



**hbSC**

HEALTH BEHAVIOUR IN  
SCHOOL-AGED CHILDREN

WORLD HEALTH ORGANIZATION  
COLLABORATIVE CROSS-NATIONAL STUDY



## The association between markers of diet quality and well-being in adolescents aged 12-18

Catherine Perry [catherine.perry@nuigalway.ie](mailto:catherine.perry@nuigalway.ie), Eimear Keane, Michal Molcho, Colette Kelly, Saoirse Nic Gabhainn



**NUI Galway**  
OÉ Gaillimh



**HPRC**

Health Promotion Research Centre



**An Roinn Sláinte**  
DEPARTMENT OF HEALTH

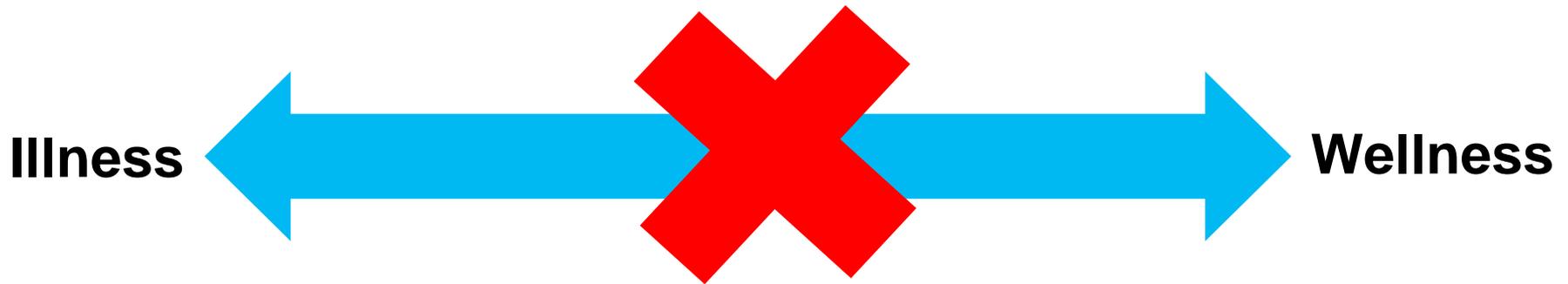
# Overview



- Introduce subjective well-being (SWB)
- Introduce the role of the diet in SWB
- Display the findings
- Discuss the findings
- Receive feedback from you on our analysis approach

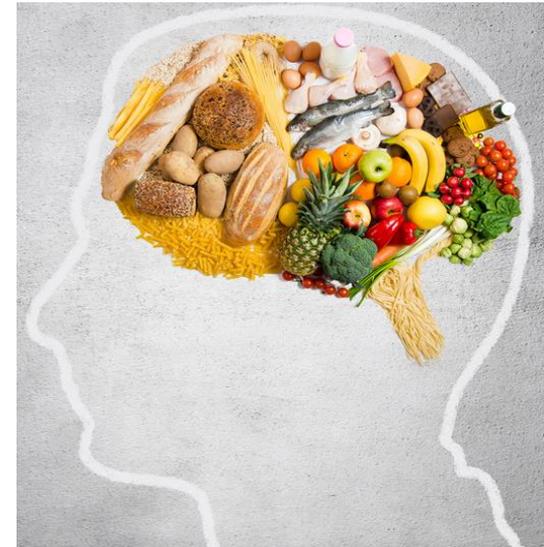
- It has been separated into three main components;
  - **Evaluative element** - life satisfaction or happiness,
  - an **Experiential element** – experiences of positive affect (joy/pride) and low experiences negative affect (pain/worry)
  - **Eudemonic**- well-being, feeling worthwhile, or achieving rewards in life that are independent of pleasure (Stiglitz commission, 2009)

# Introduction to poor well-being



# Diet and well-being

- Literature on correlates of SWB do not discuss the role of the diet
- Adolescents are transitioning to adulthood and attempting to exert their independence.
- As they establish their own identity they begin to experiment with choices that they are in control of, including nutritional intake choices (Kaur et al., 2006).
- Adolescents have been found to increase consumption of sweetened beverages, salty snacks and decrease milk intake (Demory-Luce et al., 2004).
- Associations between food and well-being in children and adolescence has mainly focused on mental ill-health such as depression and anxiety



# Objectives



1. To investigate the associations between markers of healthy and unhealthy diet quality on subjective well-being
2. To investigate the associations between markers of healthy and unhealthy diet quality on negative aspects of well-being using the psychosomatic symptoms checklist
3. To explore the relative contribution of diet to SWB, while controlling for other important co-variates

## Health Behaviour in School-aged Children (HBSC) Study

Two-stage sampling strategy

Random sample of schools across Ireland

RR 230 schools (59%)

Random sample of classes within schools

13,611 pupils participated

RR 84.5%

Self-completed questionnaire

In classroom

paper/pencil

8,995 pupils aged 12-18

# Outcomes and Primary exposure



Subjective well-being was measured using

- The Cantril ladder of life satisfaction
- General health
- Happy with life at present
- Happy with the way you are

National questions, **In general how do you feel about your life at present**, *response options* i) I feel very happy, ii) quite happy, iii) don't feel very happy, iv) I'm not happy at all  
**Thinking about the last week... Have you been happy with the way you are?** *Response options* i) Never, ii) Seldom, iii) Quite often, iv) Very often, v) Always

- A Principal Component Analysis was performed to confirm that these four variables are measuring the same concept
- Cronbach alpha tested internal consistency which was high ( $\alpha=0.71$ )
- General health and happy with life at present were reverse coded and all 4 variables were z-scored. These were then summed to get an overall SWB score. Higher scores indicated higher or better SWB

# Outcomes and Primary exposure contd.



- HBSC symptom checklist, the 8 variables were reverse coded and summed to get an overall scale. Higher scores indicate higher amount of symptoms
- The scale can be conceived as measuring a uni-dimensional latent trait of psychosomatic complaints (Ottova-Jordan et al 2015; Ravens-Sieberer et al, 2008).
- The primary exposure was markers of diet quality 8 food items (fruit, vegetables, fish, sweets, soft drinks, diet soft drinks, crisps, and chips/fried potatoes) were used to create a diet score\*.

	Response Never	< 1/ week	1/ week	2-4 days/ week	5-6 days/ week	Every day/ everyday >1
Healthy Items	0	0.25	1	3	5.5	7
	Fruit		Vegetables		Fish	
Unhealthy Items	7	5.5	3	1	0.25	0
	Sweets	Soft drinks	Diet soft drinks	Crisps	Chips	

Adapted from Vereecken et al, 2005

- Once scored, the items were summed to get an overall diet quality index where higher scores indicated higher diet quality

# Co-variates



## Variable

Socio-demographics	Age
	Gender
	Socio-economic status (highest parental occupation Central Statistics Office classifications)
Family	Social support (MSPSS) Family structure Communication with parents
Peers	Peer social support (MSPSS) Number of friends Bullied
School	Perceived academic performance Liking school Teacher social support
Local area	Good place to live
Lifestyle factors	Physical activity, screen-time and risk behaviour index (smoking, alcohol and sexual behaviour),

- PCA used to confirm SWB concept item
- Cronbach alpha used to test internal reliability
- Descriptive statistics were carried out on the variables of interest. Means and standard deviations for SWB, psychosomatic and dietary quality scores. Percentages were calculated for co-variates.
- Univariate and multivariate linear regression models were used to explore the associations between diet and SWB and diet and psychosomatic symptoms separately
- Stata v 12.0 was used to analyse data

# Results-Unadjusted association between diet and SWB



**Table 1: Relationship between diet quality and subjective well-being**

<b>SWB_zscore</b>	<b><math>\beta</math> (95% CI)</b>	<b>SE</b>	<b>Adj r<sup>2</sup></b>
<b>Diet score (Continuous)</b>	0.06 (0.05 0.07)	0.004	0.03
<b>Diet score quintile 1 (lowest DQ)</b>	1.00 (ref)	0.11	0.03
<b>Quintile 2</b>	0.54 (0.32 0.75)		
<b>Quintile 3</b>	0.71 (0.49 0.92)		
<b>Quintile 4</b>	1.25 (1.04 0.47)		
<b>Quintile 5 (highest DQ)</b>	1.48 (1.26 1.70)		

# Unadjusted association between diet and psychosomatic symptoms



**Table 2: Relationship between diet quality and psychosomatic symptoms**

<b>Psychosomatic symptoms</b>	<b><math>\beta</math> (95% CI)</b>	<b>SE</b>	<b>Adj r<sup>2</sup></b>
<b>Diet score (Continuous)</b>	-0.11 (-0.13 -0.10)	0.008	0.02
<b>Diet score quintile 1 (lowest DQ)</b>	1.00 (ref)	0.24	0.02
<b>Quintile 2</b>	-1.39 (-1.86 -0.91)		
<b>Quintile 3</b>	-1.78 (-2.26 -1.31)		
<b>Quintile 4</b>	-2.71 (-3.19 -2.23)		
<b>Quintile 5 (highest DQ)</b>	-2.65 (-3.13 -2.16)		

# Adjusted relationship between diet quality and SWB



**Table 3: Relationship between diet quality and Subjective-well-being**

	Subjective well-being			Psychosomatic checklist score		
	$\beta$ (95% CI)	SE	Adj $r^2$	$\beta$ (95% CI)	SE	Adj $r^2$
<b>Diet score (unadjusted)</b>	0.06 (0.05 0.07)	0.004	0.03	-0.11 (-0.13 -0.10)	0.008	0.02
<b>+ socio-demographics</b>	0.06 (0.05 0.07)	0.004	0.12	-0.12 (-0.14 -0.10)	0.009	0.13
<b>+ family factors</b>	0.05 (0.04 0.05)	0.004	0.27	-0.09 (-0.11 -0.07)	0.009	0.23
<b>+ peer factors</b>	0.04 (0.03 0.05)	0.004	0.34	-0.08 (-0.09 -0.06)	0.009	0.31
<b>+ school factors</b>	0.03 (0.02 0.03)	0.004	0.43	-0.06 (-0.08 -0.05)	0.008	0.39
<b>+ local area factors</b>	0.02 (0.02 0.03)	0.004	0.45	-0.06 (-0.07 -0.04)	0.008	0.40
<b>+ lifestyle factors</b>	0.02 (0.01 0.03)	0.004	0.46	-0.04 (-0.04 -0.03)	0.009	0.41

# Fully adjusted association between diet quality and SWB



**Table 4: Adjusted relationship between diet quality and subjective well-being**

SWB_zscore	$\beta$ (95% CI)	SE	Adj r <sup>2</sup>
Diet score quintile 1 (lowest DQ)	1.00 (ref)		0.46
Quintile 2	0.09 (-0.11 0.29)	0.10	
Quintile 3	0.16 (-0.05 0.37)	0.11	
Quintile 4	0.37 (0.16 0.58)	0.11	
Quintile 5 (highest DQ)	0.50 (0.28 0.71)	0.11	

Adjusted for age, gender, parental occupation, family structure, communication and support, peer quantity and quality, being bullied, school teacher support, academic performance and pressure from school work, lifestyle factors (physical activity, screen-time, smoking, alcohol and sexual health behaviours)

# Discussion



- Comparing the quintiles of the diet score showed that after adjustments those with the highest/best diets (quintile 4 and quintiles 5) had higher SWB scores and lower psychosomatic symptoms score
- With a comprehensive number of important co-variables the effect of diet on both subjective well-being and psychosomatic symptoms cannot be modelled away
- The lifestyle co-variables as well as diet explain a low proportion of the variation in both SWB and psychosomatic symptoms, however other co-variables had more items to explain their concept
- It is likely that the effect of diet on overall well-being is underestimated and a more robust dietary assessment may explain more variation in SWB and psychosomatic symptoms.

# Strengths & limitations



- Adolescents answered the questionnaire in their classroom and not in a lab setting...natural everyday environment
- The population was a large nationally representative sample of adolescents aged 12-18
- The adolescents self-reported answers to the subjective well-being measures instead of parents as proxy respondents
- Personality was not assessed and this is a known correlate with SWB
- Food consumption was only based on a select few food groups, though these items have been shown to be good markers of diet quality a more comprehensive dietary assessment may have shown stronger associations
- Frequency rather than quantity of consumption was assessed therefore a dose-response relationship was not possible to explore
- Social desirability bias may have occurred with adolescents over-estimating healthy food items and under-estimating unhealthy food items

# Conclusion



- Diet is associated with subjective well-being & psychosomatic symptoms in adolescents.
- Health promotion messages targeting children and adolescents should continue to educate about the benefits of eating a healthy diet for physical health but also should advocate a healthy diet for mental health.