


Lifeways Cross-Generation Cohort Study

Family influences on childhood nutritional status:
Findings from the Lifeways Cross Generation Cohort Study

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Outline

- Rationale for the analysis
- Overview of the Lifeways study
- Data collection methods
- Analysis at macronutrient level:
  - Relationship between pairs of family members
  - Relationship between family triads
  - Association between child and mother
- Results
- Summary

Rationale

- Childhood obesity – parental obesity
- Role of the family environment? Shared and non-shared?
- Behavioural aspects – portion size, cultural values, response to food cues, emotional overeating[1,2]
- Parental-child resemblances for food[3,4] and nutrients[5,6] - typically weak but significant
- Maternal vs paternal? Influence of grandparents?
- Maternal prenatal vs postnatal?

Objectives

- Examine parent-child diet resemblances for 5 yr old children
- Mothers' vs Fathers' diet
- Examine familial aggregation in 7 members, 3 generations
- Mothers' pregnancy (T1) vs current (T2) diet

The Lifeways Cross Generation Cohort Study, Ireland 2001-2011

Irish Medical Journal 2007; Sept 100 (8) Suppl 3-32

- Sample:
  - 1124 mothers-to-be recruited first ante-natal visit
  - Two hospitals, Galway (West) & Dublin (East)
  - Recruited Oct 2001 – Jan 03
  - 1094 babies (proband)
  - 331 fathers and 1231 grandparents
- Prenatal→ birth→ 3yr→ 5yr
- Designed to study cross-generation influences on early child development

- Instruments:
  - Questionnaires (comprehensive 2001-3 & 07-8)
  - Food Freq Questionnaires
  - Electronic ante-natal/birth hospital records (Euroking)
  - HSE Immunisation records
  - Parent held child annual records
  - General Practice follow-up
  - Anthropometric measures

Methods

- Dietary Data collection :

1. Prenatal stage (T1) : adult SQFFQ in parents + grandparents
2. Child 5+yrs of age (T2) : maternal grandmothers + mothers + children (Child SQFFQ from NDNS 4.5yrs)

- Nutrients conversion
  - McCance & Widdowsons 6th Edition food composition tables
  - FFQ_Software© by NNSC Ireland
- Natural Log Transformed
- Energy adjustments
  - Nutrient density method

NDNS: National Diet and Nutrition Survey, UK
NNSC: National Nutrition Surveillance Centre, Ireland

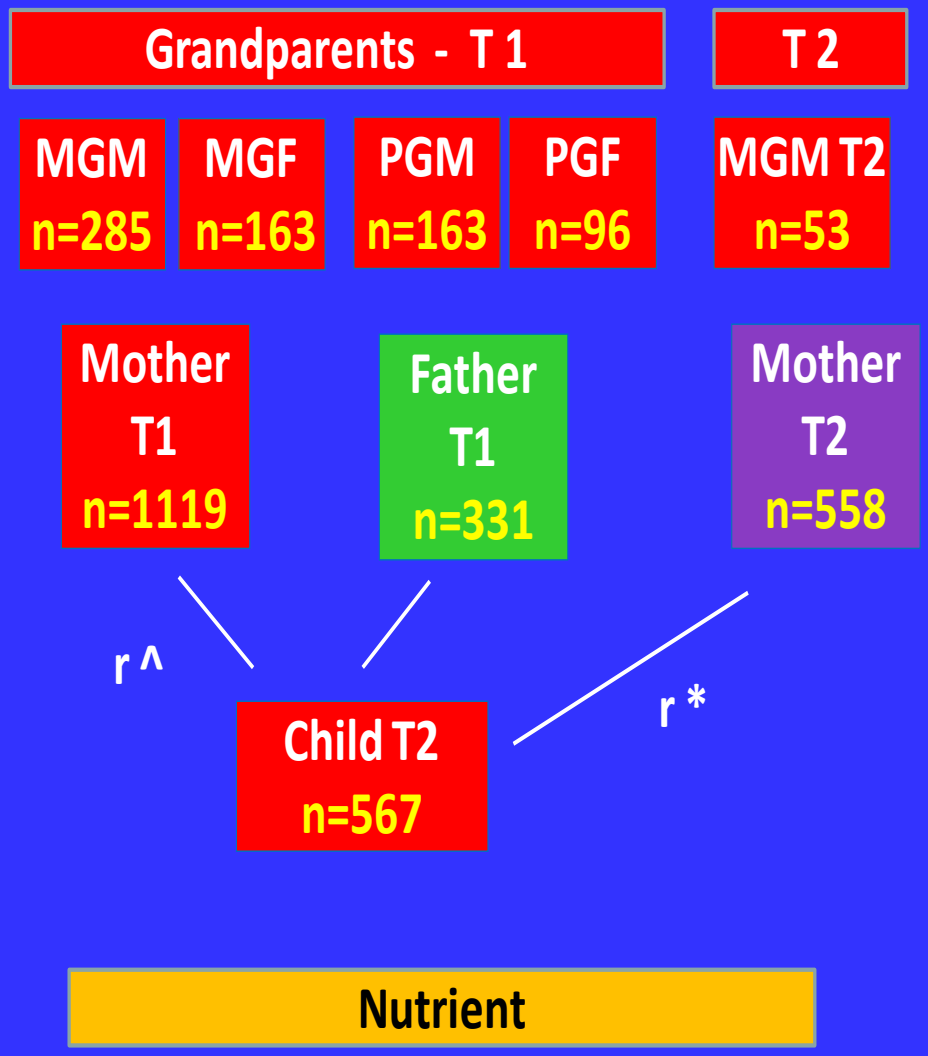
Analyses

- Pearson's Correlations in pairs
  1. Nutrients only (Energy adjusted)
  2. Fully adjusted
     (children's gender, height, BMI + energy ;
     parents' age, height, BMI, education + energy)

- Intra-class Correlations
  1. 3 nuclear family triads (Child's, Mother's, Father's)
  2. Extended families (Maternal vs Paternal line)

- Linear Regressions
  - regressed children's diet on mothers' prenatal (T1) and postnatal (T2) diet together as predictors
  - Nutrients only and fully adjusted

Sample Sizes (n)

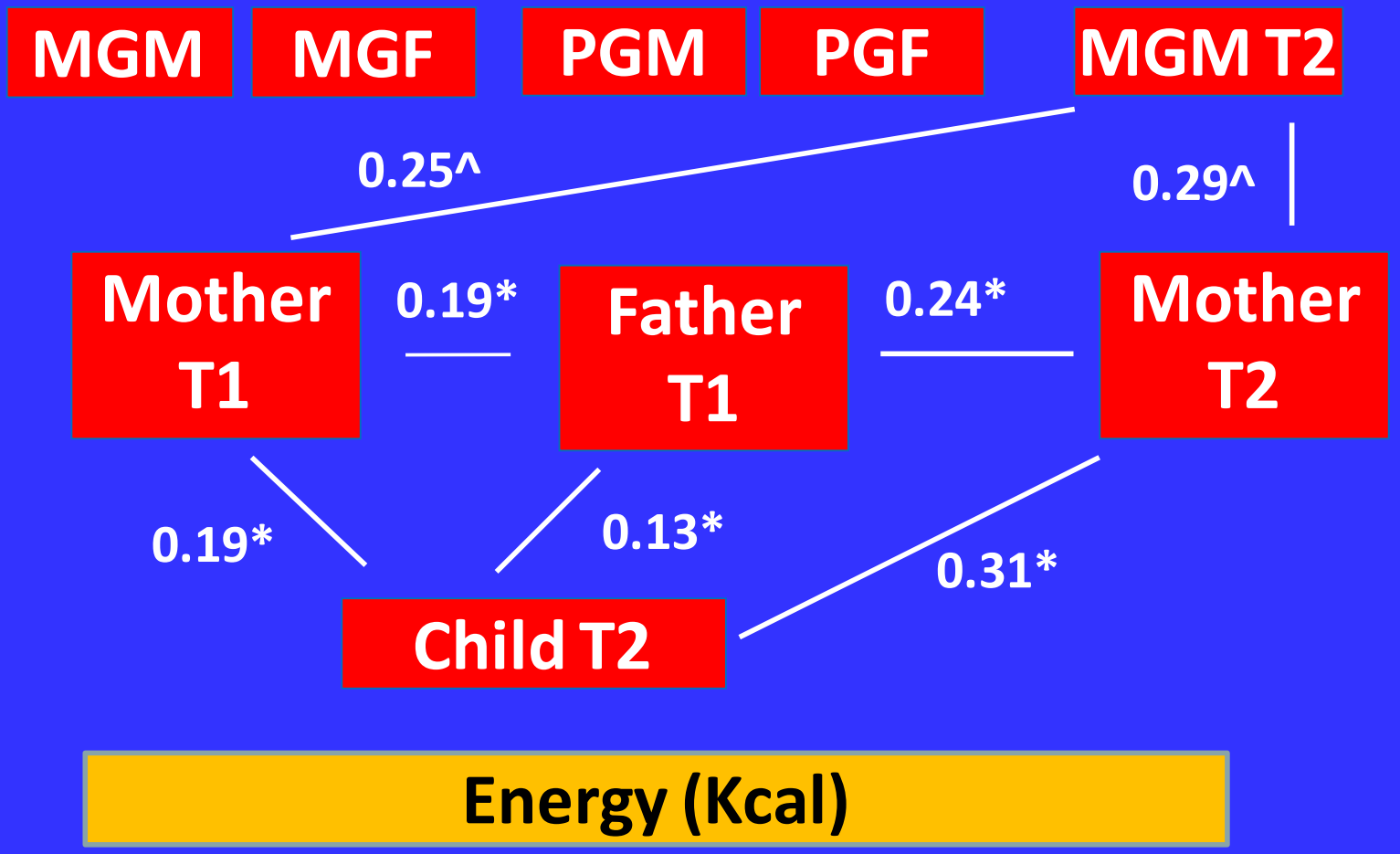


n (dyads)		Child	MT1	MT2	FT1
Child	T2				
Mother	T1	545			
Mother	T2	551			
Father	T1	229	329	234	
MGM	T1		282	181	
MGM	T2		53	37	
MGF	T1		161		
PGM	T1				86
PGF	T1				51

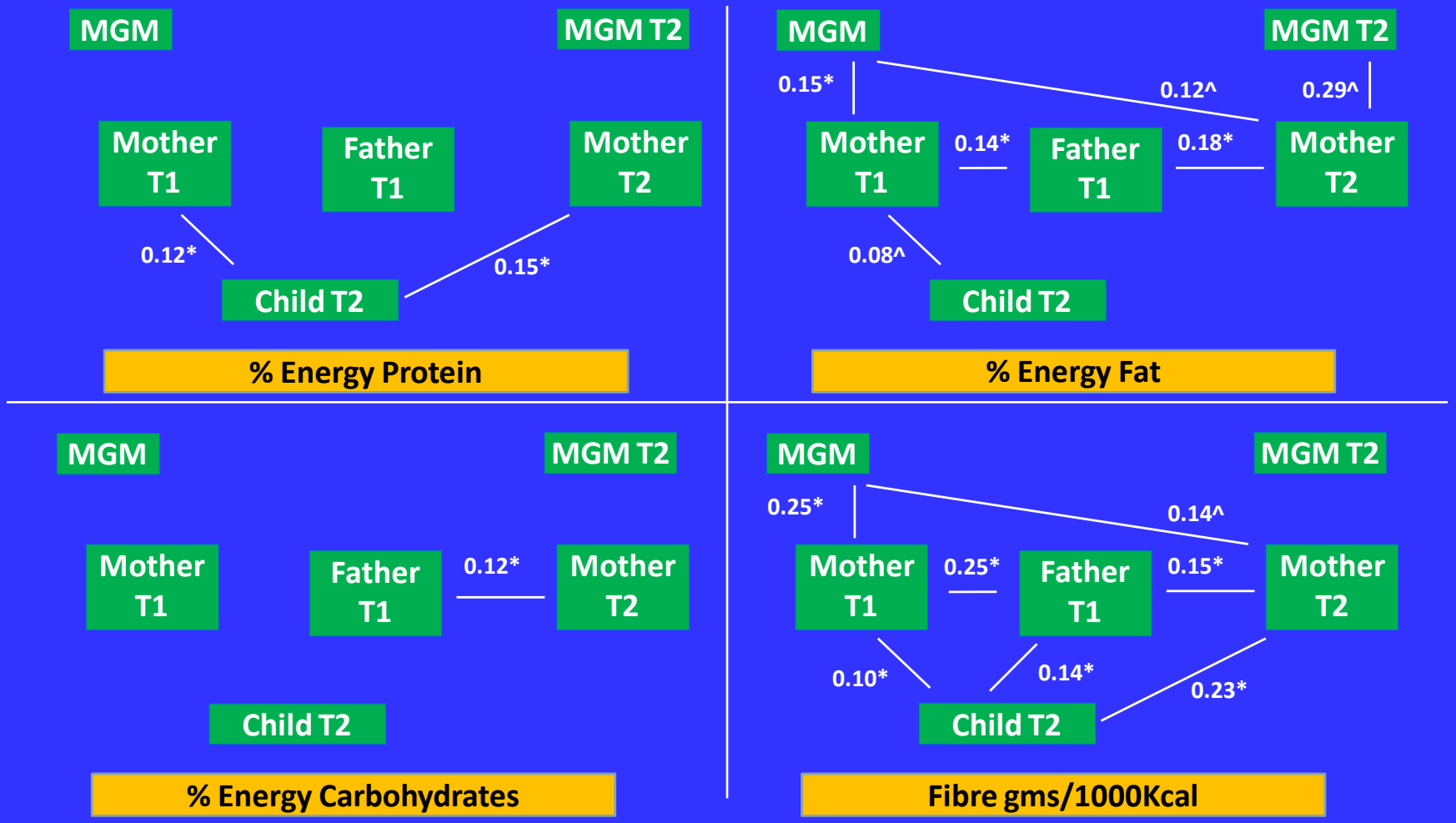
Results

1. Correlations between family pairs

Correlations for Energy between all family dyads

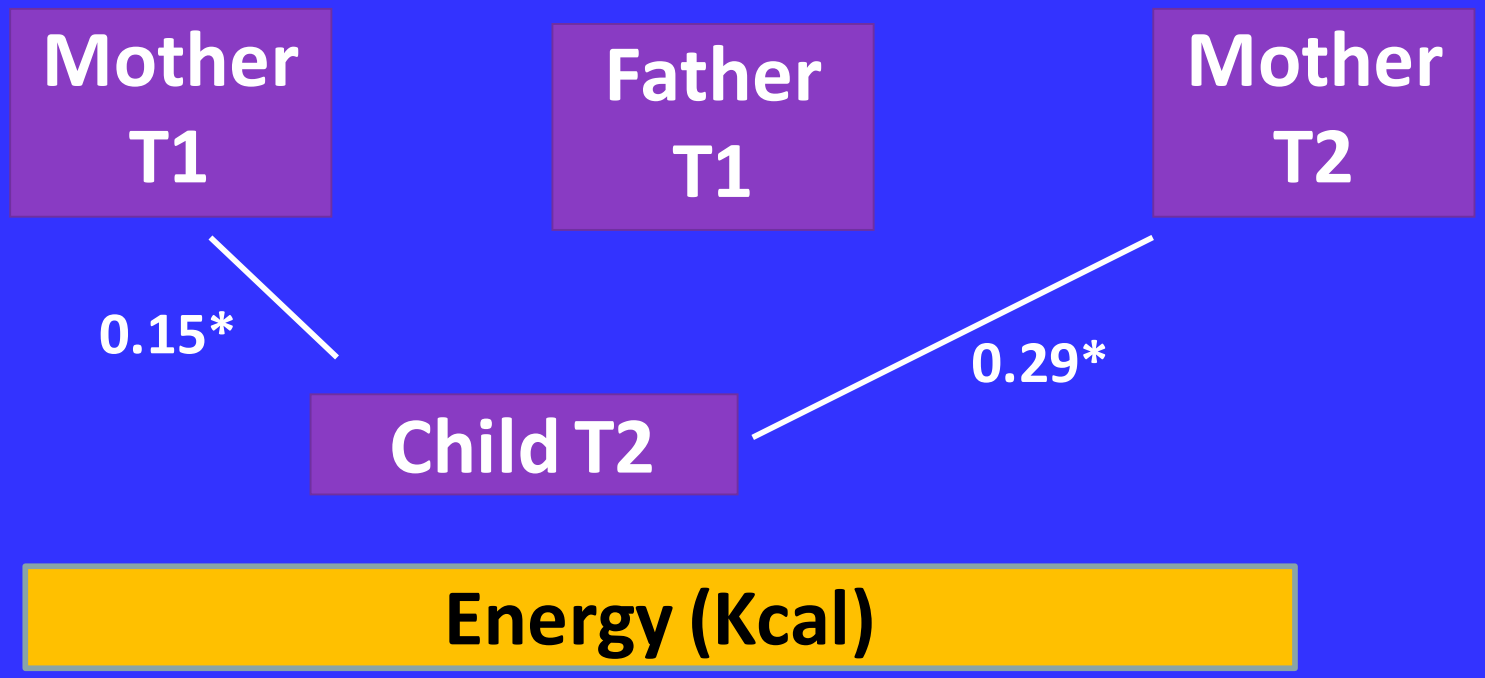


Correlations for Macronutrients MGM-parent-child



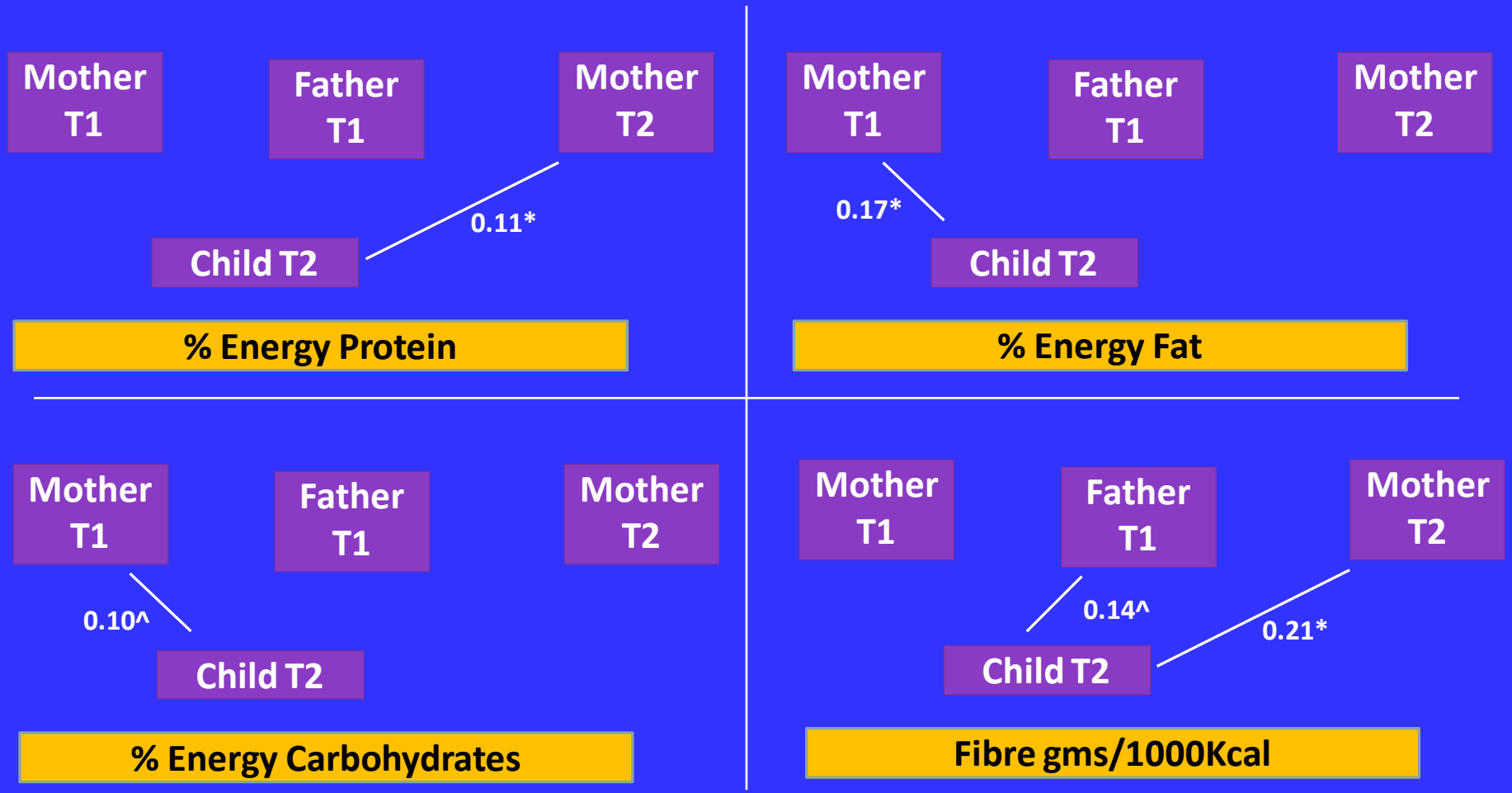
Correlations for Energy between parent-child dyads (Full adjusted Model)†

†Adjusted for children's gender, height, BMI; parents' age, height, BMI, education



Correlations for Macronutrients between parent-child dyads †

†Adjusted for children's gender, height, BMI + energy ; parents' age, height, BMI, education + energy



Results

2. Intra class correlations between family triads

Intraclass correlations between nuclear family triads and extended Maternal vs Paternal family lines

ICC values	NUCLEAR FAMILIES (TRIADS)				EXTENDED FAMILIES		
	Child's Family	Mother's (T1) Family	Mother's (T2) Family	Father's Family	4 Members Maternal Line	4 Members Paternal Line	3 Members Maternal Line
	MT2–FT1 -ChildT2	MGMT1-MGFT1 -MT1	MGMT1-MGFT1 -MT2	PMGMT1-PGFT1 -FT1	MGMT1-MGFT1 -MT2-ChildT2	PGMT1-PGFT1 -FT1-ChildT2	MGMT1-MT2 -ChildT2
N	229	122	85	37	45	26	45
Energy	0.28*	0.08	0.08	NS	0.12*	NS	0.24*
Protein	0.23*	0.11*	0.14*	NS	0.09	NS	0.12
Fat	0.22*	0.09*	0.08	NS	0.09	NS	0.22*
Carbohydrate	0.25*	0.08	0.1	NS	0.12*	NS	0.18*
Fibre	0.26*	0.19*	0.15*	0.13	0.19*	NS	0.27*

*p<0.05

Results

3. Prenatal – Postnatal comparison

Prenatal – Postnatal comparisons : Linear Regression (Energy adjusted Model)

ENERGY ADJUSTED NUTRIENT DENSITIES (N=544)	Std β	Sig
Child's % Energy Proteins		
Mother's Prenatal % Energy Proteins	0.087	0.048*
Mother's Postnatal % Energy Proteins	**0.120**	0.008*
Child's % Energy Fats		
Mother's Prenatal % Energy Fats	***0.077***	***0.10***
Mother's Postnatal % Energy Fats	-0.003	0.96
Child's % Energy Carbohydrates		
Mother's Prenatal % Energy Carbohydrates	0.041	0.34
Mother's Postnatal % Energy Carbohydrates	0.047	0.27
Child's Fibre g/1000kcal		
Mother's Prenatal Fibre g/1000kcal	0.045	0.38
Mother's Postnatal Fibre g/1000kcal	**0.286**	0.000*

*P<0.05

Prenatal – Postnatal comparisons : Linear Regression (Full†‡ adjusted Model)

ADJUSTED FOR MATERNAL AND CHILD CHARACTERISTICS† (N=420)	Std β	Sig
Child's Energy (kcal) ‡		
Mother's Prenatal Energy (kcal)	*0.096*	*0.055*
Mother's Postnatal Energy (kcal)	**0.259**	0.000*
Child's % Energy Proteins		
Mother's Prenatal % Energy Proteins	0.063	0.21
Mother's Postnatal % Energy Proteins	***0.087***	*0.09*
Child's % Energy Fats		
Mother's Prenatal % Energy Fats	**0.158**	0.004*
Mother's Postnatal % Energy Fats	0.011	0.84
Child's % Energy Carbohydrates		
Mother's Prenatal % Energy Carbohydrates	0.072	0.15
Mother's Postnatal % Energy Carbohydrates	0.060	0.22
Child's Fibre g/1000kcal		
Mother's Prenatal Fibre g/1000kcal	0.037	0.56
Mother's Postnatal Fibre g/1000kcal	**0.265**	0.000*
*P<0.05		

†Adjusted for children's gender, height, BMI + energy ; parents' age, height, BMI, education + energy

‡ Energy adjustments not done when analysing associations for energy intake

Conclusions

- Nutrients intake in children's nuclear family correlated, in moderate strengths
- Mother–Child dietary correlations stronger than Father–Child
- Children's current diet correlates better with Mothers' current diet
- Mothers' fat intake during pregnancy may be relevant in determining child's fat intake
- Significant correlations found only in maternal family line, with maternal-grandmothers

- All findings suggestive of maternal environment programming influences on young children's dietary behaviour

Thank you for your attention

Acknowledgements

- Health Research Board, Ireland
- Lifeways Families
- Lifeways Steering Group Committee

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References

1. Carnell, S. & Wardle, J. (2008) Appetite and adiposity in children: evidence for a behavioural susceptibility theory of obesity. *Am J Clin Nutr*, 88, 22-29.
2. Webber, L. Hill, C., Saxton, J., Van Jaarsveld, C.H., & Wardle, J. (2009) Eating behaviour and weight in children. *Int J Obes (London)*, 33, 21-28.
3. Pearson, N., Biddle, S.J., & Gorely, T. (2009) Family correlates of fruit and vegetable consumption in children and adolescents: a systematic review. *Public Health Nutrition*, 12 (2), 267-283.
4. Rasmussen, M., Krolner, R., Klepp, K.I. et al., (2006) Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part 1: Quantitative studies. *Int J Behav Nutr Phys Act*, 3(22).
5. Van der Horst, K., Oenema, A., Ferreira, I. et al., (2007a) A systematic review of environmental correlates of obesity-related dietary behaviours in youth. *Health Educ. Res*. 22(2), 203-226.
6. Wang, Y., Beydoun, M.A., Li., J. et al., (2011) Do children and their parents eat a similar diet? Resemblance in child and paretnal dietary intake: systematic review and meta-analysis. *J. Epidem. Comm Health*, 65(2), 177-189.