



The association between meal choices and mental wellbeing in children

Dr Richard Hayhoe

Senior Lecturer, Public Health, Anglia Ruskin University (ARU)



Norfolk
County Council



So, what is mental wellbeing?



So, what is mental wellbeing?

- Mental wellbeing is a state of realising our own potential and contributing to society, despite the 'ups and downs' of life. It involves the knowledge that we are separate from our problems and the belief that we can handle those problems.
- Mental wellbeing for children and young people can be thought of as:
 - Their happiness, life satisfaction, and positive functioning.

“ Children and young people feeling good, feeling that their life is going well, and feeling able to get on with their daily lives. ”

Why are we interested?

- Mental wellbeing is a significant public health issue.
- Prevalence of low mental wellbeing in children and young people is rising (Pitchforth et al., 2019).
- Reasons for this include:
 - delayed development of autonomy (children living with parents for longer) (Patton et al., 2016);
 - pressures of social media (Bell et al., 2015); and
 - stresses of modern school culture (Lessof et al., 2016).
- There is strong evidence of adolescent mental health problems persisting into adulthood.
 - This leads to poorer life outcomes and achievement (Clark et al., 2007).
- This therefore needs public health attention.

What affects childhood wellbeing?

- Childhood mental wellbeing is complex.
- It is affected by a wide range of factors (Arvidsson et al., 2017):
 - biological and genetic factors,
 - demographic factors and
 - modifiable lifestyle factors.
- Nutrition is a modifiable factor at both an individual and societal level.
 - It is an important influence on health throughout the life course.
 - It is involved in development and normal functioning of the body, and thus has the potential to affect both physical health and mental wellbeing (Firth et al., 2020).
 - Previous research has shown:
 - diets high in saturated fat, refined carbohydrates and processed food products are associated with poorer mental health in children and adolescents (O'Neil et al., 2014); and
 - higher wellbeing is reported by adults with greater fruit and vegetable intake (Stranges et al., 2014).

Aim

- To determine whether the self-reported dietary choices of schoolchildren participating in The Norfolk Children and Young People's Health and Wellbeing Survey were associated with their self-reported mental wellbeing.

Data collection

- Data were collected using a computer-based survey from over 50 schools in Norfolk.
- The survey was offered to all educational establishments for children in years 5– 13.
- Results were received from 30 primary schools and 26 secondary schools and Further Education colleges.
- 10 853 pupils completed the survey (9% of Norfolk primary school children in years 5&6, 22% of secondary pupils and approx. 6% of young people in years 12&13).



Data collection (cont.)

- Age-appropriate questions were used to collect data on:
 - demographics;
 - health and wellbeing;
 - Nutrition;
 - living/home situation; and
 - adverse childhood experiences.
- Mental wellbeing was assessed by age-appropriate validated measures:
 - the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) for secondary-school pupils; and
 - the Stirling Children's Wellbeing Scale (SCWS) for primary school pupils.

Wellbeing assessment

WEMWBS for older children

- Participants indicate how often on a 5-point Likert scale from 1 'none of the time' to 5 'all of the time' that they feel like each of a set of statements.
- The scores for each of the 15 statements is added together to create a total out of 70.

SCWS for younger children

- Consists of a similar set of 12 statements for younger children.
- It is scored using a Likert scale in the same way as WEMWBS (with a total out of 60).

Higher scores on either scale indicates greater mental wellbeing.

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts.
Please tick the box that best describes your experience of each over the last 2 weeks

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)
© NHS Health Scotland, University of Warwick and University of Edinburgh, 2006, all rights reserved.

Statistical analysis

Multivariable regression analysis was used to examine the association between nutritional factors (variables) with wellbeing scores.

- This allowed us to adjust (correct) for other important covariates.
- This gives a better representation of the 'real world' situation rather than the 'raw figures' of wellbeing broken down according to different nutritional intakes.

Statistical analysis (cont.)

Nutrition variables:

Fruit and vegetable consumption, type of breakfast consumed, and type of lunch consumed.

Important covariates:

Nutrition-related covariates: alcohol consumption*, free school meal status and weight satisfaction.

Demographic covariates: age group, gender, sexuality*, ethnicity, deprivation quintile*.

Health covariates: disability or long-term illness status, smoking status*, vaping status*, drug use*.

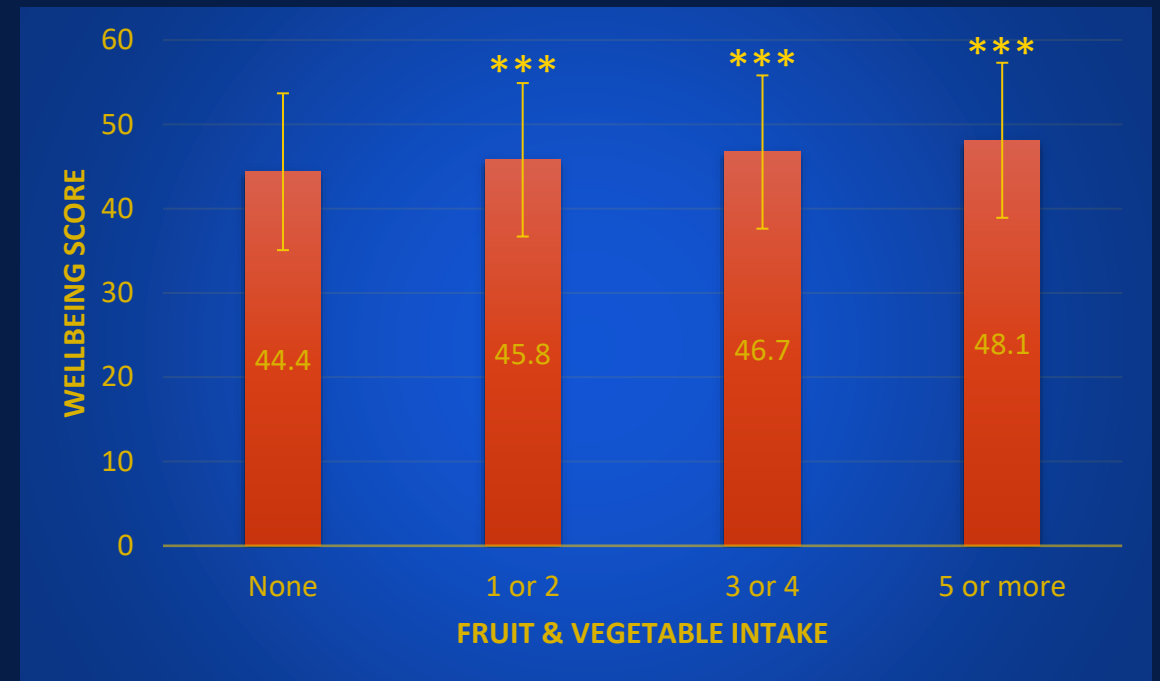
Living/home situation covariates: living situation, own bed/bedroom*, number of hours they provide care to others, parental smoking status.

Adverse experience covariates: whether they feel safe at school*, whether they feel safe at home*, whether they have been bullied, whether they have bullied others, whether they witness arguing or violence at home*.

* Secondary school survey only.

Results (secondary school) – Fruit&Veg

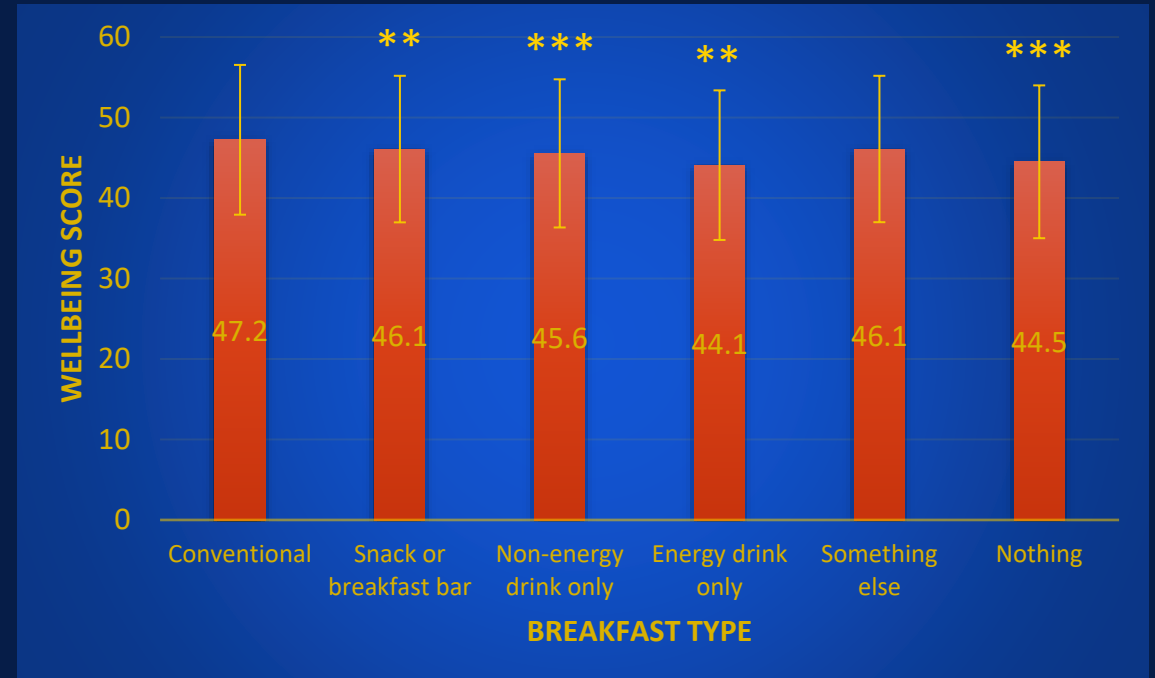
- Wellbeing varied significantly according to Fruit and Vegetable consumption.
- Higher consumption was associated with higher wellbeing scores in a linear fashion.
- The group consuming 5 or more fruits and vegetables per day had a wellbeing score 3.7 units higher than those consuming no fruits or vegetables.
 - This is after adjusting for all the other important covariates. Without the adjustment the figure is 6.6 units.



*** $p < 0.001$ vs None

Results (secondary school) - Breakfast

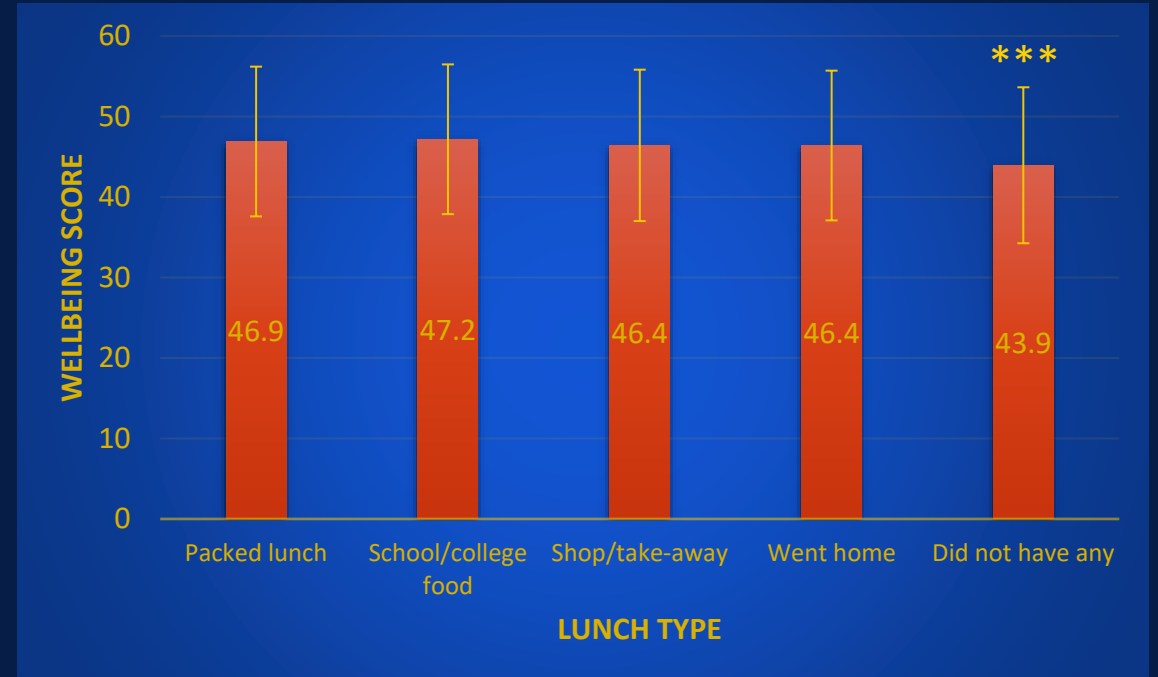
- Wellbeing also varied significantly according to type of breakfast consumed.
- In comparison to those consuming a conventional type breakfast (n=5288) (toast, porridge, cereal, yoghurt, fruit, cooked), children consuming other options tended to have lower wellbeing scores.
 - Only a snack or breakfast bar was associated with wellbeing 1.2 units lower (n=484);
 - Only a non-energy drink was associated with wellbeing 1.7 units lower (n=469)
 - Only an energy drink was associated with wellbeing 3.1 units lower (n=91); and
 - No breakfast was associated with wellbeing 2.7 units lower (n=1129).



*** $p < 0.001$, ** $p < 0.01$ vs conventional

Results (secondary school) - Lunch

- Similarly, lunch consumption was also significantly associated with mental wellbeing.
- Compared with those consuming a packed lunch (n=3744):
 - Similar scores were seen with school/college food (n=2351), food from a shop (n=303), or at home (n=312).
 - Not eating any lunch was associated with wellbeing 3.0 units lower (n=860).



*** p<0.001 vs packed lunch

Results (primary school)

- In primary school multivariable analyses, associations between nutritional variables and mental wellbeing scores were also seen.
- No trends were seen with fruit & veg intake and wellbeing scores.
- Compared with those consuming a conventional type breakfast (n=1083):
 - Consuming only a snack was associated with wellbeing 5.5 units lower (n=27);
 - consuming only a drink was associated with wellbeing 2.7 units lower (n=37); and
 - not eating any breakfast was associated with wellbeing 3.6 units lower (n=90).
- Compared with those consuming a packed lunch (n=840):
 - Eating school food was associated with wellbeing 1.3 units lower (n=371); and
 - having no lunch was associated with wellbeing 6.1 units lower (p=0.006, n=12), although this figure should be interpreted with caution due to the low number of children in this group and possible inaccuracy.

Table 4 Multivariable model for well-being and nutrition in primary school children (n=1253)

Variable type	Variable	Coefficient	Lower 95% CI	Upper 95% CI	P value*
Nutrition	Fruit and veg intake				
	None (ref)	-	-	-	-
	1 or 2	-0.070	-1.742	1.602	0.934
	3 or 4	1.190	-0.482	2.862	0.163
	5 or more	0.960	-0.730	2.651	0.265
	Breakfast				
	Conventional (ref)	-	-	-	-
	Snack	-5.504	-8.402	-2.605	<0.001
	Something else	0.998	-2.745	4.741	0.601
	Just a drink	-2.671	-5.164	-0.178	0.036
	Nothing to eat or drink	-3.616	-5.278	-1.954	<0.001
	Lunch				
	Packed lunch (ref)	-	-	-	-
	School food	-1.272	-2.245	-0.299	0.010
	Takeaway or shop	-2.814	-6.662	1.034	0.152
	Went home for lunch	1.844	-2.000	5.689	0.347
	Did not have any lunch	-6.084	-10.444	-1.725	0.006

It is important to note the limitations of the primary school survey, in particular the self-reporting of answers requiring understanding by young children, and unavailability of some covariates for adjustment, e.g., deprivation scores.

Conclusions

- Higher fruit and vegetable intake and 'healthier' meal choices are associated with higher mental wellbeing scores in Norfolk schoolchildren.
- The associations are strongest in secondary-school children, but trends are apparent even in younger children at primary-school.
- The difference in mental wellbeing between secondary-school children who consumed the most fruits and vegetables compared with the lowest was of a similar scale to those children experiencing daily, or almost daily, arguing or violence at home.
- In a hypothetical class of 30 secondary school children:
 - 4 would have had nothing to eat or drink before starting school in the morning, and
 - 3 would have had nothing to eat or drink before starting classes in the afternoon.

Public health strategies and school policies should be developed to ensure that good quality nutrition is available to all children both before and during school in order to optimise mental wellbeing and empower children to fulfil their full potential.

Thanks to:

- **Norfolk County Council Public Health and the Norfolk Safeguarding Children Board for commissioning the survey;**
- **all the schools and colleges that took part and the children and young people completing the survey;**
- **UEA Medical School and UEA Health and Social Care Partners for funding the analysis, and ARU for continued support in my current post;**

... and thank you for listening.

Team members:

Dr Richard Hayhoe (ARU, previously UEA)

Prof Ailsa Welch (UEA)

Dr Boika Rechel (NCC)

Dr Allan Clark (UEA)

Ms Claire Gummerson (NCC)

Dr SJ Louise Smith (NCC)



Norfolk
County Council



References

- Arvidsson L, Eiben G, Hunsberger M et al. (2017) Bidirectional associations between psychosocial well-being and adherence to healthy dietary guidelines in European children: prospective findings from the IDEFICS study. *BMC Public Health* 17, 926.
- Bell V, Bishop DV, Przybylski AK (2015) The debate over digital technology and young people. *BMJ* 351, h3064.
- Clark C, Rodgers B, Caldwell T et al. (2007) Childhood and adulthood psychological ill health as predictors of midlife affective and anxiety disorders: the 1958 British Birth Cohort. *Arch Gen Psychiatry* 64, 668-678.
- Firth J, Gangwisch JE, Borisini A, et al. (2020) Food and mood: how do diet and nutrition affect mental wellbeing? *BMJ* 369:m2382.
- Lessof C, Ross A, Brind R et al. (2016) Longitudinal Study of Young People in England cohort 2: health and wellbeing at wave 2.
- Patton GC, Sawyer SM, Santelli JS et al. (2016) Our future: a Lancet commission on adolescent health and wellbeing. *Lancet* 387, 2423-2478.
- Pitchforth J, Fahy K, Ford T et al. (2019) Mental health and well-being trends among children and young people in the UK, 1995-2014: analysis of repeated cross-sectional national health surveys. *Psychol Med* 49, 1275-1285.
- Stranges S, Samaraweera PC, Taggart F et al. (2014) Major health-related behaviours and mental well-being in the general population: the Health Survey for England. *BMJ Open* 4, e005878.
- Tennant R, Hiller L, Fishwick R et al. (2007) The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. *Health Qual Life Outcomes* 5, 63.
- O'Neil A, Quirk SE, Housden S et al. (2014) Relationship between diet and mental health in children and adolescents: a systematic review. *Am J Public Health* 104, e31-42.