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Tiwasing, Pattanapong; Gorton, Matthew; Quarrie, Steve; Filipovic, Jelena; Bojovic, Ratko

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# UNDERSTANDING THE DETERMINANTS OF PRIMARY SCHOOLCHILDREN'S FOOD PREFERENCES: AN INVESTIGATION OF CHILD / PARENT, SCHOOL AND LOCALITY LEVEL FACTORS

Pattanapong Tiwasing, Newcastle University, UK[1]
Matthew Gorton, Newcastle University, UK[2]
Steve Quarrie, European Training Academy, Serbia[3]
Jelena Filipovic, University of Belgrade - Faculty of Economics, Serbia[4]
Ratko Bojovic, European Training Academy, Serbia[5]

## ABSTRACT

This paper analyses the determinants of schoolchildren's food preferences, paying attention to the relative importance of child/parent, school and locality factors, using multilevel modelling. Urbanisation, location in a poorer neighbourhood, having a school lunch and some specific parental practices positively affect the range of foods and vegetables liked by children.

## INTRODUCTION

Recent research establishes that poor diets are implicated in one in five deaths globally, with the main risk factors linked to excessive intake of sodium and insufficient consumption of fruits, vegetables and whole grains (Afshin et al., 2019). Previous research establishes that children's food preferences depend on multiple factors, with parents potentially playing a crucial role (Benton, 2004). However, there is little evidence on the comparative importance of the child/parent, school and locality level factors on children's food preferences (Gerritsen, Wall & Morton, 2016; Lucas, Patterson, Sacks, Billich & Evans, 2017). Consequently, little is known regarding whether school level initiatives can counteract parent's food practices when they are inconsistent with a healthy diet (Peters, Parletta, Lynch & Campbell, 2014). Two important questions thus shape this paper: (a) to what extent do children's food likes reflect parents' food practices and (b) to what extent do school and locality level factors affect children's food preferences? We address these questions through data from schools in Serbia, where information on children's food preferences is matched to parental survey data on their food practices as well as school and locality level information.

## THEORETHICAL DEVELOPMENT

During childhood, food likes and preferences are formed through genetic predispositions, repeated exposure and learned associations with particular contexts and consequences (Alm & Olsen, 2017; Birch, 1999; Dominguez et al., 2013;

[1] Pattanapong.Tiwasing@newcastle.ac.uk
[2] matthew.gorton@newcastle.ac.uk
[3] steve.quarrie@gmail.com
[4] jfilipovic@ekof.bg.ac.rs
[5] rbojovic@gmail.com

Dubuisson et al., 2012; Sweetman, McGowan, Croker & Cooke, 2011). Consequently, whether genetic predispositions are expressed in food preferences consistent with healthy diets depends on the eating environment (Backett-Milburn, Wills, Roberts & Lawton 2010; Birch, 1999). The most important environments for children include the home and school (Andersen et al., 2016). Public policy initiatives to develop food preferences consistent with healthy diets concentrate primarily on school-level interventions, with significant effort globally to improve the quality of school meals and nutritional education in schools (Lucas et al., 2017). Establishing a balanced and healthy diet at an early age is important as food preferences created in childhood affect eating patterns in later years (Nicklaus, Boggio, Chabanet & Issanchou, 2004).

## RESEARCH DESIGN

Drawing on data for 5,245 children (predominantly 7-and-8-year-olds) from primary schools in Serbia, this paper analyses the determinants of schoolchildren's food preferences. It pays attention to the relative importance of child / parent (gender, uptake of school meals, as well as parents' food practices), school (school size and in-service training points/teacher), and locality (population, poverty incidence and educational level) level factors. School children rated 90 foods including examples of vegetables, fruits, dairy, meat and fish in terms of their degree of liking and familiarity. Parents of surveyed schoolchildren completed a separate questionnaire regarding household food practices. Following Matheson, Moineddin and Glazier, (2008) and Chambers, Dundas and Torsney (2016), we employ the multilevel (three-level) modelling with random intercepts to analyse the determinants of children's food preferences (sum of total foods liked as the dependent variable) and for the sub-category of vegetables (number of vegetables liked). The econometric approach reflects the hierarchical (clustering) structure of the data, where the information of children / parents (level 1) was collected from 25 schools (level 2) and schools were clustered within 15 municipalities (level 3). This is because using single-level regressions does not allow for residual components at each level in the hierarchy (clustering). Therefore, the standard errors of regression coefficients are underestimated, leading to an overstatement of statistical significance (Rasbash, Steele, Browne & Goldstein, 2017).

## RESULTS AND CONCLUSION

The results of the multilevel modelling are presented in Table 1 (Models II and IV) for total food and vegetable preferences respectively. We also report the results of Ordinary Least Squares (OLS) regressions for total food (Model I) and only vegetables (Model III) without controlling for the hierarchical data. The results of Models I and IV reveal that the variables (POP, WELFARE, and SECONDARY, Table 1) from the municipality level are statistically significant and positively associated with total food and vegetable preferences. Models II and IV include variables from the school and municipality level. The likelihood-ratio (LR) tests for Models II and IV are statistically significant ($p<0.05$), indicating that a hierarchical structure in the data exists and using multilevel methodology is required. The multilevel models indicate that, after controlling for the hierarchical structure and other factors, at the municipality level, only (log) population (POP) and percentage of population on social welfare (WELFARE) are positively and significantly associated with both total food and vegetable preferences. As population (urban agglomeration)

increases, children are likely to have more food available. Therefore, an urban location can expose children to a wider range of foods, including vegetables. Children in poorer localities like a wider range of foods, including vegetables. A problem of rising affluence is that children become more selective in the range of foods liked.

At the school level, the number of pupils enrolled in the school (SCHSIZE) is negatively associated with both total food and vegetable preferences. Providing food for a higher number of students often creates logistical problems and may lead to sacrifices in food quality. Larger schools are associated with a narrower range of liked foods and this holds as well when only considering vegetables. At the children/parents level, having a school lunch (SCHLUNCH) is positively associated with the range of foods and vegetables liked. Thus, receiving school meals increases the number of foods liked by children, including vegetables and can make a positive contribution to more balanced diets, not only within the school but also spilling over into wider food preferences. Considering parents' practices, *providing fresh fruit and vegetables at home every day* (PRACT1) has a positive association with vegetable, but not total food preferences. Parents that *enjoy discovering and trying new meal recipes at home* (PRACT7) pass on to their children a liking for a wider range of foods. The paper discusses the public policy implications of the results.

***Keywords:*** Food preferences, Children, parents' food practices, School meals, Multilevel modellingc Serbia

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**Table 1: Determinants of schoolchildren's food preferences: multilevel regressions**

| | **Total Food** | | **Vegetable** | |
|---|---|---|---|---|
| | **Model I (S.E.)** | **Model II (S.E)** | **Model III (S.E)** | **Model IV (S.E)** |
| POP (Settlement population (log)) | 6.579*** (1.092) | 5.608** (2.420) | 2.231*** (0.342) | 2.156*** (0.578) |
| WELFARE (% of people receiving social warfare) | 2.881*** (0.539) | 2.725** (1.254) | 0.592*** (0.171) | 0.594** (0.293) |
| SECONDARY (% of people with secondary education and above) | 0.752*** (0.211) | 0.568 (0.457) | 0.172** (0.066) | 0.132 (0.110) |
| INSERVICE (the proportion of in-service training points/teacher) | -0.050* (0.030) | -0.037 (0.011) | -0.009 (0.002) | -0.011 (0.016) |
| SCHSIZE (the total number of pupils) | -0.033*** (0.005) | -0.023** (0.010) | -0.007*** (0.001) | -0.008*** (0.002) |
| GENDER (pupils' gender: 1=girl, 0=boy) | -3.286* (1.743) | -2.659 (1.709) | 0.249 (0.542) | 0.382 (0.533) |
| SCHLUNCH (Having lunch at school: 1=Yes, 0=No) | 4.992** (2.275) | 6.097*** (2.202) | 1.604** (0.717) | 1.871*** (0.682) |
| PRAC1 (My child is given fresh fruit and vegetables at home every day: 1=Yes, 0=otherwise) | 2.126 (4.417) | 4.329 (4.292) | 2.490** (1.315) | 2.791** (1.338) |
| PRAC2 (My child is given milk and/or yoghourt at home every day1=Yes, | 3.424 (3.550) | 3.198 (3.604) | -0.839 (1.010) | -0.742 (1.123) |

| | | | | |
|---|---|---|---|---|
| 0=otherwise) | | | | |
| PRAC3 (My child is given sweetened and/or fizzy drinks at home every day: 1=Yes, 0=otherwise) | 0.728<br>(4.450) | 1.282<br>(4.152) | 0.193<br>(1.379) | 0.163<br>(1.295) |
| PRAC4 (We don't let our child have "junk" (unhealthy) food at home: 1=Yes, 0=otherwise) | 0.014<br>(1.812) | 0.811<br>(1.781) | 0.259<br>(0.564) | 0.452<br>(0.555) |
| PRAC5 (We don't have enough money to give our child healthy food at home: 1=Yes, 0=otherwise) | -2.433<br>(2.802) | -1.877<br>(2.649) | -0.109<br>(0.857) | -0.053<br>(0.826) |
| PRAC6 (I always let my child choose what he/she wants to eat and drink at home: 1=Yes, 0=otherwise) | -1299<br>(1.954) | -1.664<br>(1.976) | -0.349<br>(0.621) | -0.470<br>(0.616) |
| PRAC7 (I enjoy discovering and trying new meal recipes at home: 1=Yes, 0=otherwise) | 4.983**<br>(1.968) | 5.160***<br>(1.982) | 0.812*<br>(0.716) | 0.841*<br>(0.716) |
| PRAC8 (My child always eats at the same time at home as his/her parents: 1=Yes, 0=otherwise) | 1.681<br>(1.920) | 1.764<br>(1.899) | 0.523<br>(0.585) | 0.598<br>(0.592) |
| PRAC9 (I regulate the time my child spends watching TV or electronic devices: 1=Yes, 0=otherwise)) | 3.108<br>(2.251) | 2.712<br>(2.167) | 0.942<br>(0.703) | 0.820<br>(0.675) |
| PRAC10 (My child regularly does sports outside school: 1=Yes, 0=otherwise) | 3278<br>(2.323) | 2.951<br>(2.293) | 1.288<br>(0.612) | 1.214<br>(0.618) |
| Constant | 116.00***<br>(10.65) | 115.72***<br>(15.14) | 19.18***<br>(3.041) | 19.60***<br>(3.890) |
| **Random effects** | | | | |
| **Variance at municipalities** | - | 2.65 | - | 0.08 |
| **Variance at schools** | - | 67.73 | - | 3.00 |
| **Variance at children/parents** | - | 1151.23 | - | 112.11 |
| **ICC** | | | | |
| **Municipality level** | - | 0.22% | - | 0.07% |
| **School level** | - | 5.54% | - | 2.61% |
| **LR test (p-value)** | - | 27.84*** | - | 10.52*** |
| **Observation** | 1,625 | 1,625 | 1,625 | 1,625 |
| **NO. of groups:** | | | | |
| **School** | - | 25 | - | 25 |
| **Municipality** | - | 14 | - | 14 |
| **R-squared** | 0.067 | - | 0.049 | - |

Notes: ***, ** and * are significant at 1%, 5% and 10% levels, respectively.
S.E. denotes robust standard errors.