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Population based folate status monitoring to explore the causes of insufficient folate intake among pregnant women

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National Centre for Healthcare Audit and Inspection
EU DG SANCO Rare Diseases Task Force

Recommendations and practice for folic acid supplementation in Hungary

The EUROCAT recommends:
the **national policy** formulation on folate supplementation and food fortification;
operation of a folic acid **supplementation** supporting practice for planned pregnancies;
fortification of a basic food for non-planned pregnancies;
monitoring of folate status and its determinants and congenital anomalies;
regular **check for effectivity** of health policy performance.

The Hungarian status can be described as:
lack of declared and functioning national health **policy**;
having appropriate folic acid supplementing medicines, but their application is **not supported by health promotion**;
having food standards for food fortification, but it is not utilized because of the **lack of supporting marketing**;
having registration for congenital anomalies, which can not act directly on the prevention because it is **not integrated into multidisciplinary** working groups.

Study objectives

Establishment of a population based monitoring for pregnant women
- to describe their nutritional habits, and estimate folate intake
- to measure their red blood cell folic acid levels
- to determine folate supplementation related attitude
- to analyze the association between socio-economical characteristics and folate status/folate intake

Description of the association between estimated daily intake and measured concentrations

Development of a food-frequency questionnaire, which make it possible to export the monitoring without laboratory support

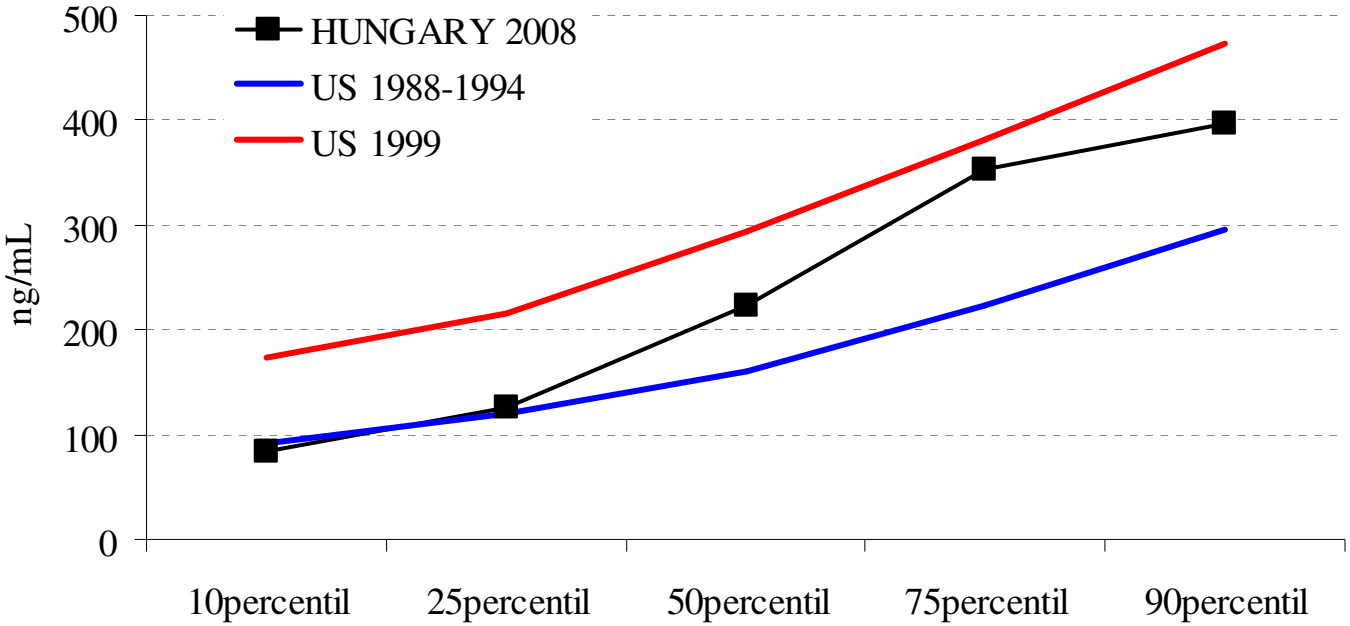
Facilitating the application of the monitoring and the interventions in other Hungarian communities

Contribution to the formulation of Hungarian policy for periconceptional folate status

Methods

Study base:	population of Szombathely 13981 women aged 18-40 years ~800 livebirths/year expected
Study period:	2008. 02. 01. – 2008. 08. 31.
Sampling:	all the pregnant women living in the town ~400 expected/study period **preliminary analysis on 174 subjects**
Interview:	by the community nurse at time of the diagnosis of pregnancy (8-10 weeks) food frequency questionnaire on the nutritional habit of the last month psychological tests (on anxiety, depression, health beliefs) supplementation history socio-economical status, demographical data reproductive history
Laboratory:	taking blood by the local hospital staff at time of the diagnosis of pregnancy measuring red blood cell folic acid concentrations

Red blood cell folate concentrations for U.S. women aged 15-44 years and Hungarian study population of women in early pregnancy



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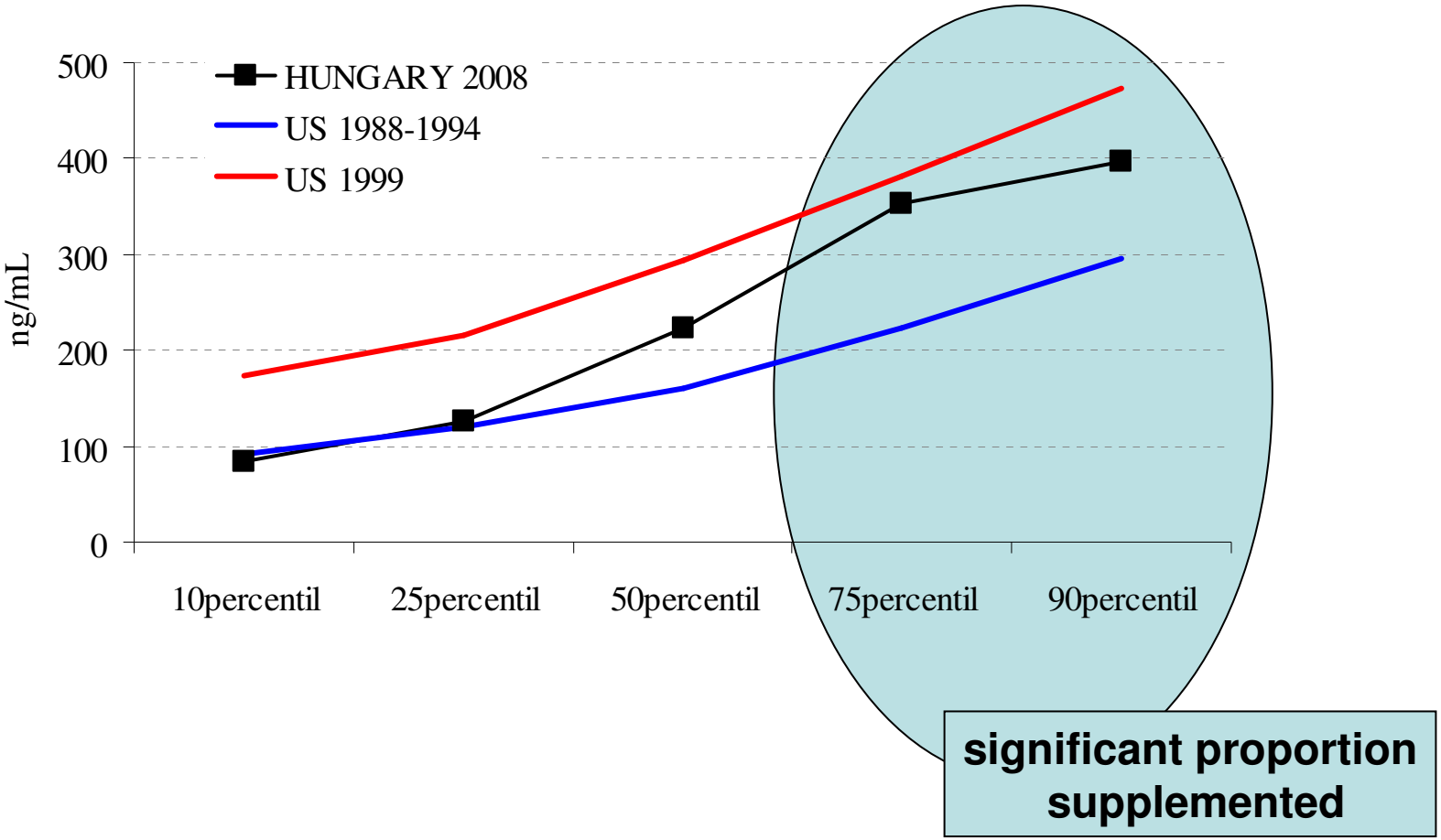

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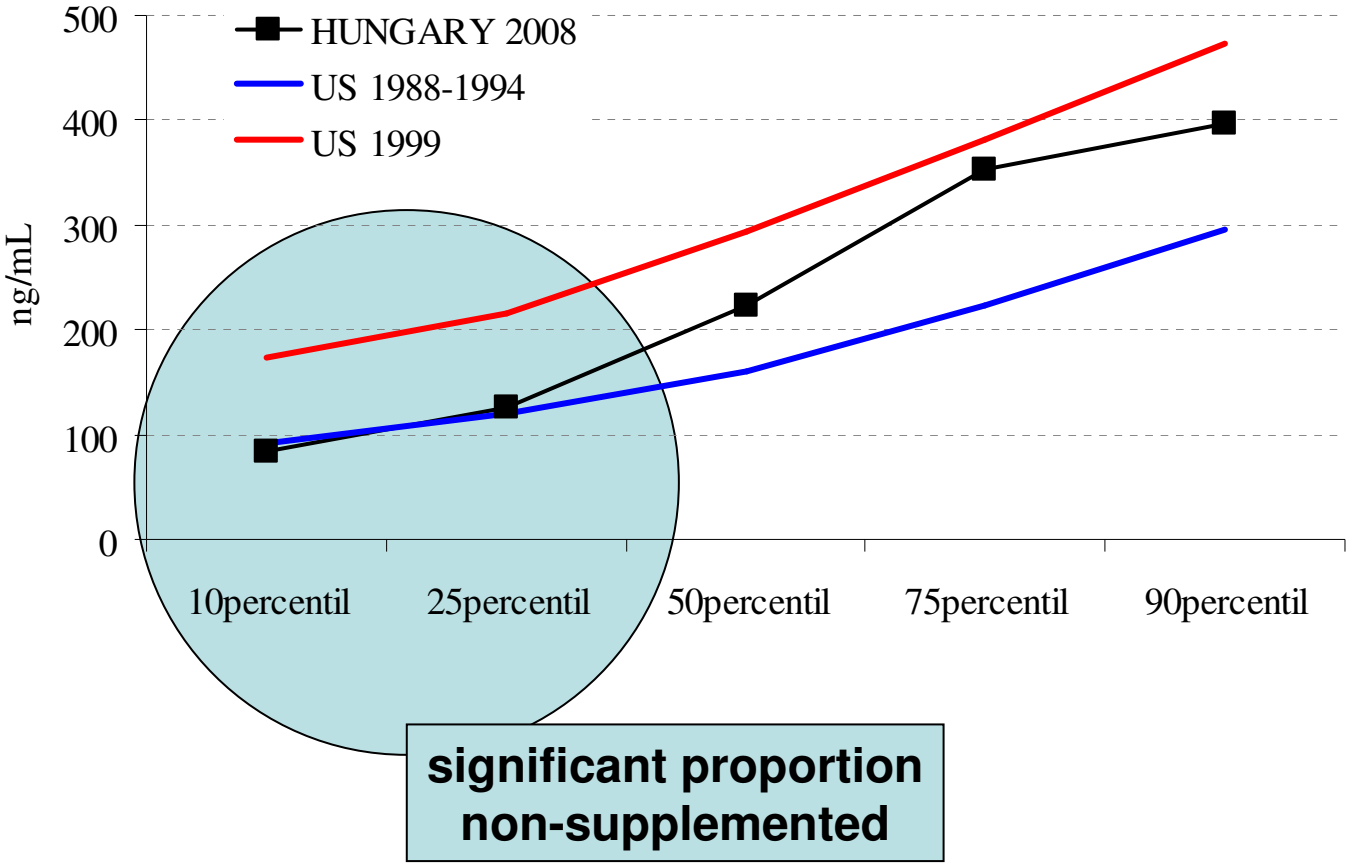
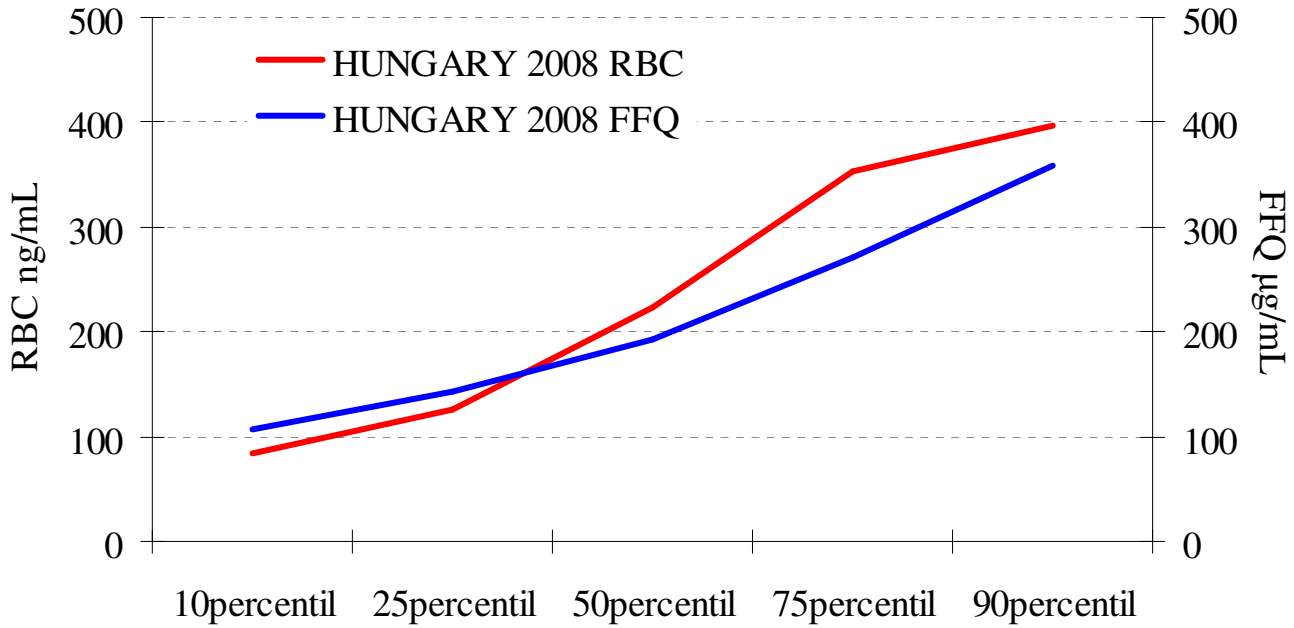


Red blood cell folate concentrations and food-frequency based estimated daily folate intake for Hungarian study population of women in early pregnancy



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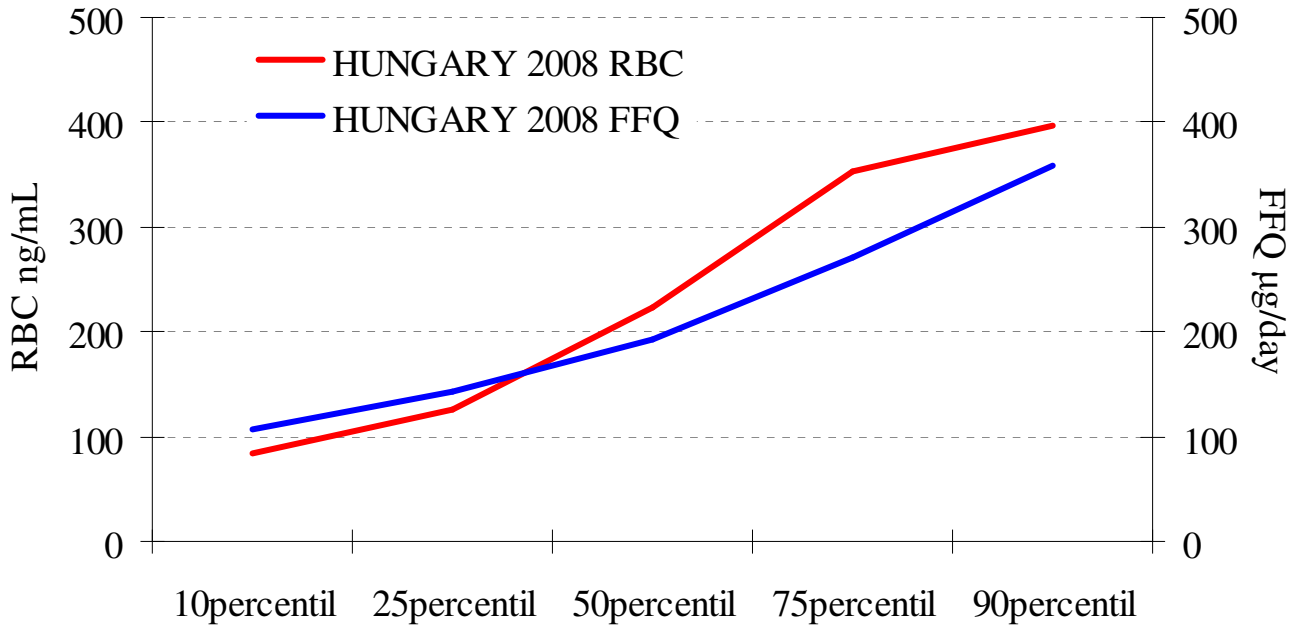
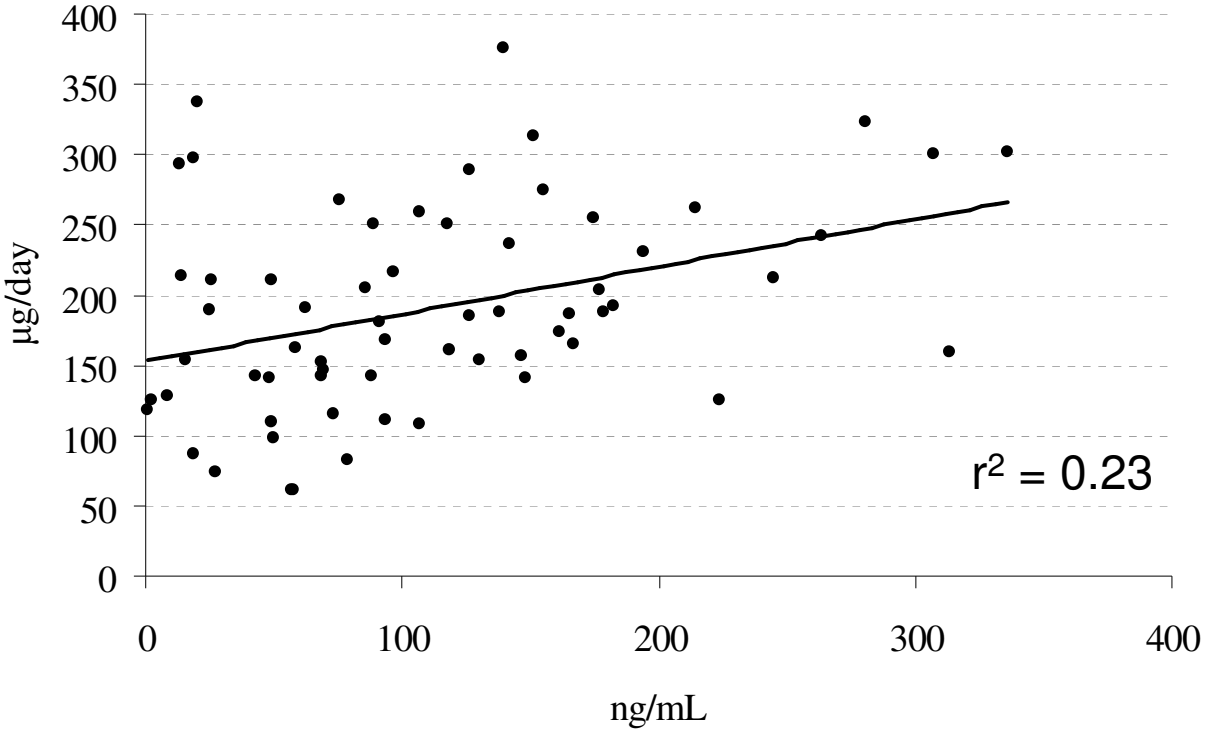


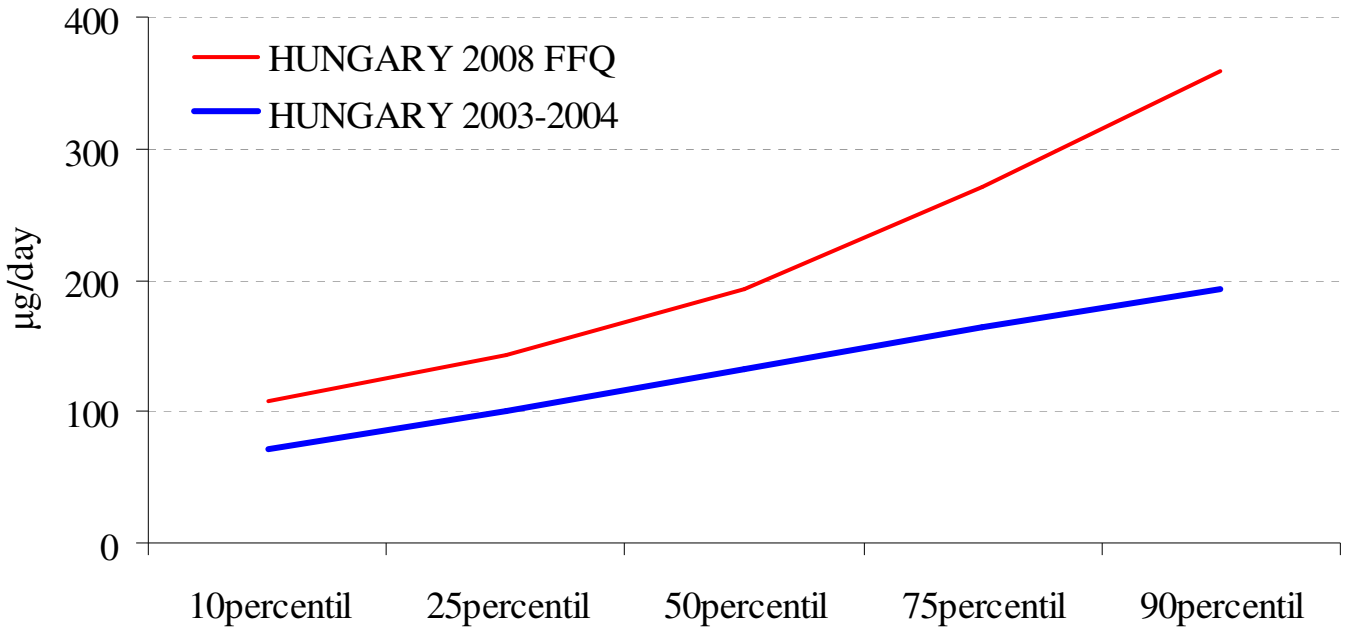
good correlation between distributions of lab-measured and FFQ-estimated folate statuses

Red blood cell folate concentrations and food-frequency based estimated daily folate intake for Hungarian study population of women in early pregnancy without supplementation



The Dietary survey in Hungary (2003-2004) investigated the nutritional habits of a representative sample.

A nested sample was investigated according to vitamin intake as well. This sub-sample consisted of 587 women aged 18-34

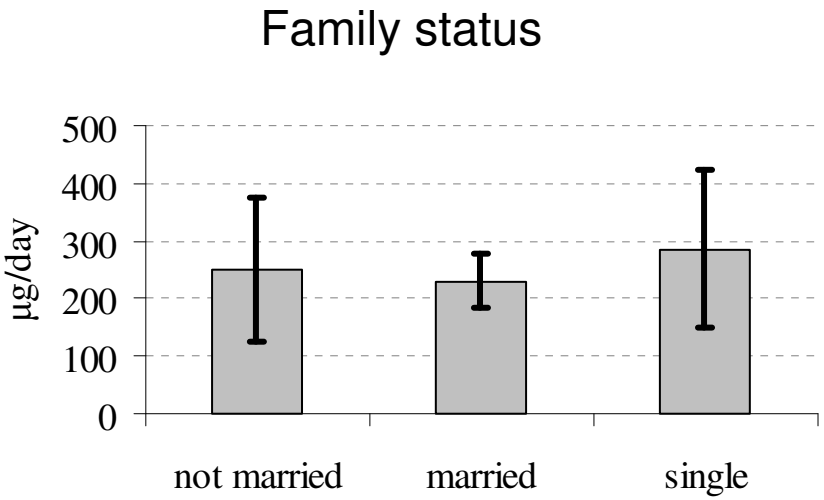


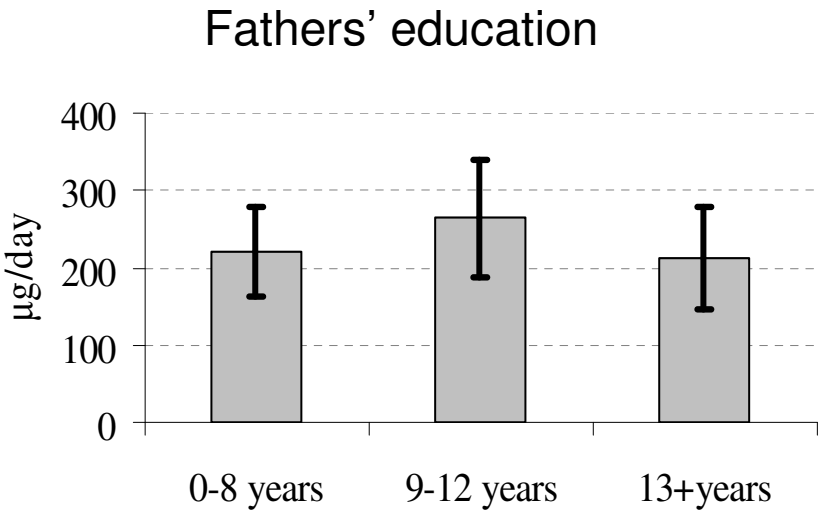
Composition of daily folate intake by food items

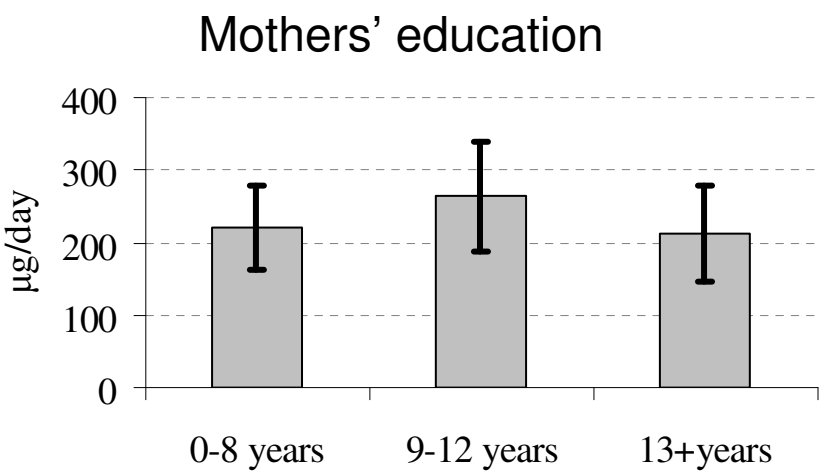
	µg/day	
chicken liver	47,4	(19,7%)
bread, cereals	33,9	(14,1%)
milk	33,5	(13,9%)
not green leaves vegetables	28,0	(11,6%)
fruits	24,1	(10,0%)
sausage, egg	18,7	(7,8%)
green leaves vegetables	17,4	(7,2%)
cod	6,9	(2,9%)
others	31,0	(12,9%)
FA fortified food	0	(0,0%)
total	***241,0***	(100%)

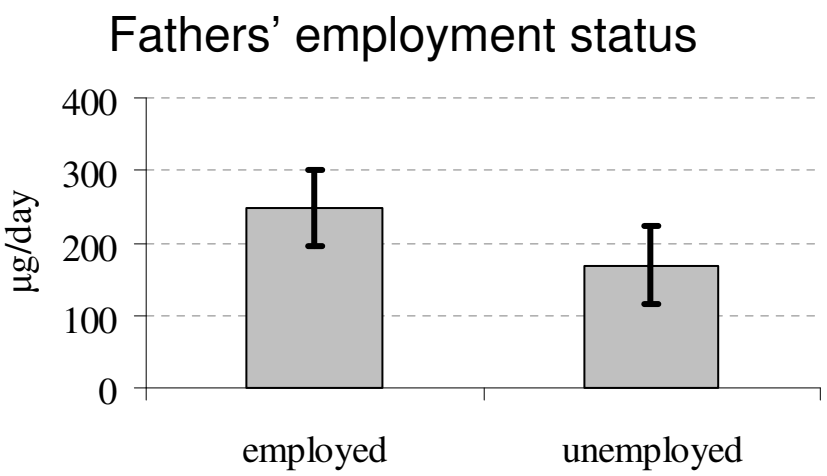
Nobody applies folate fortified food

Socio-economical determinants of daily folate intake

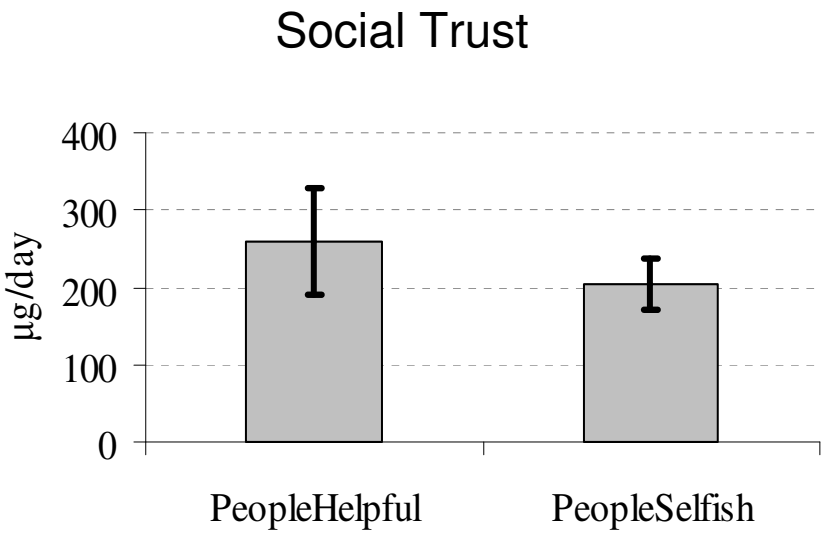


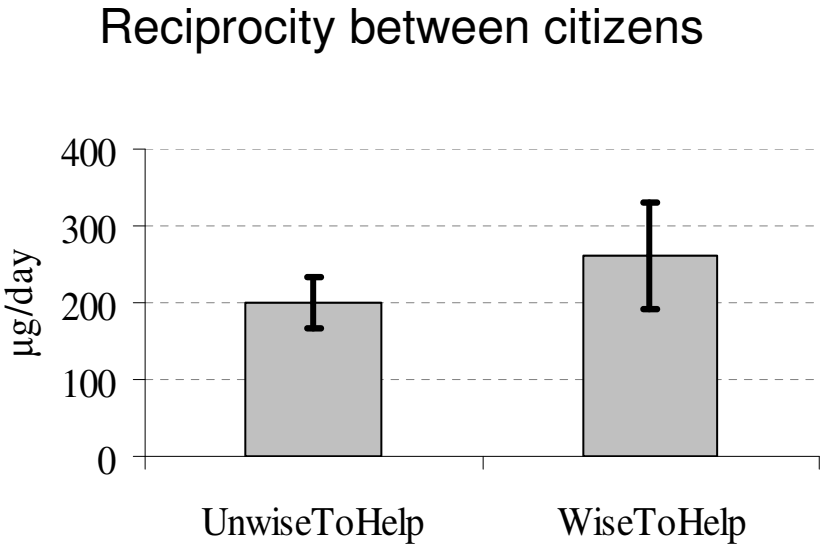


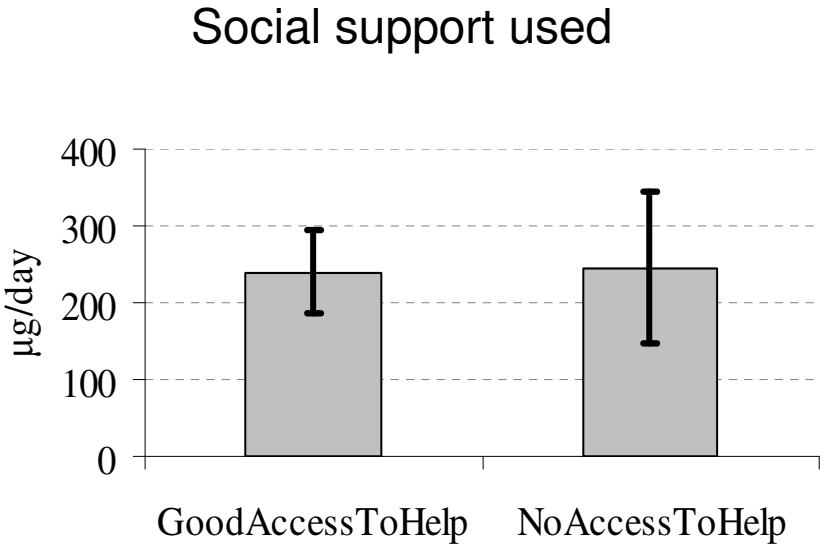




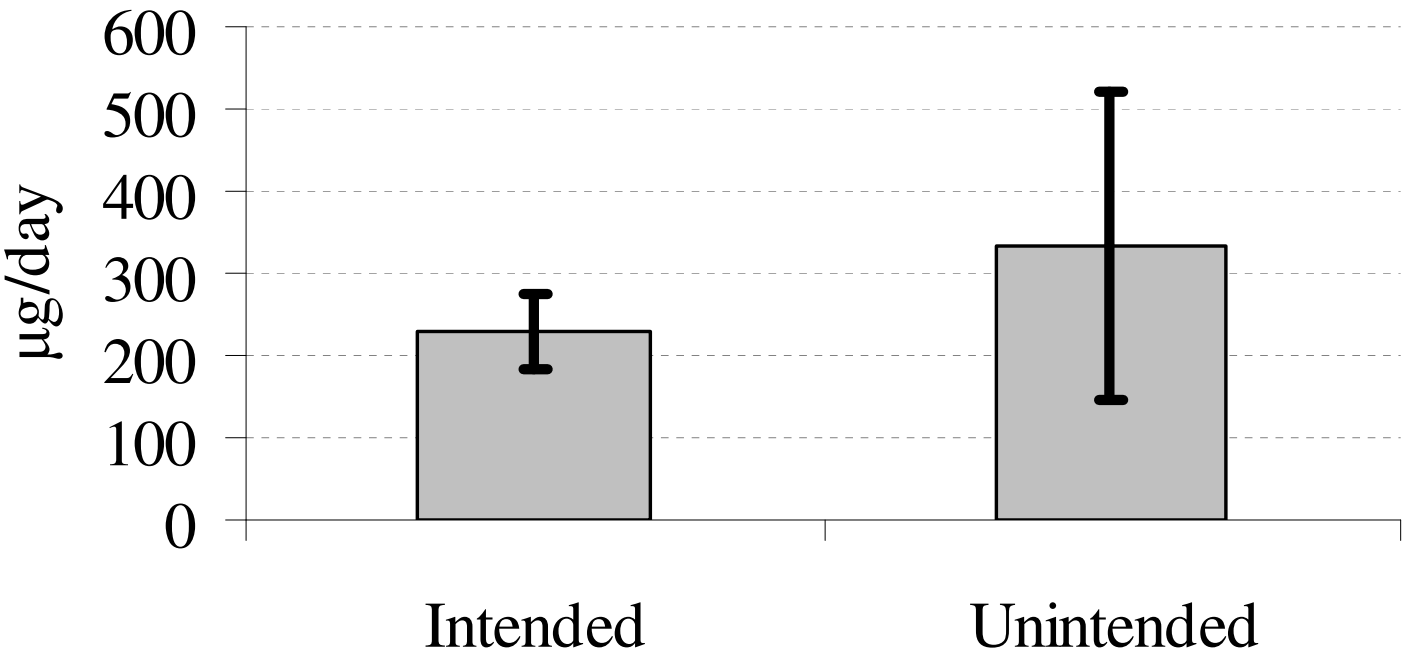
Daily folate intake according to the social capital



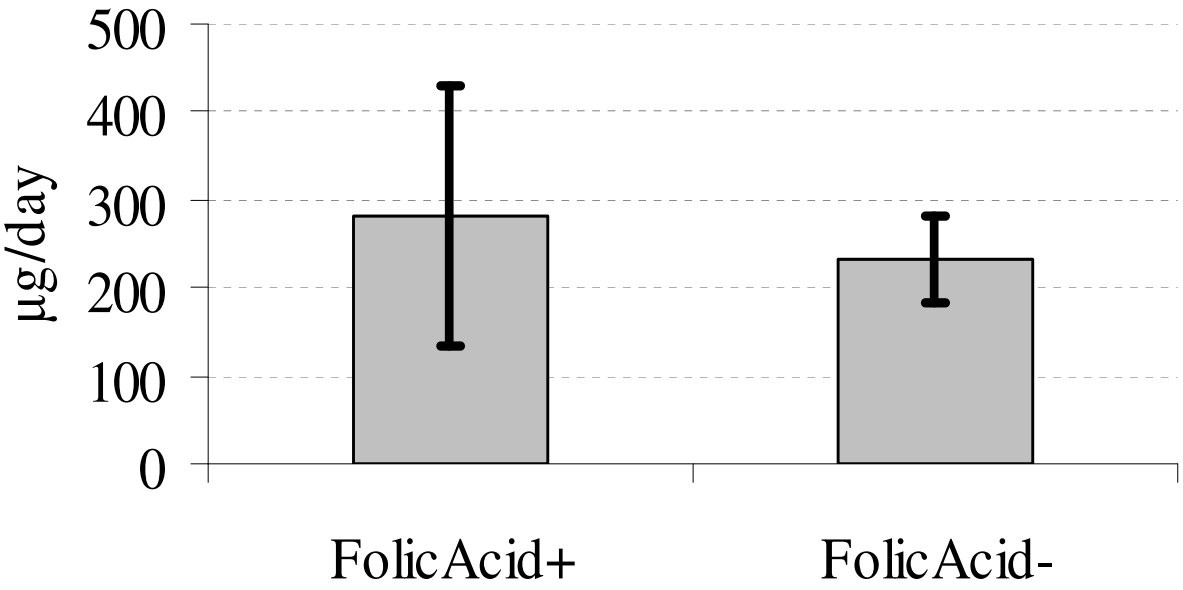




Daily folate intake according to the pregnancy planning



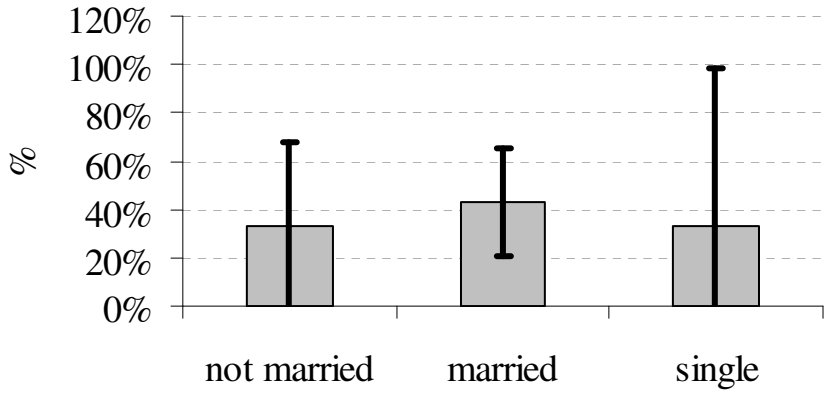
Daily nutritional folate intake and the supplemntation during early pregnancy



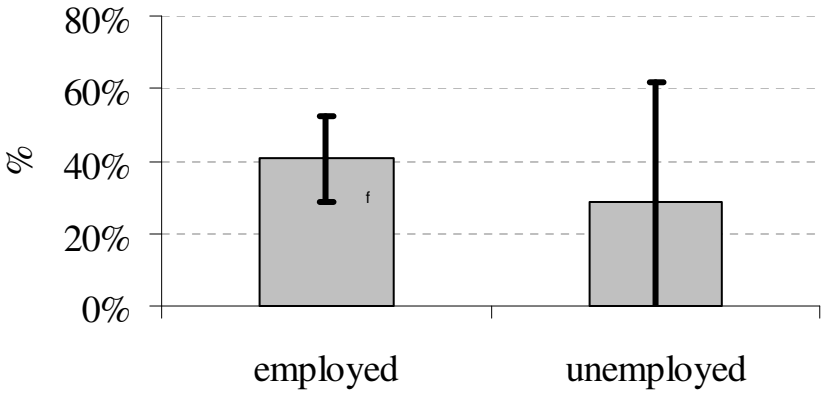
No socio-economical influence on dietary intake.

Socio-economical determinants of folate supplementation (39% is supplemented)

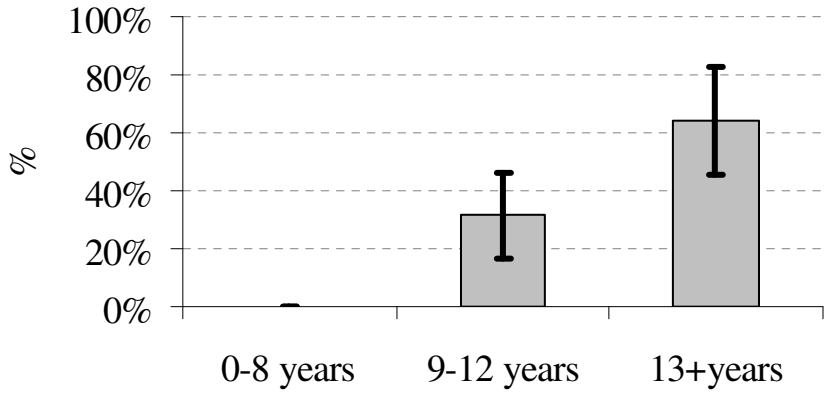
Family status



Fathers' employment status



Mothers' education



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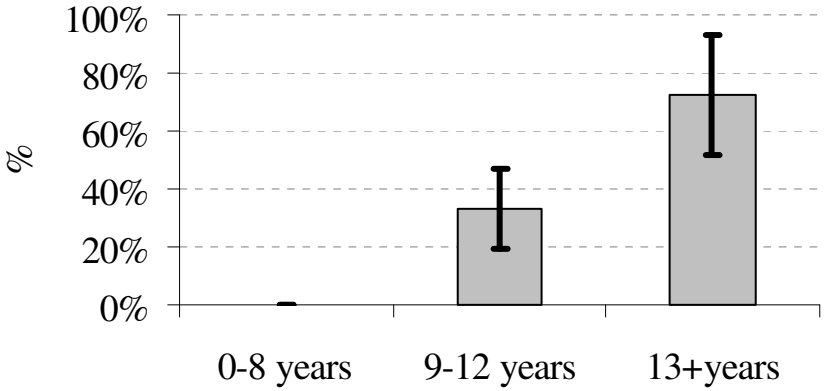

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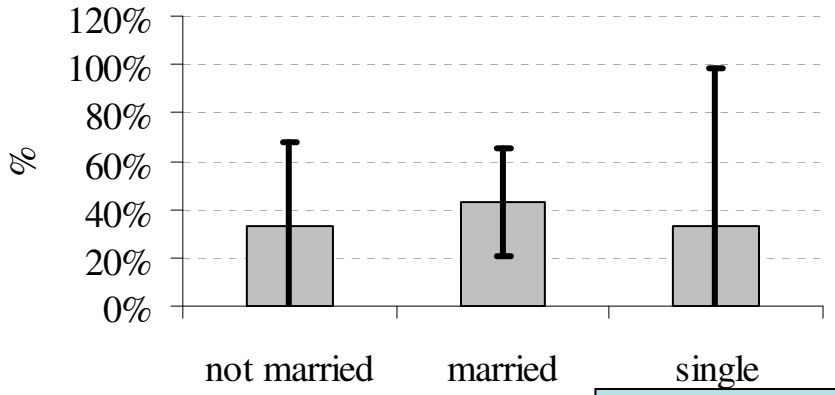

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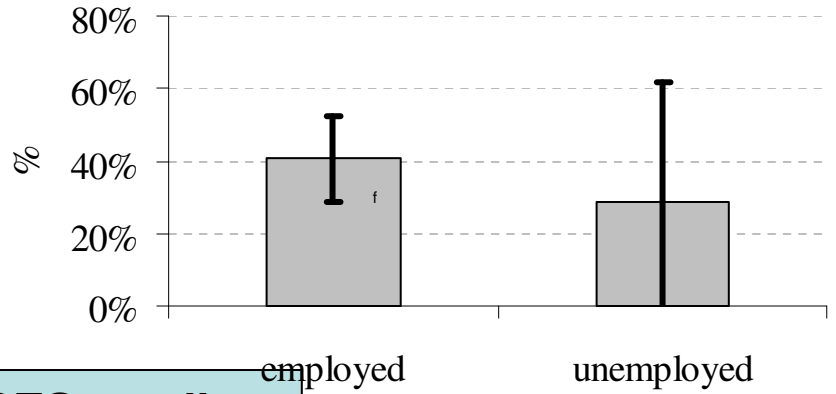
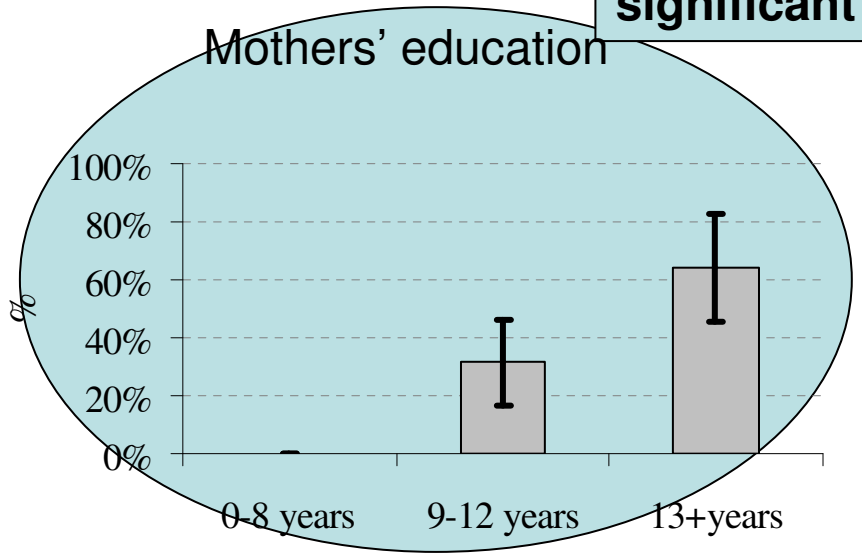


significant SES-gradient

Mothers' education



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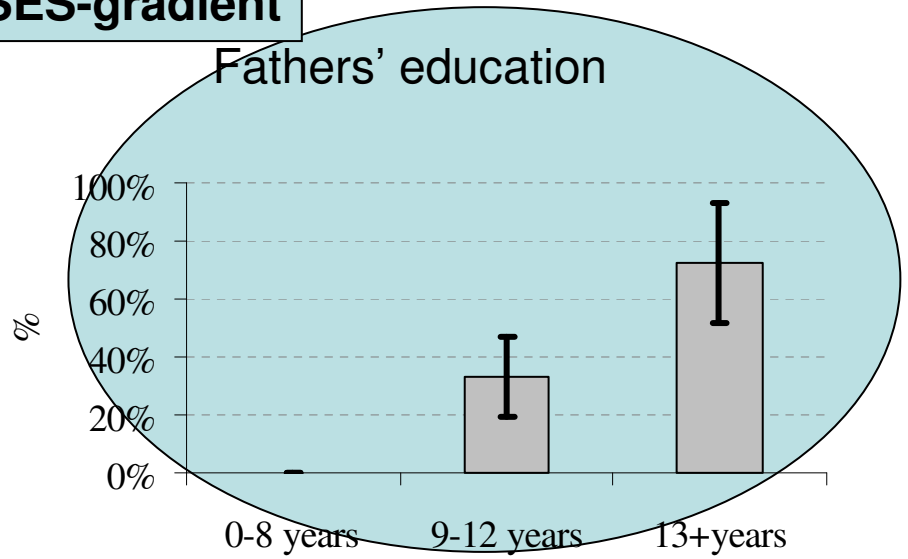
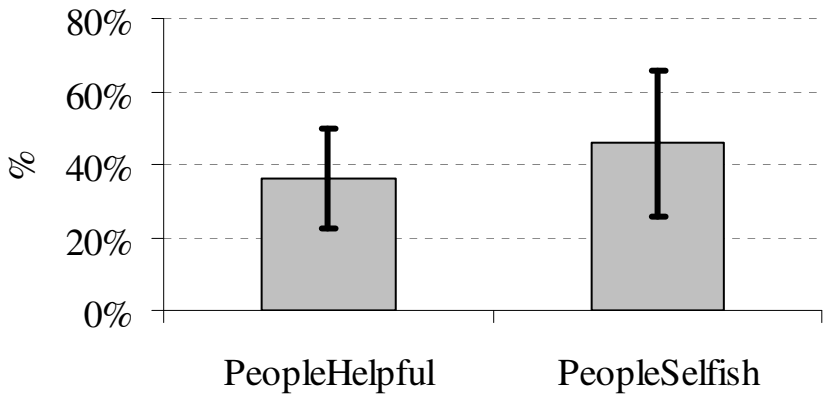
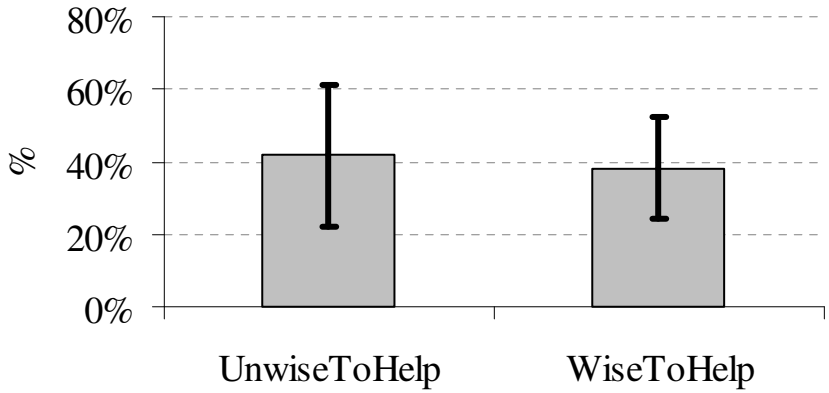


Prevalence of folate supplementation according to the social capital

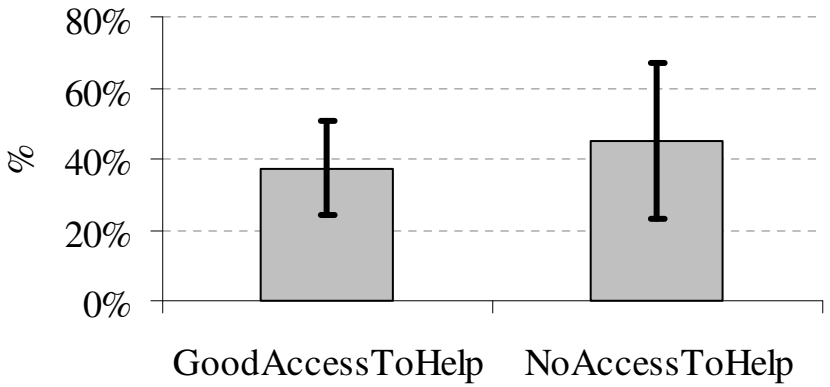
Social Trust



Reciprocity between citizens



Social support used



Psychological determinants of being supplemented by folic acid during early pregnancy:

Health and Illness Scale (Furnham) - about the beliefs of health determinants

„How could I improve my health?"

„Getting advised from friends and family members"
OR = 1.026 (0.785 – 1.342)

„Getting advised from publications"
OR = 1.162 (0.890 – 1.517)

„Participating in screening programs"
OR = 0.929 (0.643 – 1.341)

„Getting advised from medical doctors and nurses"
OR = 0.923 (0.563 – 1.514)

„Getting advised from practitioner of alternative medicine"
OR = 1.578 (1.148 – 2.170)

„Taking vitamins or tonic"
OR = 1.438 (1.093 – 1.892)

(ORs adjusted to age, mothers' and fathers' education)

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the trust in vitamins in general is connected with high prevalence of supplementation during early pregnancy

(ORs adjusted to age, mothers' and fathers' education)

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the trust in alternative medicine increases only the supplementation during early pregnancy

(ORs adjusted to age, mothers' and fathers' education)

Psychological determinants of being supplemented by folic acid during early pregnancy:
Trait Anxiety Inventory (Spielberger) - how the subjects generally feel

„I am calm, cool, and collected”
OR = 1.000 (0.554 – 1.806)

„I feel secure”
OR = 1.179 (0.537 - 2.590)

„I am happy”
OR = 1.069 (0.480 – 2.381)

„I worry too much over something that really doesn't matter”
OR = 0.427 (0.211 – 0.863)

„Some unimportant thought runs through my mind and brothers me”
OR = 0.557 (0.324 – 0.960)

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the anxiety during early pregnancy is connected with low prevalence of supplementation

(ORs adjusted to age, mothers' and fathers' education)

Conclusions
related to the food fortification – enforced supplementation debate

1) Folate intake during early pregnancy is low in a significant part of the population (who can not utilize the opportunities available at present – **action needed**)

2) The personal folate status can be reliably estimated by FFQ, the determinants of folic acid intake related behavior can be assessed by questionnaires: **theoretical opportunity for person level (specific) intervention** to achieve supplementation

3) The socio-economically disadvantaged are not supplemented, and they are **usually not responsive** to health promoting programs

4) The anxious pregnants are not supplemented appropriately, and the interventions to facilitate the supplementation can **exaggerate their anxiety without increasing the folate intake**

The enforced supplementation needs well established staff with appropriate resources – not available in Hungary.

The low budget interventions (not focusing personal needs) could be counterproductive.