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How theories from psychology and behavioural science can inform the development of effective interventions to promote health behaviour

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Outline

- Thinking Behaviourally
- Role of Psychology and Behavioural Science
- Behavioural Interventions: Considerations
- Role of Theory and Why it's Important
- Behaviour Change Techniques
- Techniques in Interventions
- Examples + Evidence

Let's think behaviourally

- What behaviours can you think of that might need 'changing' in health contexts?

Some ideas

- Adherence to exercise programs
- Reducing binge drinking
- Smoking cessation
- Eating a healthy diet
- Taking medication
- Attending health checks/screening
- Correct posture, taking breaks, lifting
- Sufficient sleep quality
- Managing stress, personal relationships
- Sun screen behaviour

Health Psychologists and Behavioural Scientists

- Health psychologists/behavioural scientists aim to:
 - Conduct basic research to provide an evidence base of the **influential factors** (**‘antecedents’**) related to health behaviour and
 - Develop **methods** or **‘behavioural techniques’** to **manipulate** the factors and **change** health behaviour
 - Interested in getting people to change by themselves for themselves: **self-regulation**

Behavioural Interventions: Considerations

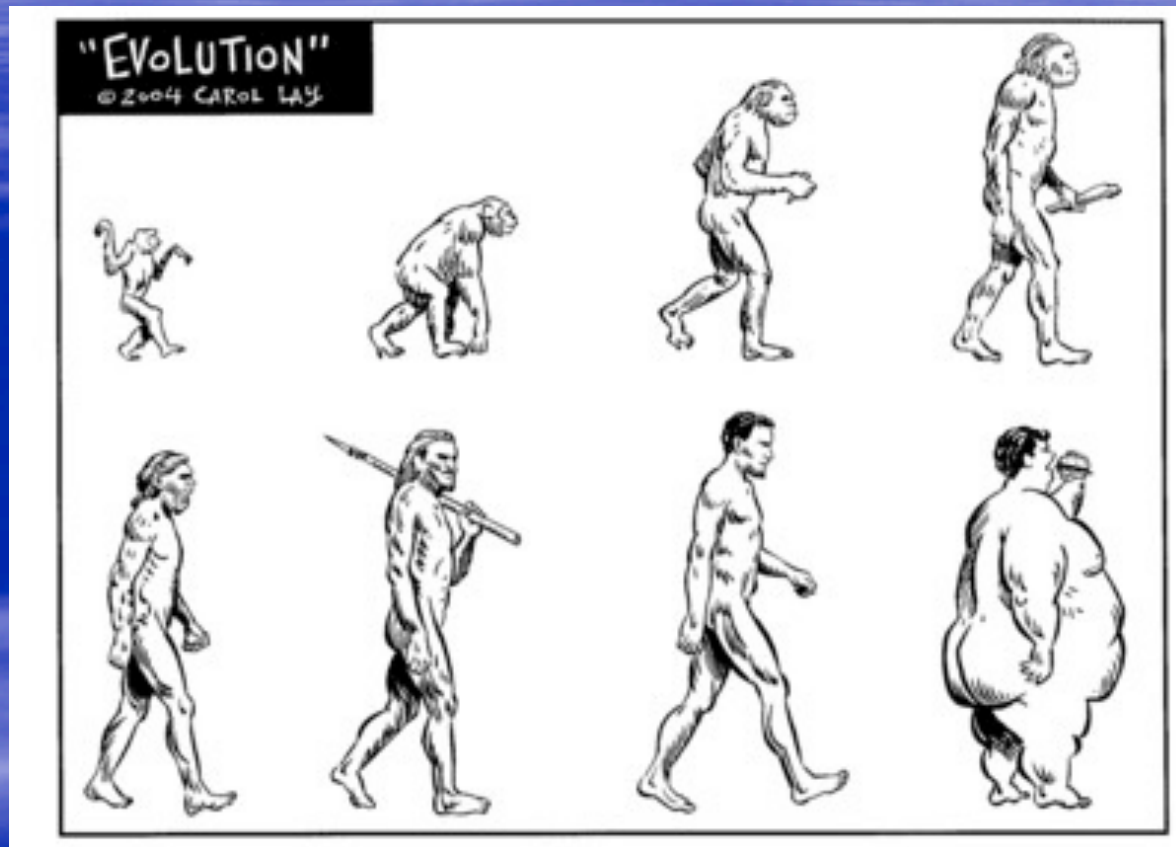
- What is the problem that necessitates change?
- Who needs to change?
- What behaviours need to change?
- What change mechanisms need to be activated?
- What behaviour change techniques/ strategies can be used to activate changes?

The Problem

- Growing problem of behaviour-related chronic non-communicable illnesses and conditions
 - Cardiovascular disease
 - Diabetes
 - Obesity
- Preventable illnesses with epidemiological research linked to
 - Low levels of physical activity
 - Diet high in energy and saturated fat



The problem



Costs of Inactivity for Diabetes

- WHO: 27 % of diabetes is caused by physical inactivity – in Finland the costs of inactivity in case of Diabetes is €725.000.000 every year
- Diabetics: health care costs €1.350.000.000 per annum in productivity costs (Dehko survey)
- And the number of diabetics is increasing every year 5 %, massive burden on healthcare services

Behavioural Interventions: Considerations

- What is the problem that necessitates change?
- **Who needs to change?**
- What behaviours need to change?
- What change mechanisms need to be activated?
- What behaviour change techniques/ strategies can be used to activate changes?

Target populations



Behavioural Interventions: Considerations

- What is the problem that necessitates change?
- Who needs to change?
- **What behaviours need to change?**
- What change mechanisms need to be activated?
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What Behaviours Need to Change?

Engaging in a suite of four healthy behaviors (not smoking, healthy diet, adequate physical activity, and moderate alcohol consumption) is associated with an estimated 11 to 14 year delay in all-cause mortality

(Ford, Zhao, Tsai, & Li, 2011; Khaw et al., 2008)

What Behaviours Need to Change?

- Multiple health conditions with behavioural roots need behavioural solutions – for prevention and management

Condition	Behaviour(s)
Cardiovascular disease	Physical activity, healthy eating
Cancer	Physical activity, not smoking, alcohol in moderation
Diabetes	Physical activity, diet, medication
Obesity	Physical activity, diet
Liver Cirrhosis	Alcohol in moderation
Sexually-transmitted infections	Barrier contraception

Behavioural Interventions: Considerations

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Effective Behaviour Change

Successful behavioural interventions...

- Use theory in intervention design
- Target cognitive and behavioural skills
- Target social influences e.g. norms
- Train those delivering the intervention
- Include multiple components

Why is Theory Important?

Answering the 'what' and 'how' questions

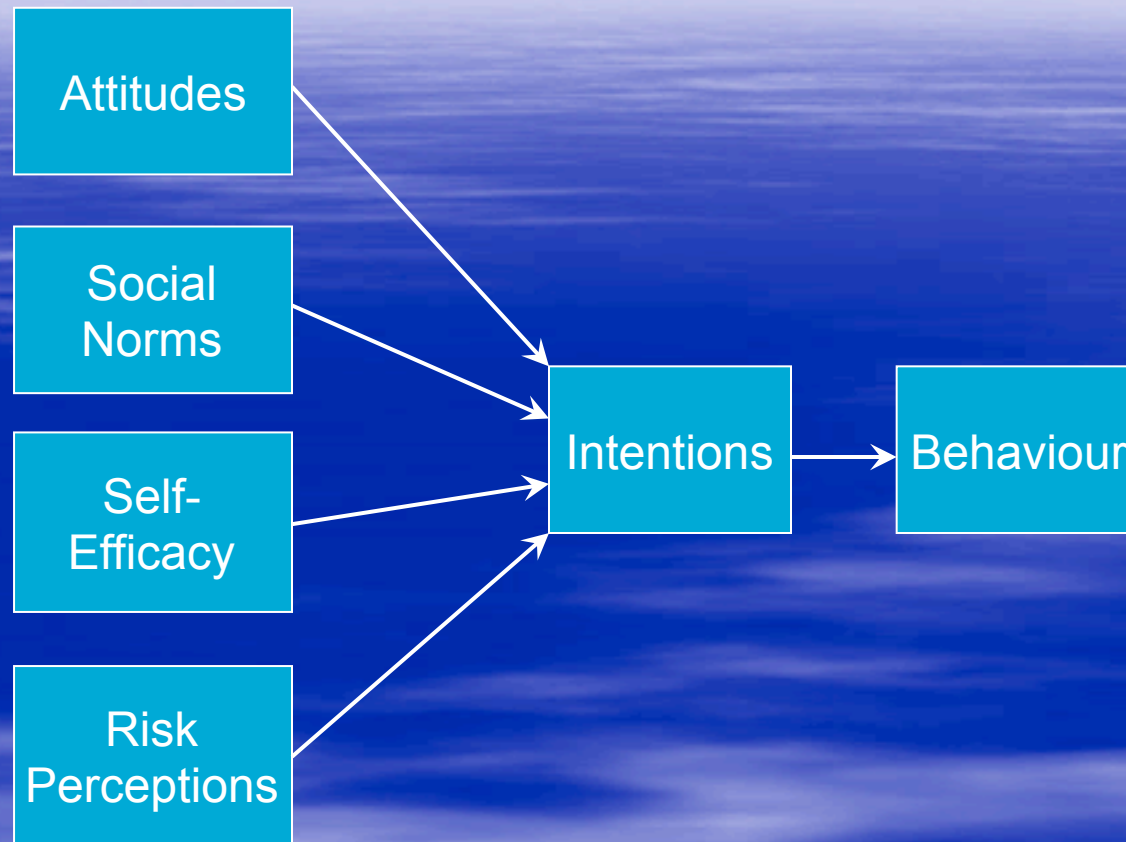
- Explanatory systems, **ideas** on how behaviour 'works'
- Allows us to pose **questions** and make **predictions**
- Permits confirmation vs. rejection
- Avoids 'hit and hope' or 'variable fishing expeditions'
- Enables more efficient, focused interventions that work

Basic Theoretical Research

Answering the 'what' and 'how' questions

- Basic research on behavioral theory in exercise psychology is essential to understand...
 - The personal and social factors ('what') – e.g., attitudes, self-efficacy, intentions/motives
 - Mechanisms responsible ('how') – mediation and moderation
 - Targets for intervention – what do we have to change to bring about change?

Boxes and Arrows!



Sources: Fishbein, M., & Ajzen, I. (2009). *Predicting and changing behavior: The reasoned action approach*. New York, NY: Psychology Press.

McEachan, R., Taylor, N., Harrison, R., Lawton, R., Gardner, P., & Conner, M. (2016). Meta-analysis of the reasoned action approach (RAA) to understanding health behaviors. *Annals of Behavioral Medicine*, 50, 592-612. doi: 10.1007/s12160-016-9798-4

Basic Process Model for Health Behavioural Interventions



Behavioural Interventions: Considerations

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Behaviour Change Techniques

What is a behaviour change technique?

“Techniques or processes that have been shown to be able to change one or more determinants of behaviour”

(Kok et al., 2016, p. 299)

“Provides a toolbox that most efficiently enables planners to select the method that fits their circumstances”

(Kok et al., 2016, p. 304)

Behaviour Change Techniques

- 'Active ingredients' of behaviour change interventions
- They 'do the work' in changing behaviour
- They are irreducible and unique in that they cannot be broken down further and are separate from others
- Could be seen as the 'tools' in a behaviour change 'toolbox'
- Can be used independently or in conjunction with others

Behaviour Change 'Taxonomy'

- Structured organisation of unique techniques that make up behavioural interventions
- “The need for a common vocabulary in terms of which content components of behaviour change interventions can be defined and described”

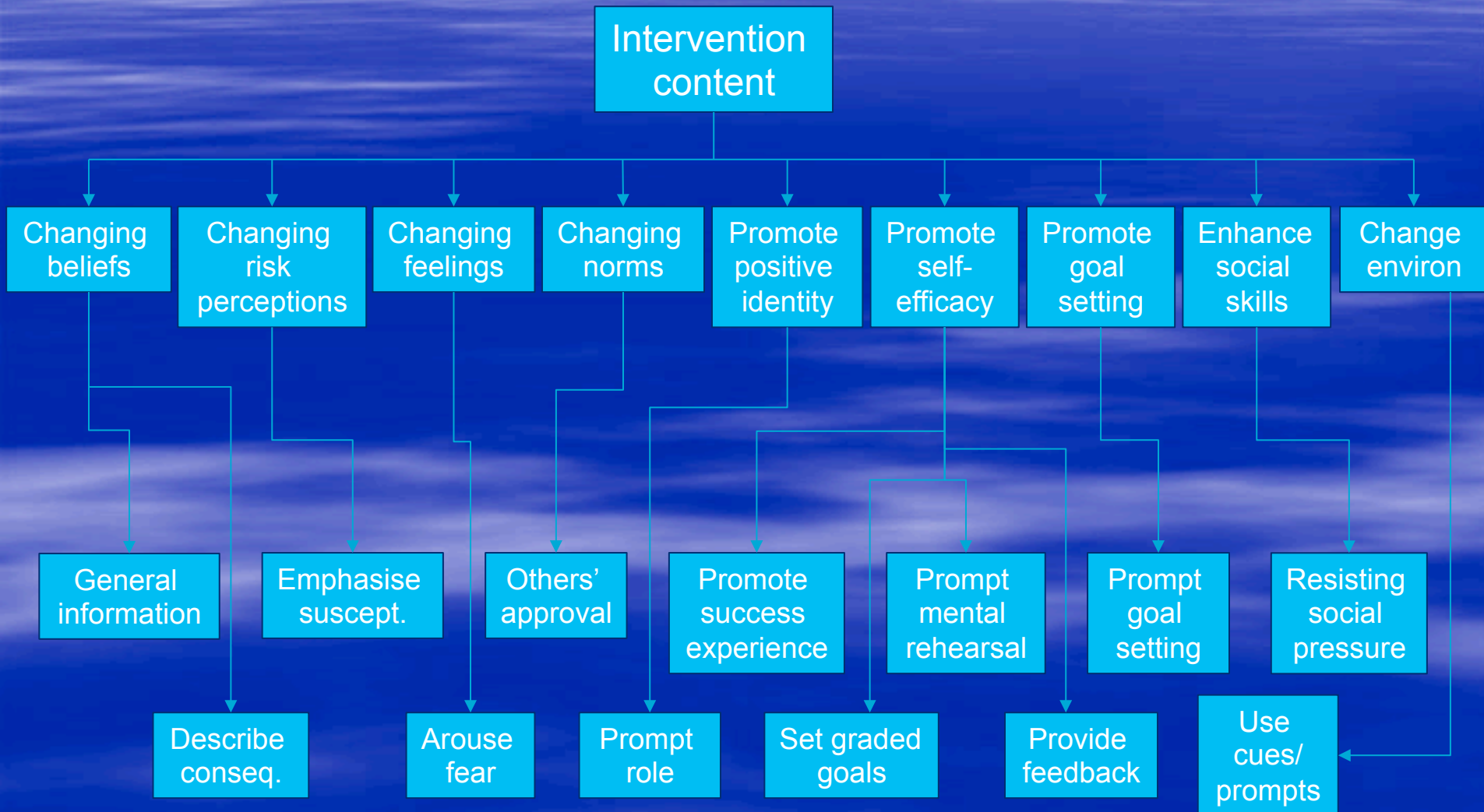
(Abraham & Michie, 2008, p. 380)

- Analogy: “Mapping the genome” of behaviour change interventions

Categories of BCTs

- Changing personal beliefs (instrumental attitudes)
- Changing risk perceptions
- Changing feelings (affective attitudes)
- Changing normative beliefs (social norms)
- Promoting positive identity
- Promoting self-efficacy
- Promoting emotional readiness for action
- Prompt goal setting and goal priority
- Enhance social skills
- Promoting environmental change
- Incentivising change using rewards

'Mapping the Genome' of Behavioural Interventions



Knowing your BCTs

- Changing personal beliefs (instrumental attitudes)
- Changing risk perceptions
- Changing feelings (affective attitudes)
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Changing personal beliefs (attitudes)

- Provide general information on behaviour-health link
- Describe consequences of behaviour

A pamphlet identifying possible benefits of exercise and how it can promote health (e.g., fitness, weight loss, social benefits)

MOVING FOR HEALTH ENERGIZE YOUR LIFE!

Physical Activity

It's important to help you maintain physical and mental health and have a greater quality of life.

Regular physical activity is very effective in helping you to lose weight, it also helps to improve mood and help relieve stress. Regular physical activity can also help to prevent and control many health dependent Type 2 diabetes.

Physical activity helps to improve bone mass, joint flexibility, muscle strength and endurance, healthy weight, and maintaining healthy weight.

Engaging in regular physical activity, such as weight bearing activities, can promote bone health and prevent osteoporosis.

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Get out and get active.

As little as 30 minutes, 5 days a week can help you live longer and better.

How often?

- At least 5 days a week
- For at least 30 minutes
- At least 150 minutes a week

What's the best activity to do?

- Any activity you enjoy
- Any activity that gets your heart rate up
- Any activity that makes you breathe hard
- Any activity that makes you sweat
- Any activity that makes you feel good
- Any activity that makes you feel better
- Any activity that makes you feel like you're doing something good
- Any activity that makes you feel like you're doing something healthy
- Any activity that makes you feel like you're doing something fun
- Any activity that makes you feel like you're doing something meaningful
- Any activity that makes you feel like you're doing something important
- Any activity that makes you feel like you're doing something special
- Any activity that makes you feel like you're doing something unique
- Any activity that makes you feel like you're doing something amazing
- Any activity that makes you feel like you're doing something incredible
- Any activity that makes you feel like you're doing something extraordinary
- Any activity that makes you feel like you're doing something phenomenal
- Any activity that makes you feel like you're doing something epic
- Any activity that makes you feel like you're doing something legendary
- Any activity that makes you feel like you're doing something mythical
- Any activity that makes you feel like you're doing something magical
- Any activity that makes you feel like you're doing something mystical
- Any activity that makes you feel like you're doing something mysterious
- Any activity that makes you feel like you're doing something enigmatic
- Any activity that makes you feel like you're doing something cryptic
- Any activity that makes you feel like you're doing something elusive
- Any activity that makes you feel like you're doing something rare
- Any activity that makes you feel like you're doing something precious
- Any activity that makes you feel like you're doing something valuable
- Any activity that makes you feel like you're doing something priceless
- Any activity that makes you feel like you're doing something irreplaceable
- Any activity that makes you feel like you're doing something invaluable
- Any activity that makes you feel like you're doing something incalculable
- Any activity that makes you feel like you're doing something immeasurable
- Any activity that makes you feel like you're doing something boundless
- Any activity that makes you feel like you're doing something endless
- Any activity that makes you feel like you're doing something infinite
- Any activity that makes you feel like you're doing something eternal
- Any activity that makes you feel like you're doing something everlasting
- Any activity that makes you feel like you're doing something permanent
- Any activity that makes you feel like you're doing something enduring
- Any activity that makes you feel like you're doing something long-lasting
- Any activity that makes you feel like you're doing something timeless
- Any activity that makes you feel like you're doing something ageless
- Any activity that makes you feel like you're doing something immortal
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- Any activity that makes you feel like you're doing something immortal

Physical activity simply is the movement of your body to use energy.

Being physically active is an important part of a healthy lifestyle to help burn the energy (calories) we get from the foods we eat.

PHYSICAL ACTIVITY SHOULD NOT BE A CHORE.

Why is ACTIVITY NEEDED?

Physical Activity

Discover activities that you enjoy and get moving!

Have fun!

BEING PHYSICALLY ACTIVE CAN HELP YOU:

- Increase your chances of living longer
- Feel better about yourself
- Sleep better at night
- Strengthen your muscles and bones
- Maintain or achieve a healthy weight
- Meet new people or spend time with friends
- Have more fun!

The more physical activity that you do, the greater the health benefits and the better you'll feel.

RECOMMENDATION:

Students should do 60 minutes (1 hour) or more of physical activity daily

REALITY:

Many students are not getting opportunities to be active.

Over half of all schools have 10% or less of their students walking or biking to and from school.

Only 45% of all schools provide opportunities for students to participate in classroom physical activity breaks.

Only 55% of all schools offer opportunities for students to participate in physical activity clubs or intramural sports programs.

Less than 4% of schools require daily physical education.

Source: School Health Policies and Practices Study 2016

Changing risk perceptions

- Emphasise personal susceptibility to negative consequences of behaviour
- Prompt assessment of personal risk

A poster illustrating possible susceptibility or risk for acting (or not acting)

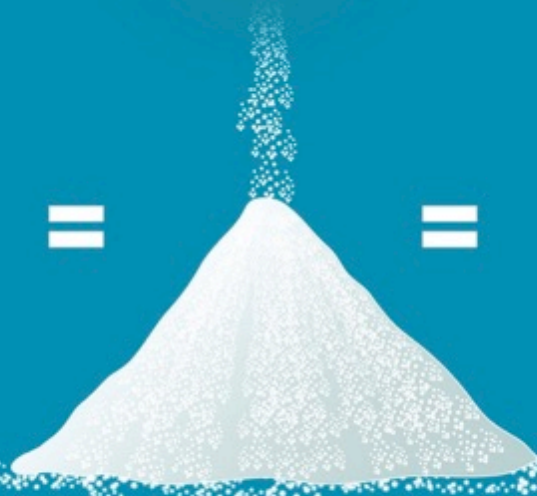
Information giving

One 375ml
can of soft
drink a day



=

Almost 15kgs of
sugar a year



=



Toxic fat and
increased risk
of type 2
diabetes,
heart disease
and some
cancers

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Does changing attitudes work?

- Attitude change is somewhat controversial in the psychological literature
- Links between attitudes and action has a chequered history
- Research has tended to show relatively weak effects
- Research on persuasion shows that attitude change often leads to changes in motivation but not behaviour!

Does changing attitudes work?



Sheeran, P., Maki, A., Montanaro, E., Avishai-Yitshak, A., Bryan, A., Klein, W. M. P., . . . Rothman, A. J. (2016). The impact of changing attitudes, norms, and self-efficacy on health-related intentions and behavior: A meta-analysis. *Health Psychology*. doi: 10.1037/hea0000387

Changing affective attitudes

- Emphasise severity of negative consequences to arouse fear

Fear arousing messages!

Fear arousing messages



GRABBABLE GUT OUTSIDE

MEANS TOXIC FAT INSIDE

Toxic fat around vital organs of a moderately overweight Australian.

Reduce your risk of heart disease, diabetes and cancer by eating less and moving more every day.

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Does arousing fear work?

Health Psychology Review, 2013

Vol. 7, Supplement 1, S8–S31, <http://dx.doi.org/10.1080/17437199.2012.703527>



Threatening communication: a critical re-analysis and a revised meta-analytic test of fear appeal theory

Gjalt-Jorn Ygram Peters*, Robert A.C. Ruiter and Gerjo Kok

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Maastricht, The Netherlands*

(Received 31 March 2011; final version received 13 June 2012)

Despite decades of research, consensus regarding the dynamics of fear appeals remains elusive. A meta-analysis was conducted that was designed to resolve this controversy. Publications that were included in previous meta-analyses were re-analysed, and a number of additional publications were located. The inclusion criteria were full factorial orthogonal manipulations of threat and efficacy, and measurement of behaviour as an outcome. Fixed and random effects models were used to compute mean effect size estimates. Meta-analysis of the six studies that satisfied the inclusion criteria clearly showed a significant interaction between threat and efficacy, such that threat only had an effect under high efficacy ($d = 0.71$) and not under low efficacy ($d = 0.01$). Under high threat, the effect was significant under high efficacy ($d = 0.71$) and not under low efficacy ($d = 0.01$).

Peters, G.-J. Y., Ruiter, R. A. C., & Kok, G. (2013). Threatening communication: A critical re-analysis and a revised meta-analytic test of fear appeal theory. *Health Psychology Review*, 7, S8-S31. doi: 10.1080/17437199.2012.703527

Changing normative beliefs

- Provide information about others' behaviour
- Provide information about others' approval of the recipient's behaviour
- Encourage recipients to seek social support opportunities

Harnessing social support from significant others

Social support



Promoting self-efficacy

- Model/demonstrate the behaviour
- Prompt behavioural practice
- Prompt barrier identification and planning in relation to anticipated barriers
- Prompts self-monitoring of behaviour
- Provide feedback on performance

Provide opportunities to experience success with the behaviour

Experiencing success



Source: McDonald, Hagger, King, Foss, & Ferguson, E. (2012). *Psychology & Health*.

Promoting self-efficacy

- Model/demonstrate the behaviour
- Prompt behavioural practice
- Prompt barrier identification and planning in relation to anticipated barriers
- Prompts self-monitoring of behaviour
- Provide feedback on performance

Instruct and practice on skills on how to monitor behaviour (e.g., devices, diaries)

Promoting self-efficacy



JAMA | Original Investigation

Effect of Wearable Technology Combined With a Lifestyle Intervention on Long-term Weight Loss

The IDEA Randomized Clinical Trial

John M. Jakicic, PhD; Kelliann K. Davis, PhD; Renee J. Rogers, PhD; Wendy C. King, PhD; Marsha D. Marcus, PhD; Diane Helsel, PhD, RD; Amy D. Rickman, PhD, RD, LDN; Abdus S. Wahed, PhD; Steven H. Belle, PhD

IMPORTANCE Effective long-term treatments are needed to address the obesity epidemic. Numerous wearable technologies specific to physical activity and diet are available, but it is unclear if these are effective at improving weight loss.

OBJECTIVE To test the hypothesis that, compared with a standard behavioral weight loss intervention (standard intervention), a technology-enhanced weight loss intervention (enhanced intervention) would result in greater weight loss.

DESIGN, SETTING, PARTICIPANTS Randomized clinical trial conducted at the University of Pittsburgh and enrolling 471 adult participants between October 2010 and October 2012, with data collection completed by December 2014.

INTERVENTIONS Participants were placed on a low-calorie diet, prescribed increases in physical activity, and had group counseling sessions. At 6 months, the interventions added telephone counseling sessions, text message prompts, and access to study materials on a

 Author Video Interview and JAMA Report Video

 Supplemental content

Jakicic, J. M., Davis, K. K., Rogers, R. J., & et al. (2016). Effect of wearable technology combined with a lifestyle intervention on long-term weight loss: The idea randomized clinical trial. *JAMA*, 316, 1161-1171. doi: 10.1001/jama.2016.12858



Articles

Effectiveness of activity trackers with and without incentives to increase physical activity (TRIPPA): a randomised controlled trial

Prof Eric A Finkelstein, PhD^{a, g},  , Benjamin A Haaland, PhD^{b, c}, Marcel Bilger, PhD^a, Aarti Sahasranaman, PhD^a, Robert A Sloan, PhD^d, Ei Ei Khaing Nang, PhD^e, Prof Kelly R Evenson, PhD^f

Summary

Background

Despite the increasing popularity of activity trackers, little evidence exists that they can improve health outcomes. We aimed to investigate whether use of activity trackers, alone or in combination with cash incentives or charitable donations, lead to increases in physical activity and improvements in health outcomes.

Methods

In this randomised controlled trial, employees from 13 organisations in Singapore were randomly assigned (1:1:1:1) with a computer generated assignment schedule to control (no tracker or incentives), Fitbit Zip activity tracker, tracker plus charity incentives, or tracker plus cash incentives. Participants had to be English speaking, full-time employees, aged 21–65 years, able to walk at least ten steps continuously, and non-

Finkelstein, E. A., Haaland, B. A., Bilger, M., Sahasranaman, A., Sloan, R. A., Nang, E. E. K., & Evenson, K. R. Effectiveness of activity trackers with and without incentives to increase physical activity (TRIPPA): a randomised controlled trial. *The Lancet Diabetes & Endocrinology*. doi: 10.1016/S2213-8587(16)30284-4

Pedometers are “unlikely to be a panacea for rising rates of chronic disease”

Finkelstein et al. (2016)

Changing self-efficacy

- Significant effects of self-efficacy interventions
- Important:
 - Feedback and vicarious experience related to much stronger effects
 - Persuasion, graded mastery, and barrier identification were less effective

Ashford, S., Edmunds, J., & French, D. P. (2010). What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. *British Journal of Health Psychology*, 15, 265-288. doi: 10.1348/135910709X461752

Promoting emotional readiness for action

- Promote self-affirmation
- Prompt self-talk
- Prompt guided imagery to change mood or psychological state

Guided mental simulation exercise over steps
to take in promoting physical activity

Mental simulations

- Guided imagery on:
 - Steps taken to achieve a goal
 - Feelings of accomplishment of achieving the goal
- Conroy & Hagger (2016). Meta-analysis
 - Small-to-medium effect ($d = .25$)
 - Providing instructions and long-term follow-up time point resulted in stronger effects

What does a mental simulation 'look like'?

The World Health Organisation (WHO) recommends that safe limits for drinking alcoholic drinks is **4 units per day for men and 3 units per day for women.**

Drinking above these safe limits could lead to some health conditions in the long run. Considering these health messages... To help you do this we ask you to take 5 minutes of your time to complete a very simple mental exercise.

EXERCISE:

You are now asked to visualize yourself having achieved your goal of keeping your alcohol intake to within safe limits on each individual occasion or session over the next three months, and imagine how you would feel....

Imagine how much effort and willpower it has taken to achieve your goal.... and that you have successfully managed to do it. Imagine how satisfied you will feel. It is very important that you see yourself actually keeping your alcohol intake to within safe limits on each occasion... and keep that picture on your mind.

Please write on the lines below how you imagine will feel if you achieve your goal...

A brief intervention to increase physical activity behavior among adolescents using mental simulations and action planning

Andre Koka^a and Martin S. Hagger^{b,c,d}

^aFaculty of Medicine, Institute of Sport Sciences and Physiotherapy, University of Tartu, Tartu, Estonia; ^bHealth Psychology and Behavioral Medicine Research Group, School of Psychology and Speech Pathology, Faculty of Health Sciences, Curtin University, Perth, Australia; ^cFaculty of Sport and Health Sciences, University of Jyväskylä, Jyväskylä, Finland; ^dSchool of Applied Psychology and Menzies Health Institute Queensland, Behavioural Bases for Health, Griffith University, Brisbane, Australia

ABSTRACT

This study evaluated the effectiveness of a brief integrated theory-based intervention to increase physical activity (PA) among adolescents over a three-month follow-up period. A 2 (mental simulation: present vs. absent) × 2 (action planning: present vs. absent) × 4 (time: baseline vs. one-month vs. two-month vs. three-month follow-up) mixed-model randomized controlled design was adopted. Adolescents aged 14–15 years ($N = 267$) completed baseline psychological measures and self-reported PA followed by the relevant intervention manipulation, if appropriate, with follow-up measures collected one, two, and three months later. Results revealed no significant effects for the mental simulation and action planning strategies nor the interaction of the two strategies. However, among participants with low levels of baseline PA, participants in both mental simulation alone and action planning alone groups reported significantly higher levels of PA at one-month follow up than other groups, suggesting that individual intervention components may be effective in low-active adolescents.

ARTICLE HISTORY

Received 19 January 2016
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KEYWORDS

Adolescents; action planning;
outcome mental simulation;
physical activity; randomized
controlled trial

Koka, A., & Hagger, M. S. (2016). A brief intervention to increase physical activity behavior among adolescents using mental simulations and action planning. *Psychology, Health & Medicine*. doi: 10.1080/13548506.2016.1211298

Prompt goal setting and goal priority

- Prompt goal setting
- Prompt specific planning/goal setting
- Agree a written behavioural contract
- Prompt review and resetting of behavioural goals

Implementation intentions or action planning exercises

Implementation Intentions

- Motivation is not enough
- “Strong effects of simple plans” (Gollwitzer, 1999)
- Plans linking a cue in the environment with the desired action
- Improves recall and efficiency of the behaviour
- Uses specific if-then format to make clear
- Self-administered

What Does an Implementation Intention 'Look' Like?

Typically use a 'pen and paper' delivery:

You are more likely to exercise for at least 30 minutes per day if you say when ('if...') and where ('then...') you will exercise and stick to your plan. In the boxes below write down when and where you plan to exercise in the next week:

If...

....the clock strikes 12:30pm for lunch...

then...

....I will pick up my gym bag and go to the fitness centre

Enhance social skills

- Provide instruction on resisting social pressure
- Provide negotiation skills training
- Provide assertiveness training

Use interviews or guided questions to identify situations in which social pressure is high and use role play to develop assertiveness

Planning to recognise and resist social pressure



Promoting environmental change

- Teach to use environmental prompts/cues
- Teach to avoid environmental prompts/cues

Training people to structure their environment to minimise temptations/lapses

(could be used in conjunction identifying cues and with planning)

Recognising and planning to deal with cues

Quitting smoking?

Use the 4 Ds to manage cravings and triggers:



Delay



Distract



**Deep
breathe**



Drink Water

Learn more sunnybrook.ca/quitsmoking

Restructuring the environment



Summary

- Preventive health is a priority to reduce human, health, and economic burden of chronic disease
- Behavioural solutions are critical
- Health psychology is at the forefront of evidence-based behavioural interventions
- Behaviour change interventions should be based on psychological theory to maximise efficiency and applicability
- A number of techniques with an increasing evidence based are available.
- Provide a 'toolkit' for behaviour change interventions

Kiitos!

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