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Helping Active Lives through Targeting Healthy Youth

Habit formation in exercise and eating behaviours

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"This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein"

Co-funded by the Erasmus+ Programme of the European Union

Habit formation

Why do we need habit formation?

- Healthy habits create the best outcomes in terms of quality of life
- Primary school create the best platform for initial stages of habit
- Healthy habits can be promoted through fun and games!
- All traditional games provide platforms for habit creation!

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What are we going to discuss

- Early life influences
- Factors influencing children's eating behaviours
- Hedonism vs length in habits creation
- Habits: Definition, stages and formation
- The role of incentives
- Maintaining healthy habits
- Applications for the family and school

Review

Early Taste Experiences and Later Food Choices

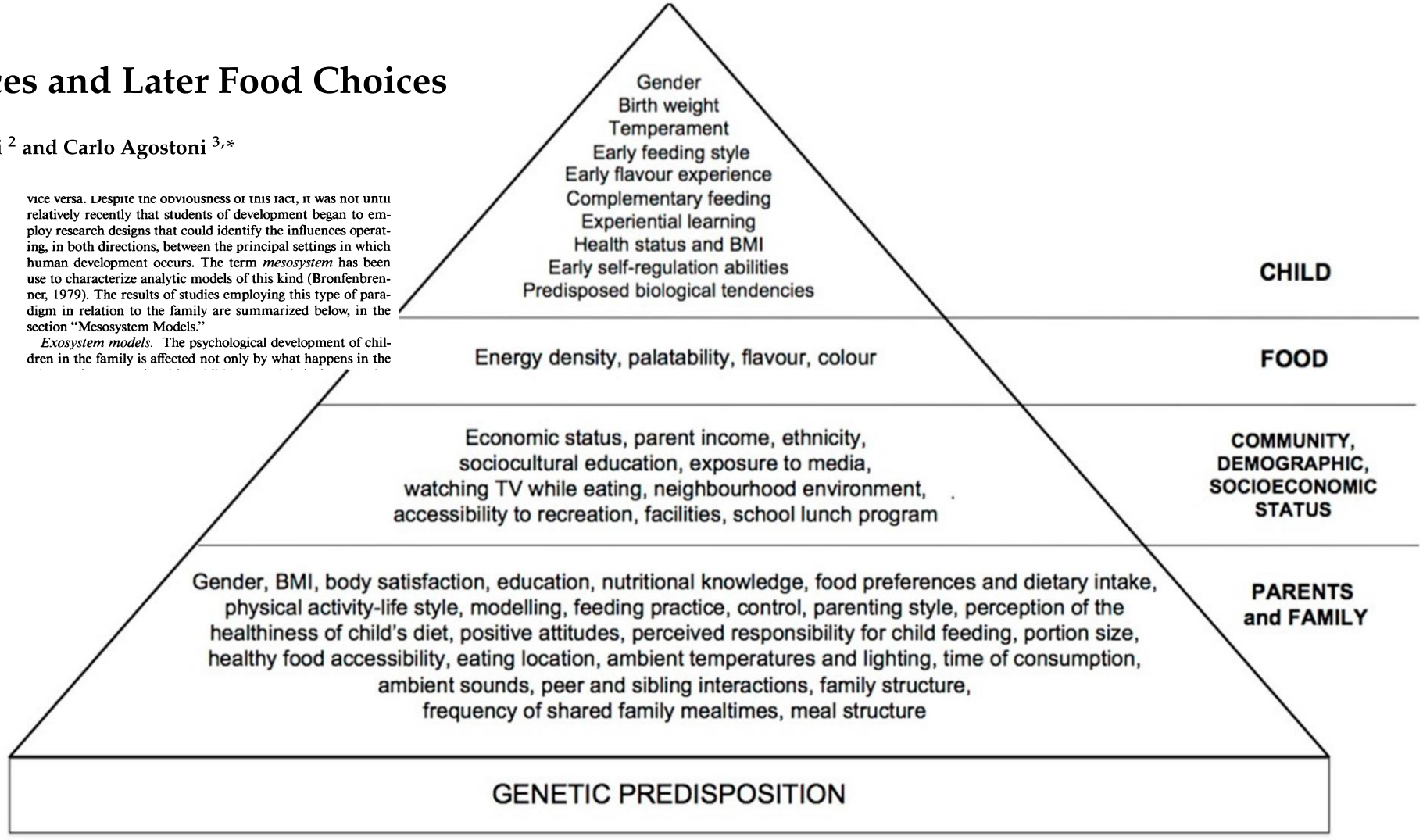
Valentina De Cosmi [1], Silvia Scaglioni [2] and Carlo Agostoni [3,*]

investigating the impact of environment on development. These paradigms provide a useful framework for ordering and analyzing studies bearing on the topic of this review. At the most general level, the research models vary simultaneously along two dimensions. As applied to the subject at hand, the first pertains

vice versa. Despite the obviousness of this fact, it was not until relatively recently that students of development began to employ research designs that could identify the influences operating, in both directions, between the principal settings in which human development occurs. The term *mesosystem* has been use to characterize analytic models of this kind (Bronfenbrenner, 1979). The results of studies employing this type of paradigm in relation to the family are summarized below, in the section "Mesosystem Models."

Exosystem models. The psychological development of children in the family is affected not only by what happens in the

This review is based on a longer background paper prepared at the request of the Human Learning and Behavior Branch of the National Institute of Child Health and Human Development in connection with



BMI: Body Mass Index

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Nutrients **2018**, *10*, 706; doi:10.3390/nu10060706

Factors Influencing Children's Eating Behaviours

Silvia Scaglioni [1], Valentina De Cosmi [2,3], Valentina Ciappolino [4], Fabio Parazzini [5,6], Paolo Brambilla [7,8] and Carlo Agostoni [2,5,*]

Strategies to improve child's eating behaviour.

Strategy	Practices
Covert control	- Purchasing only healthy foods at home - Avoidance of unhealthy stores and fast food
Avoid the use of food rewards	- Food maintains the behaviour on which its delivery and acquisition is dependent
Promoting self-regulation	- Recognition of fullness sense - Serving moderate portions - Help in organizing the feeding environment
Authoritative parenting style	- Encourage children to try new foods - Parents are the example - Parent models healthy eating and enjoyment of foods - Do not model disliking of foods in front of child - In obesogenic environment, some parental control is likely needed to moderate children's intake of palatable snack foods - Early responsive parenting [RP] intervention
Family meals	- Expose to a variety of foods - Repeatedly expose child to a food - Allow child to have input into food choices - High frequency of shared family meals - Daily shared breakfast - Socialization during mealtime - Turn off TV at meals
Parent's focused intervention	- Educationally-based interventions adapted to parents and caregivers - Feeding-related advice - Empowering parents - Social support
Family environment	- Early-life experiences with healthy tastes and flavours may promote healthy eating - Give the parental role in food shopping and preparation - Healthy food availability - Reduce screen time and get adequate sleep

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Pleasure from food – Applications during childhood years

The sensory dimension: pleasure from food sensory properties

- repeated exposure to a specific taste, flavour, texture or food enhanced the pleasure that derives from their consumption.
- children able to learn pleasure from the sensory properties of foods even when the food is initially disliked (Maier et al., 2007).

Pleasure from food – Applications during childhood years

The interpersonal dimension: pleasure from interaction with others and sharing food

- social eating situations encourage interactions between people during meals and are crucial for the development of children's eating behaviours.
- social learning plays a major role in guiding what and how much a child eats (Shutts, et al., 2012).
- children are more likely to put the food in their mouth when the adults were also eating than when the adults were simply offering the food.
- positive social interactions while eating create strong links to pleasure (Liberman et al., 2016)

Pleasure from food – Applications during childhood years

The psychosocial dimension: pleasure from cognitive representations of food

- premium offers (free gifts) the use of promotional characters, and various cartoons make the food more tasteful (Roberto et al., 2010)
- pointing out which types of foods are “good” or “bad” for health may lead children to believe that healthiness and tastiness are mutually exclusive characteristics (Baranowski et al., 1993);
- nutritional policies could be more effective if they associated healthy foods with pleasure from eating.

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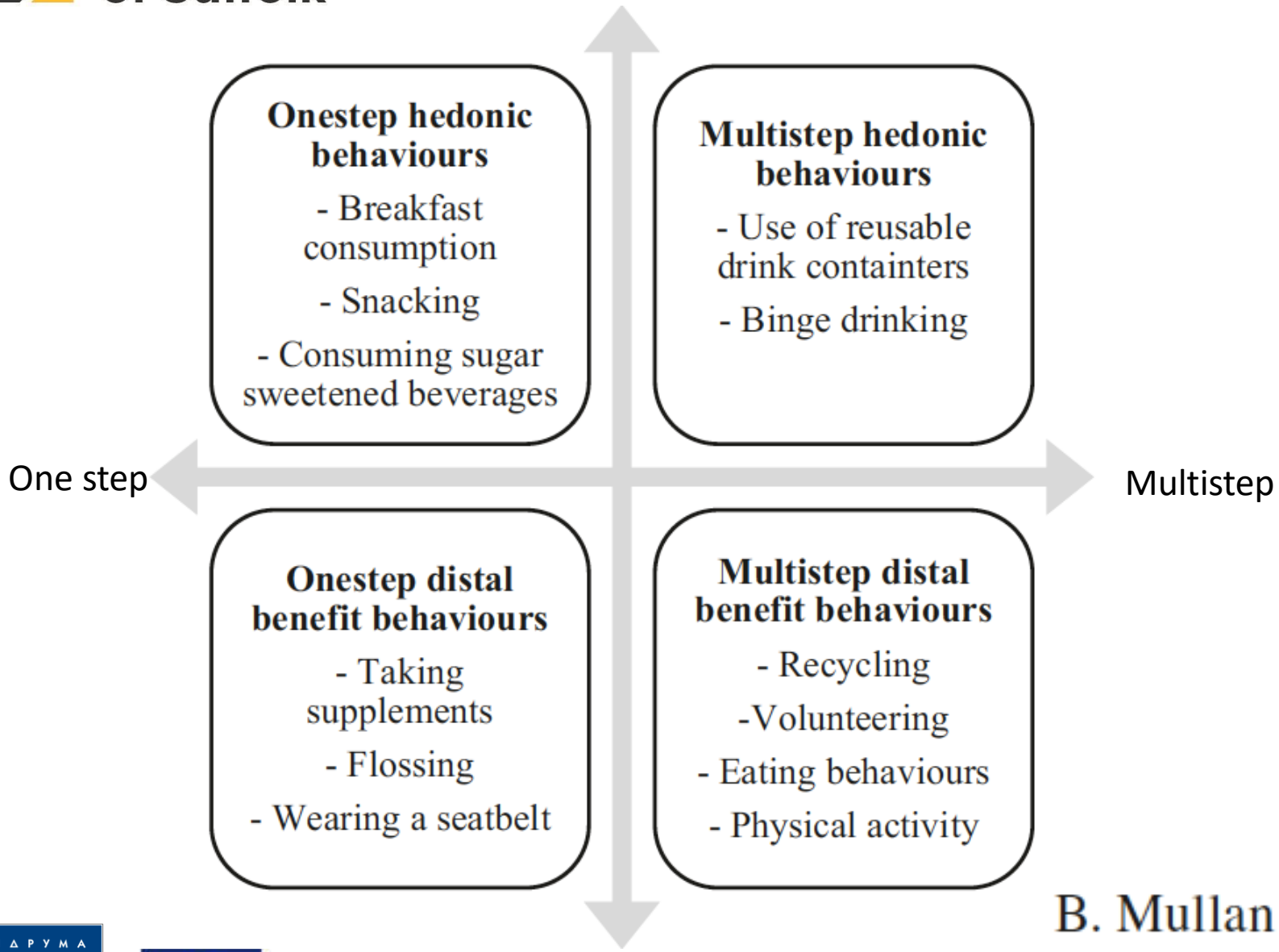

Fig. 5.1 Behaviour classification based on number of steps and outcome of behaviour with examples (*X* axis ranges from onestep to multistep behaviour; *Y* axis ranges from hedonic to distal benefit behavioural outcomes)

B. Mullan and E. Novoradovskaya (2018)

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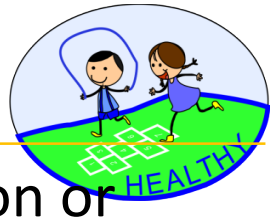

Definitions of habit

Current notions define habit as a specific action or *behavioural tendency* that is portrayed with *little conscious awareness* or reflection, in response to a specific set of combined *conditions or contextual cues*.

Automaticity is considered a key feature of habit; habits tend to be performed with little conscious awareness and, as a consequence, occur swiftly and effectively without much effort.

As habit-related routines develop, individuals become *less sensitive to the goals and rewards* that may have led to the development of the habit

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The importance of habits in eating behaviour. An overview and recommendations for future research

Jonathan van't Riet [a,*], Siet J. Sijtsema [a], Hans Dagevos [a], Gert-Jan De Bruijn [b]

Appetite 57 (2011) 585–596

When behaviour is habitual:

- people require little information to make decisions,
  i.e. brushing your teeth
- intentions are poor predictors of behaviour,
  i.e. eating popcorn in the cinema
- behaviour is triggered by situational cues.
  i.e. having pizza with friends vs. alone

Stimulus Control!
(more fruits and veggies)
Education on facts!
(healthy vs. unhealthy)
If ?...What ! Scripts
(If hungry...I'll eat a fruit)
Positive reinforcement
(eating this, you gain that!)

Healthy habits: efficacy of simple advice on weight control based on a habit-formation model

P Lally, A Chipperfield and J Wardle

International Journal of Obesity (2008) 32, 700–707

Ten Top Tips for Weight Loss

1. Keep to your meal routine
2. Go reduced fat
3. Walk off the weight
4. Pack a healthy snack
5. Learn the labels
6. Caution with your portions
7. Up on your feet
8. Think about your drinks
9. Focus on your food
10. Do not forget your 5 a day

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Habitual instigation

Habitual instigation refers to:

1. habitual triggering of the selection of an action and,
2. a non-conscious binder to executing it upon encountering a cue that has consistently been paired with the action in the past.

e.g. “eating a bag of chips” is habitually instigated with the performer automatically cued to select “eating chips” from various behavioural options

- Important implications for health (controlling contextual cues to adhere to behaviours, i.e. commuting by bicycle each morning)

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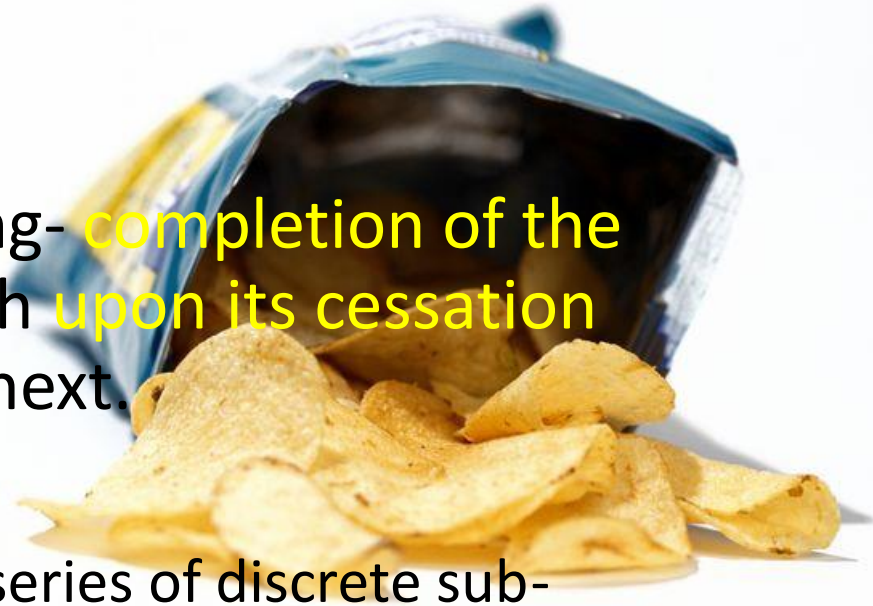
Habitual execution



- Habitual execution refers to the -habit facilitating- completion of the sub-actions. They contain any given action which upon its cessation leads in a sequential automatically triggers the next.
  - “eating a bag of chips” can be deconstructed into a series of discrete sub-actions (e.g., “opening bag,” “putting hand in bag,” “putting food in mouth,” “chewing,” “swallowing”; Cooper & Shallice, 2000).

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Phases of habit formation

1. Decision to act
2. Acting on this decision
3. Repeat acti
4. In a conducive to the development of the repetition of the action

Anticipated pleasure: Important motivating factor!

Pre-initiation stage

Post-initiation stage

(Fournier et al., 2017; Rhodes & de Bruijn, 2013; Rothman, 2000)

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Which are the most helpful techniques for instigating behaviour habit?

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Helpful techniques → Phase 1

Intention formation is likely when people anticipate that the action (or its consequences) will be positive and believe that they have a realistic opportunity and competence to complete the behavior

(Ajzen, 1991; Bandura, 2001; Michie et al., 2011; Rogers, 1983; Schwarzer, Lippke, & Luszczynska, 2011).

- Providing information on the likely positive consequences of action, or
- Choosing to pursue actions that are already most highly valued, may therefore aid habit development by enhancing motivation.

Helpful techniques → Phase 2 to Phase 3

Action control skills are required to initiate intention enactment (phase 2) and to maintain the behaviour by consistently prioritising the intention over competing alternatives (phase 3).

This will likely be facilitated by self-regulatory techniques such as;

- planning,
- setting reminders,
- self-monitoring,
- reviewing goals to ensure they remain realistic and attractive, and
- receiving (intrinsic) rewards contingent on successful performance (Gardner et al., 2012; Lally & Gardner, 2013)

In review: Habit formation

Habits are developed through repeated execution of behaviours in the presence of salient cues or contextual features.

Initiation of the behaviour at this starting stage is determined by intentional processes guided by reflection on the merits and detriments of acting and anticipated outcomes.

With repetitions in stable contexts, behavioural control shifts toward automatic, non-conscious processes;

the instigation of the behaviour acquires the features of a habit: fast, efficient, non-conscious, and non-intentional.

Physical activity/dieting habits can develop over a period of weeks;

there is considerable inter-individual variability in how quickly habits can be acquired.

Big five dimension	People with a high score on this dimension tend to be more:
Conscientiousness	Careful, dependable, self-disciplined
Agreeableness	Courteous, good-natured, empathic, caring
Neuroticism	Anxious, hostile, depressed
Openness to experience	Sensitive, flexible, creative, curious
Extroversion	Outgoing, talkative, sociable, assertive

Self-regulation

Self-regulation pupils to lead!

Individuals high on conscientiousness or trait self-control have better self-regulatory skills and more likely to form intentions to participate in physical activity or eat healthily in the future;

For example, they show:

- better capacity to organize and structure their behaviours to attain goals,

- inhibit or effectively manage barriers and contingencies that may derail their goal directed behaviours

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Dali in Madrid

- Early 20th Century: the brain discovery
- Differences between right and left hemispheres
- Decision making and automatic decision making

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Dual system and habit formation

Two pathways by which past behaviour acts on subsequent behaviour:

System 1: the automatic, spontaneous processes to behavioural enactment proposed in dual process theories and likely captures the automaticity component of habit.

System 2: The second is in direct effect of past behaviour on activities mediated by the social cognitive constructs (attitudes, subjective norms, perceived behavioural control) and intentions.

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Interventions should initially focus on fostering motivation to engage in the behaviour and identifying clear standards that represent success, both prerequisites for a goal-directed action, using strategies such as goal setting and positive feedback

Repeated successful experience in similar contexts is likely to lead to the development of habits. Interventions should therefore prompt individuals to develop and articulate a planned routine, or set of routines, and follow them regularly.

Monitor the routine for consistency in initiating cues such as location and time of day.

Increased repetition of the behaviour concurrent with the relevant contextual cues is expected to lead to a shift in the behaviour control from a reasoned process to a more automatic one as the habit develops.

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Physical Activity Habits?

Knowledge

Provide individuals with knowledge and practice on setting appropriate goals for physical activity

- appropriate and realistic, valued, able to be monitored, and sufficiently flexible to be modified according to progress (Epton et al., 2017; Brand & Ekkekakis, 2018).

Helpful Contexts

Support the identification of appropriate contexts and conditions that may cue up their regular physical activity habits,

- Balls and cones as visual reminders
- an alarm or a visual reminder such as leaving exercise clothing or equipment in a notable place (Harkin et al., 2016; Kaushal et al., 2017).

Identify antagonistic activities

Identify cues and contextual contingencies that are linked to actions that may antagonise/derail selected physical activities,

- such as invitations from friends to join them in doing something sedentary such as going for lunch or sitting down and watching television (Conroy, Maher, Elavsky, Hyde, & Doerksen, 2008).

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Physical Activity Habits?

Form implementation intentions and action plans to pair up their selected physical activity with the identified cues or contingencies

(Hagger, et al., 2016)

- using an if/then format, which requires individuals to explicitly identify both cue and associated action, and writes it down or verbally rehearses it (Chapman, Armitage, & Norman, 2009).

Structure the environment to facilitate regular participation in physical activity in stable contexts, and to refrain potential derailing occurrences. Nudging interventions to facilitate this normalisation of behaviour.

(Venema, et al., 2017)

- organise trips using public transport stepping out in the previous stop every other week; receiving a message from the Gym to remember the sporting gear when leaving home in the morning.

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Eating Habits?

Knowledge

Provide individuals with knowledge and practice on setting appropriate goals for eating behaviours

- Tasteful and hedonic as normal choices;
- Based on internal cues and satiety signals (Bacon, 2009).
- Gradually more efficient based on experience and progress (Epton et al., 2017; Brand & Ekkekakis, 2018).

Helpful Contexts

Support the identification of appropriate contexts and conditions that may cue up their regular healthy eating habits,

- Grab your fruits and nuts before leaving home;
- Start the meal with a salad;

(Harkin et al., 2016; Kaushal et al., 2017).

Identify antagonistic activities

Identify cues and contextual contingencies that are linked to actions that may antagonise/derail selected healthy eating habits,

- Eating while watching TV;
- Eating junk food when with friends;
- Associating a break with a chocolate; (Conroy, Maher, Elavsky, Hyde, & Doerksen, 2008).

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Healthy Eating Habits?

Form implementation intentions and action plans to pair up their selected eating behaviours with the identified cues or contingencies.

(Hagger, et al., 2016)

- using an if/then script, which requires individuals to explicitly identify both cue and associated action, write it down or verbally rehearsing it (Chapman, Armitage, & Norman, 2009).

Structure the environment to facilitate regular healthy eating behaviours in stable contexts, and to refrain potential derailing occurrences. Nudging interventions to facilitate this normalisation of behaviour.

(Venema, et al., 2017)

- have meals and snacks with you and organized in advance;
- check in advance healthy options in local cafés and restaurants;
- pair up business meetings with healthy snacks.

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How to promote fruit consumption in children. Visual appeal versus restriction☆

Esther Jansen *, Sandra Mulkens, Anita Jansen

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doi:10.1016/j.appet.2010.02.012

Appetite 54 (2010) 599–602

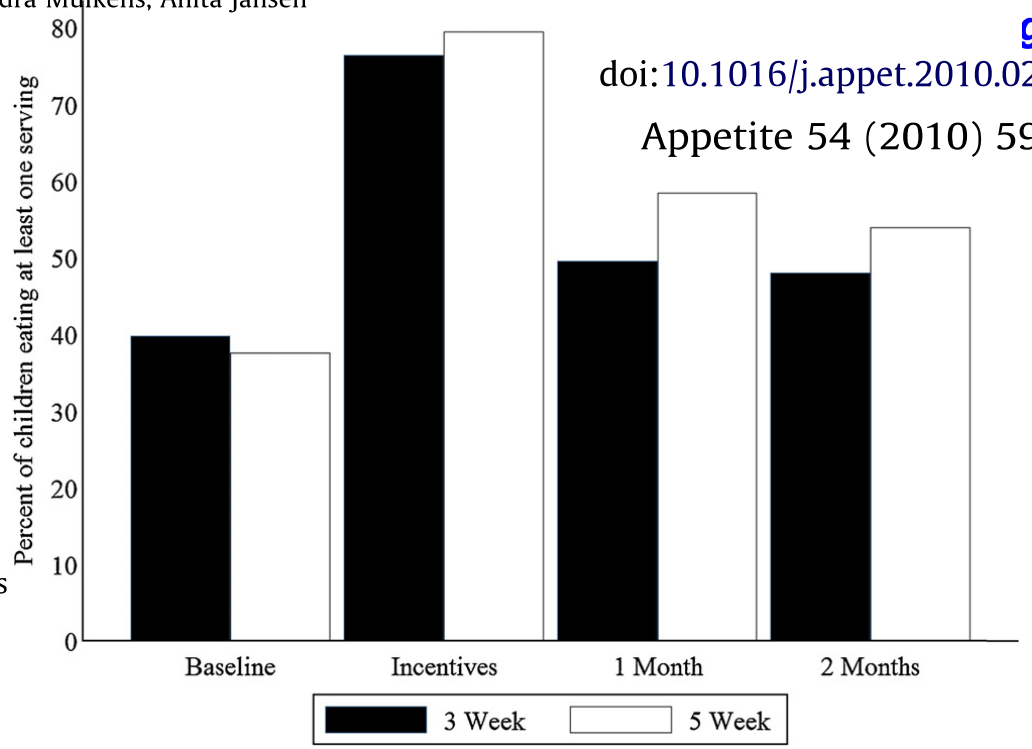

Fig. 1. Levels of consumption before, during and after the incentives period. The baseline period includes the 10 days prior to the start of the incentives. "1 month" and "2 months" refer to the first and second month after the end of the incentive period.

Habit formation in children: Evidence from incentives for healthy eating

George Loewenstein[a], Joseph Price[b,*], Kevin Volpp[c,d,e,f]

Do incentives actually work?

http://dx.doi.org/10.1016/j.jhealeco.2015.11.004 Journal of Health Economics 45 (2016) 47–54

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Maintaining healthy habits

Perspectives on Psychological Science
2015, Vol. 10(6) 701–705

Hale and Hearty Policies: How Psychological Science Can Create and Maintain Healthy Habits

Alexander J. Rothman[1], Peter M. Gollwitzer[2], Adam M. Grant[3], David T. Neal[4], Paschal Sheeran[5], and Wendy Wood[6]

DOI: 10.1177/1745691615598515

What is the impact of my behaviour to others?	*How are my loved ones affected?…*
Clear *"If…Then!"* Plans!	www.woopmylife.org https://vimeo.com/144843655
Change cues in your environment!	Visible fruits on the table; Treadmill in the common room.
Increase the frequency or Change policy to reflect the new habit	Walk the dog after each meal; Every Tuesday is apple day! Monday and Wednesday are staircase days!

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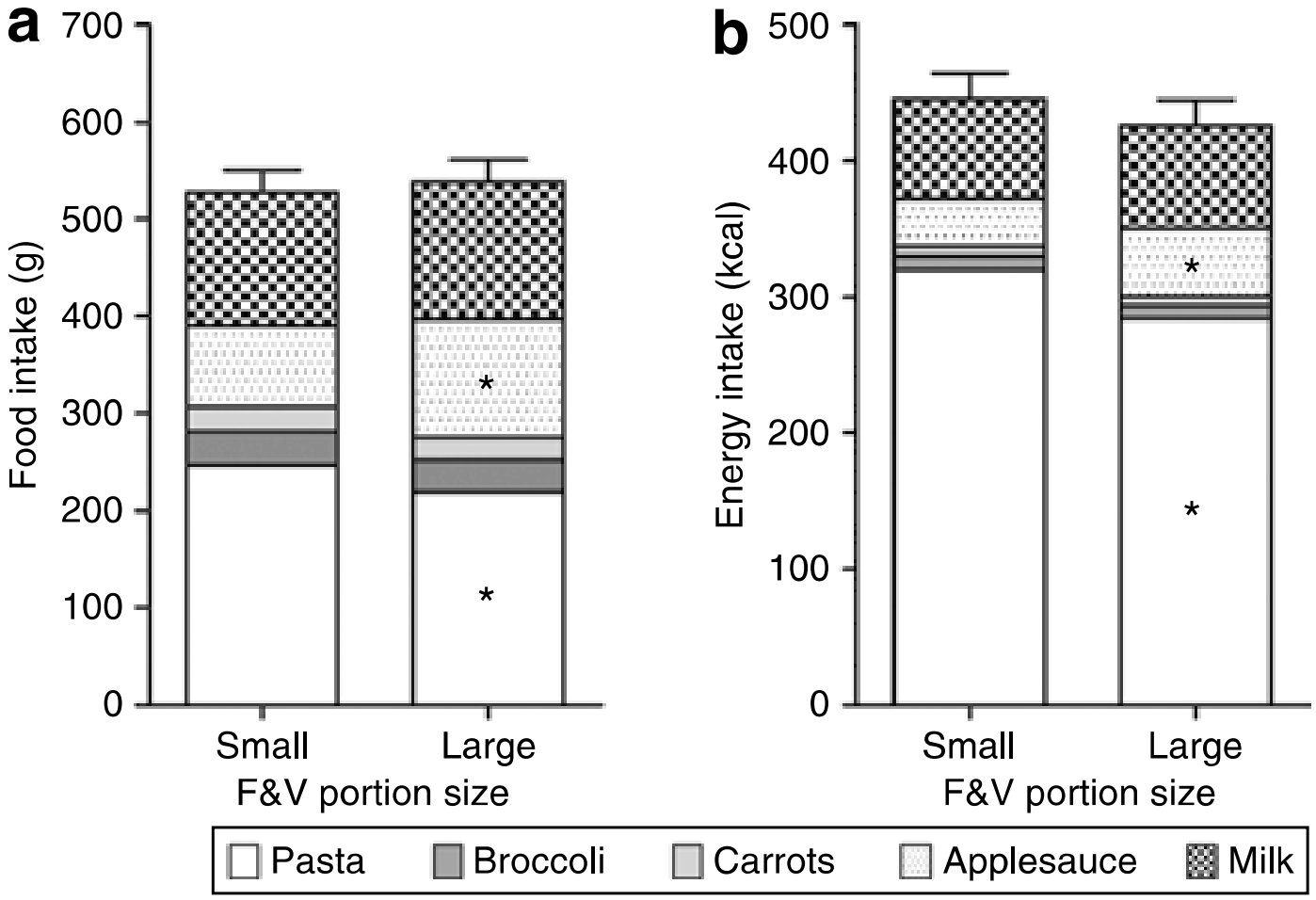
Effects of Doubling the Portion Size of Fruit and Vegetable Side Dishes on Children's Intake at a Meal

Tanja V.E. Kral[1], April C. Kabay[1], Liane S. Roe[2] and Barbara J. Rolls[2]

Obesity (2010) **18,** 521–527. doi:10.1038/oby.2009.243



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Applications for the family

- Brief tasting of unfamiliar or disliked food within a positive social context; Early exposure to veggies!

  Exposure at least for 5 (and up to 10) times

- Reward healthy choices but not with unhealthy food already liked!

  Tokens based on a well-believed cause or over a fun activity

- Fruits and veggies need to be as intrinsically appealing as possible

  Make veggies fun & entertaining to eat!

- No coercion or pressure to avoid food

  Better make unhealthy food unavailable; increase portion of veggies

- Be the social model your child wants you to be!

  Use also other means (books, media, movies, story telling, etc.)

A narrative review of psychological and educational strategies applied to young children's eating behaviours aimed at reducing obesity risk

E. L. Gibson[1], S. Kreichauf[2], A. Wildgruber[2], C. Vögele[3], C. D. Summerbell[4], C. Nixon[4], H. Moore[4], W. Douthwaite[4] and Y. Manios[5] on behalf of the ToyBox-Study Group

doi: 10.1111/j.1467-789X.2011.00939.x

obesity reviews (2012) **13** (Suppl. 1), 85–95

Applications for the schooling environment

Early life experiences and family influences play a big role in habit formation around food and physical activity habits.

We can definitely influence children through games directing attention to the consumption of fruits and veggies.

Fun and entertainment needs to be part of learning new habits.

Education needs to precede socio-cognitive and physiological influences.

Positive cues need to be repetitive and continuous for healthy habits to form.

Problem solving skills should be included in the creation of new habits.

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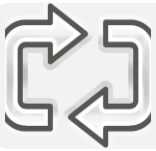
Applications for the schooling environment

Promote good habits through fun and active games! (gaining points associated to healthy food types)

Suggest how much unhealthy habits need to be avoided and "passed on" to the rival team as something negative! *("take the soda")*

Education before promoting the healthy behaviours. *("Why do we need colorful fresh veggies?")*

Prepare "If…Then!" scripts *("What are you going to take with you before leaving for school?")*



Repeat frequently with a variety of games and topics! (Veggies, food ingredients, fruits, sodas, etc.)

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Three major ingredients and their value

Fresh veggies

Protein

Carbohydrates

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Games during PE

Chase

Hide-and-Seek

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Dodgeball

Tag-of-war

Blind man's buff

Games during PE

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