S·H·E
Schools for Health in Europe

GENERALITAT VALENCIANA
Conselleria d'Educació, Investigació, Cultura i Esport

The effect of school time organization in the wellbeing of children and youth.

Daniel Gabaldón-Estevan | Online 28/10/2020
Department of Sociology and Social Anthropology, Faculty of Social Sciences, University of Valencia- Valencia (ES) - Daniel.Gabaldon@uv.es

ANALYTICAL SOCIOLOGY LAB Edu

GV/2019/002 Project TIME [Time in childhood: a mapping of Spain]

VNIVERSITAT DE VALÈNCIA Facultat de Ciències Socials

TALLINN UNIVERSITY

Why am I here?

Where am I now?

Where am I going?

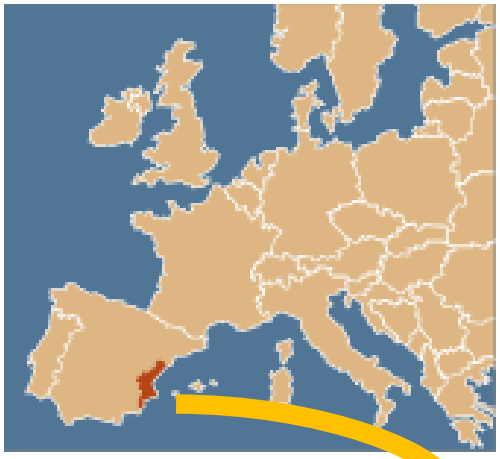
Would you join me?

Why am I here?

Where am I now?

Where am I going?

Would you join me?



Official		Extended	Compacted
8:00	8:30		
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12:30	13:00	Lunch	
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14:30	15:00		Lunch
15:00	15:30		
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Castelló
58 (31%)

València
231 (31%)

Alacant
365 (74’8%)

Why am I here?

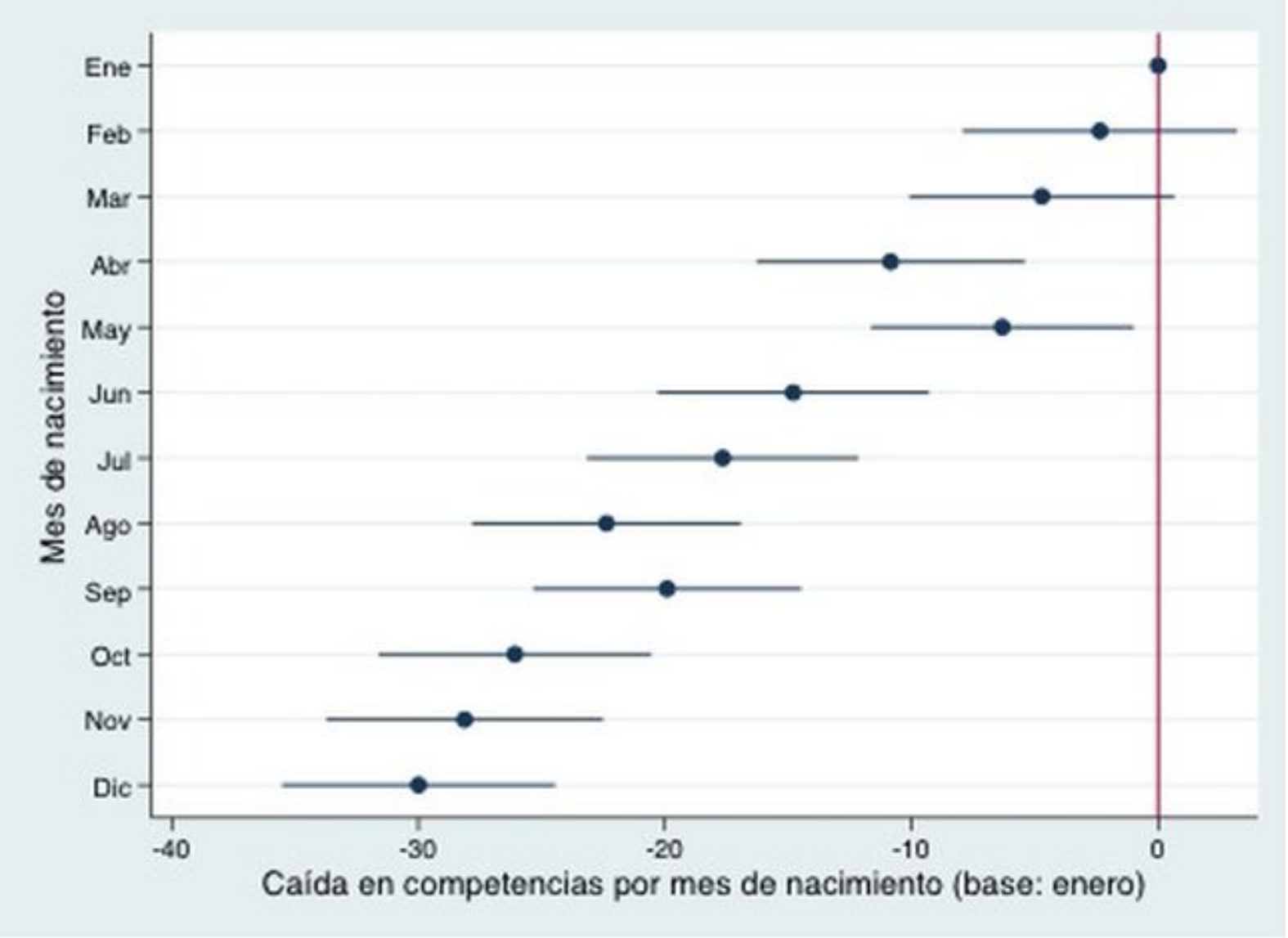
Where am I now?

Where am I going?

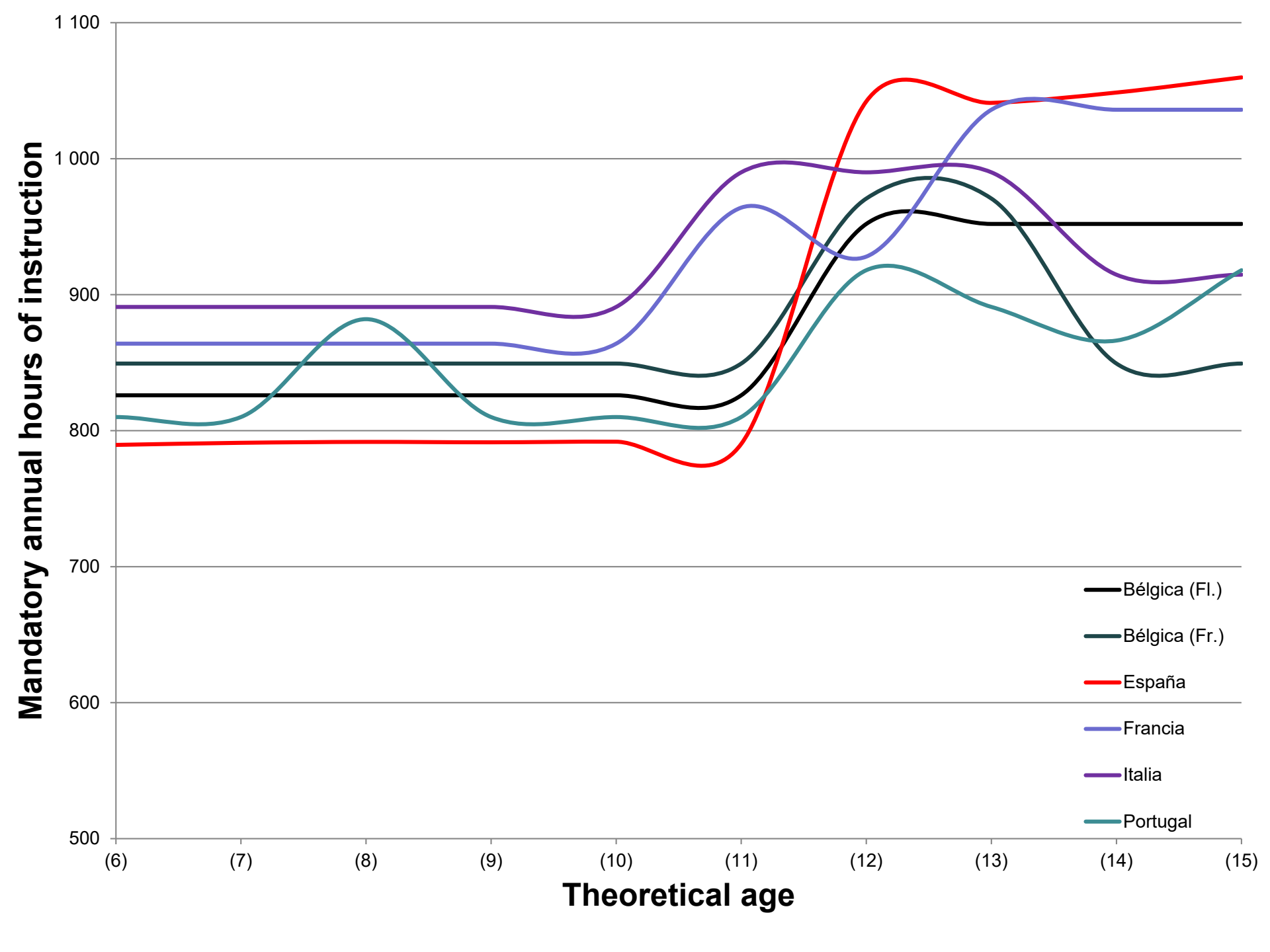
Would you join me?

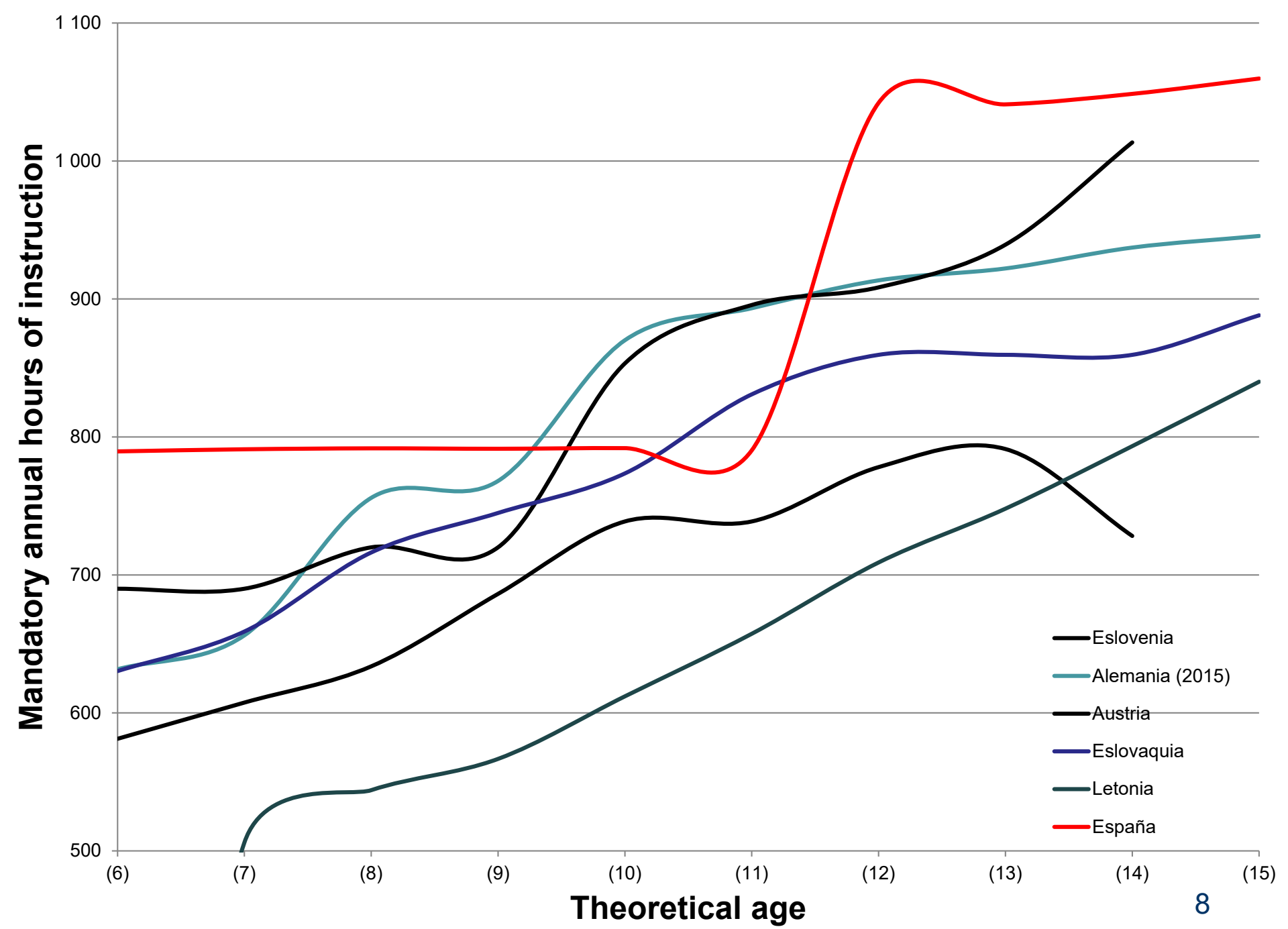
Age matter

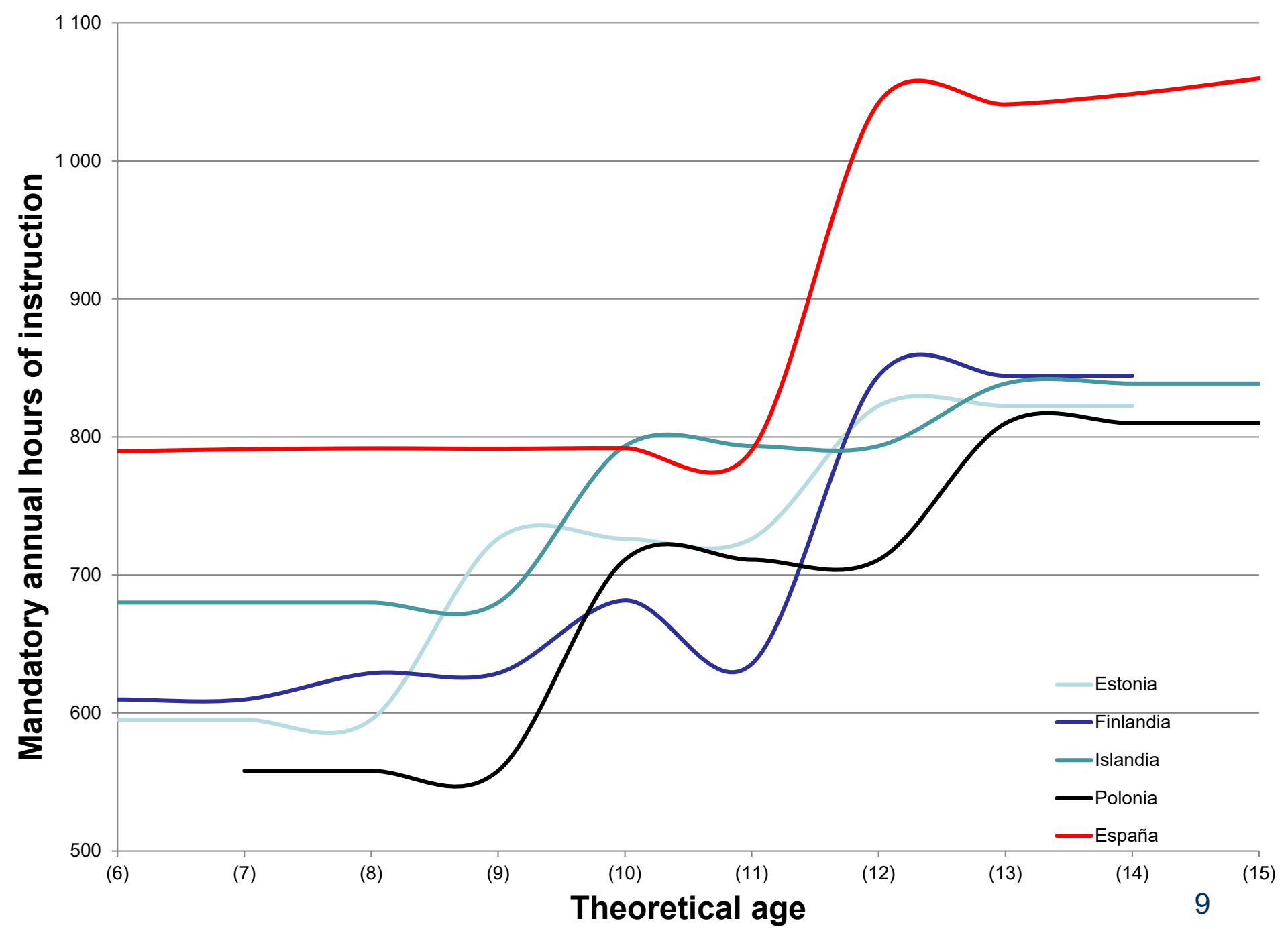
Distance in the average numerical competences of those born between the months of February and December with respect to those born in January



http://www.eldiario.es/piedrasdepapel/efecto-mes-nacimiento-preguntas-respuestas_6_568053207.html


1 100
1 000
900
800
700
600
500
Mandatory annual hours of instruction
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)
(14)
(15)
Theoretical age
Bélgica (Fl.)
Bélgica (Fr.)
España
Francia
Italia
Portugal

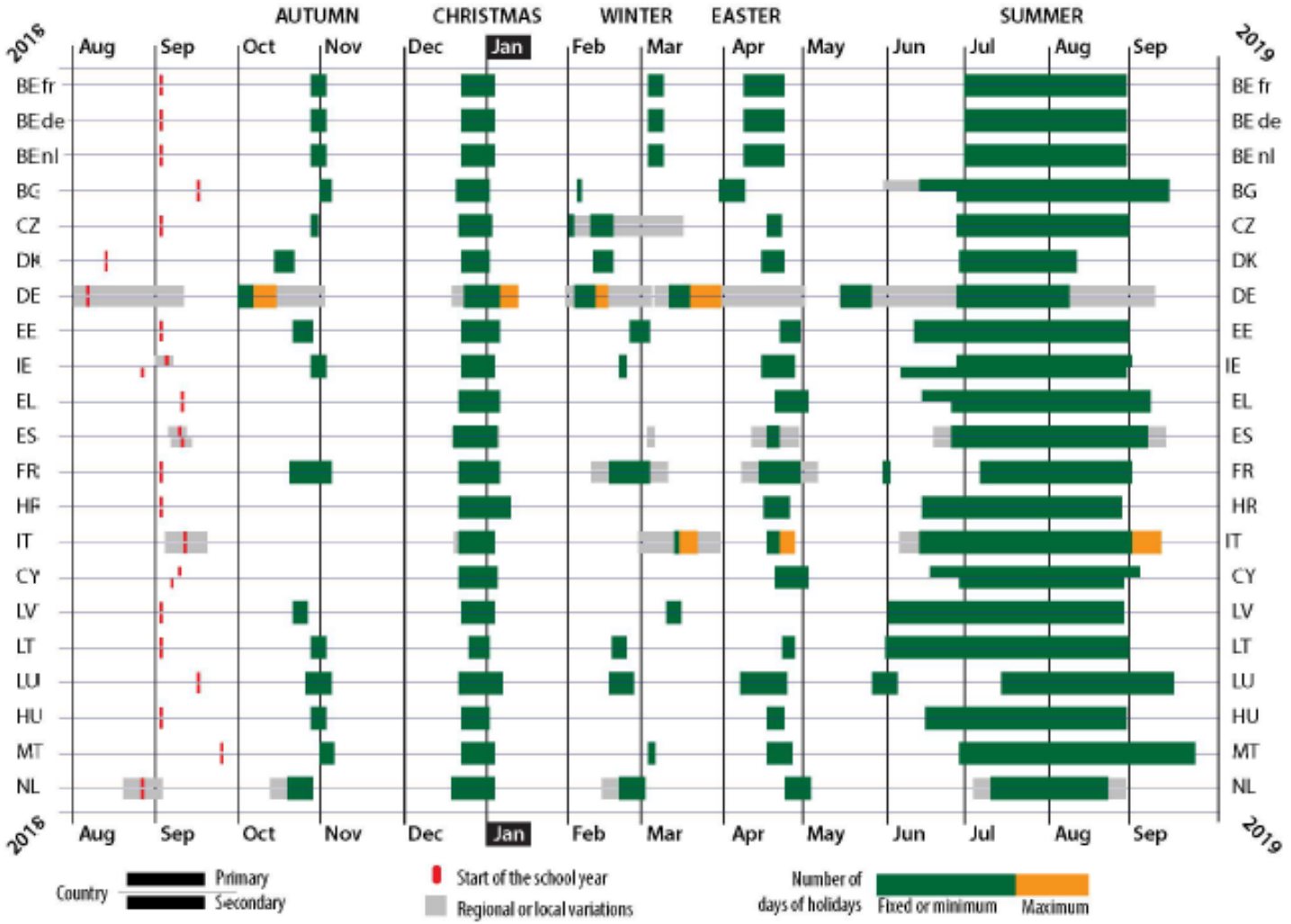

Mandatory annual hours of instruction
1 100
1 000
900
800
700
600
500
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)
(14)
(15)
Theoretical age
Eslovenia
Alemania (2015)
Austria
Eslovaquia
Letonia
España


Mandatory annual hours of instruction
1 100
1 000
900
800
700
600
500
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)
(14)
(15)
Theoretical age
Estonia
Finlandia
Islandia
Polonia
España

Breaks matter?

European Commission/EACEA/Eurydice, 2018. The Organisation of School Time in Europe. Primary and General Secondary Education – 2018/19. Eurydice Facts and Figures. Luxembourg:
Publications Office of the European Union.

Figure 1: Length of the school year and distribution of holidays, general education, ISCED 1-3, 2018/19

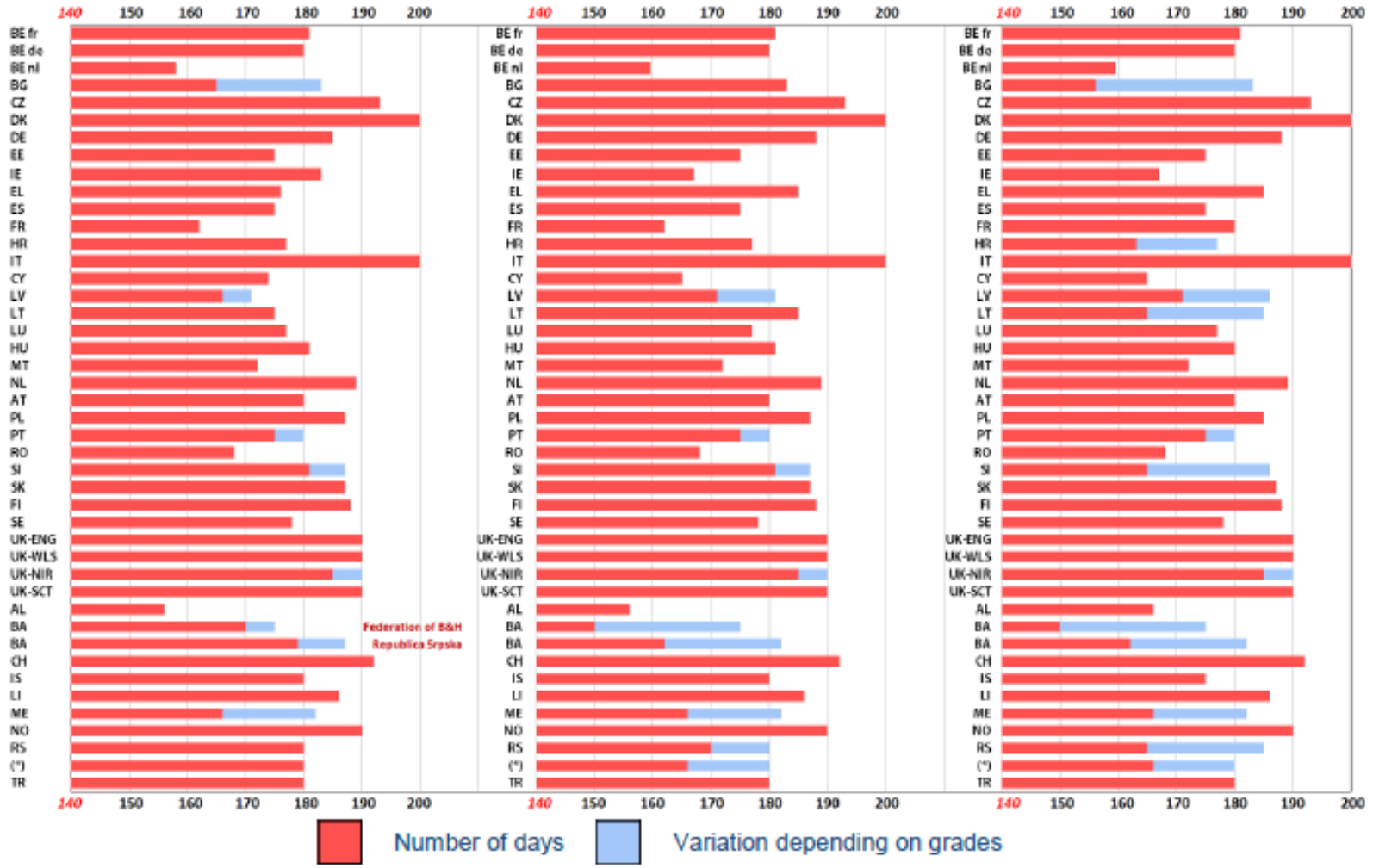


NB: **Denmark, Hungary** and **Latvia**: The distinction is made between primary and lower secondary education (single structure) on one hand and upper secondary on the other hand..

Progressivity matters?

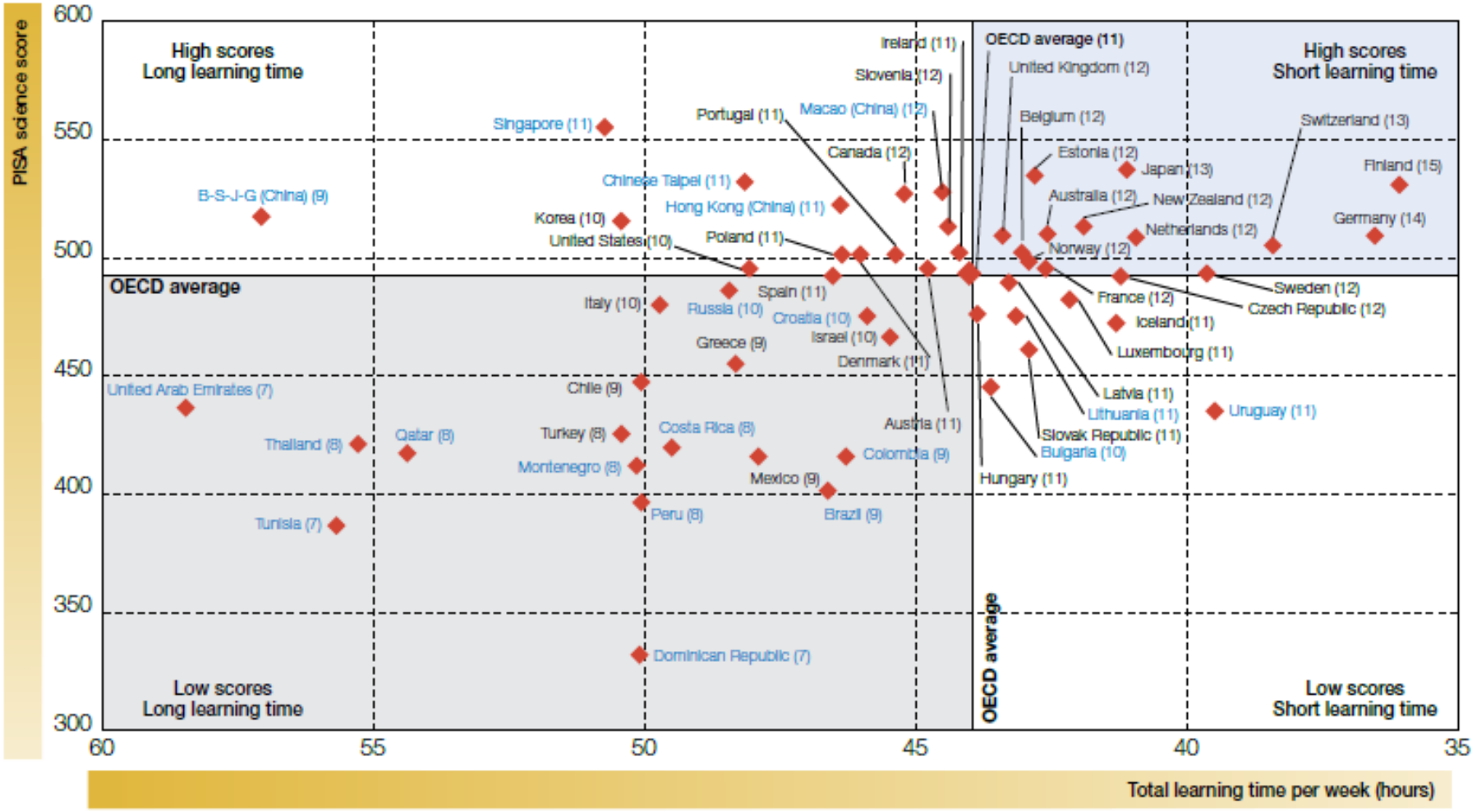
European Commission/EACEA/Eurydice, 2018. The Organisation of School Time in Europe. Primary and General Secondary Education – 2018/19. Eurydice Facts and Figures. Luxembourg:
Publications Office of the European Union.

Figure 2: Number of school days in primary and general secondary education, 2018/19



Sometimes less is more

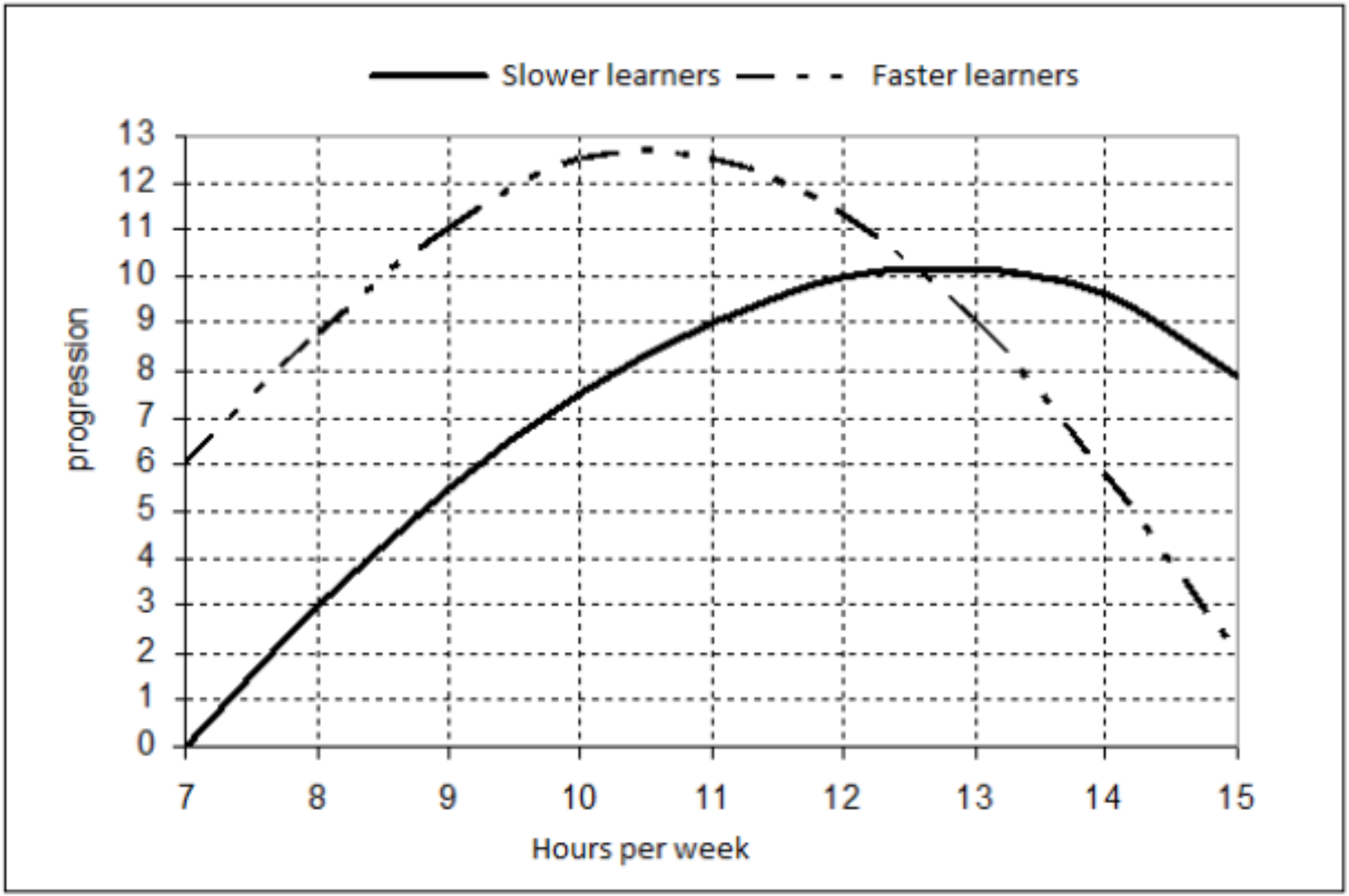
Learning time and science performance



Hours vs. capacity

Figure 3.3 Estimates of optimal instruction time for slower and faster learners in France

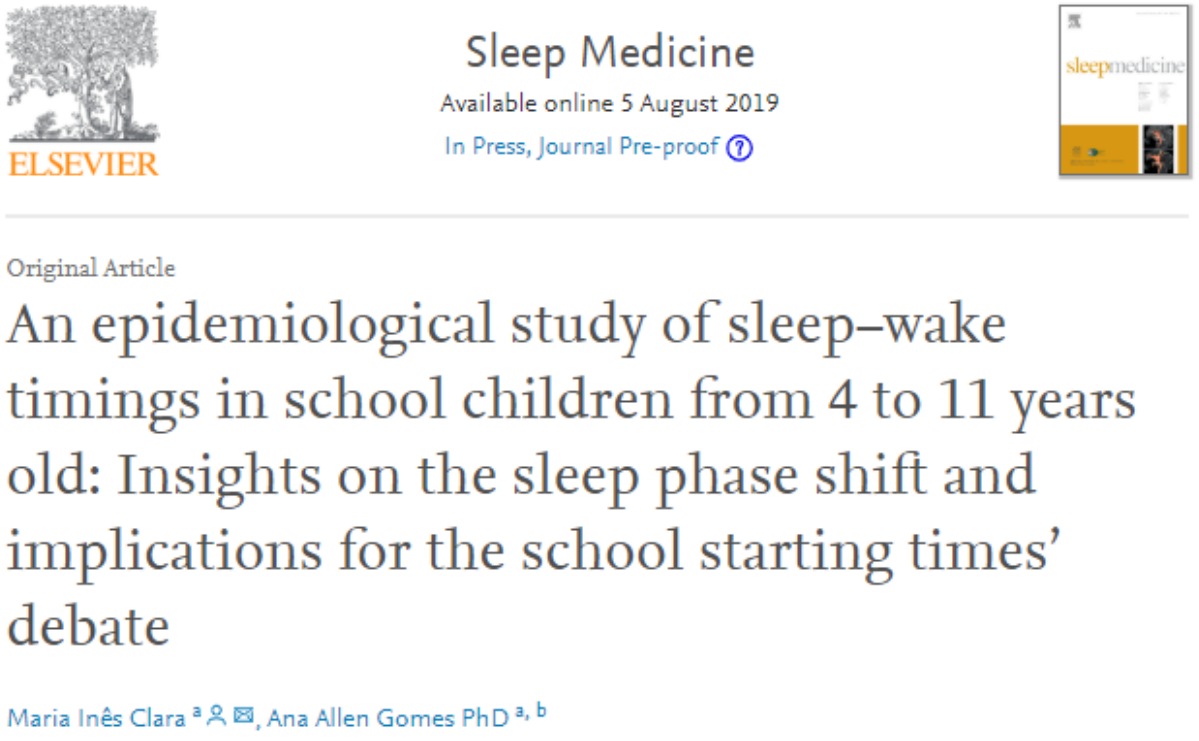
Progress in reading for 6 year-olds



Source: Reproduced from Suchaut, B. (2009), "L'organisation et l'utilisation du temps scolaire à l'école primaire: enjeux et effets sur les élèves", in Conférence à l'initiative de la ville de Cran-Gevrier; Haute-Savoie.

Sleep matters

According to recent studies, one of the situations of the student body that clearly affects performance is the lack of adequate food and lack of rest. There is a gap in reading ability (507 vs 518) and in math (11 points of difference) due to sleep deprivation. But the number of fourth-year students (10 years of age) who suffer from sleep deprivation, 49% (36% - 38% in the case of Spain) represent a greater proportion of all students, (Mullis et al. 2012a, p.22), a proportion that still increases by 10% in eighth grade students (14 years of age).
Meijer (2008) points out that chronic sleep reduction can negatively affect school performance directly and indirectly through motivation and attention.



ELSEVIER

Sleep Medicine

Available online 5 August 2019

In Press, Journal Pre-proof

Original Article

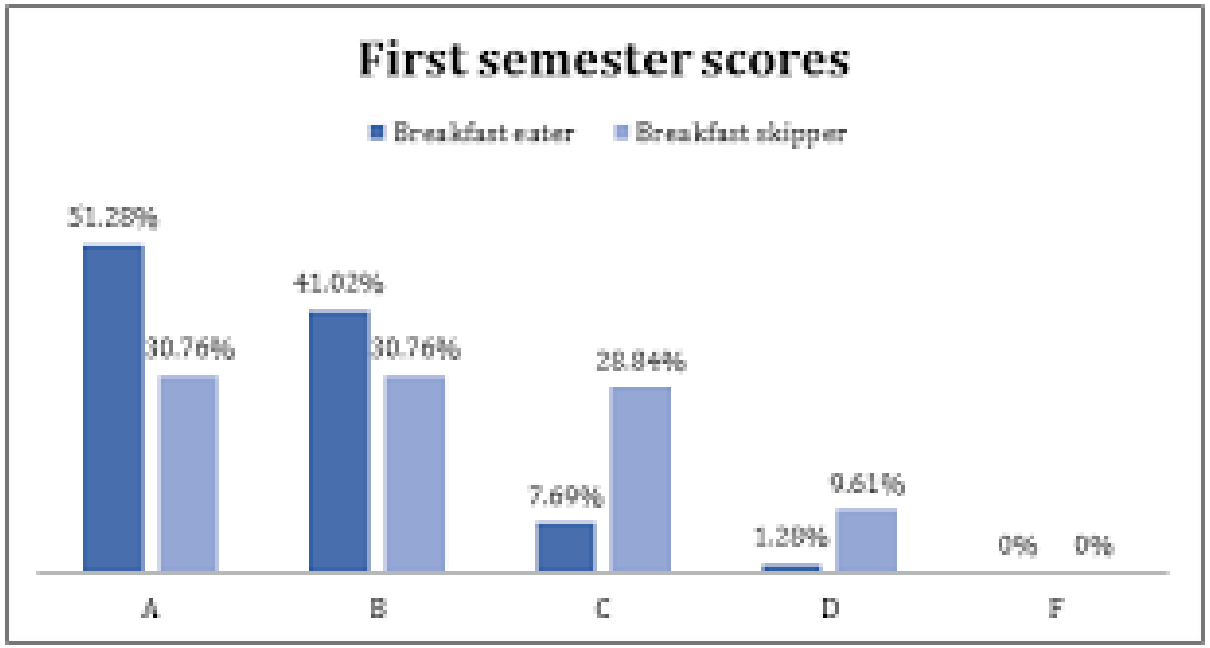
An epidemiological study of sleep–wake timings in school children from 4 to 11 years old: Insights on the sleep phase shift and implications for the school starting times' debate

Maria Inês Clara [a], Ana Allen Gomes PhD [a, b]

Nutrition matters

Academic performance is very sensitive to health status, especially inadequate nutrition and insufficient rest.

According to PIRLS 2011 and TIMSS 2011 on average, at an international level, between 27-29% (11% in the case of Spain) of fourth-year students (10 years old) are in classrooms where teaching is affected " something or a lot "because students lack sufficient food. This hurts them against those who do not suffer from such nutritional deficiencies in their reading achievements (those who lack sufficient food obtain an average of 495 compared to those who do not have those deficiencies that obtain an average of 519 points in the reading tests) and mathematics (472 vs. 498) (Mullis et al. 2012a, p.22; Mullis et al. 2012b, p.380).



DOI 10.18502/ajne.v2i1.1243

Acute sleep restriction increases dietary intake in preschool-age children

ELSA N. MULLINS[1], ALISON L. MILLER[2], SHERIN S. CHERIAN[1], JULIE C. LUMENG[2], KENNETH P. WRIGHTJR[3], SALOME KURTH[1] and MONIQUE K. LEBOURGEOIS[1]

[1]Sleep and Development Laboratory, Department of Integrative Physiology, University of Colorado Boulder, Boulder, CO, USA; [2]Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, MI, USA; [3]Sleep and Chronobiology Laboratory, Department of Integrative Physiology, University of Colorado Boulder, Boulder, CO, USA

Keywords
early childhood, food, eating, diet, sleep, recovery

Correspondence
Monique K. LeBourgeois, PhD, Department of Integrative Physiology, University of Colorado Boulder, 354 UCB, Boulder, CO 80309, USA.
Tel.: +303 492 4584;
fax: +303 492 6778;
e-mail: monique.lebourgeois@colorado.edu

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DOI: 10.1111/jsr.12450

SUMMARY

Epidemiological findings suggest short sleep duration is associated with overweight and obesity across the lifespan. In adults, experimental sleep loss increases caloric intake more than total daily energy needs, thus leading to weight gain. To date, little is known about the relationship between sleep restriction and dietary intake in preschool children. Healthy children ($n = 10$; 41.2 ± 5.4 months; 5 females) followed a strict sleep schedule for 5 days before each experimental condition: 1 day of baseline sleep (nap and scheduled bedtime/wake time) and 1 day of sleep restriction (no-nap and ~2.3 h bedtime delay). Standardized parent-report dietary intake measures were obtained on baseline, sleep restriction and sleep recovery (*ad libitum* sleep opportunity in the 24-h following sleep restriction) days. As designed, children slept ~3 h less on the sleep restriction than the baseline day ($P < 0.001$), with no significant differences in sleep between baseline and recovery days (verified with actigraphy). Repeated-measures ANOVAs indicated differences across conditions in total kilocalories, sugar, carbohydrate and fat intake (all $P < 0.05$; no differences in protein). *Post hoc* tests revealed that compared with baseline, children consumed 21% more kilocalories, 25% more sugar and 26% more carbohydrates on the day of sleep restriction, as well as 14% more kilocalories and 23% more fat on the day of sleep recovery (all $P < 0.05$). Findings suggest that acute sleep loss increases dietary intake in preschoolers both on the day of and the day after sleep restriction. Increased kilocalorie intake may promote weight gain over time and be a mechanism through which short sleep contributes to childhood obesity risk.

Physiology & Behavior 134 (2014) 44–50

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Physiology & Behavior

journal homepage: www.elsevier.com/locate/phb

Timing of food intake and obesity: A novel association ☆

Marta Garaulet *, Purificación Gómez-Abellán

Department of Physiology, Faculty of Biology, University of Murcia, Spain

HIGHLIGHTS

- Changes in meal timing influence obesity and success of weight loss therapy.
- Unusual feeding time can induce a disruption of the circadian system.
- Digestive enzymes express in a circadian manner and are synchronized by food.
- Feeding is the source of energy for adipose tissue. The time of feeding is decisive.
- Clock genes are important in meal timing by changes in circadian control of hunger.

ARTICLE INFO

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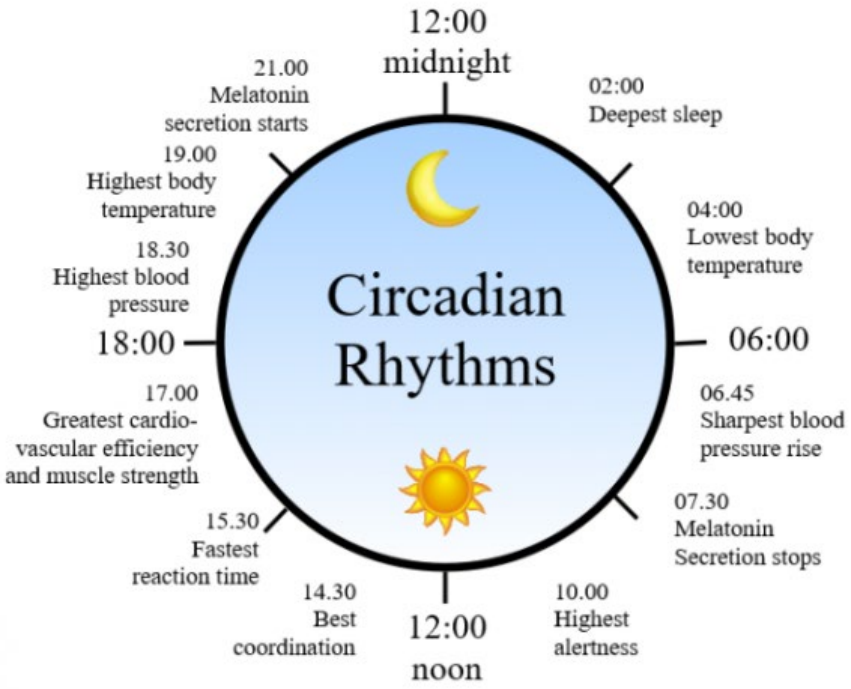
Keywords:
Timing
Food intake
Obesity
Weight loss
Clock genes
Circadian

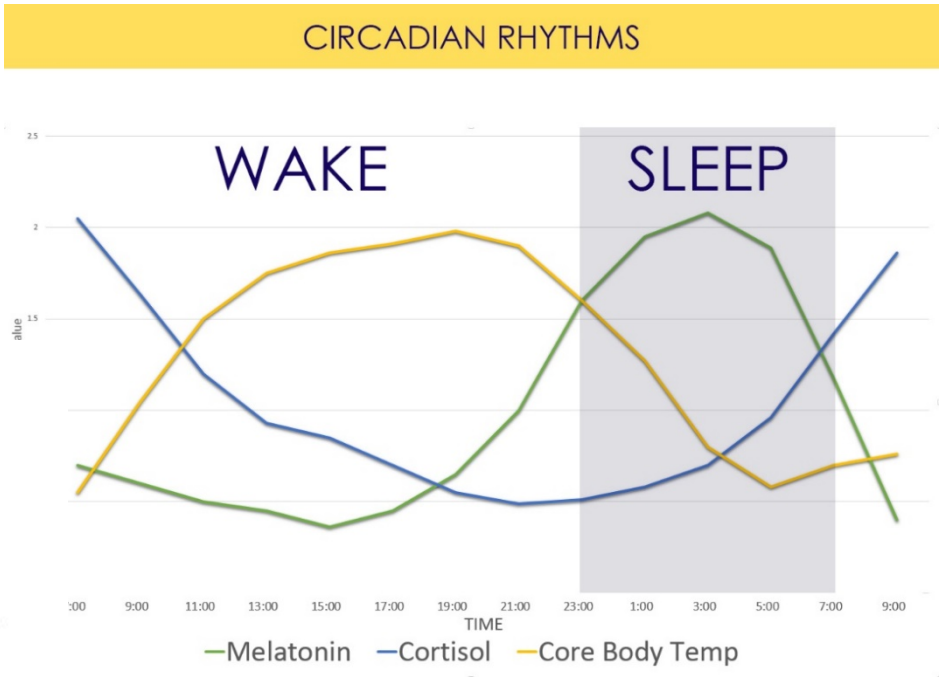
ABSTRACT

Recent studies link energy regulation to the circadian clock at the behavioral, physiological and molecular levels, emphasizing that the timing of food intake itself may have a significant role in obesity. In this regards, there is emerging literature in animals demonstrating a relationship between the timing of feeding and weight regulation. Unusual feeding time can produce a disruption of the circadian system which might produce unhealthy consequences in humans. In a longitudinal study, we recently showed that the timing of the main meal was predictive of weight loss during a 20-week dietary intervention and that this effect was independent from total 24-h caloric intake. The importance of caloric distribution across the day on weight loss therapy was supported by a recent 12-week experimental study showing that subjects assigned to high caloric intake during breakfast lost significantly more weight than those assigned to high caloric intake during the dinner.

Furthermore, one of the most influential discoveries relevant for this area of research in the last years is the presence of an active circadian clock in different organs related to food intake. This is the case for stomach, intestine, pancreas or liver. New data also suggest that there is a temporal component in the regulation of adipose tissue functions. Thus, a specific temporal order in the daily patterns of adipose tissue genes appears to be crucial for adipose tissue to exclusively either accumulate fat or to mobilize fat at the proper time. Taking into account that feeding is the source of energy for adipose tissue, the time of feeding, particularly for high-energy content meals, may be decisive, and changes in this timing could have metabolic consequences for the development of obesity and for weight loss.

School day planning: circadian rhythms





Hours matters

Gráfico 13: Variaciones diarias en el rendimiento de los alumnos de 10-11 años después de 3 eventos. Fuente: Testu (1994), INSERM, 2001, p. 54, citado en Suchaut, B. (2009, May).

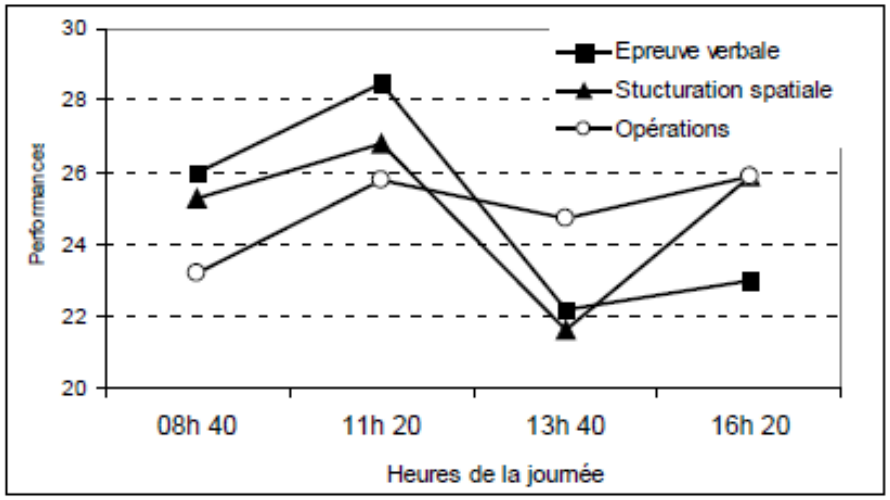


Gráfico 11: Rendimiento escolar promedio según la hora en que comenzó la lección. Fuente: Klein (2004).

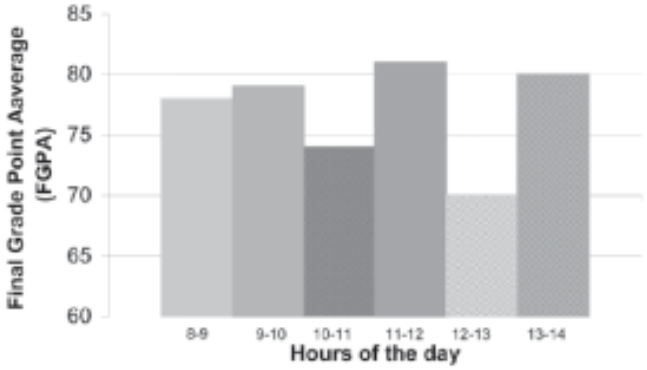
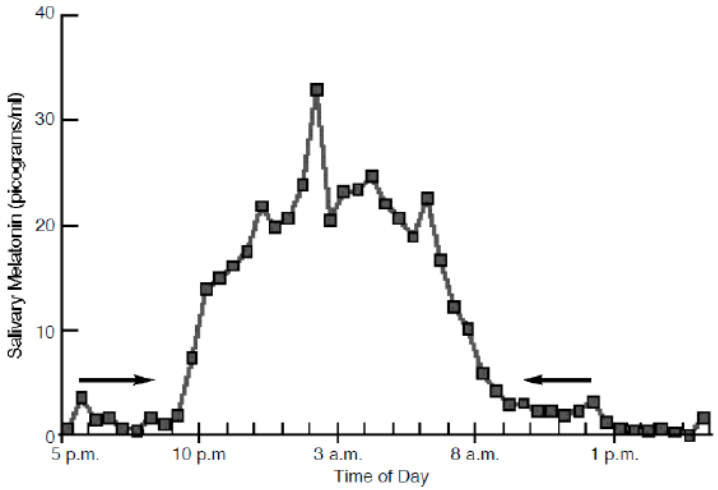
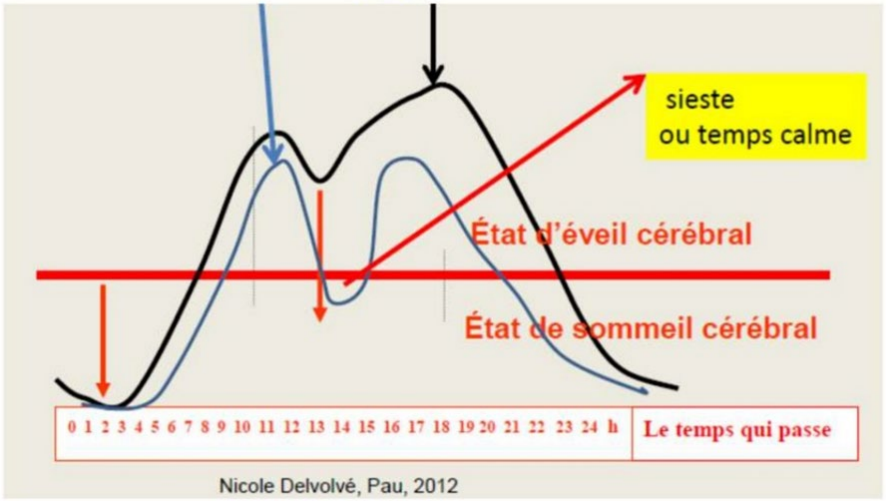


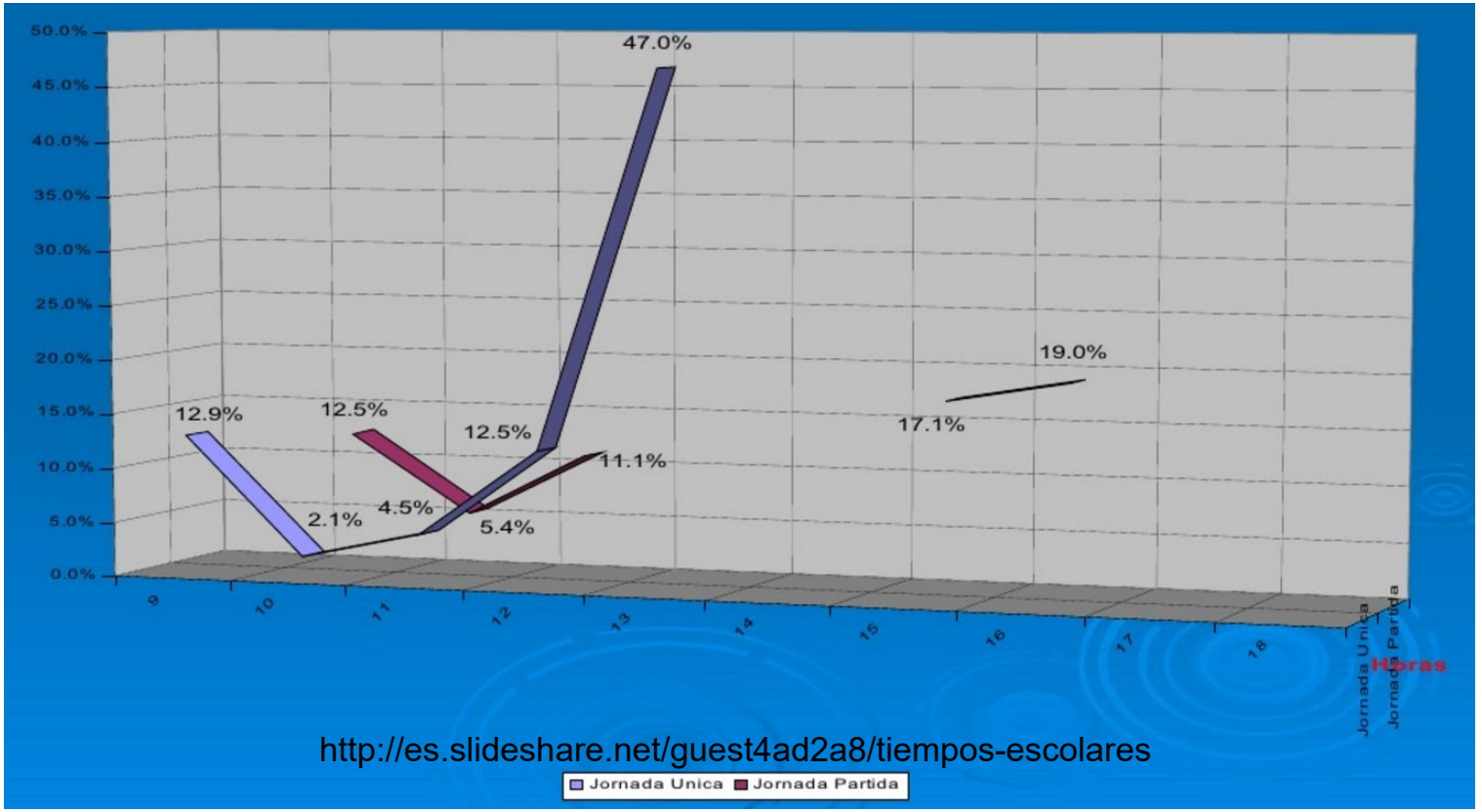
Gráfico 15. Patrón de secreción de melatonina (medido en saliva). Fuente: Carskadon (1999)



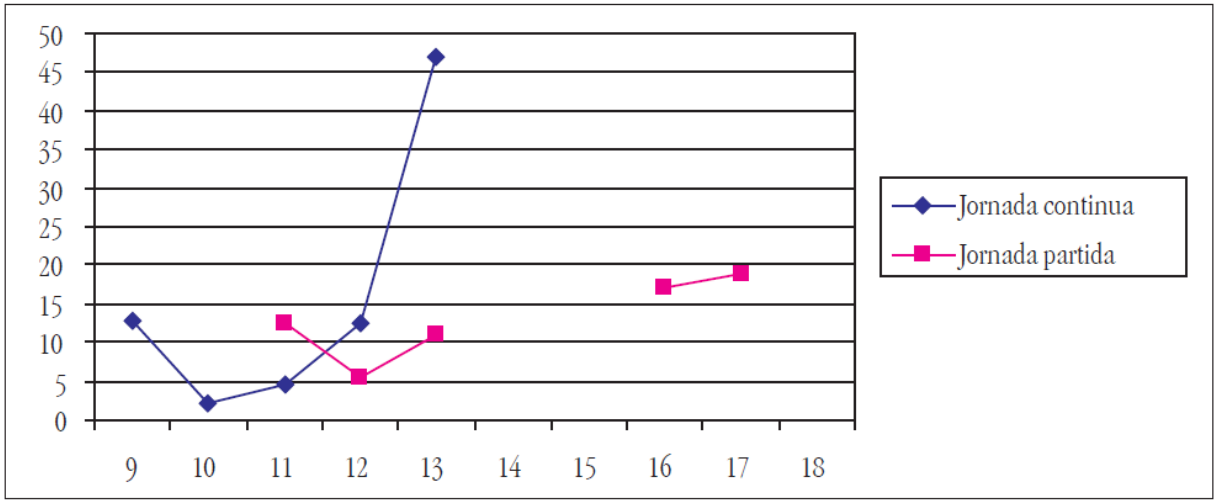
Variabilité circadienne chez l'enfant (bleu) et chez l'adulte (noir)



Hours matter



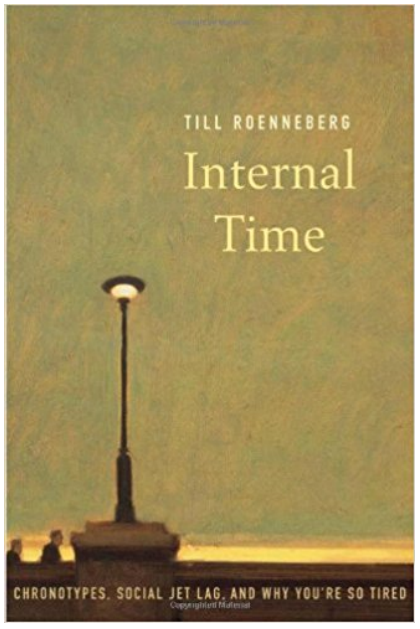
Nivel de "autofatiga" percibida por los alumnos



Niveles de "fatiga autopercibida" según tipo de jornada. Estáun S. (UB) (citado en Feito, 2010)

Caride Gómez, J. A. (1994). El estado de la cuestión. Cuadernos de Pedagogía, (221), 68-69.

Chronotypes

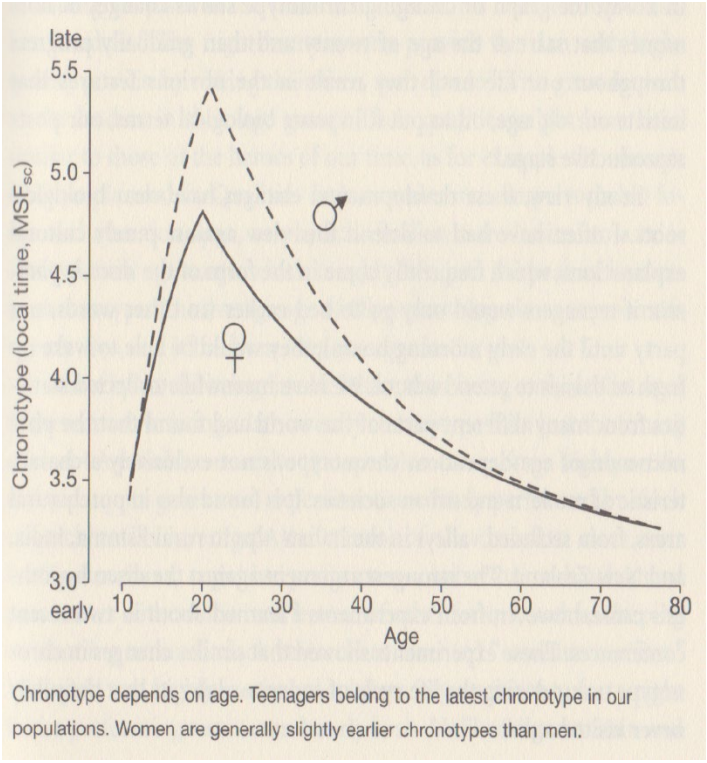


Both cognitive status (vigilance, alertness and attention) and skills (motor coordination, performing simple calculations or memory tasks) are controlled by the body clock in the same way than the sleep/wakefulness, body temperature or circulating hormones.

2 hours out door can advance individual chorotype by an hour improving:

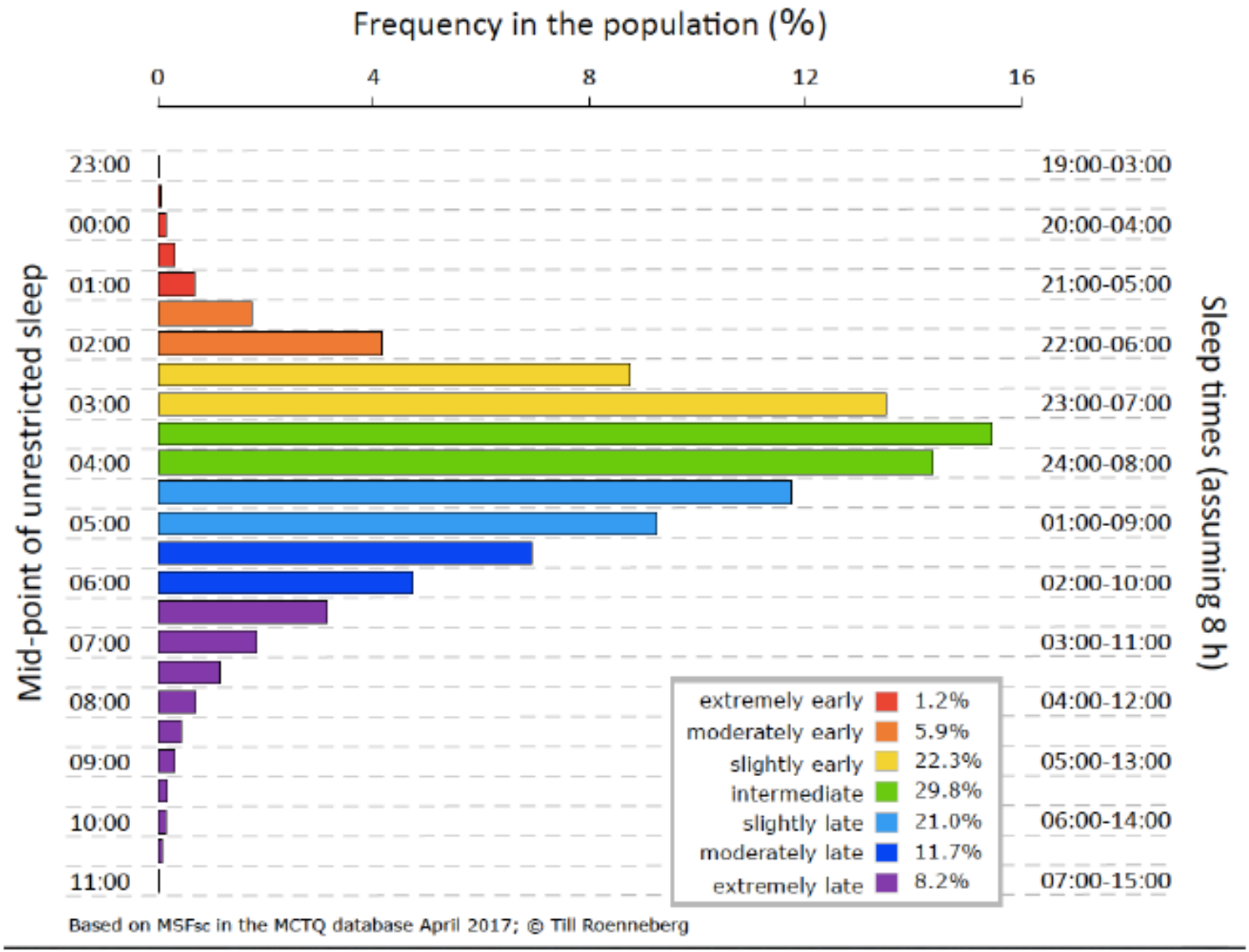
- Learning capacity
- Immune system
- Mood
- Social skills

The delay of the chorotype towards adolescence is stronger for boys than for girls. Besides boys pick is reached on average at 21 years old and girls pick is around 19,5 years old. This difference slowly reduces untill age 52 when there is no difference.

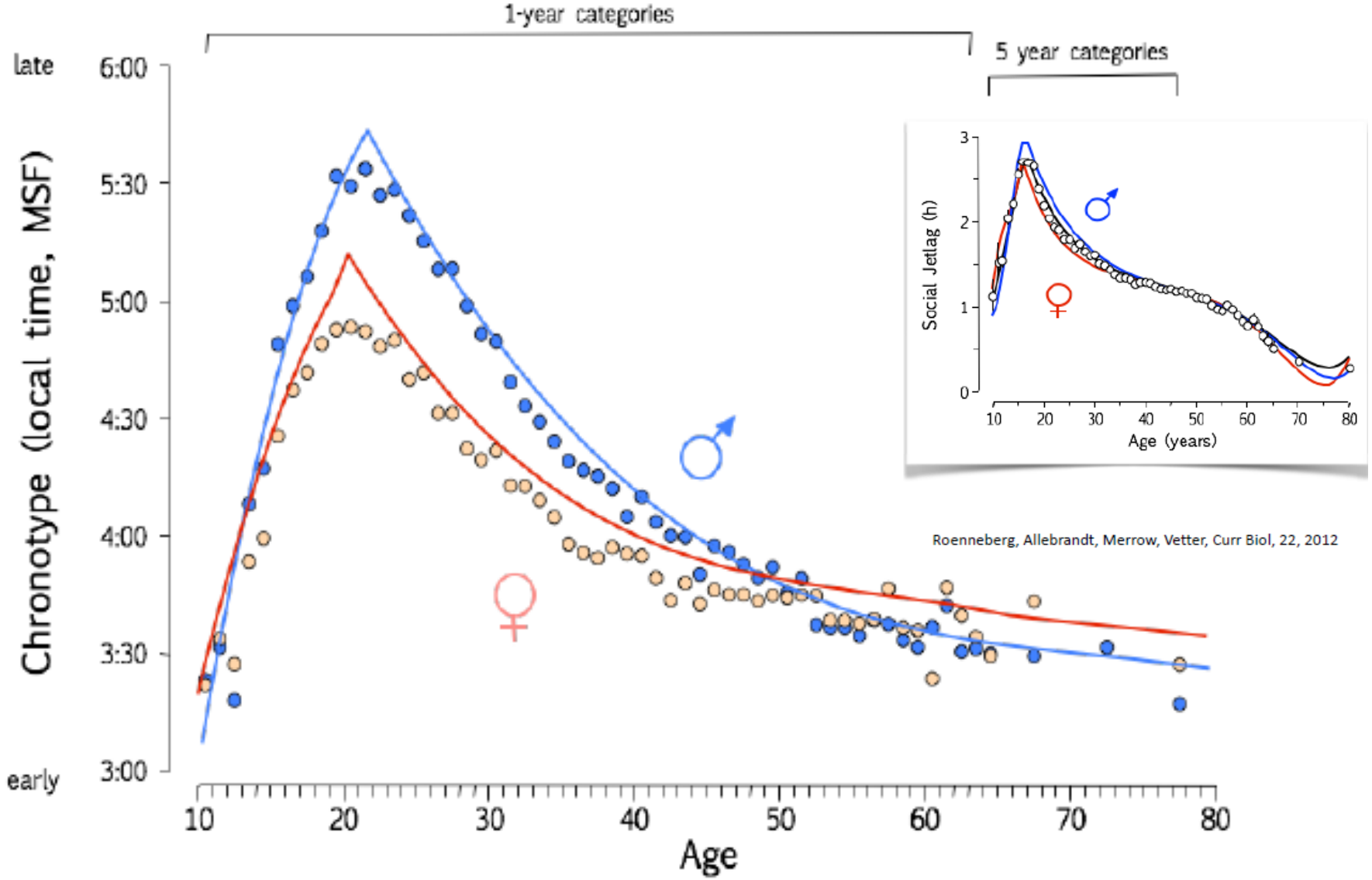


Chronotype depends on age. Teenagers belong to the latest chronotype in our populations. Women are generally slightly earlier chronotypes than men.

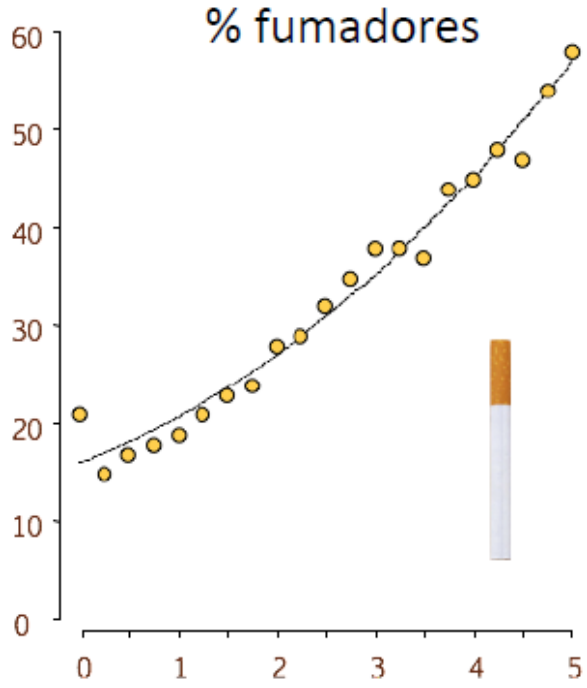
Roenneberg, T. (2012). *Internal Time: Chronotypes, Social Jet Lag, and Why You're So Tired*. Harvard University Press.

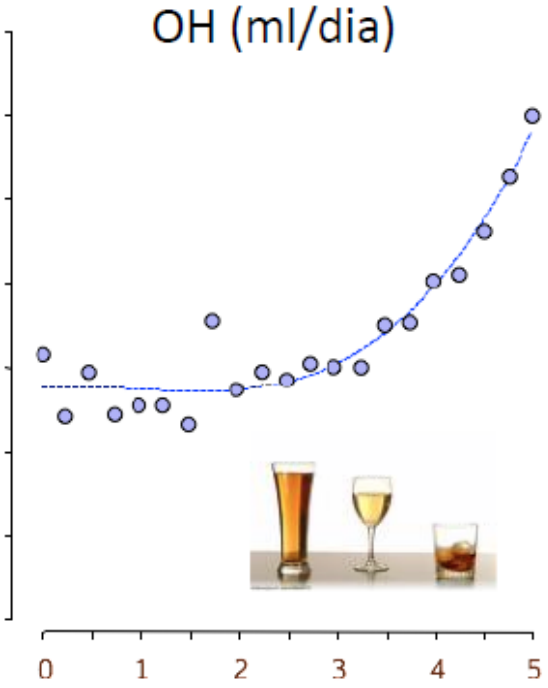

Frequency in the population (%)
0
4
8
12
16
Mid-point of unrestricted sleep
23:00
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
Sleep times (assuming 8 h)
19:00-03:00
20:00-04:00
21:00-05:00
22:00-06:00
23:00-07:00
24:00-08:00
01:00-09:00
02:00-10:00
03:00-11:00
04:00-12:00
05:00-13:00
06:00-14:00
07:00-15:00
extremely early 1.2%
moderately early 5.9%
slightly early 22.3%
intermediate 29.8%
slightly late 21.0%
moderately late 11.7%
extremely late 8.2%
Based on MSFsc in the MCTQ database April 2017; © Till Roenneberg

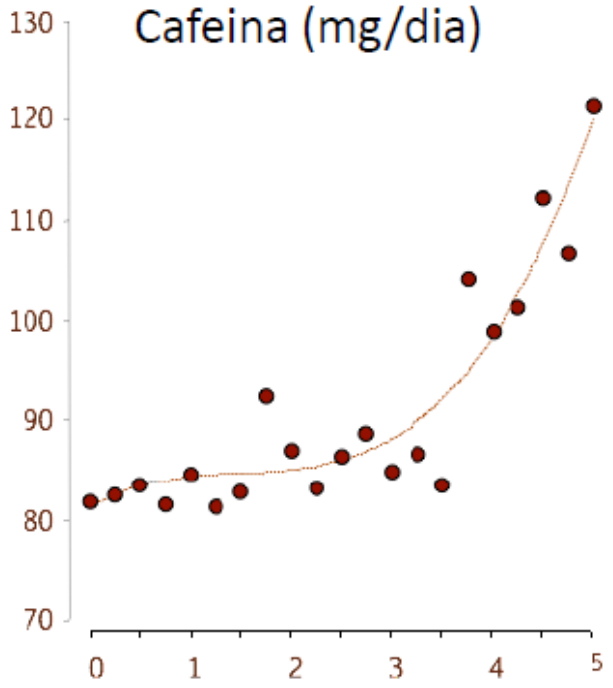
Chronotypes, gender and social jet lag



Roenneberg et al. (2004). A marker for the end of adolescence. Curr. Biol. 14, R1038-R1039.

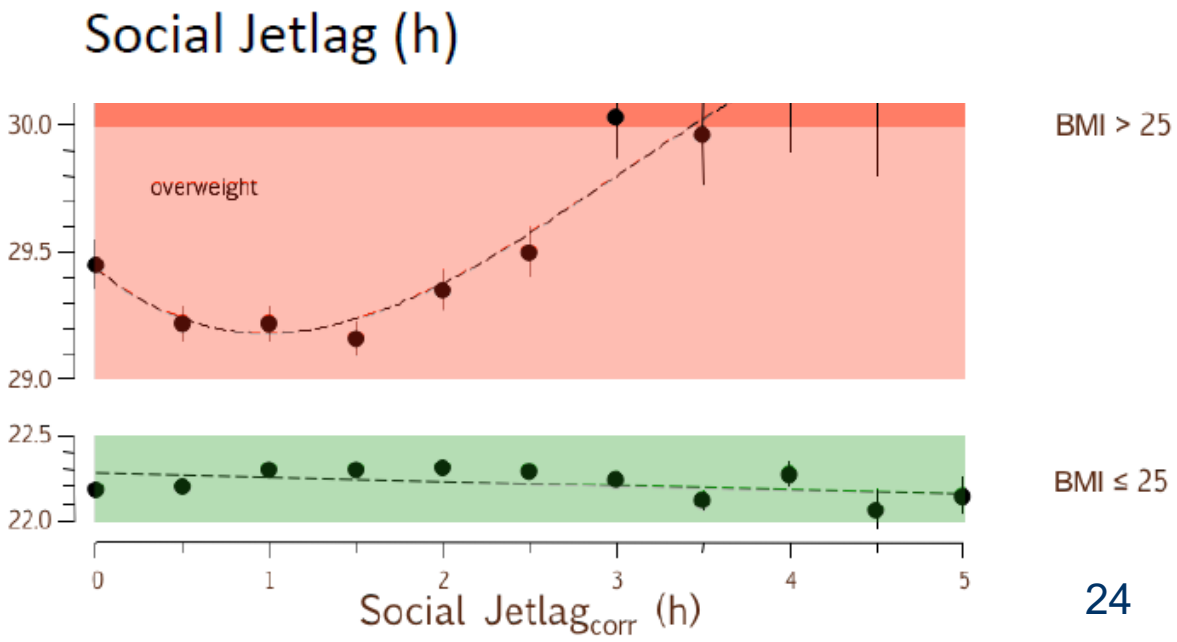






From Till Roenneberg

Chronotypes, social jet lag & health



Roenneberg, et al (2012). Social Jetlag and Obesity. Current Biology, 22(10), 939–943.

Catia Reis - Social Clocks - examples from Europe, seasons and lifespan (2019)

Time zones & social jet lag

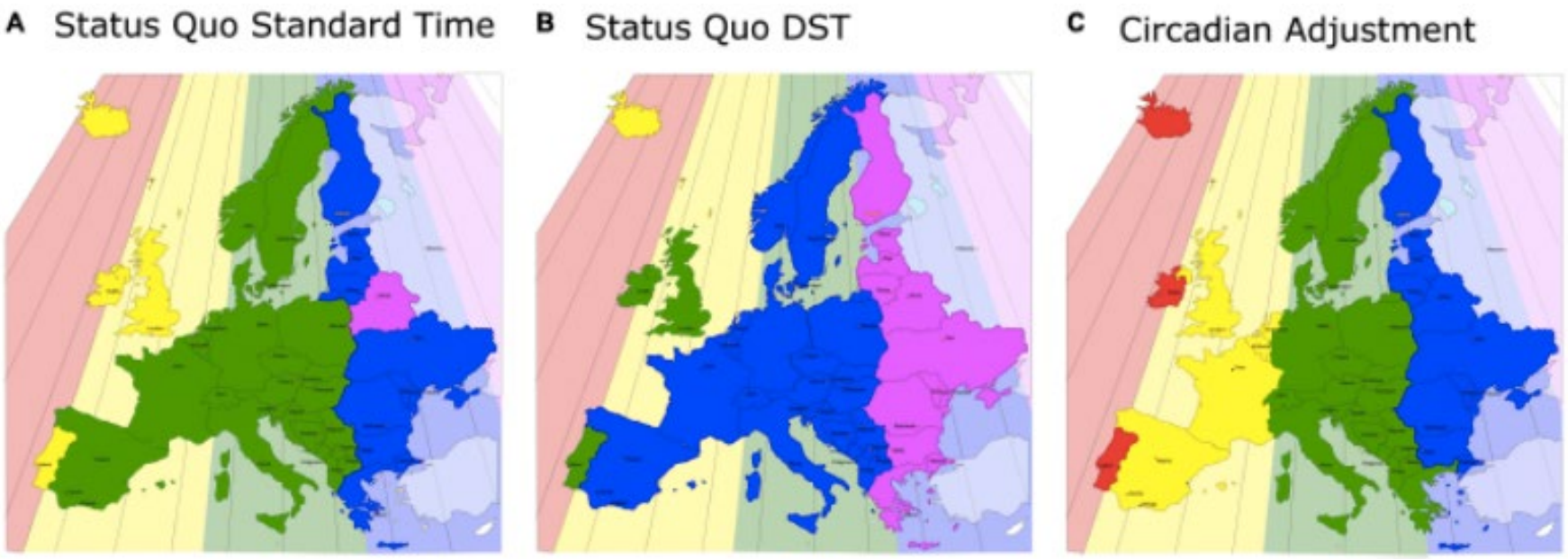
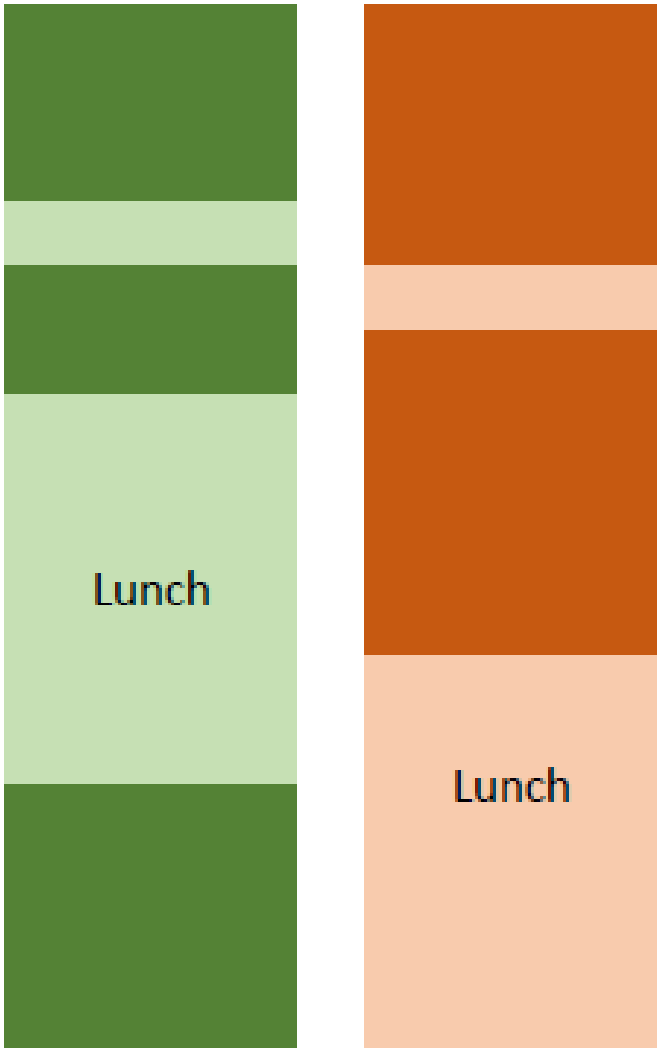


FIGURE 2 | A map of Europe equivalent to **Figure 1**: the actual, sun-based time zones are drawn as color-coded backgrounds and the social time zones are shown in the same (stronger) colors in front. Even under Standard Time, the western areas of the social time zones are far away from the respective eastern borders of the sun-based time zones **(A)**, this discrepancy increases by 1 h under DST **(B)** (note that Iceland is on perennial DST). **(C)** A solution to the problem: the political borders of Europe are actually ideal for the correct, chronobiological separations into time zones, so that in no area of Europe the social clock has to be discrepant from the sun clock by more than 30 min.

Roenneberg et al. 2019. Daylight Saving Time and Artificial Time Zones – A Battle Between Biological and Social Times. Frontiers in Physiology. 10;944. doi: 10.3389/fphys.2019.00944

Summer		Winter		Official	
6:00	6:30	7:00	7:30	8:00	8:30
6:30	7:00	7:30	8:00	8:30	9:00
7:00	7:30	8:00	8:30	9:00	9:30
7:30	8:00	8:30	9:00	9:30	10:00
8:00	8:30	9:00	9:30	10:00	10:30
8:30	9:00	9:30	10:00	10:30	11:00
9:00	9:30	10:00	10:30	11:00	11:30
9:30	10:00	10:30	11:00	11:30	12:00
10:00	10:30	11:00	11:30	12:00	12:30
10:30	11:00	11:30	12:00	12:30	13:00
11:00	11:30	12:00	12:30	13:00	13:30
11:30	12:00	12:30	13:00	13:30	14:00
12:00	12:30	13:00	13:30	14:00	14:30
12:30	13:00	13:30	14:00	14:30	15:00
13:00	13:30	14:00	14:30	15:00	15:30
13:30	14:00	14:30	15:00	15:30	16:00
14:00	14:30	15:00	15:30	16:00	16:30
14:30	15:00	15:30	16:00	16:30	17:00
15:00	15:30	16:00	16:30	17:00	17:30
15:30	16:00	16:30	17:00	17:30	18:00



Learning, Media and Technology, 2015
Vol. 40, No. 2, 210–226, http://dx.doi.org/10.1080/17439884.2014.942666

Routledge
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Synchronizing education to adolescent biology: 'let teens sleep, start school later'

Paul Kelley[a*], Steven W. Lockley[b], Russell G. Foster[c] and Jonathan Kelley[d]

[a]*Sleep and Circadian Neuroscience Institute, Nuffield Department of Clinical Neurosciences, University of Oxford, Oxford, UK;* [b]*Division of Sleep Medicine, Department of Medicine, Harvard Medical School, Brigham and Women's Hospital, Boston, USA;* [c]*Nuffield Laboratory of Ophthalmology, Nuffield Department of Clinical Neurosciences, University of Oxford, Oxford, UK;* [d]*International Survey Center and University of Nevada, Reno, NV, USA*

(*Received 16 October 2013; accepted 4 July 2014*)

Arne Duncan, US Secretary of State for Education, tweeted in 2013: 'let teens sleep, start school later'. This paper examines early starts and their negative consequences in the light of key research in the last 30 years in sleep medicine and circadian neuroscience. An overview of the circadian timing system in adolescence leading to changes in sleep patterns is given and underpins the conclusion that altering education times can both improve learning and reduce health risks. Further research is considered from education, sleep medicine and neuroscience studies illustrating these improvements. The implementation of later starts is briefly considered in light of other education interventions to improve learning. Finally, the impact of introducing research-based later starts synchronized to adolescent biology is considered in practical and policy terms.

PsyCh Journal
INSTITUTE OF PSYCHOLOGY
Chinese Academy of Sciences

PsyCh Journal **6** (2017): 263–276
DOI: 10.1002/pchj.178

Time to learn: How chronotype impacts education

Giulia Zerbini,[1] and Martha Merrow[1,2]

[1]Department of Neurobiology, Groningen Institute for Evolutionary Life Sciences, University of Groningen, Groningen, The Netherlands, [2]Institute of Medical Psychology, LMU Munich, Munich, Germany

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SCIENTIFIC REPORTS

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Lower school performance in late chronotypes: underlying factors and mechanisms

Giulia Zerbini[1], Vincent van der Vinne[2], Lana K. M. Otto[1], Thomas Kantermann[1,3], Wim P. Krijnen[4], Till Roenneberg[1] & Martha Merrow[1,3]

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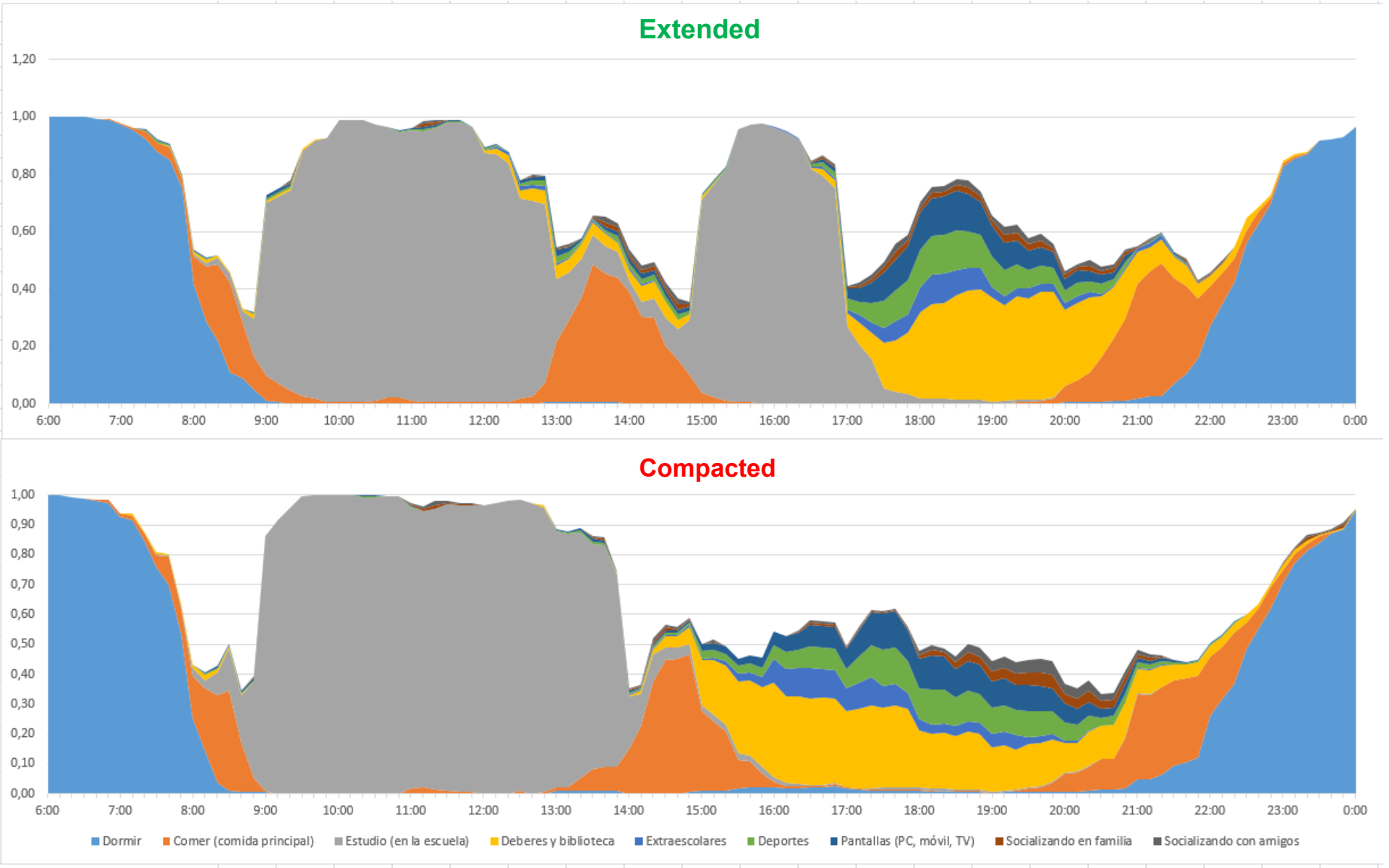
Timing of Examinations Affects School Performance Differently in Early and Late Chronotypes

Vincent van der Vinne,*,[1] Giulia Zerbini,*,[1] Anne Siersema,† Amy Pieper,† Martha Merrow,*,‡ Roelof A. Hut,* Till Roenneberg,‡ and Thomas Kantermann*,§,[2]

Chronobiology unit, Groningen Institute for Evolutionary Life Sciences, University of Groningen, Groningen, the Netherlands, †High school De Nieuwe Veste, Coevorden, the Netherlands, ‡Institute of Medical Psychology, Ludwig-Maximilians-Universität München, Munich, Germany, and §Institute for Occupational, Social and Environmental Medicine, Ludwig-Maximilians-Universität München, Munich, Germany

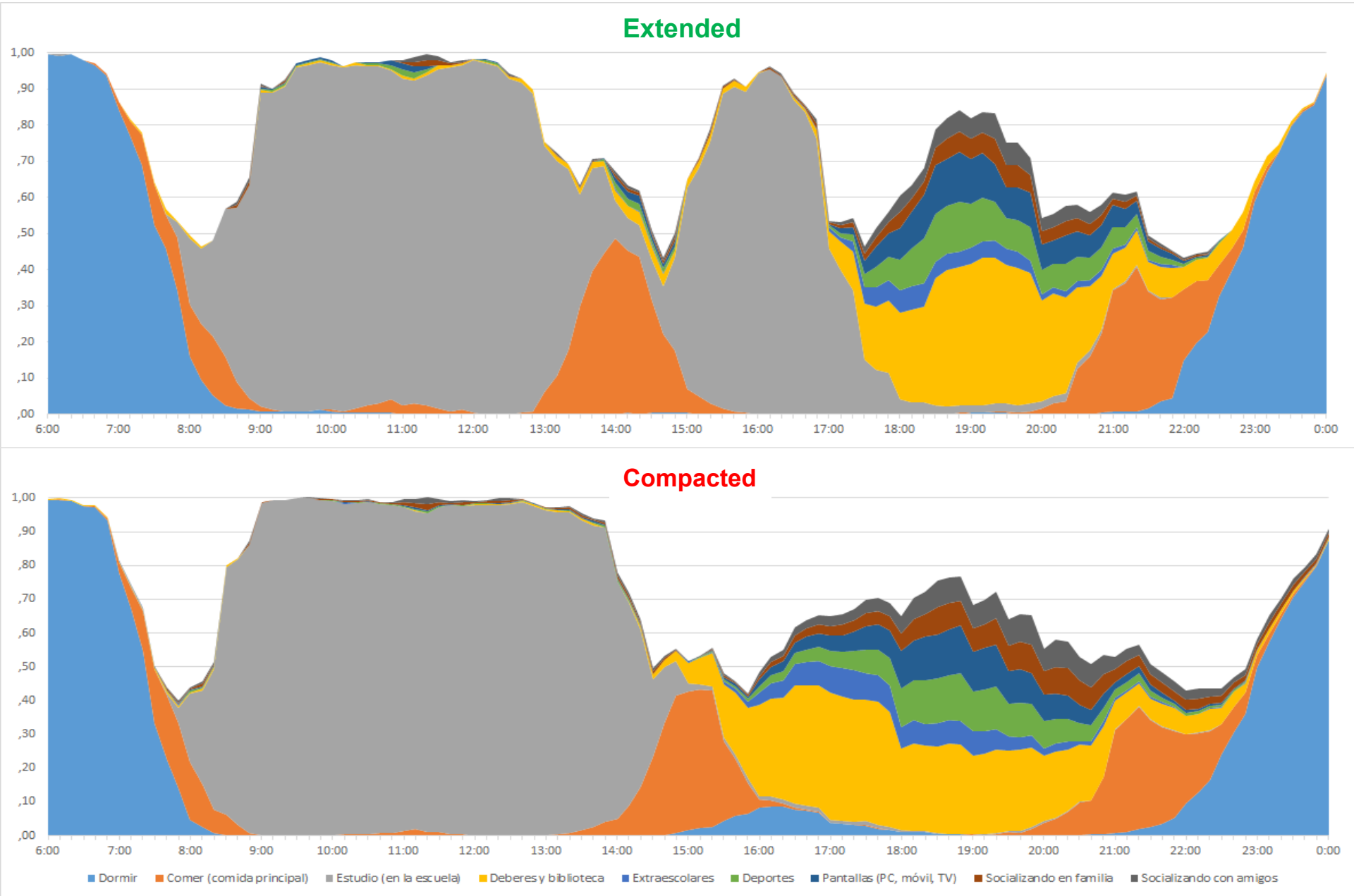
Distribution throughout the day of related activities. Primary education.

[Encuesta de Empleo del Tiempo (INE) de 2002-03]



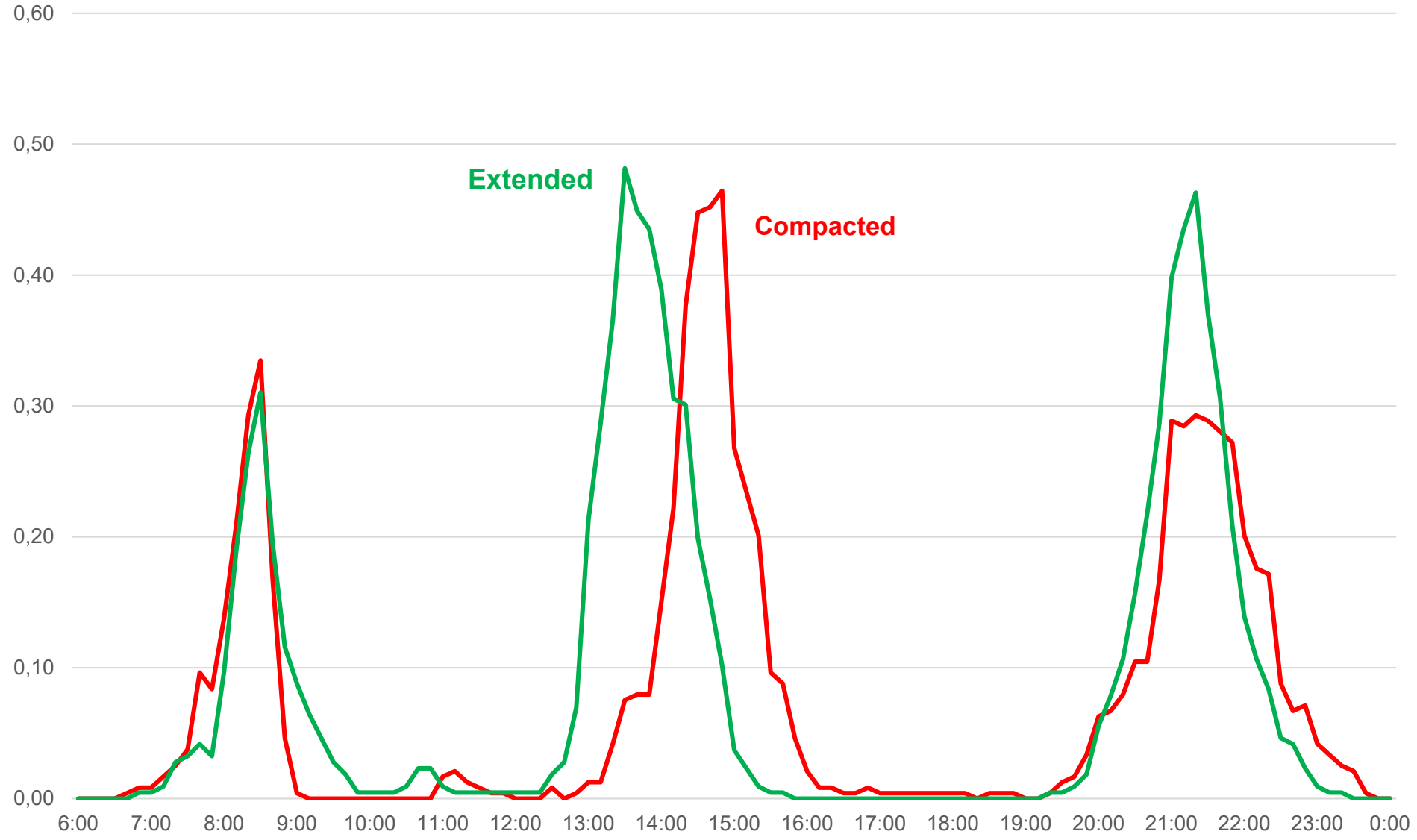
Distribution throughout the day of related activities. Secondary education.

[Encuesta de Empleo del Tiempo (INE) de 2002-03]



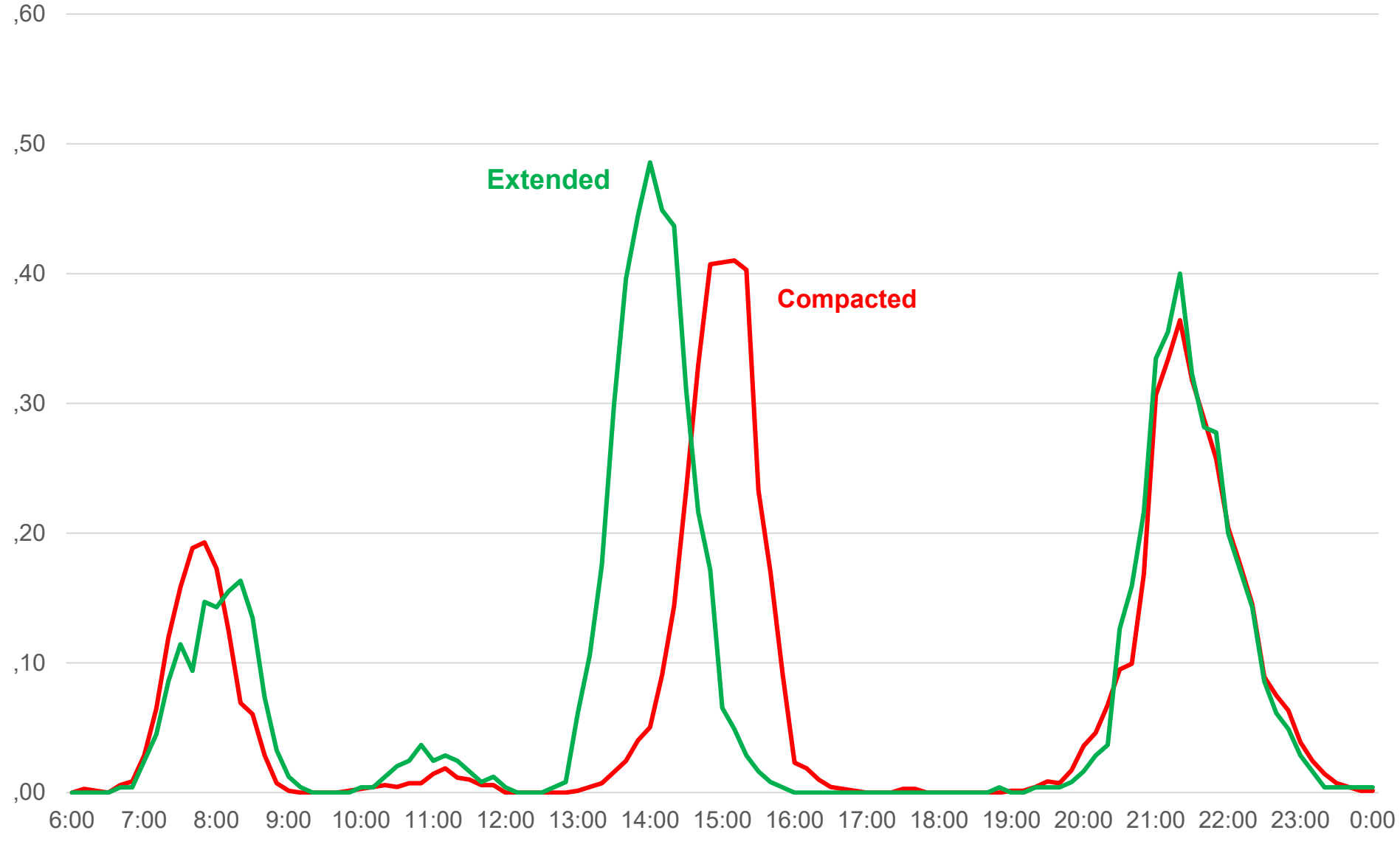
Distribution throughout the day of the main meals, Primary Education.

[Encuesta de Empleo del Tiempo (INE) de 2002-03]



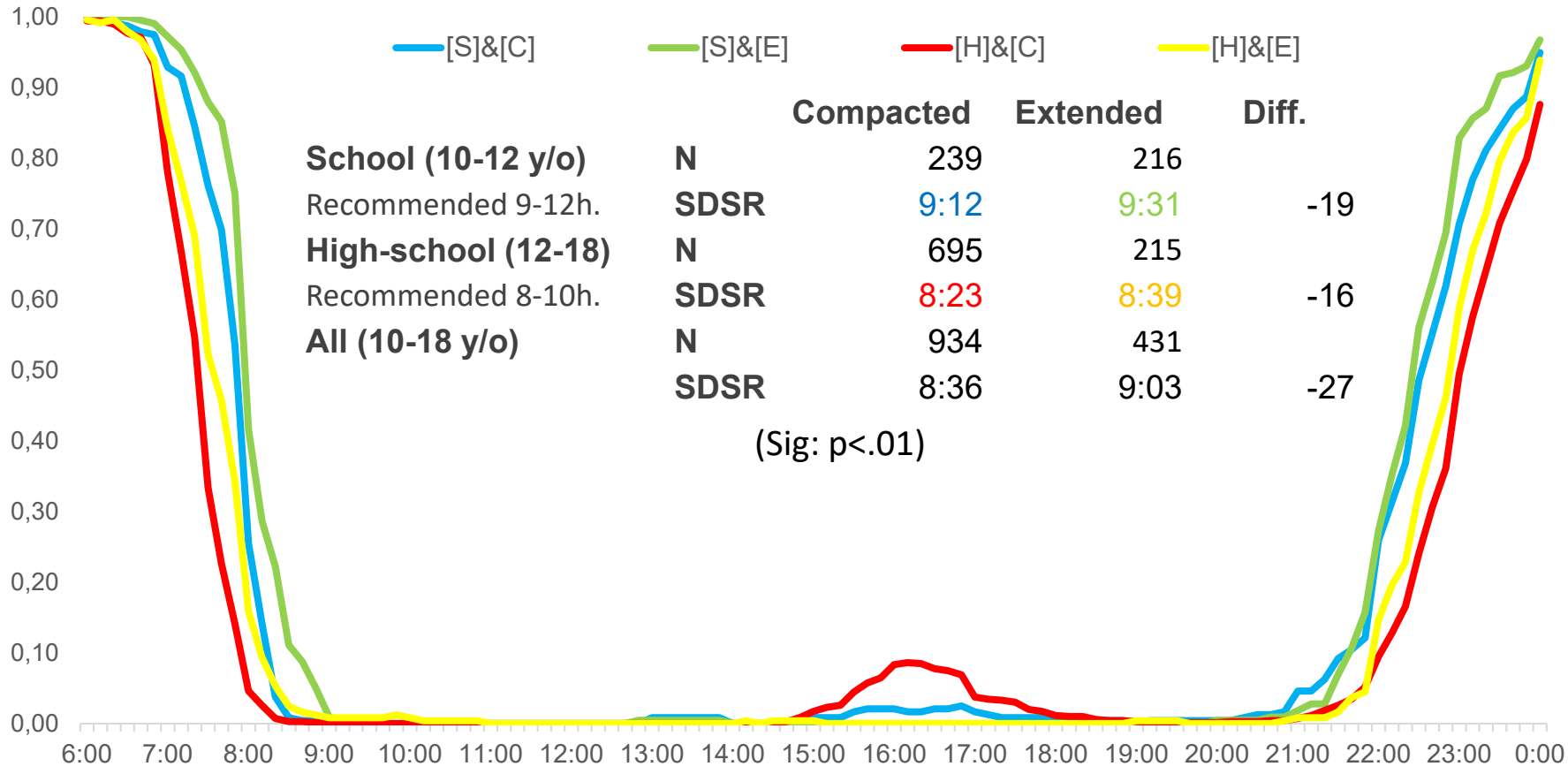
Distribution throughout the day of the main meals, Secondary Education.

[Explotación de la Encuesta de Empleo del Tiempo (INE) de 2002-03]



Distribution throughout the day of rest (sleep) in Secondary Education.

[Explotación de la Encuesta de Empleo del Tiempo (INE) de 2002-03]



		Compacted	Extended	Diff.
School (10-12 y/o)	**N**	239	216	
Recommended 9-12h.	**SDSR**	9:12	9:31	-19
High-school (12-18)	**N**	695	215	
Recommended 8-10h.	**SDSR**	8:23	8:39	-16
All (10-18 y/o)	**N**	934	431	
	SDSR	8:36	9:03	-27

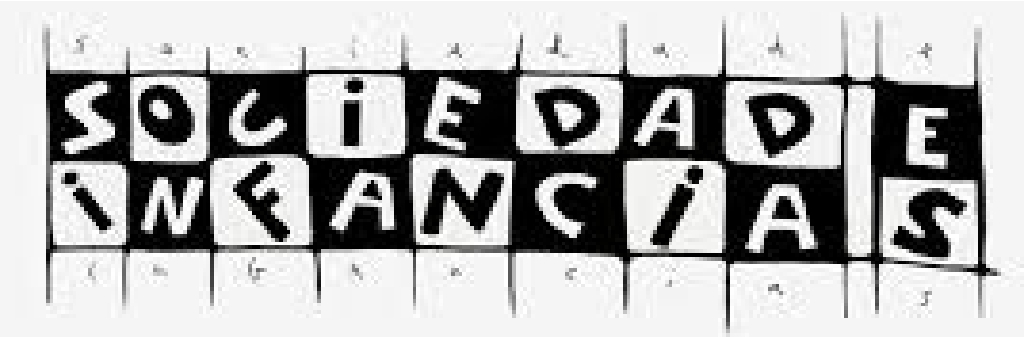
(Sig: p<.01)

Differences in daily time dedicated to 11 selected activities, depending on the school schedule.

[Encuesta de Empleo del Tiempo (INE) de 2002-03]

	All				Primary (10-12)				Secondary (12 +)			
	E	C			E	C			E	C		
Activity	N=431	N=934	Dif.	Sig	N=216	N=239	Dif.	Sig	N=245	N=695	Dif.	Sig
110 Sleep	543	516	-27	***	571	552	-19	***	519	503	-16	***
212 Homework and library	79	95	16	***	79	82	3	ns	79	99	20	***
221 Studying during free time	11	17	6	***	13	16	3	ns	10	17	7	***
511 Time with the family	3	4	1	*	2	4	2	**	3	4	1	ns
519 Time with friends	9	19	10	***	6	7	1	ns	12	24	12	***
531 Passive leisure (doing nothing)	7	10	3	**	6	9	3	ns	7	11	4	Ns
6120-6190 Active sport	23	27	4	ns	23	27	4	ns	24	26	2	Ns
7230-7282 (-7250) PC/mobile	6	8	2	ns	2	1	-1	ns	9	11	2	Ns
7330 Videogames	5	13	8	***	6	13	7	***	5	13	8	***
8120 Reading	2	2	0	ns	2	3	1	ns	2	2	0	Ns
8200-8220 TV/Videos	72	92	20	***	75	94	19	***	73	92	19	***

E = Extended; C= Compacted; Sig: *** p<.01; ** p<.05; *p<.10



De-escalation time and new normal. An opportunity to rethink school times by placing students in the centre

http://dx.doi.org/10.5209/soci.69800 (in Spanish, written May 2020)

1) End the course
2) Reintegration by needs (not by age)
3) Adjust to capabilities
4) Respect rest
5) Healthy eating
6) Sync school
7) A holistic view & informed decisions

Why am I here?

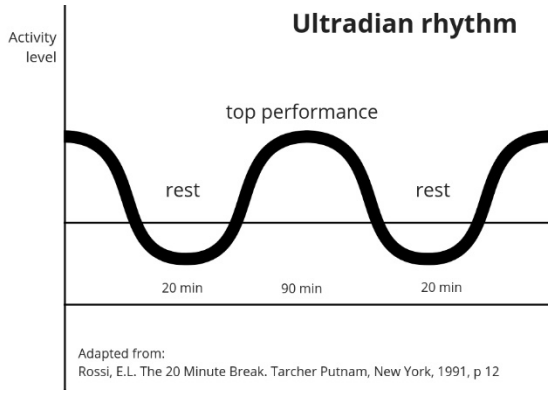
Where am I now?

Where am I going?

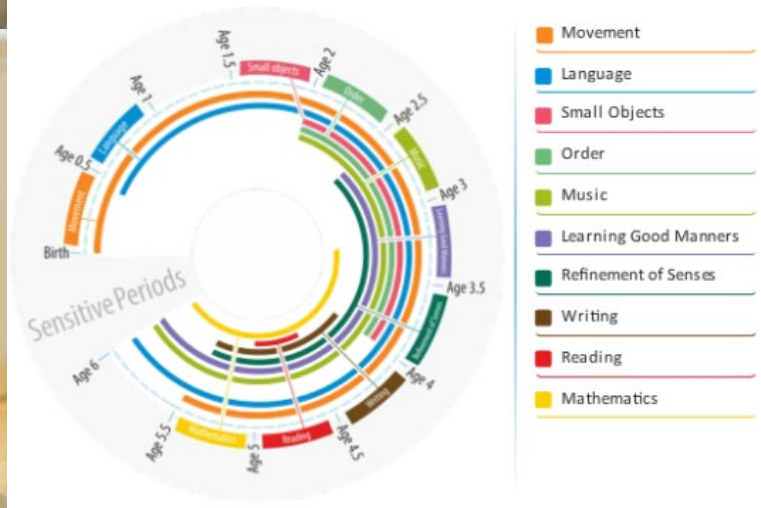
Would you join me?

Because the health and wellbeing of children and youth are of paramount importance!

Because health and wellbeing matter, How to best organize school time? especially when ‘one size does not fits all’



Because health and wellbeing matter,
What about
school organization in terms of pedagogies?
again when
‘one size does not fits all’



Why am I here?

Where am I now?

Where am I going?

Would you join me?

Multidisciplinarity more than welcomed

Medical sciences

Pedagogy

Sleep

Biology

Nutrition

Psychology

Neurology

Sociology

Psychiatry

Where to start?

2nd International Workshop on Time Studies in Childhood and Youth

1ST INTERNATIONAL WORKSHOP ON TIME STUDIES IN CHILDHOOD AND YOUTH

https://ansolab.blogs.uv.es/

cost
European Cooperation in Science and Technology

INTERNATIONAL JOURNAL OF SCHOOL HEALTH

European Commission

European Journal of *Investigation in Health, Psychology and Education*

International Journal of SCHOOL HEALTH

S·H·E
Schools for Health in Europe

GV/2019/002 Project TIME
[Time in childhood: a mapping of Spain]

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Thank you for your attention!!!

Daniel Gabaldón-Estevan | Online 28/10/2020
Department of Sociology and Social Anthropology, Faculty of Social Sciences, University of Valencia- Valencia (ES) - daniel.gabaldon@uv.es

ANALYTICAL SOCIOLOGY LAB Edu

http://www.slideshare.net/DanielGabaldnEstevan

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https://www.researchgate.net/profile/Daniel_Gabaldon-Estevan

https://www.linkedin.com/pub/daniel-gabad%C3%B3n-estevan/23/722/aaa

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http://www.researcherid.com/rid/B-5195-2011