overall, 130 students and their parents[3] took part in the study. Since the study aimed to identify the relationships between parental socio-demographics characteristics, diet awareness, lifestyle, and children's food habits, two different structured questionnaires were administered. While the questionnaires were structured adapting the language to the two targets, a pre-test with a small group of participants was carried out to prevent potential misinterpretation of the questions.[4] Both questionnaires were administered to the children at school with the recommendation to fill—at home—one questionnaire and give the other to one of their parents.[5] The questionnaire submitted to parents collected: (i) socio-demographics characteristics of respondents (e.g., age, gender, household, education, occupation); (ii) their food habits such as the frequency of consumption of several unhealthy foods; (iii) the awareness about the negative effects—on health—of a high-calorie diet, i.e., "Are you aware about the negative effects, on health, of a high-calorie diet?"; (iv) the interest to acquire information about health by different sources (e.g., magazine, television, and radio); (v) weekly frequency of physical activity. Children, instead, were asked to indicate their general information (i.e., gender, place of residence), food habits (i.e., daily frequency of fruit and vegetables consumption, as well as weekly candy and soft-drink consumption), how often they eat at fast food, and whether they play any sports.

The variables investigated in parent questionnaire attempt to characterize lifestyle and food habits of family that are expected to have a positive effect on children's food habits. To this extend, previous studies have suggested the effect of socio-demographic characteristics of respondents such as education and occupation on children's food habits and consumption patterns. Specifically, according to previous studies, higher is parental education and healthier should be children diet (Patrick and Nicklas 2005; McCurdy et al. 2014), while parents' occupation is supposed to affect plan meal at home (Morin et al. 2013). Parental engagement in physical activity is assumed to affect positively children's practice of physical activity as well. Indeed, children may be encouraged to play sports by the desire to conform to their parents (Guidetti and Cavazza 2008). Lastly, the awareness about the negative effects of a high-calorie diet is expected to affect children's consumption of fruit and vegetables, their engagement in physical activity, and less consumption of candies and soft drinks as a consequence of the greater attention towards healthy food habits that children perceive at home.

All questionnaires were duly completed and treated for descriptive and statistical analysis such as correspondence analysis.

Data description

The descriptive statistics of parents interviewed are shown in Table 1. The sample is overrepresented by female (76.9% of the sample) and with an average age of about 41 years (± 5.24). The average household consists of four members (± 0.92) ranging from two to seven members. As for education, parents display a low school degree. Specifically, 61.5% of fathers and 50% of mothers hold a school degree lower than high school, while one third of the sample has high school degree (31.6% and 40.8% for fathers and mothers respectively). Fathers are mainly self-employed (78.5% of the sample) compared to mothers who are mostly housewives (46.2%).

Looking at parent diet awareness and food habits (Table 2), the majority of respondents define themselves quite aware about the negative effects of a high-calorie diet (93.3% of respondents). Further, they show a clear interest to acquire information about health by using different media such as magazine (73.9%) and television and radio (86.2%). Respondents interest towards health seems to affect also the food habits

Table 1 Parent descriptive statistics (*N = 130*)

Variable name	Description	Mean	Frequency	Standard deviation	Min	Max
Gender	1 if female	0.769		N/A	0	1
Age	Respondent's age	40.984		5.245	29	60
Household	Household size	4.246		0.923	2	7
Education level	Education level classes (father)	2.392		0.802	1	5
	Primary school		8.5%			
	Secondary school		53.0%			
	High school		31.6%			
	University degree		4.6%			
	Above university degree		2.3%			
	Education level classes (mother)	2.546		0.788	1	5
	Primary school		6.1%			
	Secondary school		43.9%			
	High school		40.8%			
	University degree		7.7%			
	Above university degree		1.5%			
Occupation	Occupation status (father)	1.307		0.745	1	5
	Employed		17.7%			
	Self-employed[a]		78.5%			
	Husband		0.8%			
	Retired		0.7%			
	Unemployed		2.3%			
	Occupation status (mother)	2.169		0.881	1	4
	Employed		30.8%			
	Self-employed[a]		22.3%			
	Housewife		46.2%			
	Retired		0.7%			
	Unemployed		0.0%			

[a]It includes all self-employed occupations (e.g., entrepreneurs, farmers, lawyers)

engaged at home. As suggested by the frequency of consumption of different unhealthy foods investigated, parents interviewed appear to follow healthy eating habits favoring a low consumption of snacks, soft drinks, and junk foods among others. By contrast, the majority of respondents is not keen to engage on regular basis in physical activity. Specifically, most of them stated they rarely engage in physical activity (30%) or one to two times a week (26.2%).

Children socio-demographic characteristics, food habits, and involvement in physical activity are displayed in Table 3. The sample is equally distributed between gender (52.3% are male and 47.7% are female), with participants living mainly in the city (41.5% of the sample in city center, 33.1% of the sample in suburbs) and only marginally in rural area (25.4%). As for children's food habits, the majority of the sample shows healthy eating habits. Specifically, 35.4% and 28.5% of respondents interviewed stated of eating often—in the main meal—respectively fruit and vegetables, while only about 10% do not (8.5% for fruit and 12.3% for vegetables). Further, one third of

Table 2 Parental lifestyle and food habits

Variable name	Description	Mean	Frequency	Standard deviation	Min	Max
Awareness	Awareness of high-calorie diet	2.461		0.636	1	3
	Yes aware		53.8%			
	Yes, more less aware		38.5%			
	No aware		7.7%			
Information about healthy lifestyle	Magazine (1 if yes)	0.738		0.441	0	1
	Yes		73.9%			
	No		26.1%			
	Television and radio (1 if yes)	0.861		0.346	0	1
	Yes		86.2%			
	No		13.8%			
Consumption of unhealthy foods	Frequency of consumption					
	Sweet snack	3.300		1.344	1	6
	Salty snack	2.715		1.115	1	6
	Salami	2.953		1.018	1	6
	Junk foods	1.269		0.539	1	6
	Soft drink	2.376		1.163	1	6
	Energy drink	1.538		0.933	1	6
	Chocolate	2.723		1.134	1	6
	Sauce (e.g., mayonnaise, ketchup)	2.007		0.952	1	6
	Candy	2.946		1.354	1	6
Physical activity	Frequency of physical activity	3.246		1.288	1	5
	Everyday		14.6%			
	3 times a week		11.5%			
	1–2 times a week		26.2%			
	Rarely		30.0%			
	Never		17.7%			

children interviewed stated that they consume candies and soft drinks only occasionally. The highest percentage of respondents consumes both candies and soft drinks mostly one to two times a week (31.5% of the sample for the two products investigated). Moreover, children taking part at the study only rarely eat at fast food (73.9% of participants). As for physical activity, the study reveals a reverse situation to food habits. The majority of respondents, indeed, stated they did not play any sports (57.7% of children interviewed).

Results and discussions

To assess the existing relationships between parental socio-demographics characteristics, diet awareness, lifestyle, and children's food habits and lifestyle, data were

Table 3 Children's food habits and lifestyle

Variable name	Description	Mean	Frequency	Standard deviation	Min	Max
Food habits	Daily fruit consumption	2.223		0.925	1	4
	Yes, everyday		25.4%			
	Often		35.4%			
	Sometimes		30.7%			
	No, never		8.5%			
	Daily vegetable consumption	2.500		0.917	1	4
	Yes, everyday		16.9%			
	Often		28.5%			
	Sometimes		42.3%			
	No, never		12.3%			
	Weekly candy consumption	2.707		1.601	1	5
	Everyday		16.9%			
	3–4 times a week		23.1%			
	1–2 times a week		31.5%			
	Rarely		28.5%			
	Never		0.0%			
	Weekly soft-drink consumption	2.600		1.528	1	5
	Everyday		13.9%			
	3–4 times a week		26.9%			
	1–2 times a week		31.5%			
	Rarely		22.3%			
	Never		5.4%			
Fast food	Frequency of eating at fast food	4.461		1.330	1	6
	More than once a week		5.3%			
	3–4 times a month		0.8%			
	2–3 times a month		6.1%			
	Once a month		8.5%			
	Rarely		73.9%			
	Never		5.4%			
Physical activity	Practice of physical activity (1 if yes)	0.423		0.495	0	1
	Yes		42.3%			
	No		57.7%			

processed firstly by creating contingency tables aimed at identifying interrelation between the variables investigated. Once the dependence was determined, a multivariate descriptive statistical method was applied in the study, namely, correspondence analysis. The latter has been widely applied in previous studies either on consumers (Hoffman and Franke 1986; Kara et al. 1996; Beldona et al. 2005) or on food consumption habits (Guinot et al. 2001; Wądołowska et al. 2009). Correspondence analysis enables to (i) detect associations; (ii) outline their relationships; (iii) show their clear representation and interpretation (Hoffman and Franke 1986; Beldona et al. 2005). More deeply, it is a statistical method able to summarize the information contained in a categorical data matrix into few dimensions (Hoffman and Franke 1986; Guinot et al. 2001; Beldona et al. 2005). Hence, these dimensions, also called orthogonal components, are displayed, as axis system, in a joint low-dimensional space (Guinot et al. 2001; Nicolosi et al. 2016). The result is a joint plot aimed to provide an easy interpretation of associations between the categorical variables investigated. The resulting plots reveal the relationships between parental variables investigated (i.e., education, occupation, awareness about the negative effects of a high-calorie diet, frequency of physical activities) and children's traits mostly responsible of overweight and obesity (i.e., daily frequency of fruit and vegetables consumption, weekly candy and soft-drink consumption, involvement in physical activity).

The first relationship investigated is the correlation between two parental socio-demographic characteristics such as education and occupation, and children's food habits (i.e., daily frequency of fruit and vegetables consumption, weekly candy and soft-drink consumption) and involvement in physical activity. Although the analysis does not show a univocal correspondence between the parental and children characteristics investigated, few distinctive groups can be identified (Fig. 1). Specifically, families made up of self-employed parents or unemployed mothers are more likely to have children eating—daily—more fruit and drinking rarely soft drink (i.e., never or one to two times a week) than those having both parents employed in which children do not eat neither fruit nor vegetables on daily basis. However, families with highly educated parents (i.e. university degree) showed to have children with unhealthy habits far higher than all other groups. More deeply, their children tend to eat candies every day, fruit and vegetables only sometimes, and not play any sports. Although, these results have to evaluate carefulness given the small size of parents holding a university degree, correlation between parental socio-demographic characteristics (i.e., education and occupation), and children's food habits and involvement in physical activity may be likely explained by parents occupation. The latter, in fact, may have an effect on both the family income and the time availability for meals preparation. For instance, since self-employed parents may have less time to devote to meals preparation, children diet may turn out to be poor in vegetables that require longer cooking and preparation times. Further, the longer and unbalanced working hours often associated with self-employed jobs may result in less time spent at home by the parents and less control over the food eaten by their children (Morin et al. 2013; Ziegler et al. 2006). Rather, a diet low in fruit and vegetables intake, observed in children with employed parents, may be due to the higher disposable income of family. Indeed, previous studies showed that higher household income is positively associated with both a higher consumption of meals outside home and convenience foods (Robson et al. 2016), food habits often

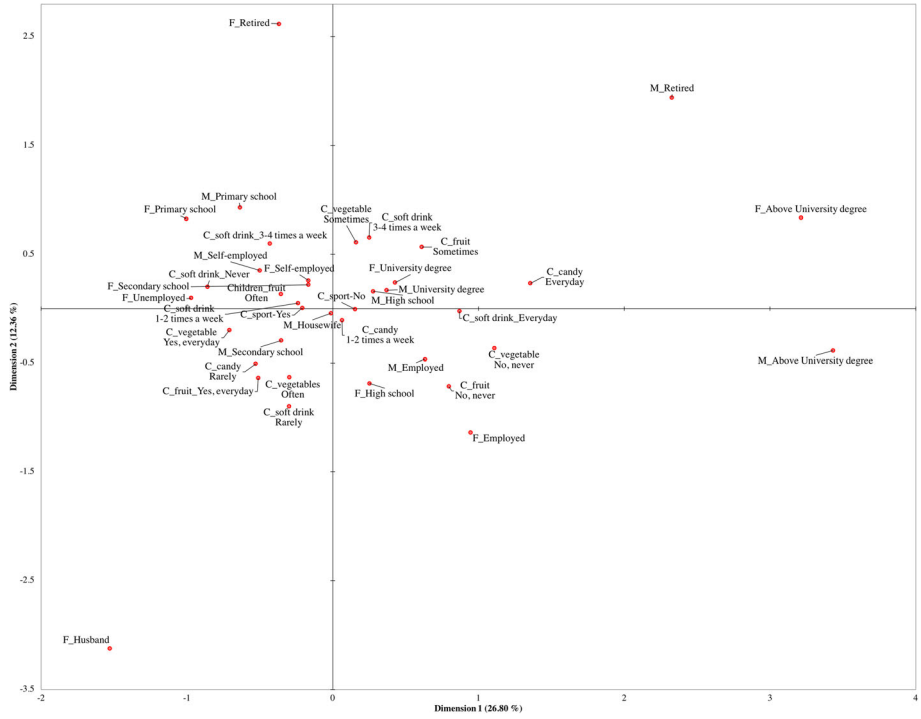

Fig. 1 Parental socio-demographic characteristics and children's food habits and lifestyle

related to a poor diet quality and a greater energy intake (Nago et al. 2014; Powell and Nguyen 2013). As for the unhealthy habits exhibited by children of highly educated parents, it may be correlated to highly demanding parental jobs which may leave less time to meals preparation as well as less control over what children eat at home. Previous studies support our findings revealing the link between time availability and the ability to plan meals in advance, as well as to eat at home where the presence of parents should ensure a greater control over the food taken by children (Morin et al. 2013; Ziegler et al. 2006). These results show clearly the effect of economic and social changes affecting modern society on citizen-consumer's eating habits. To this extend, the paradox arising from the study is that children living in families counting on stable income or with parents having a higher educational degree did not have a better quality of life—in terms of diet—but rather more unhealthy habits.

The study also uncovered whether parental awareness about the negative effects of a high-calorie diet affects children's daily consumption of fruit and vegetables, their involvement in physical activity, and their weekly consumption of candies and soft drinks (Fig. 2). Indeed, the underlying hypothesis was that more aware parents are able to instill healthier food choices and lifestyles. Correspondence analysis shows that as parental awareness increases, healthier food choices and lifestyle can be observed. Specifically, children eat often vegetables in their daily diet as well as are more involved in physical activity. Conversely, children of parents less aware of the negative effects of a high-calorie diet embrace more unhealthy food choices. Indeed, they tend to consume candies (i.e., three to four times a week or one to two times a week) and soft drink (i.e., one to two times a week) on a regular weekly basis. Accordingly, parental awareness about the negative effects of a high-calorie diet guides children towards both healthier

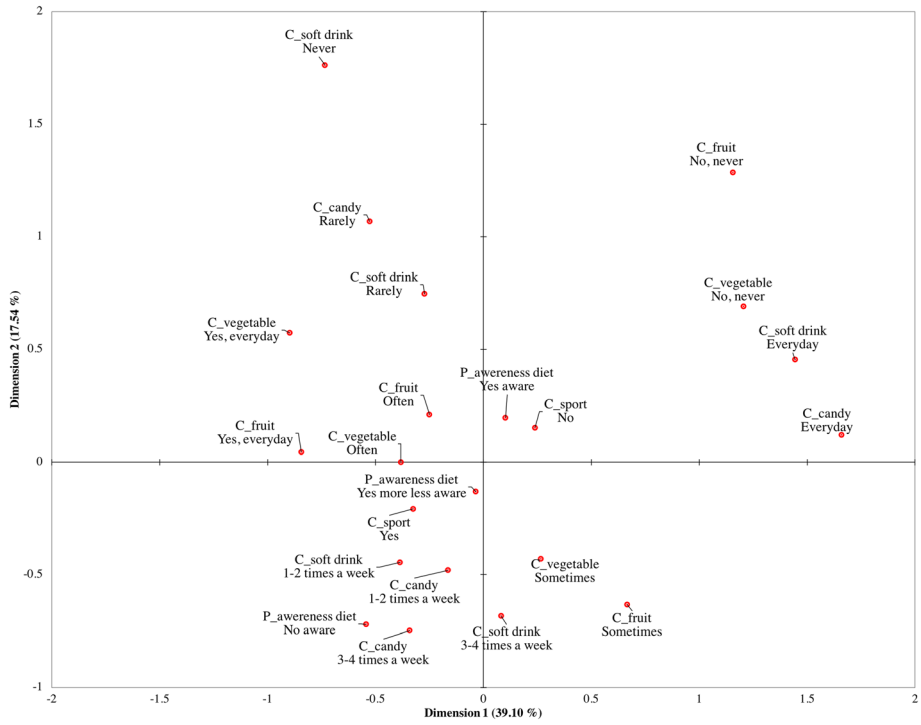

Fig. 2 Parental awareness about high-calorie diet and children's food habits and lifestyle

food choices and lifestyle. These findings suggest that awareness generates concerns that are perceived by children who tackle them by changing their food habits (i.e., eating more vegetables) and lifestyle (i.e., engaging in physical activity).

Lastly, children involvement in physical activity was assessed in relation to parents' frequency of physical activity. This relationship enables to highlight the influence parents have in encouraging a more active lifestyle in their children. In this regard, the results of the study emphasize that a higher frequency of parental physical activity affects positively the involvement of children to play sports. More deeply, higher is the frequency of parents playing sports and higher is also children involvement. To this extend, parents who practice physical activity three times a week or on an everyday basis, have children more involved in sports and vice versa. As suggested by previous studies, the desire of children to conform to their parents' model may explain the correlation between the frequency of physical activity of parents and children engagement in sports (Guidetti and Cavazza 2008; Gross et al. 2010).

Conclusions

The study findings have shown the effects of parental characteristics on children's consumption patterns, to promote more sustainable and responsible food habits. More deeply, the analysis explored the characteristics of parents more likely to create positive spillover effects for overweight and obesity reduction in children. Based on the variables investigated, the study findings enable to draw the characteristics of parents having a greater effect in encouraging children to develop and adopt food habits more responsible for both the health and the environment. Indeed, the results reveal a strong correlation of parental socio-demographic characteristics, diet awareness, and lifestyle

on children's food habits and lifestyle. As a consequence, knowing more about parents allows setting up initiatives that are able to instill positive and aware habits among children. On this line, the results of the study identify occupation and education as the main socio-demographic traits of parents having a positive effect on children. To this extend, children of self-employed parents display healthier habits than the employed or highly educated ones. These findings suggest that higher income (e.g., employed parents) encourage families to eat more often outside home or more high-fat foods rather than to have healthier food habits, while the current longer and stressful working day (e.g., self-employed and highly educated parents) leave less time for parents to prepare meal and less control over what children eat at home. In other words, children living in families counting on stable income or having a higher education seem to have a less quality of life in term of diet. Whether the correlation detected between the frequency of physical activity of parents and children engagement in sports can be clearly explained as the desire of children to conform to their parents' model (Guidetti and Cavazza 2008; Gross et al. 2010), the results related to parental awareness of the negative effects of high-calorie diet need a deeper investigation. Indeed, the study identified that parents' awareness of the negative effects of high-calorie diet promotes positive habits helpful for an effective reduction of overweight and obesity in children: greater vegetables consumption and higher engagement in physical activity. This finding may suggest that parents' awareness generates concerns that are perceived by children who tackle them by changing their food habits and lifestyle. To sum up, in the crusade against children who are overweight and obese, parents play a main role being able to establish healthy and sustainable food habits. Indeed, the main determinants of overweight and obese children are lifestyles and food habits (e.g., more energetic diet, less fruit and vegetables consumption, and sedentary lifestyle) that are mostly established by parents in childhood.

Overweight and obesity charge massive social and environmental costs on society (Mancini et al. 2015; Telese et al. 2016). A reduction in the rate of overweight and obesity turns into less health expenditure (Lawless et al. 2013) and less environmental pollution due to the reduced use of water, fertilizers, chemicals, and transportation.

The study findings offer useful implications also for policy-makers on how to promote healthy and sustainable food habits among children (at the school level), with obvious advantages for society and environment. For instance, since the study uncovered the role of parental awareness and lifestyle to encourage healthier food choices among children, policy-makers may establish soft policies (e.g., advertising campaign) to enhance responsible consumer behavior.

The study shows that diet awareness and lifestyle play a main role to encourage more sustainable and responsible consumption patterns; however, to correct irresponsible food habits, parents should be also more aware about the real health condition of their children. To this extend, the latest report (Ministry of Health 2016) of "Sistema di Sorveglianza Okkio alla Salute" points out that about 40% of mothers of overweight or obese children believe that their child's weight is normal. Accordingly, there is a clear need to address policies and educational initiatives towards families, aiming to strengthen the relationship between education and health. Educational initiatives, in order to be effective, have to begin in childhood by involving families and school community.

Although the study findings draw practical insights for regulators, some limitations occurring in the study offer a starting point for future research. Since the study was carried out surveying students of one age cohort and one school, in a specific area, the representativeness of the sample may be biased. Accordingly, future research may extend the study to a larger sample including different geographical areas and age cohorts. Moreover, the paper investigated only some of the variables for encouraging healthy, responsible, and sustainable food habits, paving the way to further analysis. For instance, future research may explore along with parental characteristics also the effect of the environment in which children and their family live such as urban or rural context as well as parental food attitudes able to affect children food choices. Furthermore, to draw a clear portrait of sample, future studies should collect more information about respondents which may directly measure obesity such as the body mass index or have an indirect effect on it such as the family net income. Information about parents' time availability at home in general and for meal preparations in particular may support the results of the current study, unveiling new knowledge on the behaviors encouraging unhealthy food habits. Lastly, some of the variables investigated (e.g., awareness about the negative effects of a high-calorie diet) were collected posing direct and self-reported questions which raises potential negative effect related to social desirability bias. To overcome this issue, future studies may implement indirect measures and new methodological approaches.

Endnotes

[1]According to the European Association for the Study of Obesity (EASO 2015), the southern regions of Italy have the issue of childhood obesity more prominent. Although Campania region and the sample are not representative of the Italian population living in the South of Italy, investigating the selected region may positively contribute to understanding the causes behind childhood obesity in Italian Southern regions.

[2]Italy is overrepresented by public schools which account for the majority of all schools. Although the schools show similar characteristics in terms of number of students and teaching program, the selected school cannot be assumed representative of the overall student population.

[3]Due to the limited time availability of parents, the study involved only one parent for each student.

[4]A pre-test with five parents and five children sharing similar characteristics with those interviewed was carried to facilitate the structure of the two questionnaires. The pre-test did not identify any critical issues, supporting the choice of the languages used in the questionnaires.

[5]To avoid any potential confusion and facilitate the identification of the questionnaire to be filled in, both questionnaires were marked on the cover: one with the title "for children" while the other with "for parents."

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Competing interests
The authors declare that they have no competing interests.

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