

Should Height be Added to the Well -Being Indicators ?

Evidence using GUI

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Lit Review: Height as a Predictor of Well -Being



- ❖ Academics focus on genetic and environmental determinants of height (often integrated)
- ❖ Debate as to how salient genetic endowment is in height determination
 - Wingerd and Schoen (1974) estimate parental height can predict their child's height up to 88.6%, while other factors account for just 11.4%.
- ❖ However, most academics agree that it is a combination of both genetic and environmental (socioeconomic) factors that effect height and growth velocity



Lit Review: Height as a Predictor of Well -Being



- ❖ Studies have found that poverty, income inequality, adverse conditions at the societal and individual level (such as ACE's), as well as psychosocial stress can result in smaller

stature/stunting

(De Onis & Branca, 2016; Bird *et al.* , 2019; Denholm *et al.* , 2013; Abajobir *et al.* , 2017; Wilkinson & Pickett 2009; Pickett &

Wilkinson, 2015)

- ❖ Sufficient nutritional and caloric intake in children can affect height (Goldstein, 1971; Headey *et al.* , 2018;

Graham *et al.* , 1981; Kim *et al.* , 2021; Morency *et al.* , 2017; Griffen, 2016)

- Dairy, meat and egg consumption: positive growth ^
- Increased calorie consumption correlated with taller stature



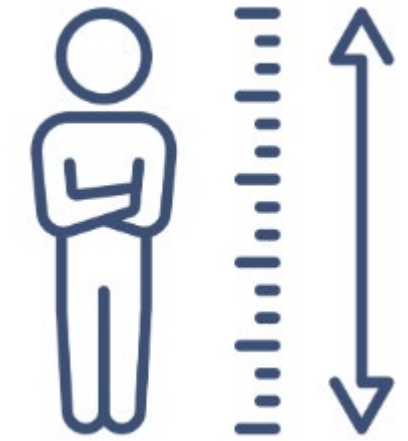
Lit Review: Height as a Predictor of Well -Being



- ❖ Educational attainment (Galobardes *et al.* , 2012; McCrory *et al.* . 2017)
 - Mothers with higher education have been shown to have taller children
- ❖ Substance usage, especially smoking, enacts a toll on child stature (Berkey *et al.*, 1984)
 - Maternal smoking, in particular, can result in smaller children
 - Koshy *et al.* (2010) argue that short stature in children is 2 -4 times more likely in cases of maternal smoking
- ❖ Ethnicity (Li & Pearce, 2016; Mittal *et al.* , 2022)
 - Differences in height determination due to both genetic and environmental factors
- ❖ Geography: rural vs urban divide in wealthy and developing nations (Young & Visser, 2023; Zhang *et al.*, 2019)



Background: Significance



- ❖ Height is a sensitive indicator of overall long-term health and well-being
- ❖ Taller individuals (Bozzoli *et al.* 2007; Griffen, 2016; Alacevich & Tarozzi 2017; Deaton, 2007)
 - Earn more, enjoy greater labour productivity, are better educated, and more likely to occupy higher social classes
- ❖ Stunted individuals (Bird *et al.*, 2019; Bozzoli *et al.* , 2007; Schneider, 2025; Alacevich & Tarozzi, 2017; Deaton, 2007; Griffen, 2016; Xiong *et al.* , 2023; Zhang *et al.*, 2019; De Onis & Branca, 2016)
 - Higher rates of morbidity/mortality, poorer cognitive/motor development, and higher rates of chronic disease
- ❖ Height is not a negligible factor — it has enduring consequences and is central to human well-being.



International Comparison



❖ Where does Ireland sit in the height rankings internationally?

Country	Male Height (Age 19)	Female Height (Age 19)	Male Height (Age 5)	Female Height (Age 5)	UNICEF Rank	OECD Income Inequality	OECD Wealth Concentration
Ireland	22–25th (179 cm)	44 –48th (164.5 cm)	50–66th (114.7 cm)	50–57th (113.6 cm)	5	14	13
United Kingdom	28–39th (178.2 cm)	42–49th (163.9 cm)	69–102nd (112.5 cm)	69–96th (111.7 cm)	21	31	26
New Zealand	15–41st (177.7 cm)	23–41st (164.7 cm)	43–76th (114.2 cm)	36–71st (113.1 cm)	32	24	17
United States	36–47th (176.9 cm)	38–58th (163.3 cm)	44 –84th (113.7 cm)	54–64th (113.3 cm)	—	33	27
Australia	21–29th (178.8 cm)	34–40th (164.7 cm)	50–58th (115.8 cm)	50–56th (113.9 cm)	—	21	21
Netherlands	1–2nd (183.8 cm)	1st (170.4 cm)	4–6th (119.6 cm)	2–3rd (118.4 cm)	1	16	16
Slovenia	10–12th (181 cm)	13–14th (167.2 cm)	13–17th (118.5 cm)	5th (118.1 cm)	13	2	2

Data Sources: International data is based on global height rankings published in the Lancet by the NCD Risk Factor Collaboration (2020).

UNICEF child well-being data (Innocenti Report Card 19, 2025)

OECD data examining income inequality and wealth concentration (Society at a Glance, 2024)



International Comparison



- ❖ Height is inextricably linked to general societal and child well-being in a given country
- ❖ Societies with weaker child well-being scores and relative societal inequality have shorter stature
- ❖ Societies with stronger child well-being scores and more equal societies emerge as taller
- ❖ Ireland stands up quite well internationally
 - Doing better than the United Kingdom, New Zealand, and the United States
 - But worse than the Netherlands, Slovenia and Australia (despite Australia's poorer scores)
- ❖ This suggests we still have room for improvement

Comparative Irish Data on Child Height

- ❖ Various surveys which have collected anthropometric measurements for both children and adults in Ireland
 - Many of these surveys predominantly focused on nutrition, food and obesity respectively
- ❖ These surveys provide useful comparative insights in that we can track the approximate growth trajectory of Irish children into adults, as well as the growth distribution of Irish children
- ❖ The accumulation of this data presents a comprehensive overview of what we know about the height of the Irish population

Irish Sources of Height Data
National Pre-School Nutrition Survey
Health Behaviour in School-aged Children Study
National Children's Food Survey
National Teen's Food Survey
National Adult Nutrition Survey
Childhood Obesity Surveillance Initiative

• *Full table of Irish sources of data will be included in the appendix for further reference*

Objectives/Research Questions

1. How tall are Irish children (using GUI data)?
2. What are the salient determinants of height regarding Irish children?
3. Should height be considered a well-being measure in Ireland?



Methodology

- ❖ The Growing up in Ireland survey is longitudinal study which endeavours to investigate the heterogeneous factors that contribute to the well-being of children
- ❖ Focus: 2008 cohort (otherwise known as the infant cohort)
- ❖ I utilised the first three waves of cohort '08
 - Wave 1: 11,134 9-month -old infants, conducted between September 2008 -April 2009
 - Wave 2: 9,793 3 -year -olds, conducted between December 2010 -July 2011
 - Wave 3: 9,001 5 -year -olds, conducted between March -September 2013
- ❖ AMF data processed using SPSS version 29



Methodology

- ❖ Height measurements were obtained from both parents (mother and father), and the study child in each wave

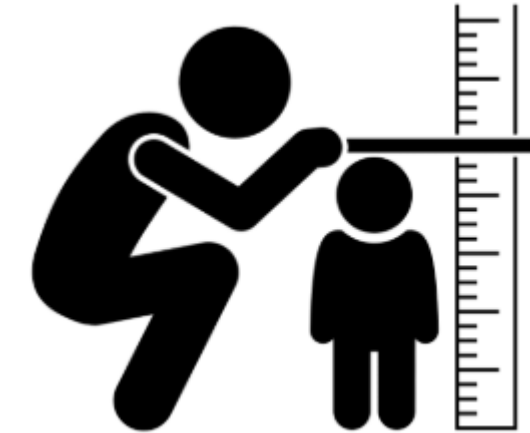
- ❖ Length measurements also reported for the study child at birth

- ❖ How height was measured:

- Adult height measurements were administered utilising the Leicester portable height measure

- The length of the 9-month-old study child was collected using the SECA 210 measuring mat

- For waves 2 and 3 the Leicester measure stick was used to collect the upright height of the children



Results:

Descriptive Statistics

Wave of GUI survey	Wave 1 (Newborn) 2008 -09	Wave 1 (9 Months) 2008 -09	Wave 2 (3 Years) 2011	Wave 3 (5 years) 2013-14
Average Height (both sexes) in cm	50.7	73.2	96.4	111.7
Average Male in cm	51.2	74.0	97.0	112.0
Average Female in cm	50.2	72.2	95.8	111.2
Median Height (both sexes) in cm	52.0	73.0	96.4	112.0
Height of Bottom 10%	46.0	69.5	91.5	106.0
Height of Top 90%	56.0	77.0	101.5	118.0

n=4 0 17

*Missing values excluded

Results:

Descriptive Statistics

- ❖ As the genetic component of height determination is dominant, the parental height statistics were analysed for parents in the GUI survey

Wave of GUI survey	Wave 1 (Self - reported)	Wave 1 (Measured)	Wave 2	Wave 3
Mother (Average in cm)	164.2	163.8	163.8	163.9
Father (Average in cm)	178.0	177.4	177.7	177.6



Multivariate Analysis: Linear Regression

Variables	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7
Mother Height	(+) ^{***}	(+) ^{***}	(+) ^{***}	(+) ^{***}	(+) ^{***}	(+) ^{**}	(+) ^{***}
Father Height	(+) ^{***}	(+) ^{***}	(+) ^{***}	(+) ^{***}	(+) ^{***}	(+) ^{***}	(+) ^{***}
Household Income		/	/	/	/	/	/
Mother Education		/	/	/	/	/	/
Father Education		(-) ^{**}	(-) ^{**}	(-) ^{**}	(-) [*]	(-) ^{**}	(-) ^{***}
Dairy and Eggs			(+) ^{***}	(+) [*]	/	/	/
Meat			/	(-) ^{**}	/	/	/
Vegetables			/	/	/	/	/
Fruit			/	(-) ^{**}	(-) ^{***}	/	/
Sweets and Desserts			/	(+) [*]	(+) [*]	(+) ^{***}	(+) ^{***}
Fried Food			/	/	/	/	/
Carbonated/Flavoured Drinks			/	/	/	(-) ^{**}	(-) ^{**}
Carbohydrates			(+) ^{***}	(+) ^{***}	(+) ^{**}	/	/
Child has Asthma				/	/	/	/
Child Good Health				/	/	/	/
Child Poor Health				/	/	/	/
Mother Smoking					/	(-) ^{***}	(-) ^{***}
Father Smoking					/	/	/
Mother Alcohol Consumption					/	/	/
Father Alcohol Consumption					/	/	/
Length at 9 Months						(+) ^{***}	(+) ^{***}
Height at 3 Years						(+) ^{***}	(+) ^{***}
Weight at Birth							(-) ^{***}
Child Weight at 3							(+) ^{***}
	r ² = .225	r ² = .229	r ² = .238	r ² = .214	r ² = .195	r ² = .782	r ² = .790

Appendix
90% Confidence Level - 0.10 *
95% Confidence Level - 0.05**
99% Confidence Level - 0.01***
(+) is positive association with height
(-) if negative association with height
/ If insignificant



NCD Global Data vs. GUI data Advertised?

— Smaller than



Wave of GUI survey	Wave 3 (5 years) 2013-14
Average Height (both sexes) in cm	111.67
Average Male in cm	112.08
Average Female in cm	111.20

n=4017

* Censored Data Excluded

NCD Risk Height Data for Ireland 1998-2016	5 years of age
Average Male in cm	114.7
Average Female in cm	113.6

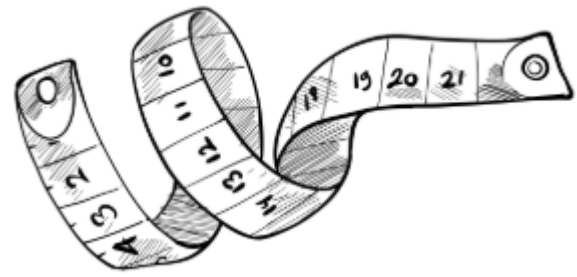
n=13,759



Recommendations and Policy Implications



- ❖ Height has shown its utility as a general indicator of well-being in populations globally
- ❖ It reflects cumulative outcomes of nutrition, health care, and living conditions — particularly during critical developmental windows such as early childhood
- ❖ Height tells us who has already been marked by early disadvantage — disadvantage that becomes written into children's bodies during their formative years/in utero
- ❖ This may complicate data collection and prompt us to reflect upon what we are measuring
- ❖ Internationally Ireland has room for improvement in our height metrics. We can learn from higher performing countries regarding potential models of interventions which target child well-being and societal equality — these could include maternal health outcomes, early childhood interventions, or broader social policies supporting families



Recommendations and Policy Implications

- ❖ Ireland lacks a systematic, population-level surveillance mechanism for tracking child height and other anthropometric indicators over time (BMI is monitored, but height, a constituent element of BMI calculation, is often under-reported)
- ❖ Without consistent measurement protocols, national benchmarking and disaggregated reporting, it is difficult to understand trends and emerging problems or evaluate early years policies
- ❖ Although Ireland falls short internationally, evidence does not suggest pronounced ethnic or class disparities in child height (this needs to be monitored)
- ❖ This may indicate a relatively equitable distribution of early life outcomes



Recommendations and Policy Implications

- ❖ So, should height be added to Ireland's well-being indicators?
 - The answer is a tentative not yet, but it holds significant promise
- ❖ With frequent measurement longitudinally, as well as more granular data, disaggregated by socioeconomic status, ethnicity, and region, height warrants **serious** consideration to be included in the well-being indicators
- ❖ Policymakers should consider implementing systematic, standardised height measurement at 5 years of age in annual national surveys



THANK YOU

For your attention

Any suggestions or feedback would be greatly appreciated!
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Supplementary Appendix

1. Irish Sources of Height Data (comprehensive table)
2. Raw Linear Regression Data

Survey	Year	Age	Sex	Cases	Mean Height (cm)	Median Height (cm)	Min Height	Max Height	Interquartile	Standard Deviation
NPNS	2010-11	1	Both	124	82.5	NA	74.8 (5th percentile)	90.0 (95th percentile)	NA	1.7
NPNS	2010-11	2	Both	122	91.1	NA	82.6 (5th percentile)	99.7 (95th percentile)	NA	5.2
NPNS	2010-11	3	Both	126	99.2	NA	92.6 (5th percentile)	108.1 (95th percentile)	NA	4.7
NPNS	2010-11	4	Both	123	104.7	NA	95.6 (5th percentile)	112.3 (95th percentile)	NA	4.9
HBSC	2014	9	Male	142	140.88	NA	100	200	NA	15.48
HBSC	2014	10	Male	183	146.83	NA	100	200	NA	14.02
HBSC	2014	11	Male	206	150.19	NA	104.14	190	NA	11.92
HBSC	2014	12	Male	251	156.46	NA	104.14	190	NA	11.01
HBSC	2014	13	Male	302	163.53	NA	129.54	200	NA	11.13
HBSC	2014	14	Male	377	170.6	NA	121.92	198.12	NA	11.08
HBSC	2014	15	Male	415	176.03	NA	101.6	200	NA	9.6
HBSC	2014	16	Male	464	178.12	NA	121.92	200	NA	8.62
HBSC	2014	17	Male	297	179.95	NA	149.86	198.12	NA	7.04
HBSC	2014	18	Male	44	178.87	NA	167	193.04	NA	6.92
HBSC	2014	9	Female	98	138.93	NA	101.6	190	NA	12.95
HBSC	2014	10	Female	197	142.64	NA	100	200	NA	15.46
HBSC	2014	11	Female	228	150.66	NA	104.14	200	NA	14.25
HBSC	2014	12	Female	290	156.03	NA	121.92	193.04	NA	9.83
HBSC	2014	13	Female	440	160.74	NA	107	196	NA	10.26
HBSC	2014	14	Female	488	162.66	NA	121.92	193.04	NA	9.07
HBSC	2014	15	Female	641	164.99	NA	106.68	185.42	NA	8.3
HBSC	2014	16	Female	635	165.4	NA	142.24	187.96	NA	7.36

HBSC	2014	17	Female	361	165.47	NA	108	193.04	NA	9.14
HBSC	2014	18	Female	40	166.74	NA	154.94	195.58	NA	8.62
NCFS II	2017-18	05-08 Years	Both	296	122	NA	108(5th percentile)	138 (95th percentile)	NA	8.8
NCFS II	2017-18	9-12 Years	Both	300	145	NA	129 (5th percentile)	164 (95th percentile)	NA	10
NCFS II	2017-18	05-12 Years	Male	298	135	NA	111 (5th percentile)	158 (95th percentile)	NA	14.7
NCFS II	2017-18	05-12 Years	Female	298	134	NA	113 (5th percentile)	157 (95th percentile)	NA	14.8
NTFS II	2019-20	13-18 Years	Both	426	167	NA	NA	NA	NA	8.8
NTFS II	2019-20	13-18 Years	Male	211	172	NA	NA	NA	NA	8.4
NTFS II	2019-20	13-18 Years	Female	215	163	NA	NA	NA	NA	6.5
NANS II	2021-22	19-64 Years	Both	716	171	172	NA	NA	NA	0.1
NANS II	2021-22	Over 65 Years	Both	282	167	167	NA	NA	NA	0.1
NANS II	2021-22	19-64 Years	Male	346	179	179	NA	NA	NA	0.07
NANS II	2021-22	Over 65 Years	Male	142	174	174	NA	NA	NA	0.08
NANS II	2021-22	19-64 Years	Female	370	165	165	NA	NA	NA	0.08
NANS II	2021-22	Over 65 Years	Female	140	160	160	NA	NA	NA	0.07
COSI (Round 6)	2022-23	70-75 Months	Both	7	NA	121.3	117.0 (p.25)	124.6 (p. 75)	7.6	NA

COSI (Round 6)	2022- 23	76-81 Months	Both	160	NA	121.9	118.7	125.8	7.1	NA
COSI (Round 6)	2022- 23	82-87 Months	Both	592	NA	124.6	121.1	128.1	7	NA
COSI (Round 6)	2022- 23	88-93 Months	Both	659	NA	126.5	123.2	130.8	7.6	NA
COSI (Round 6)	2022- 23	94-99 Months	Both	640	NA	130.1	126.2	134	7.8	NA
COSI (Round 6)	2022- 23	100- 105 Months	Both	501	NA	132.6	128.4	136.4	8	NA
COSI (Round 6)	2022- 23	106- 111 Months	Both	51	NA	132.9	129.2	136.8	7.6	NA
COSI (Round 6)	2022- 23	112- 117 Months	Both	4	NA	134	127.8	137.7	9.5	NA
COSI (Round 6)	2022- 23	118- 123 Months	Both	22	NA	146.6	142.3	154.9	12.6	NA
COSI (Round 6)	2022- 23	124- 129 Months	Both	234	NA	144.7	140.9	150.2	9.3	NA
COSI (Round 6)	2022- 23	130- 135 Months	Both	622	NA	147.7	142.9	152.6	9.7	NA
COSI (Round 6)	2022- 23	136- 141 Months	Both	648	NA	150.2	145.9	155.6	9.7	NA
COSI (Round 6)	2022- 23	142- 147 Months	Both	633	NA	153.9	148.8	158.8	10	NA
COSI (Round 6)	2022- 23	148- 153 Months	Both	376	NA	155.5	150.5	160.8	10.3	NA
COSI (Round 6)	2022- 23	154- 159 Months	Both	21	NA	158	152.4	164.7	12.3	NA

Variables	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7
Mother Height	<.001	<.001	<.001	<.001	<.001	0.012	0.003
Father Height	<.001	<.001	<.001	<.001	<.001	0.002	<.001
Household Income		0.501	0.496	0.687	0.226	0.93	0.983
Mother Education		0.638	0.426	0.94	0.43	0.62	0.604
Father Education		0.021	0.019	0.017	0.071	0.014	0.005
Dairy and Eggs			0.001	0.071	0.201	0.989	0.812
Meat			0.808	0.037	0.101	0.939	0.816
Vegetables			0.602	0.624	0.172	0.528	0.827
Fruit			0.568	0.039	0.01	0.256	0.464
Sweets and Desserts			0.565	0.086	0.091	0.005	0.004
Fried Food			0.531	0.948	0.99	0.954	0.907
Carbonated/Flavoured Drinks			0.84	0.119	0.139	0.049	0.047
Carbohydrates			<.001	0.003	0.011	0.125	0.079
Child has Asthma				0.162	0.33	0.843	0.681
Child Good Health				0.245	0.373	0.569	0.537
Child Poor Health				0.719	0.943	0.542	0.701
Mother Smoking					0.233	0.002	0.006
Father Smoking					0.818	0.819	0.58
Mother Alcohol Consumption					0.387	0.817	0.658
Father Alcohol Consumption					0.223	0.208	0.183
Length at 9 Months						0.005	0.001
Height at 3 Years						<.001	<.001
Weight at Birth							0.003
Child Weight at 3							0.001
	r ² = .225	r ² = .229	r ² = .238	r ² = .214	r ² = .195	r ² = .782	r ² = .790

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