Section A: CPHE to complete	
Name:	Charles Abraham
Job title:	Professor of behaviour change
Address:	University of Exeter Medical School
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – identifying effective elements of behaviour change interventions
Evidence gaps or uncertainties:	[Please list the research questions or evidence uncertainties that the testimony should address]
What are the benefits and challenges in developing a taxonomy of behaviour change interventions?	
How can we identify the effective elements of behaviour change interventions?	

Section B: Expert to complete	
Summary testimony:	

Summary of Evidence Provided by Charles Abraham

Health behavior change (BC) interventions have been shown to be effective across domains and have the potential to be very cost effective compared to later treatment. However, effectiveness is variable and the key aim for reviewers is to identify what features of intervention enhances effectiveness for which group applied to which behavior patterns.

Ground breaking work in this field was reported by Albarracín et al. (2005) who identified 10 change techniques that could be (i) linked to underlying empirically-supported regulatory processes, and (2) reliably identified in intervention descriptions. The authors were able to identify change process and related techniques likely to enhance the effectiveness of HIV-preventive intervention among particular groups. They, noted, for example, that,

> *…. the most effective interventions contained educational information, attitudinal arguments, behavioral skills arguments, and behavioral skills training…. the least effective attempted to induce fear of HIV.*

A noteworthy finding was some change techniques are effective for particular groups and counter-productive for others. So, for example, providing normative feedback (e.g., using the two techniques of providing information on others' approval of behaviors and others' performance of behaviors) was effective for young target groups but use of such techniques was associated with reduced effectiveness among intervention older recipients.

Abraham & Michie (2008) built on Albarracín et al's (2005) work by identifying and defining a larger set of change techniques linked to empirically-supported change

processes which were found to be reliably identifiable in descriptions of interventions provided in papers from across a wide range of behavioural domains and from manuals of HIV-preventive interventions.

The impact of change techniques on intervention effectiveness may be moderated by a range of other intervention characteristics. As well as target group by technique interactions (as identified by Albarracín et al., 2005), the delivery format, the context and frequency of change technique use, the competence of those involved and other intervention characteristics can moderate effectiveness. A useful list of intervention characteristics was provided by Davidson et al. (2003). The "Syntheses of HIV Risk Reduction Research" (SHARP) intervention content classification system (Abraham et al., under review) was developed using insights from Albarracín et al's (2005) and Abraham & Michie (2008) and allows categorization of a range of intervention features which may moderate the effectiveness of change techniques on intervention effectiveness. The system has been found to be reliable and useful in identifying intervention features associated with effectiveness in interventions promoting safer sex.

Research has shown that the content of usual care is an important determinant of intervention effectiveness (de Bruin et al., 2010). Any intervention is more likely to be found to be effective when compared to a relatively poor, versus a relatively good, active control. Thus interpretation of effectiveness data in which active controls groups are used (like usual care) requires analyses of the characteristics, not only of interventions, but also of active controls. Without such analyses, an intervention deemed to be effective on the basis of a comparison with usual care may not be effective relative to higher quality usual care – and vice versa. Checking usual care comparisons for representativeness of common practice may mitigate this problem.

Two studies comparing the number of change techniques identifiable from paper and manual descriptions of the same intervention have reported significant and substantial differences indicating that the range of change techniques included in interventions is unrepresented in paper descriptions (Abraham & Michie, 2008). Consequently, descriptions provided in published papers may not provide comprehensive descriptions of manualised or delivered interventions. This is problematic because effectiveness (or ineffectiveness) may be linked to characteristics not reported in published papers. Analyzing manual descriptions may mitigate this problem.

More generally, reviewers using meta analytic techniques to identify moderators of effectiveness (e.g., target audience, change technique combinations, delivery formats etc) must strive to avoid the problem of combining distinct features in the same category; the so called "apples and pears" problem. When the moderator is not an objectively verifiable characteristic of the intervention (e.g., the intervention was delivered to young women) reviewers need to ensure that the coding category definitions used to analyse intervention descriptions are both reliable and valid. Standard practice have been established for reliability analyses (e.g., Kappa = .7, Abraham & Michie, 2008). Validity may be enhanced by ensuring that definitions are specific and based on previous empirical evidence. For example, since previous research has identified differences in the effects of providing descriptive (e.g., others do this) and subjective normative information (e.g., others approve of this) these should be distinguished rather than using a less well defined category such as "normative feedback". Less specific categories may capture quite distinct aspects of an intervention that have different or opposing effects. This principle applies to all categorization including delivery formats.

The relationship between intervention characteristics and effectiveness is likely to vary as a consequence of the fit between intervention characteristics and recipients/ users. For example, the effectiveness of if-then planning has been demonstrated among motivated intervention recipients. However, this technique is only likely to work if the plans generated are realistic and pertinent to the current barriers to enhancement of intentions. In some cases this content may be obvious and researcher-generated, if-then plans may be effective. In other cases, recipients may be able to generate their own plans using an online questionnaire but in other groups, face-to-face delivery using instruction, modeling and feedback may be necessary for the technique to have measurable effects on e.g., physical activity and diet (Luszczynska, 2007). Thus, as was highlighted in the NICE (2007) guidance, the pre-existing knowledge, motivation and skills of recipients is critical to choice of intervention content and delivery format. In particular, interventions are likely to be effective when viewed to be rewarding and realistic by recipient/ users. Paulussen et al. (1994) found that effectiveness was not an important criterion for the adoption of sex education interventions in Dutch schools, illustrating that unless the intervention is desirable and rewarding for adopters/users/recipients it is unlikely to be integrated into everyday practice – even if efficacy has been demonstrated.

Similarly, as intervention which is effective in one context may not be sustainable in another (Glasgow et al., 2002). So interventions found to be effective in trials may not have an impact when rolled into practice because they are not maintained or because they are "adapted" for use in practice leaving out critical components determining efficacy under trail conditions.

The importance of the match between recipients and intervention content and between context and intervention content implies that interventions are more likely to be effective when developed for specific recipients in particular contexts. This is the approach recommended by "Intervention Mapping" (Bartholomew et al., 2011). A key element of this approach is the co-creation of interventions which is also recommended by use of Patient-Practitioner-Involvement strategies by the National Institute of Health Research. Thus the way in which an intervention has been developed is likely to be an independent predicator of its effectiveness in context. Thirteen key aspects of intervention mapping and co-creation were identified in the evidence provided, using the HeLP intervention development process and trail design as an illustration (Wyatt et al., under review). i.e.,

1. Begin with a problem-solving approach to empirically-verified health needs,
2. Identify underlying regulatory and change processes.
3. Develop interventions in the context in which they will be used.
4. Develop products and interventions that can readily be used in everyday work/ leisure environments and are sustainable over time within available resources, with the active creative participation of those who will use, deliver and adopt the intervention.
5. Understand the reasons why adopters would select and employ products, including interventions, and "design-in" such usability features.
6. Assemble a multi-skilled team including users and those who will deliver the intervention.
7. Use intervention mapping procedures to map change techniques to be used in the intervention onto underlying change processes.
8. Pilot the intervention and seek to improve it in-context.
9. Conduct feasibility evaluations and re-design time.
10. Include process evaluations that track adherence, how the intervention is "used" and the change processes it affects – ideally qualitative and

quantitative data.

11. Design effectiveness trials to scale…
12. . ….using objective measures (linking outcomes to behaviours) with long-term follow up.
13. Develop detailed implementation manuals to ensure fidelity of replication.

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Luszczynska, A., Sobczyk, A, & Abraham, C (2007) Planning to lose weight: RCT of an implementation intention prompt to enhance weight reduction among overweight and obese women. *Health Psychology,* **26***,* 507-512.

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Identifying effective elements of behaviour change interventions

OR

Identifying Effective Intervention Development Processes

Charles Abraham

NICE, London Sept 6th 2012

Overview

1. Are behaviour change interventions effective?
2. The problem for reviewers
3. Identifying Behaviors Change Techniques
4. The SHARP Taxonomy: Illustration of Method
5. Active control content and effectiveness
6. Questions for Reviewers.
7. Project HeLP –illustrative intervention developed using Intervention Mapping, IMB and BCT identification.
8. Pointers to effective intervention development.
9. Issues for guidance development.

Measuring Behaviour Change Intervention – Cohen's *d*

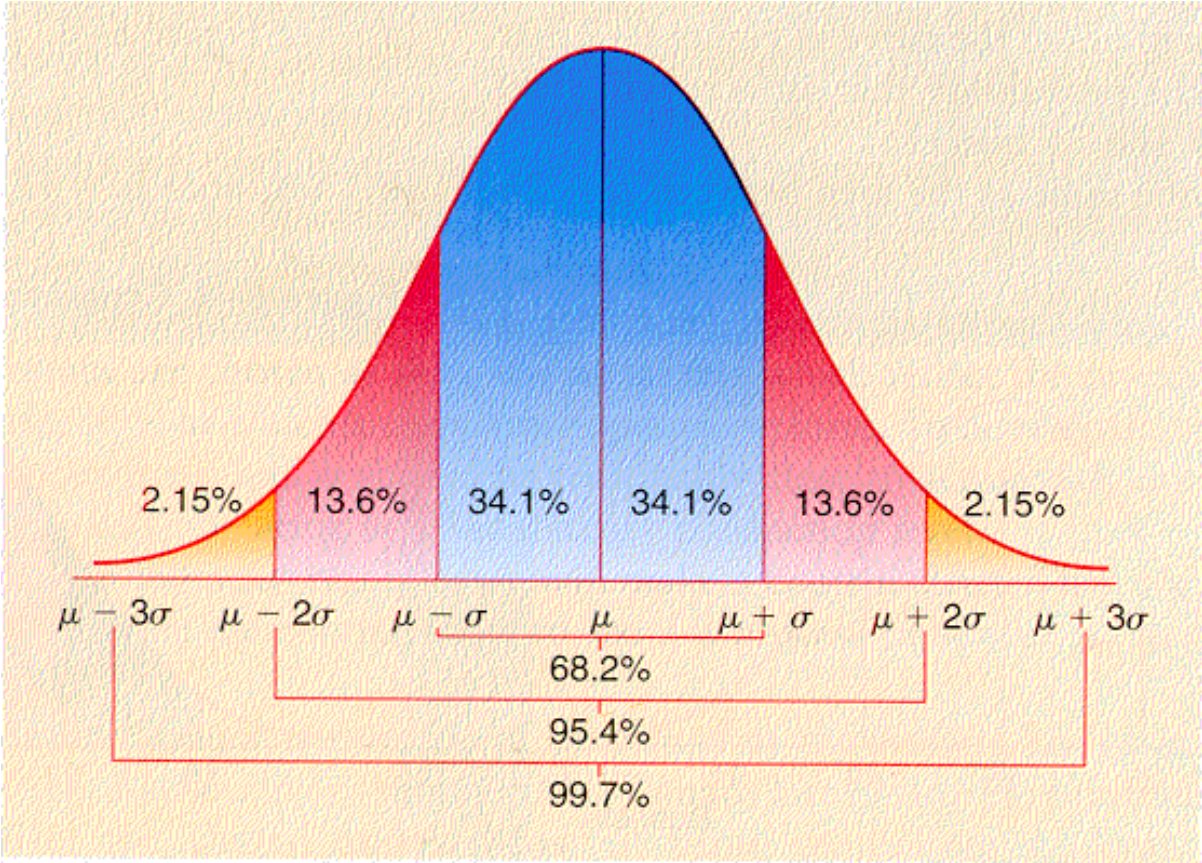
d = difference between intervention and control means/ overall variation

1 .0= changed by a standard deviation

0.5 = changed by half a standard deviation

0.25 = changed by a quarter of a standard deviation

0 = no change



Behaviour Change Interventions *Can* Work

Johnson et al. (2010, *Am J Pub Hlth*)

- Synthesis of 62 meta analyses, 1,011 primary evaluations
- Interventions targeting-
  eating, physical activity, sexual behaviour,
  addictive behaviours, stress management,
  screening for women and use of health services.
- Targeting women & older people - more effective.
- Shorter interventions - more effective.
- Heterogeneity of small/ medium effect sizes

d*s = .08 - .45. *Why – what works?

The Problem for Reviewers I

Davidson et al. (2003, *Annals of Behavioural Medicine*)

"Often.. reports fail to describe the actual behavioural intervention techniques used; instead they provide details regarding treatment format… this omission.. is an obstacle not only to replication but also to the credibility and understanding of core, science-based behavioural medicine intervention technology" (p.165)

Defining Behaviour Change Techniques

Abraham & Michie (2008, *Health Psychology*)

1. General information
2. Information on consequences
3. Information about approval
4. Prompt intention formation
5. Specific goal setting
6. Graded tasks
7. Barrier identification
8. Behavioral contract
9. Review goals
10. Provide instruction
11. Model/ demonstrate
12. Prompt practice
13. Prompt self monitoring
14. Provide feedback
15. General encouragement
16. Contingent rewards
17. Teach to use cues
18. Follow up prompts
19. Social comparison
20. Social support/ change
21. Role model
22. Prompt self talk
23. Relapse prevention
24. Stress management
25. Motivational interviewing
26. Time management

Person is asked to keep a record of specified behaviour/s. e.g. using diary/ questionnaire.

Behaviour Change Techniques Taxonomy Project





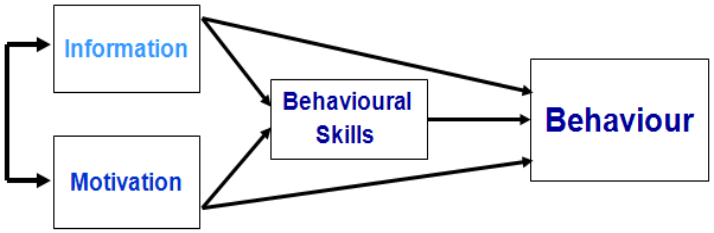



What is a “Behaviour Change Technique”?

- Observable technique
- Smallest active ingredient. Cannot be sub-divided.
- Which has a basis in hypothesised change processes, i.e., we can describe *how* it promotes behaviour change,
- Can be faithfully replicated using additional information about materials (i.e., in a protocol or manual),
- Can be empirically related to intervention effectiveness through meta regression.

SHARP Techniques to Change – What?

Intervention Mapping Question:
What are the modifiable determinants of the target behaviour?



Fisher & Fisher (1992)

What are the determinants of condom use?
Sheeran, Abraham and Orbell (1999)
Albarracín et al (2001)

Which change processes count in condom use promotion?
Albarracín et al (2005)

…. the most effective interventions contained educational information, attitudinal arguments, behavioral skills arguments, and behavioral skills training…. the least effective attempted to induce fear of HIV.

(all refs from *Psychological Bulletin)*

SHARP Change Techniques and Targets I

Knowledge (9 techniques)

e.g., Modes of Transmission (information on)

Awareness (2 techniques)

(i) Self-Monitoring of Behaviour & (ii) Feedback on Behaviour

Attitudes (6 techniques)

e.g., (i) Provide Information on Affective Consequences

Social influence (4 techniques)

e.g., Approval by Others (Injunctive Norm)

Self-efficacy (13 techniques)

e.g., Planning Strategies to Overcome Identified Barriers

Intention (4 techniques)

e.g., Prompt goal formation.

SHARP Change Techniques and Targets II

Action control (4 techniques)

e.g., Implementation Intention Formation(If-then plans)

Maintenance (2 techniques)

e.g., Use of follow-up prompts.

Facilitators (3 techniques)

e.g., Creating social support.

47 change techniques (9 broad change targets) defined in (22 pp) SHARP Taxonomy Coding Manual

SHARP Intervention Content Classification System I

SYNTHESES OF HIV/AIDS RISK REDUCTION CODING FORM

Study ID: _____

Coder: _____

	Information Provided		USED
☑	GK.1	Epidemiological Info	
☑	GK.2	Modes of Transmission	
☑	GK.3	Prevention Strategies	
☑	GK.4	Structure of HIV	
☑	GK.5	Reproductive Anatomy	
☑	GK.6	General (Unspecified Sex-RR)	
☑	GK.7	Active Information Encoding	
		vant)	
		e Access	

Control / Experimental Condition: _____

Intervention Focus (circle): HIV / STIs / Both / Irrelevant

Generic: BCT delivered to participant(s) is identical, or virtually identical for all.

the individual level, (i.e. special characteristics of the participant, NOT
; e.g., race, gender, age, etc. [See IF.42]). Must be clear to code; **do not**

d in more than one session

TAILORED?

TYPE OF BEHAVIOUR TARGETED?

	Behavior Change Techniques		Generic SexRR	rgeted Sexual Behavior				PAGE NUMBERS & NOTES
				ABS IN	USE	TALK	OTHER	
T	AW.10	Self-Monitoring of Behavior		X				
T	AW.11	Feedback on Behavior			X+			

IN MORE THAN ONE SESSION?

SHARP Intervention Content Classification System II

	Other Intervention Features	
IF.1	Macro-Tailoring?	Gender / Race / Sexuality / Occupation / HI
IF.2	Is model theoretically based? (If SOC/TTM-based only, code AW.10a, SE.20a, and SE.20b [Tailored] at a minimum)	☐ TRA/TPB [Fishbein/Aizen] ☐ Social Cognitive Model [Bandura] ☐ AIDS Risk Reduction Model [Catania] ☐ IMB Model [Fisher & Fisher] ☐ Health Belief Model [Rosenstock] ☐ Transtheoretical Model/Stages of Change [Prochaska & Diclemente] ☐ rotectio ☐ Self-Perc [Aronson, Bem, Festinger] ☐ ocial A ☐ Other:
IF.3	List Intervention Objectives other than safe sex. Write 'unclear' if the behavioral objective is very vague.	
IF.4	Delivery Mode Used	One-on-One / Couple / Group Verbal / Print Materials (during) / Print Ma nals (atte
IF.5	Number of Sessions	
IF.6	Average Session Length (mins)	
IF.7	Quality Control	
IF.11	Identity of Intervention Provider	
IF.12	Intervention Provider Training	Intensive Interactive / Brief Interactive / Inter Mate
IF.13a	Provide Testing?	STD/STI
IF.13b	Pre and post-test counseling?	
IF.14	Provide Condoms?	Free, Provided / Free, Availabl Reques

Tailored to target group

Theory based

Delivery format

Intervention provider

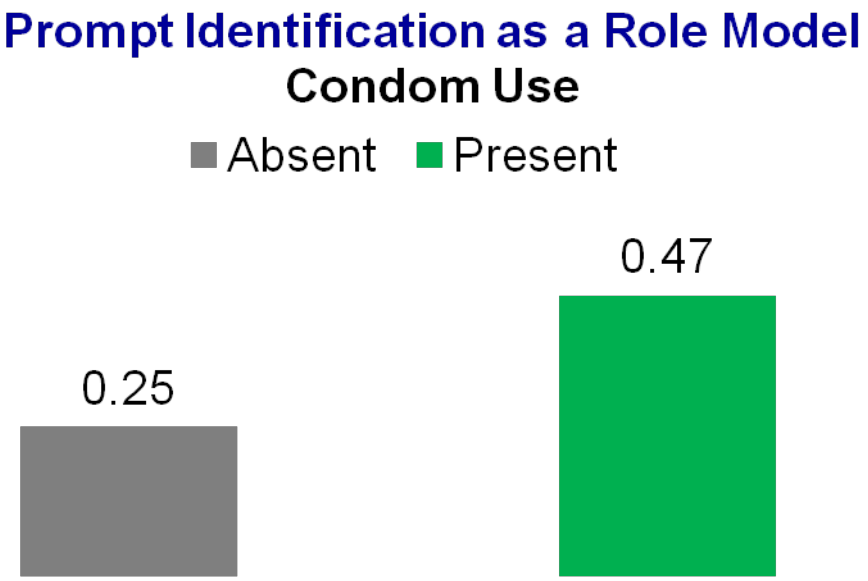
HIV counselling & testing

Which SHARP Change Techniques are Associated with Effectiveness? Illustrative Early Analysis

Overall average ***d* = 0.265**

Inclusion of *some* techniques alters average *d*

Despite a large data set techniques are often not included frequently enough to assess impact of effectiveness.

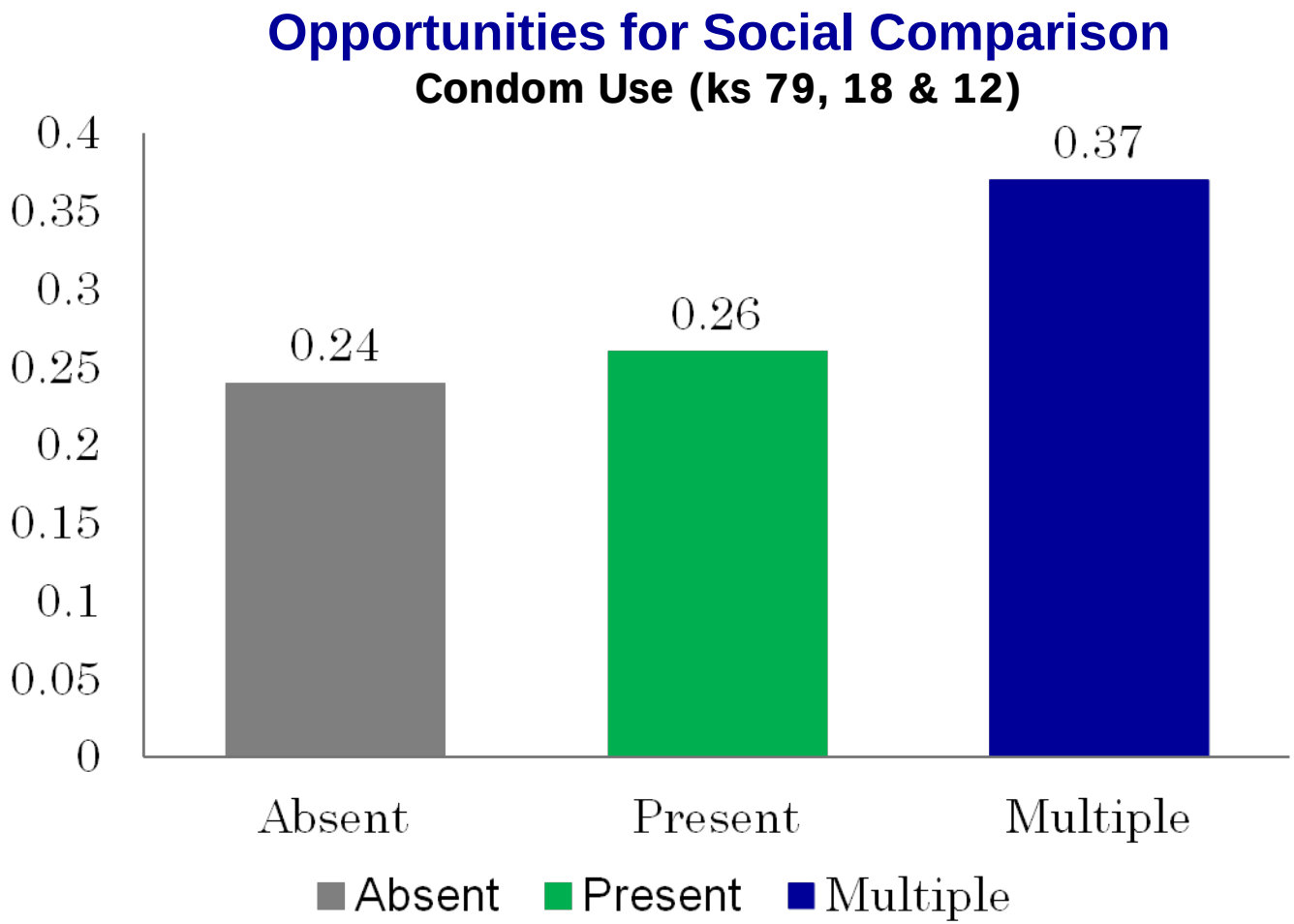


BUT

Absent k=105

Present k=4…?

Multiple versus Single Use
MAY be Important for Some Techniques



Conclusions

Sharp Taxonomy…

a comprehensive, easy-to-use, reliable tool for identifying change techniques in intervention descriptions,

can be used to assess the effectiveness of including techniques and using them once versus repeatedly for specific behavioural targets,

can guide the selection of change techniques and the construction of evidence-based (as opposed to theory-based) change techniques.

Facilitating Replication through Accurate Reporting of Methods

Abraham & Michie (2008) Taxonomy

13 article- manual pairs (describing the same intervention)
Correspondence of included change techniques = 74%.
73% of mismatches - technique in manual only.
Techniques in manuals M=9.07
Techniques in articles M=6.07 $t(25) = 2.4$ $p<0.033$ (2 tailed)

SHARP Taxonomy

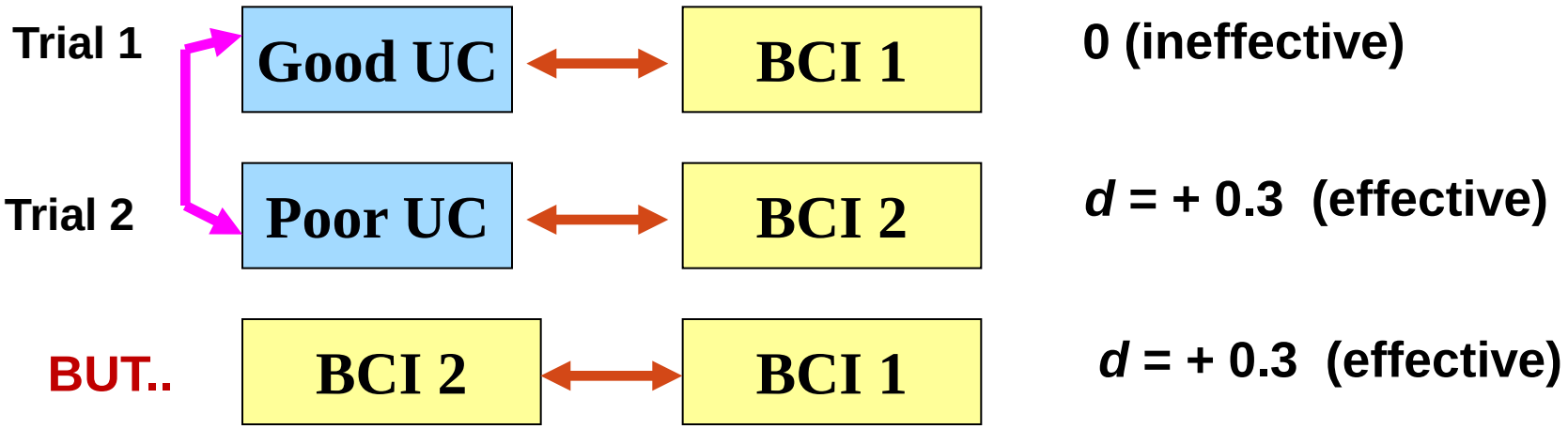
27 article- manual pairs (describing the same intervention)
Correspondence of included change techniques = 78%.
84% of mismatches - technique in manual only.
Techniques in manuals M=44.63 (multiple behaviours)
Techniques in articles M=18.56 $t(26) = 7.15$ $p<0.000$ (1 tailed)

Under-reporting of intervention change techniques in articles compared to manuals means replication requires manuals…

Unspecified Active Controls
e.g. “Usual Care

Davidson et al (2003)

“efforts should be to specify the therapeutic elements that constituted usual care so that…the reader can compare the intensity of usual care with the treatment intervention (p.165)



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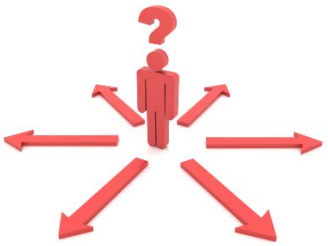


Questions for Reviewers

1. How should we define BCTs – mechanism?
2. What level of specificity...?
3. How reliable?
4. Is it worth coding papers – i.e., not manuals?
5. How can we code active controls (e.g., usual care)?

Helping Motivated, Overweight and Obese Woman to Lose Weight

Research Question

Does action and if-then planning help motivated people lose weight?

Sample

Randomised Controlled Trial of 45 women attending Weight Watchers classes.

Intervention

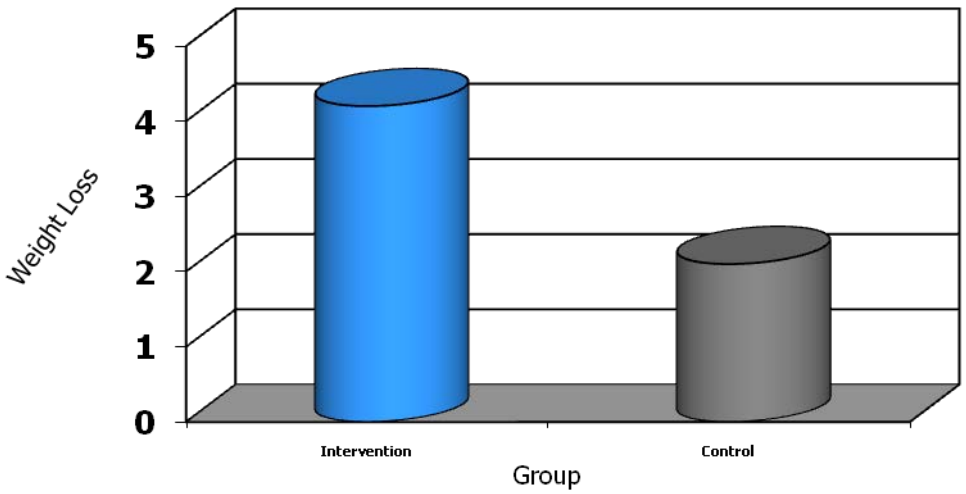
Single session add-on “planning” (including if-then plans) intervention.

Outcome.

Weight loss two months later.

Luszczynska, A., Sobczyk, A, & Abraham, C (2007) Planning to lose weight: RCT of an implementation intention prompt to enhance weight reduction among overweight and obese women. *Health Psychology, 26,* 507-512.

Intervention Development/ Improvement is Continuous
Results – 2 Months Later



Control	**2.1kg Lost**
Intervention	**4.2 Kg Lost**

Clinically significant reduction of weight (5%):

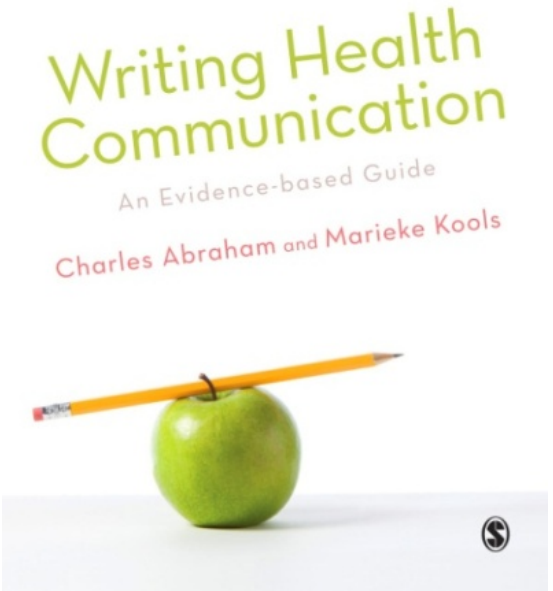
54.2% of Intervention participants
8.3% of Control participants

A Guide to Mapping Change Techniques Onto Change Processes

From.... **Abraham & Michie (2008) 22 techniques + 4 groups mapped to theories**

To..... **Abraham (2012) - 40 Change Techniques defined in detail and mapped onto 11 broad change processes/ (i.e., targets)… *in***

Abraham, C. & M. Kools (Eds 2012)
Writing Health Communication:
An Evidence-Based Guide.
London, SAGE Publications Ltd.



Pointers for Intervention Development I

1. Begin with a problem-solving approach to empirically-verified health needs,
2. Identify underlying regulatory and change processes.
3. Develop interventions in the context in which they will be used.
4. Develop products and interventions that can readily be used in everyday work/ leisure environments and are sustainable over time within available resources,
5. … with the active creative participation of those who will use, deliver and adopt the intervention.
6. Understand the reasons why adopters would select and employ products, including interventions, and “design-in” such usability features.
7. Develop a multi-skilled team including users and those who will deliver the intervention.

Pointers for Intervention Development II

8. Use intervention mapping procedures to map change techniques to be used in the intervention onto underlying change processes.

9. Pilot the intervention and seek to improve it in-context.

10. Conduct feasibility evaluations and re-design time.

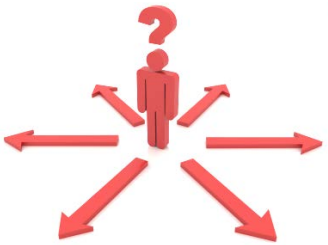
11. Include process evaluations that track adherence, how the intervention is “used” and the change processes it affects – ideally qualitative and quantitative data.

12. Design effectiveness trials to scale…

13. ….using objective measures (linking outcomes to behaviours) with long-term follow up.

14. Develop detailed implementation manuals to ensure fidelity of replication.

Issues for Guidance Development



1. Editorial policy on manaul preparation and availability.
2. Intervention development is crucial – most interventions are adapted to context... i.e.
3. Development/ improvement is continuous.
4. Delivery modes are important.
5. In-context co-creation may be crucial.
6. Make expertise available to commissioners and practitioners through (1) guidance, (2) training and (3) collaboration.

THANK YOU!

Section A: CPHE to complete	
Name:	Ray Pawson
Job title:	Professor of Social Research Methodology
Address:	School of Sociology and Social Policy, Faculty of Education Social Sciences and Law University of Leeds
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Mechanisms and processes of behaviour change
Evidence gaps or uncertainties:	
Provide the PDG with an overview of your perspective on the mechanisms and processes of effective behaviour change.	
Section B: Expert to complete	
Summary testimony:	

Invisible Mechanisms

Pawson's testimony suggested that the deliberations of the Programme Development Group should be led by an evaluation question – what are the components of behavioural change that an intervention must prompt in order to achieve lasting outcomes? Public health problems are often intractable, social and behavioural change happens slowly and painstakingly, a whole sequence of measures is often required to bring about profound and lasting change – and, alas, the methods of evaluation research are not always up to scratch in being able to identify the crucial concatenations.

The presentation went on to suggest that many crucial elements of behavioural change are overlooked because of the way programme evaluation is pursued. Policy-making is energised by the hot new idea. Attention is thus drawn immediately the unique properties and powers of the new 'measure', 'nudge', 'treatment', 'therapy', 'mechanism of action', or 'theory of change'. To be sure, other eyes are also on the prize, namely impact on the intended outcome. Accordingly, interventions find support and are brought to life if there are persuasive reasons to believe that a new-fangled idea might have a significant leverage on a long-standing problem.

But what happens next? The machine takes over. The intervention and is assembled in a series of standard, bureaucratic procedures. The programme has to be organised and delivered – sites are mulled over and selected, resources are drawn in and allocated, staff roles are planned and allotted, and subjects are recruited, processed, certificated and stood down. Pawson's hypothesis here is that these routine features, the generics of programming, often have as profound an influence on the behaviour of programme subjects as do the big ideas. People enter programmes at the margins and sometimes quite tangentially; they have an existing life outside programmes; there are always other programmes; life offers many new

opportunities besides programmes. And once within the ambit of a programme there are many opportunities to quit or stay. And even within those choosing to be camp-followers, there is a range of behavioural commitments from passing interest to dull compunction to abiding passion. There are many such collateral pathways for so-called 'programme subjects' to consider, and the manner in which participants choose to navigate their way in and around interventions has been overlooked in evaluation research. These strategies for journeying though, rather than responding to, interventions deserve a sustained programme of research and the presentation set out a brief agenda for such inquiries.

A simple seven stage model of programme-inspired behavioural change was presented. It describes the programme subject in different stages of preparedness for change and prescribes the sequence of mechanisms necessary to propel to subject towards the aims and objectives of a programme.

The model begins with the outsider (1), the disaffected subject at best indifferent to or at worst antagonistic in respect of the programmes goals. For a behavioural change programme to leave the starting blocks a close encounter is needed to accomplish the often forbidding preliminary step of persuading subjects about to the risks inherent in their current activities and to seed doubt about the wisdom of their continuation. An element of self-uncertainty (2), once inculcated, leads to the possibility of presenting alternatives to current behaviour and life-styles. These options are likely to vary in their palatability to different subjects and the intervention then needs to make a case that the particular programme pathway has some basic feasibility in the eyes of participants. An initial level of anticipation (3) is induced which may be hardened by further explanation of why the theories, ideas and resources within the specific programme are applicable to that particular subject. The subject then enters the programme with some cautious expectations (4), which are unlikely to be met unequivocally and are thus more likely to endure if immediate evidence of the promised success is presented. Regardless of such quick wins, subjects will face repeated challenges in adapting behaviour and the programme will need to assist in demonstrating how to be resilient in the face of adversity. We are now in the midst of the programme, by which stage the subject will have made make numerous recalculations (5) about the wisdom of continuation. The persistence of the subjects' motivational change can be tested and thus confirmed by ceding control of elements of the programme to the participants and assigning them responsibility for some programme goals. Playing an active part in co-producing the intervention is a sign of arrival at insider status (6) and of adherence to a new behavioural code. The programme is then in a position to attest success by 'certifying' the gains. Graduates (7) leave the programme without further need for its support and may even go on to act as ambassadors to other potential subjects.

A generic model of this kind might serve as a platform for NICE guidance on behavioural change.

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Section A: CPHE to complete	
Name:	Robert West
Job title:	Professor of Health Psychology
Address:	Health Behaviour Research Centre Department of Epidemiology and Public Health University College London
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change and addiction
Evidence gaps or uncertainties:	
Provide the PDG with an overview of your work in the area of addiction and behaviour change, including:	
- Characteristics of effective interventions for behaviour change in relation to addiction	
- Links between theoretic approaches to behaviour change and effective interventions inc synthetic theory	
- Transferability of characteristics of behaviour change interventions across different health related behaviours	
Section B: Expert to complete	
Summary testimony:	

The testimony aimed to show how an overarching model of behaviour, the 'Synthetic Model' (1), can help to understand addictive behaviours and develop effective intervention strategies for combating these, and to draw lessons from this to development of more effective interventions for behaviour change more generally. It reviewed the 'synthetic model' of behaviour (COM-B+PRIME) and a framework for describing behaviour change interventions (the Behaviour Change Wheel - BCW). It provided an overview, using the BCW framework, of what has worked and what has not in combating addictive behaviours. It drew lessons for developing interventions to combat addictive behaviours and lessons for behaviour change more generally. The slides are attached as an Annexe. Key points are summarised below.

The COM-B model starts by recognising that for any behaviour to occur, the individual or group must have the physical and psychological capability, the physical and social opportunity, and be more motivated to do it at the relevant time than anything else.(2) These elements interact so that influencing one can change another. For example, increasing opportunity can increase motivation, and through behaviour can increase capability. To take a simple example, giving one's teenage child money for driving lessons can motivate him or her to learn to drive and taking the lessons then helps with acquisition of the necessary skills.

For many health-related behaviours, including addictive behaviours, the central

issue is motivation in its broadest sense – not just reasons for doing things but all those brain processes that energise and direct behaviour.(3) PRIME Theory focuses specifically on motivation. It was developed to bring together into a common framework diverse aspects of motivation from analytical choice and evaluation to drives, instincts and habits. It contains several laws:

The first is that at every moment we act in pursuit of our strongest motives (wants or needs) at that moment. Wants involve feelings of anticipated pleasure or satisfaction while needs involve anticipated relief from, or avoidance of, mental or physical discomfort. Understanding momentary wants and needs and the competition between them lies at the heart of understanding most health-related behaviour. For example, wanting to 'spend more time in the gym' will not influence behaviour unless it translates into wanting or needing to do this more than wanting or needing to do something else on occasions when the opportunity presents itself, or unless it is strong enough to create the opportunity and then use it.

The second law is that evaluations (beliefs about what is good and bad) and plans (self-conscious intentions to do or not do things) are important in controlling our actions, but only if they create motives at the appropriate moments that are stronger than competing motives coming from other sources. For example, believing that stopping smoking is a good thing will have no effect on behaviour unless at some point in time it makes the individual want or need to stop more than he or she wants or needs to carry on. Translating 'ought' into 'want' or 'need' is a key target for behaviour change interventions.

The third law is that self-control (acting in accordance with plans despite opposing motivations) requires mental energy (sometimes called 'ego strength'). Stress, tiredness, having had to exercise self-control for a while, and drugs such as alcohol can all deplete ego strength. For example, trying to make several difficult life changes requiring self-control can undermine ability to achieve any of them.

The fourth law is that our identities (thoughts, images and feelings and feelings about ourselves) can be a source of very strong motives. These include labels (the categories we think we belong to), attributes (the features we ascribe to ourselves) and personal rules (imperatives about what we do and do not do). Identity plays an important role in health related behaviours – both in promoting risky behaviours and in protecting against these. It can also play an important role in promoting or preventing behaviour change. For example, wishing no longer to be an 'addict' and all this entails is one of the factors than can promote attempts at recovery from addiction. Adopting, and feeling attached to, a new identity as a non-smoker, an ex-addict, a 'health nut', 'a careful driver' etc. can all help to maintain new behaviour patterns in a way that more specific beliefs about the benefits of the new patterns may not.

The fifth law states that motives influence actions by creating impulses and inhibitions, which are also generated by habitual (learned) and instinctive (unlearned) associations; behaviour is controlled by the strongest momentary impulses and inhibition. The moment to moment competition between impulses and inhibition represent the final common pathway to behaviour. Some of these are 'hard wired' as responses to particular kinds of stimuli, some arise from learned associations through conditioning. Much behaviour, including health

related behaviour involves a strong habitual element although very little is entirely habitual in this sense. Thus tooth-brushing and exercising are often referred to as habits but it is more accurate to regard them as 'routines' – initiated and terminated by motives (we do not find ourselves exercising unconsciously) but with elements strongly reinforced by habit processes.

With these fundamental principles in mind, one can bring together a diverse range of observations about behaviour in general and addiction in particular. Addiction can usefully be defined as 'repeated powerful motivation to engage in a purposeful behaviour that has no survival value, acquired as a result of engaging in that behaviour with significant potential for unintended harm.' (1)

It so happens that certain psychoactive drugs can generate this powerful motivation, and the multiple mechanisms underlying this are quite well understood.(4) For example the effect of these drugs on dopamine release or re-uptake in the nucleus accumbens appears to play a central role. When dopamine attaches to neural receptors in the nucleus accumbens, the brain treats this as a 'teaching signal' so that the animal/human experiences an impulse to enact the behaviour that immediately preceded this when it encounters a similar situation. This is a natural reward mechanism that is usurped by addictive drugs.

Behaviours become addictive primarily to the extent that they create powerful wants, needs or impulses to engage in them, or undermine motivation or capability to resist these. There are many ways in which this can occur. For example, alcohol can provide short-term relief from dysphoria and a certain amount of pleasure or release but mood may rebound later making the need for alcohol all the greater. With very heavy drinking, more severe unpleasant abstinence symptoms may emerge that alcohol consumption resolves. It is important to recognise that the learned association between drinking and pleasure or relief from dysphoria can create a strong want or need to drink in response to drinking cues that long outlast any abstinence syndrome.

An important implication of this analysis is that addictive behaviours are not qualitatively distinct from other behaviours. This in turn means that a) the range of interventions that influence other behaviours (see below) will also influence addictive behaviours, and b) it is helpful, when attempting to change other behaviours, to take account of features that they share in common with addictive behaviours

An analysis of 'what it would take' to achieve the desired behaviour in terms of the COM-B model and PRIME Theory is the first step in developing an intervention strategy. The next step is to use this analysis to identify relevant intervention functions from among all those available. A systematic review of behaviour change intervention frameworks has yielded nine such functions: education, persuasion, incentivisation, coercion, training, restriction, environmental restructuring, modelling and enablement.(2) The same systematic review also identified seven types of policy that can be used to implement those intervention functions: legislation, regulation, guidelines development, service provision, environmental planning, communication/marketing, and fiscal measures.

There may be many different intervention strategies and policy options that would achieve the desired effect, but generally only a small subset of these will have other essential features, namely: affordability, practicability, and acceptability

(including absence of adverse side-effects). Thus, in theory one could legislate to coerce people to stop smoking through threat of summary execution, backed up by putting vast resources into detection (through saliva assays for the nicotine metabolite, cotinine). This would no doubt reduce smoking prevalence considerably and probably save tens of thousands of lives – but would not be acceptable. In general, when it comes to health-related behaviour western societies prefer to focus on policy options and interventions that maximise people's sense of choice – except in the case of addictive drugs that do not have large commercial interests supporting them where legislation and threat of punishment are the primary mechanism for control.

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Section A: CPHE to complete	
Name:	Laura Haynes
Job title:	Head of Policy Research
Address:	Behavioural Insights Team UK Cabinet Office
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – policy and context
Evidence gaps or uncertainties:	

Provide the PDG with an overview of current policy and work in relation to behaviour change, in particular around:

- Individual-level interventions
- Choice architecture and 'nudge' approaches

Section B: Expert to complete	
Summary testimony:	[Please use the space below to summarise your testimony in 250 – 1000 words – continue over page if necessary]

The Behavioural Insights Team (BIT) was created in the early months of the Coalition Government. A small team in the Cabinet Office, we are tasked with applying behavioural science to public policy. BIT has worked across a range of policy areas in collaboration with other government departments, local authorities, private sector providers, and academics.

The principal focus of our work is determined by our Steering Board, chaired by the Cabinet Secretary. Over time, our delivery of these work programmes) has increasingly involved the development of randomised trials in the field. After field work to understand the policy context from the citizen's perspective, we use insights from behavioural science research to develop changes or new interventions, and then use rigorous experimental methods to test their effectiveness.

We have a large portfolio of trials, in policy areas including tax, fraud/debt/error, energy/environment, unemployment, growth of SMEs, charitable giving, and electoral registration. Our relatively unique use (in government) of experimental methods, means we can demonstrate the value-add of behavioural science on outcomes and savings. In the recent 2 year review, it was estimated that BIT "achieved savings of around 22 times the cost of the team and identified specific interventions which will save at least £300m over the next 5 years."

Section A: CPHE to complete	
Name:	Colin Greaves
Job title:	Senior Research Fellow
Address:	University of Exeter Medical School
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – Implementation and Maintenance
Evidence gaps or uncertainties:	[Please list the research questions or evidence uncertainties that the testimony should address]

Provide the PDG with your perspective on the implementation and maintenance of effective behaviour change interventions, including:

- *The core characteristics, competences and processes required to implement effective behaviour change interventions (in particular, in the topics of interest, if you are able - smoking, diet, physical activity, sexual health or alcohol)?*

- *When, why and how behaviour change is maintained?*

- Core content of intervention materials and training courses on behaviour change for practitioners and service providers (in particular, in the topics of interest if you are able - smoking, diet physical activity, sexual health or alcohol)?

- Are there core areas or factors that can be generalised across topics?

Section B: Expert to complete	
Summary testimony:	

The core characteristics, competences and processes required to implement effective behaviour change interventions (in particular, in the topics of interest, if you are able - smoking, diet, physical activity, sexual health or alcohol)?

Provider characteristics

Competency in delivering most behaviour change techniques can be taught to a wide range of people with different professional and academic competencies. I have personally taught (and in many cases assessed subsequent intervention fidelity for) nurses, healthcare assistants, fitness industry staff, GPs, hospital-based consultants, social workers and health trainers to use behaviour change techniques and person-centred counselling techniques. This has been mainly for supporting changes in diet and physical activity, but also for smoking cessation.

Some perform better than others, but performance is not related to prior qualifications, so much as to other life-skills and personal characteristics (particularly

the ability to become patient-centred /to resist the righting reflex /to put aside your own agenda). I believe that most people with CGSE or higher education can be taught to deliver behaviour change techniques.

From what I have seen of it, the evidence base on differences in performance between staff with different characteristics in behavioural interventions (e.g. comparisons of delivery of the same intervention by GPs or nurses) is extremely weak both in quality and quantity. I am aware of no study that has been powered to properly address such questions. Our review of reviews of interventions for supporting changes in diet and /or physical activity[1] found no robust evidence on this (no consistent or significant relationship between intervention provider and weight, physical activity or dietary outcomes at up to 12 months of follow up). However, it was clear from individual RCTs that "a wide range of providers (with appropriate training) including doctors, nurses, dieticians/nutritionists, exercise specialists and lay people, can deliver effective interventions for changing diet and/or physical activity.[1]

Skills and Competencies: The skills and competencies needed for intervention delivery will obviously vary depending on the intervention to be delivered, but, based mainly on experience in delivering trials and training intervention providers, the competencies that staff should be trained in for delivering behaviour change interventions might typically include:-

1. Empathy-building skills. This is a critical skill-set in my experience. If these skills are weak in the provider, most behavioural interventions will fail. This is particularly difficult to assess at job interviews! Micro-skills include: Using a Guiding style; Open-ended questions; Affirmation; Reflective Listening; Rolling with Resistance.
2. Using Assessment Tools: (e.g. dietary and PA assessment).
3. Exchanging information (to support motivations, action-plans and problem-solving, a lot of information is often needed – what is a healthy diet, what different strategies might I use to help me stop smoking, what are the safety considerations etc): Micro skills might include using the Ask-Tell-Discuss (elicit-provide-elicit) process, or use of problem-based learning techniques.
4. Exploring motivation: This includes the ability to elicit the current circumstances, beliefs and preferences of the participant(s) that might influence behaviour change. Micro-skills might include using decisional balance techniques; exploring possible futures; using a confidence ruler; making summaries; use of 'turning point' questions.
5. Facilitating action planning: Micro-skills might include facilitating SMART (or SMART-ER) goals. Facilitating the completion of coping and social support plans.
6. Establishing self-regulation: Micro-skills might include setting up self-monitoring; providing feedback in the event of positive or negative outcomes; managing setbacks; problem-solving.
7. Managing emotional processes. Micro-skills might include encouraging enjoyable lifestyles; teaching techniques for managing impulses (e.g. food cravings); cognitive re-framing.
8. Group facilitation skills: This requires the ability to recognise group dynamics and to intervene to guide them in directions that evoke increasing engagement /attention /focus, rather than resistance /disinterest /drifting off topic. Empathy building techniques can be adapted for group settings, but

these may need to be combined with direction-building techniques to keep the group on a clear trajectory.

When, why and how is behaviour change maintained?

Behaviour change is not always sustained. Indeed, relapse to prior behaviour seems to be the norm. The phenomenon of relapse is well documented in smoking cessation (where quit rates fall from around 40% at 4 weeks to around 10% at 12 months), interventions for drug and alcohol overuse and in physical activity. In the field of weight loss, although lifestyle (diet and physical activity) interventions are increasingly successful in promoting initial weight loss[1,2,3] gradual weight regain is common, with weight typically returning to baseline levels over 3-5 years.[3]

Behaviour change is perhaps more likely to be maintained when a) very strong motivation has been established ("Road to Damascus" moments or significant life crises[4]) b) when changes that are made are 'sustainable' in that they require little or no ongoing effort or motivation to continue with and c) when the person making the change experiences a significant benefit, thereby reinforcing the ongoing behaviour. For instance, people who still have a high level of food cravings after changing their diet are less likely to maintain weight loss. However, if the new diet satisfies hunger needs and personal standards about being able to enjoy food, then it is more likely to be sustained.

An increasingly common approach to promoting behaviour change maintenance is to encourage people to go through multiple cycles of self-regulation (a cycle would typically consist of making a plan of action, self-monitoring progress, reviewing progress, problem-solving and then revising the action plan). There is evidence that the use of self-regulation techniques is associated with an increase in the effectiveness of weight loss interventions at up to 12 months of follow-up[1,5] and several "maintenance by self-regulation" interventions have been shown to be effective in supporting the maintenance of weight loss (through diet and physical activity) from 18 to 30 months (although substantial weight regains were still observed).[6,7,8] The evidence for the effectiveness of self-regulation techniques in helping to promote weight loss maintenance (i.e. changes in diet and /or physical activity) is therefore strong.

The ongoing self-regulation approach may be less well suited to maintenance of 'categorical' behaviours like smoking or drug use, but the same techniques can still be used in an 'acute response' mode (to manage relapses).

Further theoretical and technological approaches to behaviour maintenance exist and need further exploration: These might include emotional self-regulation (using techniques to monitor impulses and improve impulse-control, as well as to manage stress-induced eating behaviour).[9] Social influences may also play an important role in either facilitating or hindering behaviour maintenance,[10] but few studies have specifically explored the potential of manipulating social influences (e.g. using social skills training, engaging social support) for behaviour maintenance. The developers of self-determination theory suggest that higher levels of autonomous self-regulation, perceived competence and relatedness might facilitate maintenance of health-behaviour change[11] and have applied SDT to at least one maintenance intervention (which is still under evaluation).[11] There has been speculation that

other theories, such as learning theory (providing retrieval cues after the new learning is complete, varying the contexts in which the new learning takes place to enhance generalisation of the new behaviour) could be applied to behaviour maintenance,[12] but I am not currently aware of any intervention studies that have tried to specifically test such ideas.

Using mobile phone or internet based software to support longer-term behaviour change (e.g. to provide regular or context-specific prompts or reminders, to support self-monitoring, or as a source of 'critical moment' advice) is becoming increasingly popular and the evidence base is developing rapidly in this area. The evidence base to date is mixed however and confounded by a large number of low quality studies and reviews. I will present some preliminary data from our ongoing review of reviews of this literature.[13]

There is a potentially interesting debate about whether maintenance of behaviour change is best supported by providing ongoing support (as seems to work in some commercial weight loss programmes), or by teaching people the skills needed to regulate their own behaviour so that they can self-manage when new challenges arise. Preliminary evidence suggests that ongoing guidance /support from a health promotion worker may work better than a self-help (either internet or self-help workbook) approach,[7,8] but the interventions used in these trials were intensive. Hence, further research is needed to identify the most cost-effective methods for achieving weight loss maintenance (and the maintenance of other health behaviours).

Further research is needed to identify the best and most cost-effective approaches to behaviour maintenance for different health behaviours (including diet, physical activity, smoking, sexual health behaviours and drinking).

Core content of intervention materials and training courses on behaviour change for practitioners and service providers (in particular, in the topics of interest if you are able - smoking, diet physical activity, sexual health or alcohol)?

What should core content include? The intervention content, including the behaviour change techniques to be used, will clearly vary depending on the target behaviour. Please refer for instance to NICE guidance PH38 on diabetes prevention in individuals at risk of type 2 diabetes for evidence based recommendations on the content of behavioural interventions for promoting changes in diet and physical activity.[14]

However, the training should focus primarily on the *process* of intervention and the *skills* needed to deliver the intervention as well as the delivery of any specific behaviour change techniques and information that is relevant to the particular intervention.

I think it is useful during training to summarise the intervention in the form of a process model (a diagram depicting the journey that participants have to go in terms of processes of behaviour change in order to achieve the targeted changes). This can then be broken down into specific behaviour change techniques and skills, and each skill /technique can be taught separately.

Providing opportunities to practice delivery of the intervention components is essential.

I would also recommend that any training course on supporting behaviour change should ideally include a formative feedback element, whereby several recorded consultations are checked and reviewed by a specialist (and by the trainee) with a view to improving and maintaining performance. This is because taught skills (and particularly person-centred counselling skills) can 'drift' back to the person's previous counselling style if formative feedback is not provided. Direct evidence on the benefit of offering formative feedback to improve the fidelity of behavioural interventions is lacking and this would be a useful practice-informing topic for future research.

Are there core areas or factors that can be generalised across topics?

I have experience in promoting changes in diet, physical activity, medication use (as part of the self-management of asthma and diabetes) and to a small extent smoking behaviour. Based on this, it is clear that people attempting to change these behaviours vary in terms of a) *what motivates* them to want to change b) *what barriers* to change they encounter and c) the *specific information and skills* they need in order to succeed. The specific information and training needed to address these elements will vary from intervention to intervention. However, I would suggest that the same core processes apply to promoting change in each of these behaviours. These core processes are:.

Getting Motivated: This should not be taken for granted, even if people have 'turned up' for the intervention – motivation still needs to be consolidated, made explicit and maximised /reinforced.

Deciding what to do: This involves gaining information and making a plan of action. It may include making a coping plan about how to pre-empt and address potential barriers.

Keeping Going: i.e. Maintenance. This may be facilitated for instance by the use of self-regulation techniques or other theoretically driven techniques to support maintenance (as discussed above)

In implementing these core processes, it also makes sense to think in terms of what are the social and emotional (or hedonic) influences on the behaviour and how these might influence the above processes (e.g. what are the social influences on motivation and barriers to change; what changes can people make to their diet without reducing their enjoyment of food).

Delivery style: The issue of where the intervention sits on the spectrum of directive vs. person-centred is critical and needs to be specifically covered in the training course. The teaching of techniques to build empathy is essential if the course has a patient-centred counselling /empowerment /shared decision-making element.

Mode of delivery may also impact on training – for example, in group-based interventions, the teaching of group facilitation skills is important.

Finally, it is worth noting that, in a review of group-based behaviour change intervention in weight loss (through diet and physical activity) interventions, only 10 out of 125 articles reported that any kind of training had been provided in group facilitation skills.[15] Given the prominence of group-based formats for behavioural

intervention, more research is needed to understand better how intra-group processes might help to generate change in group-based interventions, and how facilitators can be trained to maximise such effects.

References (if applicable):

1. Greaves CJ, Sheppard KE, Abraham C, Hardeman W, Schwarz P, Roden M, et al. Systematic review of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions. BMC Public Health 2011;11(119):1-12

2. Jolly K, et al. Comparison of range of commercial or primary care led weight reduction programmes Lighten Up randomised controlled trial. *BMJ* 2011; 343:d6500.

3. Dansinger M, et al. Meta-analysis: the effect of dietary counseling for weight loss. *Ann Intern Med* 2007; 1471:41-50.

4. Ogden J, Hills L. Understanding sustained behavior change: the role of life crises and the process of reinvention. Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine 2013;12[4]:419-437.

5. Dombrowski SU, Sniehotta FF, Avenell A, Johnston M, MacLennan G, Araújo-Soares V. Identifying active ingredients in complex behavioural interventions for obese adults with obesity-related co-morbidities or additional risk factors for co-morbidities: a systematic review. Health Psychology Review 2010; 6(1):7-32.

6. Svetkey LP, Stevens VJ, Brantley PJ, Appel LJ, Hollis JF, Loria CM et al. Comparison of Strategies for Sustaining Weight Loss. JAMA 2008; 299(10):1139-1148.

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9. Collins RL. Relapse Prevention for Eating Disorders and Obesity. In: Marlatt GA, Donovan DM, editors. Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors. 2nd Edition ed. New York: Guildford Press; 2008.

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13. Tang J, Abraham C, Yates T, Greaves C. Self-Directed Interventions to Promote Weight Loss and Maintenance: A Systematic Review of Reviews. In preparation for submission 2013 (personal communication).

14. National Institute for Health and Clinical Excellence. Preventing type 2 diabetes: Risk identification and interventions for individuals at high risk. 2012. London, National Institute for Health and Clinical Excellence.

15. Borek A, Abraham C, Tarrant M, Greaves C. The use of groups in weight-loss programmes: A systematic review. In preparation for submission 2013 (personal communication).

Section A: CPHE to complete	
Name:	David Buck
Job title:	Senior Fellow
Address:	King's Fund, London.
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – Complex and Multiple health-related behaviours
Evidence gaps or uncertainties:	
- How do health related behaviours cluster together?	
- Are patterns of behaviours affected by socio-economic group, age, ethnicity or gender? What other factors influence the patterning and duration of behaviours?	
- How can this data help our understanding of health related behaviours, and how to change them?	
Section B: Expert to complete	
Summary testimony:	

People's health behaviours are widely known to affect their health and risk of mortality. Less is known about how these behaviours cluster together in the population and how multiple lifestyle risk patterns have changed over time between different population groups.

Using data from the Health Survey for England, we examined how four lifestyle risk factors – smoking, excessive alcohol use, poor diet, and low levels of physical activity – co-occur in the population and how this distribution has changed over time.

We found that the overall proportion of the population that engages in three or four of these unhealthy behaviours declined significantly, from around 33 per cent of the population in 2003 to around 25 per cent by 2008. However, these reductions have been seen mainly among those in higher socio-economic and educational groups. For example, people with no qualifications were more than five times as likely as those with higher education to engage in all four poor behaviours in 2008, compared with only three times as likely in 2003. The health of the overall population will improve as a result of the improvement in these behaviours, but the poorest and those with least education will benefit least, leading to widening inequalities and avoidable pressure on the NHS.

If policy-makers, public health commissioners and the NHS wish to address health inequalities, they will therefore need to find effective ways to help

people in lower socio-economic groups to reduce the number of unhealthy behaviours they have.

This is likely to work only if a holistic approach to policy and practice is adopted that addresses lifestyles that encompass multiple unhealthy behaviours. At a policy level, this is likely to mean moving beyond siloed approaches to public health behaviour policies, in which the focus is on renewing strategies on individual lifestyle risks one at a time, as this ignores how behaviours are actually distributed in the population. It may also mean adapting services to work with "people" and their complex range of behaviours as well as injecting shots of intervention on single issues.

However, there are still many unanswered questions about the right approach to intervention and how effective and cost-effective multiple intervention is compared to single, or sequenced intervention.

References (if applicable):

See powerpoint presentation at the session.

Section A: CPHE to complete	
Name:	Alan Higgins[1] Rachel Flowers[2]
Job title:	[1]DPH Oldham [2]DPH Newham
Address:	*[1]PDG member* *[2]Newham Council,* *London Borough of Newham*
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – Local Authorities and Public Health
Evidence gaps or uncertainties:	[Please list the research questions or evidence uncertainties that the testimony should address]

Provide the PDG with an overview of local authorities and, commissioning arrangements for behaviour change interventions, including:

- Potential barriers to implementation of NICE behaviour change guidance from a local authority perspective
- How might local authorities vary the provision and delivery of behaviour change interventions across different populations in a local authority area
- How can local authorities take account of equity in commissioning and managing behaviour change interventions and services?

Section B: Expert to complete

Summary testimony:

This is a time of significant change with many Local Authorities experiencing sizable budget reductions and going through re-structuring or re-prioritising to manage this change. This could provide either a barrier or an opportunity for implementation of NICE behaviour change guidance within Local Authority. The approach will also reflect the localism agenda in terms of provision and delivery. Some Local Authorities are moving towards a more Strategic Commissioning Provision split while others aren't and some are somewhere in between. This will also affect their approach to commissioning. All of the above will vary reflecting the nature of the authority- unitary, metropolitan, two tier or a London Borough as well as local politics, both party and individual.

Local authorities are one of the pieces in what the Health and Social Care Act described as a new public health system. The other pieces include Public Health England, the Clinical Commissioning Groups where some responsibility for public health still resides, the NHS Commissioning Board and a centrally controlled resource on public information. The presentation will review how this system might work with local Health and Wellbeing Boards to improve health.

Local authorities will have a budget to achieve public health outcomes. Much of the budget will come with a history of investment although all authorities also have an

uplift to the budget. The presentation will review the way that behaviour change activity has been commissioned in Newham and Oldham to date and make projections as to how this activity will be commissioned in the future.

Consideration will also be given to the use of NICE guidance and evidence in the commissioning of behaviour change activity in councils, barriers to this and possible solutions.

References (if applicable):

Section A: CPHE to complete	
Name:	Theresa Marteau
Job title:	Director, Behaviour and Health Research Unit
Address:	Behaviour and Health Research Unit University of Cambridge
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change: Choice architecture, economic environment and the ethics/Acceptability of such techniques
Evidence gaps or uncertainties:	Are 'choice architecture' or economic environment interventions effective and cost effective at changing someone's behaviour and leading to sustained change? How acceptable are such interventions to the public and to policy makers?
What is the theoretical/conceptual framework for explaining how choice architecture interventions work?	
Under what circumstances do such interventions work, for whom, and for how long?	
Is there any harm associated with the use of choice architecture interventions – for example, can they lead to a "halo" effect, whereby combining a healthy option with an "unhealthy" option makes the unhealthy option appear healthier?	
What are the ethical issues associated with specific behaviour change techniques or practices (e.g. financial incentives)?	
How do views of acceptability differ between participants of behaviour change interventions, the general public, and policy makers?	
What is the potential impact of these views on the practical application of behaviour change techniques?	
Section B: Expert to complete	
Summary testimony:	

Changing environments to change behaviour

We can understand behaviour as arising from two sets of processes: goal directed, reflective processes, and automatic, habitual processes largely cued by stimuli in the immediate environment (1). The latter set of processes controls more of our behaviour than the former. Choice architecture interventions are those that involve altering the properties or placement of objects or stimuli within micro-environments with the intention of eliciting health-enhancing behaviour (2). Such interventions are implemented within the same micro-environment as that in which the target health-enhancing behaviour is performed, typically require minimal conscious engagement, can in principle influence the behaviour of many people simultaneously, and are not targeted or tailored to specific individuals. It is expected that they work largely through automatic habitual processes.

To date there is insufficient evidence -synthesis of choice architecture interventions to know effect sizes of various interventions, individually and in combination, and the extent to which these might be sensitive to context and populations. We hypothesise that these interventions, by by-passing reflective processes to activate behaviour, are

more likely to achieve behaviour change in those who are more as well as less socially deprived. Results of a recent large scale scoping review (2) suggests several promising intervention types warranting further primary and secondary research: those regarding sizing, ambience, availability, prompting, priming and proximity.

Regarding potential harms from choice architecture interventions, we do not know if these are more or less likely than for other interventions. The potential for no effect (with attendant resource cost) as well as the potential for unintended perverse effects (such as the increased consumption of calories that can occur when foods are labelled as low as opposed to high fat) underscores the importance of evaluating interventions.

Regarding the impact of economic environments on diet and physical activity related outcomes, our principal finding from a recent large scale scoping review was that evidence for the effects of economic instruments and exposures on diet and physical activity is limited in quality and equivocal in terms of its implications (3). A synthesis of evidence regarding the impact of taxes and subsidies on diet revealed that most of the evidence supports the null hypothesis (4), tempering the enthusiasm with which some have been advocating taxes to improve diet-related health outcomes.

Acceptability of government intervention to change behaviour

We have recently completed a narrative review of the acceptability of government intervention to change health-related behaviour (5). Based on 200 studies we found that acceptability varied as a function of: (a) the type of intervention, with less intrusive interventions, those already implemented, and those targeting children and young people attracting most support; and (b) the targeted behaviour, with more support observed for smoking-related interventions; (c) the characteristics of respondents, with support being highest from those not engaging in the targeted behaviour, and with women and older respondents being more likely to endorse more restrictive measures. The results of two recent discrete choice experiments show that the public is prepared to trade off negative attitudes towards intervention for population benefit, with support being sensitive to the nature and scale of the benefit (6,7). Uncertainty remains about how effectively evidence of benefit can be communicated alongside messages heralding harm from intervention, from organisations such as those representing the alcohol, food and tobacco industries.

The limited evidence that public acceptability of intervention is to some extent contingent on evidence of intervention benefit is likely to be reflected in more nuanced thinking amongst policy makers regarding public acceptability of policies.

References (if applicable):

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2. Hollands GJ, Shemilt I, Marteau TM, Jebb SA, Kelly MP, Nakamura R, Suhrcke M, Ogilvie D Unfudging nudging: towards an evidence base (under review).
3. Shemilt I, Hollands GH, Marteau TM, Nakamura R, Jebb SA, Kelly MP, Suhrcke M,Ogilvie D. Economic Instruments for Population Diet and Physical Activity BehaviourChange: A Systematic Scoping Review. (under review)
4. Shemilt I, Ogilvie D, Kelly M, Suhrcke M, Nakamura R., Kirk S, Marteau T. Food taxes and subsidies: Does cumulative evidence support their use? (under review)
5. Diepeveen S, Ling T, Suhrcke M, Roland M, Marteau TM. Public acceptability

of government intervention to change health-related behaviours: a narrative review (under review)

6. Promberger M, Dolan P, Marteau TM. "Pay them if it works": Discrete choice experiments on the acceptability of financial incentives to change health related behaviour. *Social Science and Medicine* 2012 75: 2509-2514 http://www.sciencedirect.com/science/article/pii/S0277953612006971
7. Pechey R, Burge P, Monsiavis E, Suhrcke M, Marteau TM Public acceptability of population-level interventions to reduce alcohol consumption: a discrete choice experiment (in preparation)

Section A: CPHE to complete	
Name:	Rona Campbell
Job title:	Professor of Public Health Research
Address:	University of Bristol School of Social and Community Health,
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – Complex and Multiple Interventions
Evidence gaps or uncertainties:	
How to manage complex multi-level behaviour change interventions for complex problems?	
How to approach individuals with multiple health issues /risks: • where to intervene first? • in what order?	
Section B: Expert to complete	
Summary testimony:	

Risk behaviours such as smoking, drinking alcohol, unprotected sex or antisocial and criminal behaviour often begin in adolescence. A majority of young people will engage in more than one risk behaviour. Analyses of data on 13 risk behaviours collected from members of the ALSPAC cohort suggest that at 15 to 16 years of age 40% of adolescents engage in between three and five risk behaviours; 32.6% engage in four or more behaviours: and 6.2% engage in seven or more.[1] There is also is evidence of patterning in these behaviours by gender and social class[2] and although some types of risk behaviours appear to cluster together (e.g. substance use behaviours) analyses of data from the ALSPAC cohort suggest it is the absolute number of behaviours engaged in that distinguishes between different groups of young people.[3] Multiple risk behaviour matters because it is associated with poor educational attainment, morbidity and premature mortality in adolescence and early adulthood.[4]

In spite of risk behaviours co-occurring, public health interventions tend to focus on single risk behaviours such as smoking or safe sex. There is an evidence base for the effectiveness of such single focus interventions but systematic reviews of interventions that tackle a number of risk behaviours simultaneously are only just beginning to be undertaken[5,6] and while for reasons of parsimony it may appear logical to implement interventions that tackle risk behaviours multiply, care must be taken not to assume that this is the better approach. We do not yet have the evidence on which to make that judgement.

Theory is important in the design of complex interventions for public health improvement. The behaviour change field in public health is already well informed by psychological theories but is more focussed on intervention at the individual level. Sociological theories may help to inform the development of multi-level interventions

because sociology is concerned with human social life, groups and societies, social class, culture, institutions and collective behaviour. Sociological theories may be useful in guiding interventions designed to address a number of levels but they are not always easy to identify from the extant literature or to specify as logic models.

A recently conducted, small-scale review of sociological theories of risk-taking likely to be harmful to health identified 16 relevant theories. It revealed that risk-taking is not simply an individual behaviour but is a social practice involving a range of social actors which can only be fully understood within its social context.[7] The review suggested that serious multiple risk behaviour is associated with: social isolation and being a member of a marginal social group; being labelled as 'deviant' and becoming a member of a 'deviant subculture' (which leads to social isolation); and avoiding the influence of convention (which may be related to social isolation). Greater application of sociological theories in public health may result in better interventions and more empirical testing of theory.

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1. MacArthur GJ, Smith MC, Melotti R, Heron J, Macleod J, Hickman M, Kipping RR, Campbell R, Lewis G. Patterns of alcohol use and multiple risk behaviour by gender during early and late adolescence: the ALSPAC cohort. *J Pub Health*. 2012. Mar;34 Suppl 1:i20-i30 Mar;34 Suppl 1:i20-i30.
2. Kipping R, Smith M, Heron J, Hickman M, Campbell R. Patterns of multiple risk behaviour during adolescence by parental socio-economic status: the Avon Longitudinal Study of Parents and Children birth cohort. (Submitted for publication)
3. Heron J, Hickman M, Kipping R, Smith M. Campbell R. A latent class analysis of multiple risk behaviours in adolescence: the ALSPAC cohort. (In prep.)
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5. MacArthur G, Kipping RR, White J, Chittleborough C, Lingam R, Pasch K, Gunnell D, Hickman M, Campbell R. Individual-, family-, school- and community-level interventions for preventing multiple risk behaviours in 8 to 25 year olds (Protocol). The Cochrane Library, Issue 6, 2012
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7. Pound P. Campbell R. Sociological theories of risk taking. (Submitted for publication)

Section A: CPHE to complete	
Name:	Deryn Bishop
Job title:	Health Behaviour Specialist, The Training Tree
Address:	*PDG member*
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – Evidence into practice
Evidence gaps or uncertainties:	

Provide the PDG with an overview of Making Every Contact Count – evidence into practice, including:

- The evidence base that informs the intervention
- Core training and competencies
- Outcomes and evaluation

Section B: Expert to complete

Summary testimony:

Making Every Contact Count; what it is?

MECC means making the most of every opportunity to raise the issue of healthy lifestyles; systematically promote the benefits of healthy living and signpost people to further support where necessary. It is a programme adopted by NHS Midlands and East as one of their top 5 ambitions. MECC may be delivered opportunistically or as part of routine practice.

Why is it important?

Unhealthy lifestyle behaviours place a resource and financial burden on the NHS and Society as a whole , and generate inequalities in health outcomes, not only because people in more deprived areas are less likely to follow healthy behaviours but when they suffer ill health as a consequence, their outcomes are not as good as people from more affluent areas.

- Smoking prevalence 19% -22%
- 25% of people are drinking at increasing risk or high risk levels.
- 22 - 26 % of men are obese and 24 -28 % of women are obese
- 61% of men and 71% of women do not meet the recommended physical activity levels
- Only 25 % of men and 29% of women regularly eat 5 portions of fruit and vegetables a day
- Average life expectancy in “Middle Earth” (East, EMids and WMids) is as low as 65.5 years in some areas and just over 90 years in others

In Europe, 33% of the entire disease burden is thought to be caused by five reducible population risk factors: tobacco consumption, excessive alcohol use, a high blood pressure,

high LDL cholesterol levels, high Body Mass Index and high blood sugar levels.

There is an increasing trend in the incidence and prevalence of lifestyle-related chronic diseases. More than 75% of cardiovascular disease results from smoking, high blood pressure or cholesterol, or their combination. High cholesterol causes more than 4 million premature deaths a year; tobacco almost 5 million, and high blood pressure 7 million worldwide. The future priorities for EU health policies(1) show a shift in healthcare policy from a clinical, curative focus to the development of a preventative one.

Cost-Effectiveness; Costs to UK economy: Diabetes £9bn pa (2), physical inactivity £8.2bn and obesity £2.5bn pa (3). Alcohol costs NHS £3.5 bn pa, CJS £11bn and cost of lost productivity is £7.3bn.(4)

Utilising our best assets (our frontline staff)to Ask, Advise and Assist on healthier lifestyles can lead to a reduced demand for future healthcare .When people adopting healthy lifestyles do establish disease it is likely to be later in life, and people are likely to have better treatment outcomes.

Where we can expect an impact:

1. **Primary prevention:**

Poor health is not just an individual's problem but relates to the lifestyle of the whole community. North Karelia Project: Programmes were held in churches, supermarkets, schools etc to encourage individuals and groups to adopt a healthy lifestyle (5); and had a significant impact on premature death.

However, 2 US studies examining the effectiveness of preventative interventions aimed at influencing the adoption of a healthy lifestyle showed no real improvement whilst a third had reasonably good results (6, 7, 8)

2. **Secondary prevention:**

Early identification of individuals at high risk (e.g. with high cholesterol and high blood pressure) and giving them pharmacological treatment is both clinically and cost effective (9). Early diagnosis and treatment of people with diabetes resulting from obesity can have a major impact on reducing cardio vascular events, kidney failure, dialysis cost and future heart failure activity (10)

Formal screening for cardiovascular risk in GP surgeries coupled with opportunistic use of "teachable moments" can result in the early detection, effective treatment and follow up of patients with raised blood pressure. The clinical and cost-effectiveness benefits of early diagnosis and treatment of many cancers are well documented (11). MECC can be a way of encouraging people to participate in all sorts of screening programmes.

Tertiary prevention:

Sign-posting and advice on chronic disease management facilities or appropriate access to unscheduled care services could significantly improve access to health care services and enhance service response that reflects the profile of patients being referred.

Evidence Base:

Studies have shown that delivering health messages is associated with an increase in participation in health-related behaviour (12), most frequently related to smoking, alcohol consumption and physical activity.

1. Interventions associated with smoking cessation increase quitting rates from 1-3% (13),(14),(15);
2. Interventions targeted at heavy drinkers are effective in decreasing alcohol use in the adult population(16).
3. Providing health advice increases physical activity levels (17).
4. Less is sometimes more: 5 minutes brief advice by trained professionals is as effective as 20 minutes counselling in preventing and reducing excessive alcohol

consumption(18).

Noar at al 2007 (19) showed that messages were associated with greater effectiveness when they were tailored to represent some of the underpinning theoretical constructs (e.g. attitudes, self-efficacy and self management).

"G*oal setting, monitoring behaviour, receiving feedback, and reviewing goals in the light of feedback are central to self management and behavioural control* (20).

The EPIC study carried out in Norfolk 1993 to 2006 looked at survival according to healthy lifestyle behaviours.(21).

The overall impact was a 14 years difference in life expectancy between those undertaking all four behaviours and those not following any, with increased benefits with each lifestyle behaviour followed.

The clustering of unhealthy behaviours over time also informed MECC (22), as most often people are following more than one unhealthy behaviour.

MECC Potential

Tens of millions of people come into contact with the NHS each year.eg in ME Cluster there were over 5 million visits to A&E in 2010/11.

Brief advice takes up to 5 minutes to deliver. If everyone did this 10 times a year it would take less than an hour per staff, and add up to millions of opportunities to motivate someone. Staff benefit too, through better health, higher moral, less time off sick, increased skills etc

As PH integrates into local authorities, MECC is also being rolled out to council, union and voluntary sector staff.

Theory Base:

Ajzen's Theory of Planned Behaviour; Motivational Interviewing skills, Prime Theory. Fits in with the Ladder of Interventions and NICE Guidance.

Skill Base: Active listening skills, Motivational Interviewing skills, FRAMES

Tools to support MECC:

Competency framework:

Competency framework covering 4 levels of behaviour change competency requirements.

Levels I and II are associated with skills and competencies required to increase the awareness of health related behaviour and its influence on individuals' health as well as brief interventions which help individuals to take action. Level III is associated with selecting and using appropriate techniques aiming to change health related behaviour. Level IV is associated with specialised/advanced health behaviour approaches such as Cognitive Behavioural Therapy or Motivational Interviewing.

Whilst MECC is concerned with Level I competencies, it can optimise the access and use of NHS services associated with remaining 3 levels of competencies included in the framework.

Every Contact Counts E Learning suite: Brief Encounters and Motivating Change modules. Includes Knowledge Bank, case study scenarios, videos and quizzes as well as a Learning Journal. Can be delivered as stand alone or as part of blended learning package.

Organisational, Team and Individual Assessment tools: encourage leadership, ownership, sets out expected milestones etc

Exemplar CQUINs to incentivise delivery in acute and community care settings

Insight Research: showed staff seen as credible messengers, their own lifestyles are important etc

Metrics: Links into PH framework; outcome measures etc; taking into account health

inequalities

Prompt cards for staff: tailored prompts for staff from different areas eg Fire Service, Learning Disabilities, Acute Care etc.

Communications Kit: sets the scene, links to organisational values etc

Outcomes and Evaluation:

- Improving Healthy Lifestyle pilots
- West Midlands Clinical Champions and Brief Intervention Training/Train the Trainers
- Every Contact Counts E Learning Suite review

MECC examples: adopted by WMFS staff for Vulnerable Person's Home Checks; smoking and alcohol brief advice delivered by acute care staff (OPD, gynaecology, maxillo-facial, cardiology); Learning Disabilities Teams; Council staff, HR staff and Union Staff; Adopted into undergraduate curricula;; Adult Social Care staff;

MECC Opportunities:

1. Other topics eg sexual health, breastfeeding, falls prevention and fuel poverty can be part of MECC
2. Quality assurance of staff's communication skills
3. Synergies between behaviours can be addressed
4. Impact on wider determinants/transport/streets, planning departments etc can be addressed

References (if applicable):

1. White Paper: Together for Health: A Strategic Approach for the EU 2008-2013
2. NHS East of England & Technology Strategy Board.
3. Report of Chief Medical Officer DH 2004
4. NICE Local Government Public Health briefings 2012
5. North Karelia Project Shows The World How To Reduce Heart Disease: http://kantele.com/nwfwebsite/puska_heart.html)
6. Farquhar HW et al. (1990) Effects of community wide education on cardiovascular disease risk factors - the Stanford five-city project. JAMA;264:359-65.
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8. Greister E et al. Final risk factor change after 7 years of a multicentre community intervention program – the German cardiovascular prevention study. (1994) Abstract, 34th annual conference on cardiovascular disease Epidemiology and Prevention, March, Tampa, Florida).
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smoking cessation (Cochrane Review).

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17. Ogilvie D, Foster C.E.. Rothnie H., Cavill N., Hamilton V., Fitzsimons C.F., Mutrie N. (2007), Research Interventions to promote walking: systematic review BMJ;334:1204 (9 June), doi:10.1136/bmj.39198.722720.BE.
18. Babor et al., 1994 T.F. Babor, M. Grant, W. Acuda, F.H. Burns, C. Campillo, F.K. Del Boca, R. Hodgson, N.N. Ivanets, M. Lukomskya, M. Machona, (1994) A randomized clinical trial of brief interventions in primary care: summary of a WHO project. *Addiction* 89, pp. 657–660.

Also unpublished SIPS research currently undergoing peer review

19. Noar, S.M., Benac, C.N. & Harris, M.S. (2007). Does tailoring matter? Psychological Bulletin, 133, 673–693.O'Cleirigh, C., Ironson, G., Weiss, A. & Costa, P.T. (2007).
20. Michie S., Abraham C., Whittington C., McAteer J., Sunjai G., Effective techniques in healthy eating and physical activity interventions: A Meta Regression. *Health Psychology.* 2009, 23:6.
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22. Buck D and Froseni F: The clustering of health behaviours over time: implications for policy and practice. The Kings Fund

Section A: CPHE to complete	
Name:	Diana Moss
Job title:	Lead national trainer/assessor
Address:	Royal Society of Public Health
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – Behaviour Change Qualifications
Evidence gaps or uncertainties:	Provide the PDG with an overview of the development and content of the 'Understanding Health Improvement programme' (and associated qualifications) • What are the competences associated with the programme, and how are they developed during delivery of RSPH qualifications? • Is there a need for behaviour change qualifications targeting specific behaviours or are more generic cross cutting qualifications appropriate? • Does delivery of behaviour change interventions or techniques need to be altered to meet the needs of different population groups?
Section B: Expert to complete	
Summary testimony:	

Overview of the development and content of the 'Understanding Health Improvement programme' (and associated qualifications)

RSPH Role & Function

- Independent, multi-disciplinary organisation , dedicated to the promotion and protection of collective human health and well-being
- Awarding organisation regulated and subject to the code of practice of Ofqual (formerly Qualifications & Curriculum Authority -QCA)
- Portfolio of qualifications relevant to the workplace
- Website policies:

http://www.rsph.org.uk

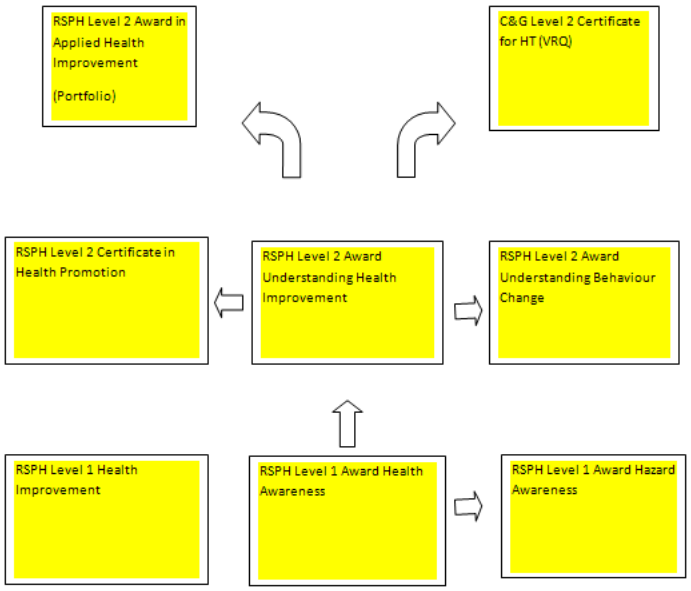
Recognition and regulation by Ofqual assures that the awarding organisation in getting a qualification accredited has

- Governance arrangements; securing any potential conflict in interest in the development and delivery of awards, standards of qualification and public interest
- Integrity, systems, processes, resources, finances and facilities for the development, delivery and award of any qualification
- Understanding of, commitment to, and approach to the development, delivery and award of qualifications, ensuring they are valid, reliable, comparable,

manageable, minimise bias and are compatible with requirements of Equalities legislation

RSPH Qualifications are on the Qualifications and Credit Framework (the national credit transfer system for regulated qualifications in England, Northern Ireland and Wales). Centres approved to deliver these qualifications are registered with RSPH, meet criteria for centre approval as well as individual qualification approval.

Awards in the RSPH Health Improvement suite and possible progression



What are the competences associated with the programme, and how are they developed during delivery of RSPH qualifications?

The level 2 Understanding Health Improvement (UHI) and Level 2 Understanding Behaviour Change (UBC) programmes are both mapped to the National Occupational Standards (NOS) HT2 and HT3.

It is important to note that National Occupational Standards focus on what a person must know, understand and be able to do to work effectively; they are not in themselves levelled. Some will span all levels whilst others may be appropriate to a specific level on the career framework.

The standards underpinning these competencies were first developed by the British Psychological Society (commissioned by DH), the Sector Skills Councils; Skills for Health, Skills for Care and Skills for Justice are responsible for updating and review of the standards (for Health Trainers).The excel spread sheet shows where these awards have been matched to HT 2 and HT3 and where additional input would be required to cover all the criteria. (Green- Fully covered, Yellow –Partially covered, Red- Not covered).

The number of certificates issued for UHI between November 2011 and November 2012 was 4,523. There are 281 centres across the country currently offering the UHI award. To date there are 24 centres registered to offer the new UBC award (Qualification accredited in September 2012). The first centre to enter candidates for

UBC has successfully put 17 candidates through the examination.

Maximising opportunities to make every patient contact count , both the Yorkshire and the Humber Competence Framework[1] , and the East Midlands Behaviour Change Care Pathway and Competence Mapping tools[2] , are derived from a cross section of these same competency units and part standards 'lifted ' from other areas/disciplines. Thus these awards provide some of the underpinning understanding, knowledge and competence in these frameworks.

How competence in the learner is developed during delivery of the programme is the domain of the Centre (registered with RSPH as the awarding organisation). An adult learning style is promoted during Train the Tutor Events and tutors encouraged to make reference to local examples where appropriate. This not only makes the learning meaningful but also develops the learner to be fit for the intended purpose. Flexibility enables tutors to expand on areas of specific interest, however only the core syllabus is examined.

Examination of UHI and UBC are both by short 45 minute multiple choice examination (achieving 20 out of 30 correct answers), these primarily assess 'know how'.
Portfolio examined awards such as the level 2 award in Applied Health Improvement provide evidence of a candidates ability to demonstrate their application of knowledge and understanding in practice –the 'show how'.

Portfolio assessment of competence for RSPH Level 2 Award in Applied Health Improvement is the only RSPH health improvement programme at this time providing an assessment of the candidates' performance of competence.

The RSPH Level 1 Health Improvement, a mandatory unit for the Youth Health Champion programme, (currently in development 14yrs upward) is assessed by a workbook and has a progression route in which additional optional modules focus on knowledge development of Alcohol misuse, Encouraging physical activity, Sexual health, Smoking cessation, Substance misuse, Weight management and healthy eating. These will also be available as single-unit qualifications.

Is there a need for behaviour change qualifications targeting specific behaviours or are more generic cross cutting qualifications appropriate?

The RSPH awards are generic cross cutting qualifications focussed on supporting healthy lifestyle messages (effect of lifestyle, attitudes, smoking, diet, physical activity, alcohol intake and sexual health on health).

UHI aims to provide knowledge and understanding of the principles of promoting health and wellbeing and of how to direct individuals towards further practical support in their efforts to attain a healthier lifestyle.
The qualification covers examples of inequalities in health within the UK, explains

[1] Yorkshire and The Humber Prevention and Lifestyle behaviour Change – A Competence Framework

[2] An Implementation Guide and Toolkit for Making Every Contact Count:
Using every opportunity to achieve health and wellbeing
Tools and resources-The Behaviour Change Care Pathway and Competence Mapping

possible reasons for why there are inequalities in health and current approaches to tackling these inequalities. How individuals can help others improve their health is central to this qualification, are how effective communication can support health messages, how to promote improvements in the health and well-being of others and understanding the impact of change on improving an individual's health and well-being.

UBC aims to provide the learner with the knowledge and confidence to offer opportunistic brief advice to, or engage in brief interventions with, individuals about behaviour change which could improve their health and well being.

Neither is intended to support individuals in the specific management of depression, insomnia, problematic gambling, crash or injury prevention, self management and chronic disease as described by Browning and Thomas[3].

Does delivery of behaviour change interventions or techniques need to be altered to meet the needs of different population groups?

Delivery of the RSPH programme syllabuses allows flexibility for the trainer to include variation to meet the needs of different population groups.

Both UHI and UBC programmes focus on individual behaviour change and incorporate how models of behaviour change can be used to support individuals to adopt healthier behaviour.
They provide an outline of: theory of planned behaviour and reasoned action model, stages of change model, health belief model. And the application of the models by; sharing with the individual to raise awareness of motivation, using them to explore process and possible outcomes, including the possibility of relapse, as well as using them as a catalyst for promoting the adoption of positive behaviour in an individual.

RSPH Health Improvement qualifications aim to support the four objectives of the Public Health Outcomes Framework[4]:

1 Improving the wider determinants of health

2 Health Improvement

3 Health protection

4 Healthcare public health and preventing premature mortality

Used widely across all sectors and in a range of settings[5] RSPH developed a national cascade training model that supported and helped the delivery channel to grow organically and to reflect local needs and settings. In so doing, it helped build capacity, supported and developed by the local HT hub. Whilst some areas have retained the HT hub model, transferring it to the Local Authority as part of the Public Health team this is not the case everywhere.
As an organisation RSPH is sensitive to both the immediate and longer term implications of this for the support and guidance of Health Champions and Health

[3] Browning J and Thomas S Behavioural Change – An evidence-based Handbook for Social and Public Health

[4] Improving outcomes and supporting transparency Part 1: A public health outcomes framework for England, 2013-2016 p 22 para 4.8

[5] RSPH Healthy Communities Guide

Trainers. RSPH is especially keen to explore its potential to provide a knowledge hub and network for HCs and HTs possibly providing a mechanism for safeguard and risk management where Health Champions operate in isolation. Having a network of around 3,500 individuals committed to this work who form a community of practice, RSPH would be able to use them for your future consultations as well as all our Centres and the wider membership of both RSPH and IHM[6].
References (if applicable):

[6] The Institute of Healthcare Management (IHM) joined the Royal Society for Public Health (RSPH) on Friday 26th October 2012.

Section A: CPHE to complete	
Name:	Diane Dixon
Job title:	Senior lecturer
Address:	School of Psychological Sciences and Health University of Strathclyde Glasgow
Guidance title:	Behaviour change
Committee:	Programme Development Group (PDG)
Subject of expert testimony:	Behaviour change – Behaviour Change Competencies
Evidence gaps or uncertainties:	

Provide the PDG with an overview of your work on the Health Behaviour Change Competency Framework, including:

- The evidence base that informs the framework
- What characteristics and competencies are required to deliver behaviour-change interventions and techniques effectively?
- Implementation and evaluation of the framework

Section B: Expert to complete	
Summary testimony:	

Evidence Base Informing the Framework

Competencies were identified by examining the published evidence base. Several sources of information were consulted.

- Relevant professional competency frameworks
- Systematic reviews of interventions for behaviour change
- Manuals for behaviour change interventions
- NHS and Health Scotland Skills for Health and competency frameworks for alcohol brief interventions

The competency framework for the delivery of cognitive behaviour therapy[1] was identified as the professional competency framework of most relevance for the delivery of health behaviour change (HBC) because; a) it describes competencies for delivery of personal change interventions and, b) it is a clear, well-developed framework. This framework was adapted to provide a framework for generic HBC. The content of interventions to change specific health behaviours was also analysed. These included a systematic review of interventions to promote healthy eating and physical activity in community populations that specifically examined the content of the interventions in relation to behaviour change techniques[2]. In addition, a systematic review of smoking cessation intervention manuals was analysed[3]. The competencies detailed in the *Skills for Health* documents *AH10* and *HT3*; the interim guidance on competencies and training for the delivery of alcohol brief interventions

2009 and *Delivery of Alcohol Brief Interventions: A Competency Framework* were also analysed.

Of particular importance was the need to identify specific behaviour change techniques (*BCTs*) to be included in the HBCC framework because the competency framework for cognitive behavioural therapy does not exclusively focus on behaviour. The most comprehensive review of *BCTs* was included in the analyses[4], from which 89 *BCTs* were identified as relevant to health behaviour change.

In addition, the HBCC was developed to take account of the latest work on models of behaviour and behaviour change. There is little evidence available to determine the use of one model in preference to any other[5]. Rather, NICE suggests that training programmes should be based on competencies and skills, rather than focussed on specific models. The HBCC, therefore, does not employ any one model of behaviour change; rather, it describes a route *MAP* to behaviour change, which includes many of the concepts identified by NICE to be used to structure and inform interventions. Each of the 89 techniques was mapped to one or more of three routes to behaviour change[6], namely, *Motivation* development, *Action* on motivation, *Prompted* or cued behaviour. Within the HBCC behaviour change is initiated and maintained through the development of strategies to increase and maintain *Motivation* and to improve and broaden skills that enable that motivation to be translated into *Action*. In addition, the HBCC includes a third route, the *Prompted* or cued route, and this route supports behaviour change without the need for the constant cognitive effort required by the other routes. The effectiveness of the prompted route is strongly supported by the evidence base. The current fashion for 'nudging' behaviour change would largely be accounted for by the prompted route. The *MAP* was also designed to be a useful mnemonic to make such a large number of techniques usable by and useful for policy makers, managers and frontline staff.

The HBCC is organised into three competency domains: *Foundation*, *Behaviour Change* and *Behaviour Change Techniques* (*BCTs*) and then into a three level hierarchy, as in the stepped model of care used in psychological therapies. This hierarchy describes the competences relevant to the delivery of low, medium and high intensity interventions.

The mapping work and content analyses used to develop the HBCC were carried out independently by the Framework's two authors. The competencies were assigned to the hierarchy independently by four practitioner health psychologists. In all cases κ scores for agreement were above 0.7, which indicates acceptable and substantial agreement between judges. This means the HBCC is not simply a consensus document.

What characteristics and competencies are required to deliver behaviour-change interventions and techniques effectively?

Foundation competencies include the professional and ethical guidelines required for practice. Communication skills required to develop an effective, collaborative intervention alliance are core to this competency domain. These communication skills can be supported by evidence based training programmes, which are now a core component of medical education[7].

Central to the *behaviour change* domain is the science of health behaviour and health behaviour change and the skills required to deliver that science in practice. This domain requires knowledge of models and theories of behaviour and how these have been used to develop behaviour change interventions. It describes the general assessment and core intervention skills required to implement theory based interventions for behaviour change in practice. It also includes the knowledge and skills that are specialist to particular health behaviours, for example, how to use a CO

monitor for smoking cessation interventions.

The HBCC currently describes *89 BCTs* organised into the route *MAP* to behaviour and behaviour change[6]: ***M****otivation* development (e.g. recording antecedents and consequences of behaviour); ***A****ction* on motivation (e.g. setting behavioural goals) and ***P****rompted* or cued behaviour (change the environment to facilitate the target behaviour). This *MAP* of behaviour change can be used to ensure that interventions and training programmes exploit each route to behaviour change.

NB: We are currently revisiting the BCT domain to ensure that all the BCTs in the MRC-BCT taxonomy project are contained in the HBCC and are *MAP*ed.

Implementation and evaluation of the framework

The HBCC was commissioned so that training in behaviour change skills could be delivered generically, to avoid the repetition experienced when topic specific training is delivered, e.g. training for smoking cessation and training for alcohol brief interventions.

The HBCC was implemented as a basis for training and also for assessing training needs. The HBCC is currently used as the template for the health behaviour change training programmes delivered by NHS-Health Scotland. A self-assessment tool for the HBCC competencies has been developed in NHS Grampian. Evaluation of training using this tool indicates increased self-reported competence in each domain for health psychologists[8].

However, the HBCC has not been evaluated to assess whether staff trained using the framework are more effective than either staff not trained on the framework or staff trained using other training programmes.

References (if applicable):

1. Roth AD, Pilling S. The competencies required to deliver effective cognitive behavioural therapy for people with depression and anxiety disorders. *Improving Access to Psychological Therapies (IAPT) Programme*. London: Department of Health, 2007.

2. Abraham C, Michie S. A taxonomy of behavior change techniques used in interventions. *Health Psychology* 2008;27(3):379-87.

3. Michie S, Churchill S, West R. Identifying evidence-based competences required to deliver behavioural support for smoking cessation. *Annals of Behavioral Medicine* 2011;41(1):59-70.

4. Michie S, Johnston M, Francis J, Hardeman W, Eccles M. From theory to intervention: mapping theoretically derived behavioural determinants to behaviour change techniques. *Applied Psychology: An International Review* 2008;57(4):660-80.

5. NICE. Behaviour change at population, community and individual levels. Public health programme guidance. London: NICE, 2007.

6. Strack F, Deutsch R. Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review* 2004;8(3):220-47.

7. BESST. Behavioural and social sciences teaching in medicine. 2009. http://www.heacademy.ac.uk/besst/index.asp

8. Bull E, Johnston M., Dixon D. Young dogs taught new tricks: using health psychology training level to validate the Health Behaviour Change Competency Self-Assessment. *British Psychological Society, Division of Health Psychology Annual Meeting*, Liverpool. 2012.

Section A: CPHE to complete	
Name:	Jessica Allen
Job title:	Deputy Director
Address:	UCL Institute of Health Equity University College London
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change – policy and context
Evidence gaps or uncertainties:	

Provide the PDG with an overview of your work on inequalities and health in relation to behaviour change, in particular around:

- The principle of Proportionate Universalism.
- How Local Authorities may be able to target their resources most effectively using this principle.
- What are the implications for intervention commissioning, design and delivery when considering this principle.

Section B: Expert to complete	
Summary testimony:	[Please use the space below to summarise your testimony in 250 – 1000 words – continue over page if necessary]

Health and life expectancy closely relate to socio-economic status and the relationship exists across the whole income distribution – everyone below the very top in society experience some degree of health inequality. This is known as the social class gradient in health and is observable in countries across the world. The English social class gradient was described in Fair Society Health Lives (2010).

- Action to successfully tackle health inequalities must relate to the whole social class gradient, to be universal, without this action will not be of sufficient scale or sustainability to tackle inequalities across the gradient.
- Action should also be proportionate to need, in order to lift and flatten the social class gradient in health.
- There is a need for population wide programmes, but with more focus on those at the lower end of the socio-economic gradient. Targeted action alone, can never achieve the scale and intensity needed to reduce population wide inequalities in health.

- Examples of proportionate universal policies are Childrens Centres, the NHS. Proportionate universal policies must also be appropriate for different stages across the life course and tailored as such. For instance smoking programmes which are appropriate for older people are not necessarily appropriate for teenagers.
- It would be appropriate to measure success in different ways across the social class gradient, with greater weight being given to success further down the social class gradient. This would provide an incentive for programmes to be proportionate to need and a disincentive for them to go for quick, easy wins.

References (if applicable):

Marmot M; Allen, J et al (2010). Fair Society Healthy Lives [The Marmot Review] - strategic review of health inequalities in England http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review

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SDH, Capabilities, Proportionate universalism and behaviour change

NICE, 22 April 2013

Jessica Allen

UCL Institute of Health Equity

www.instituteofhealthequity.org

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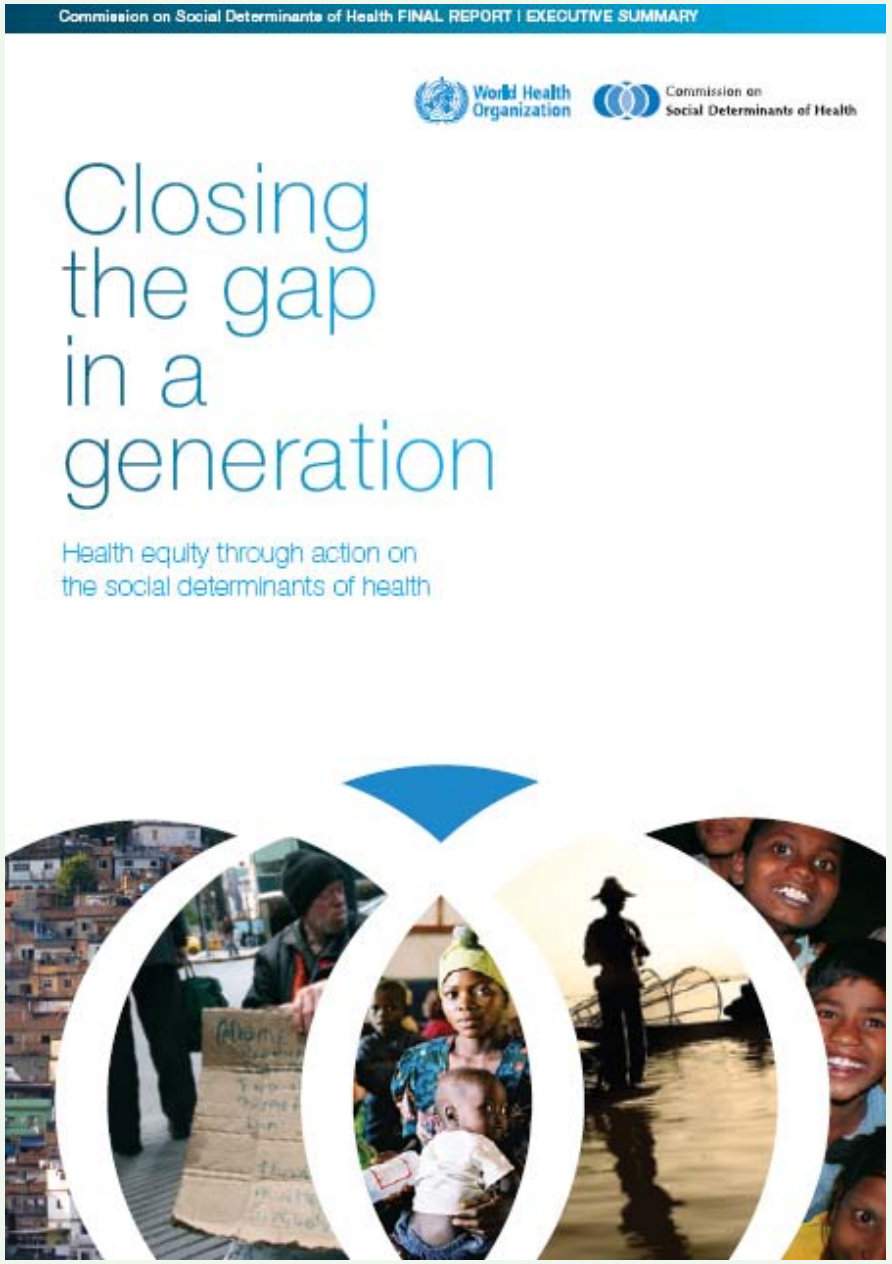
Key principles

- Social justice
- Material, psychosocial, political empowerment
- Creating the conditions for people to have control of their lives



www.who.int/social_determinants

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Some behaviour change approaches

- Very intensive (expensive)
- Affect too few
- Worsen inequalities
- Don’t alter long term (life course)

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Policy Objectives: The Social Determinants of Health

A. Give every child the best start in life
B. Enable all children, young people and adults to maximise their capabilities and have control over their lives.
C. Create fair employment and good work for all
D. Ensure a healthy standard of living for all
E. Create and develop healthy and sustainable places and communities
F. Strengthen the role and impact of ill-health prevention

Some policies

- Targetted when should be universal (spearhead approaches)
- Inflexible (to need)
- Too late – eg homelessness, sex workers etc.
  - Processes of exclusion (some of which also relate to professional cultures, silos etc)

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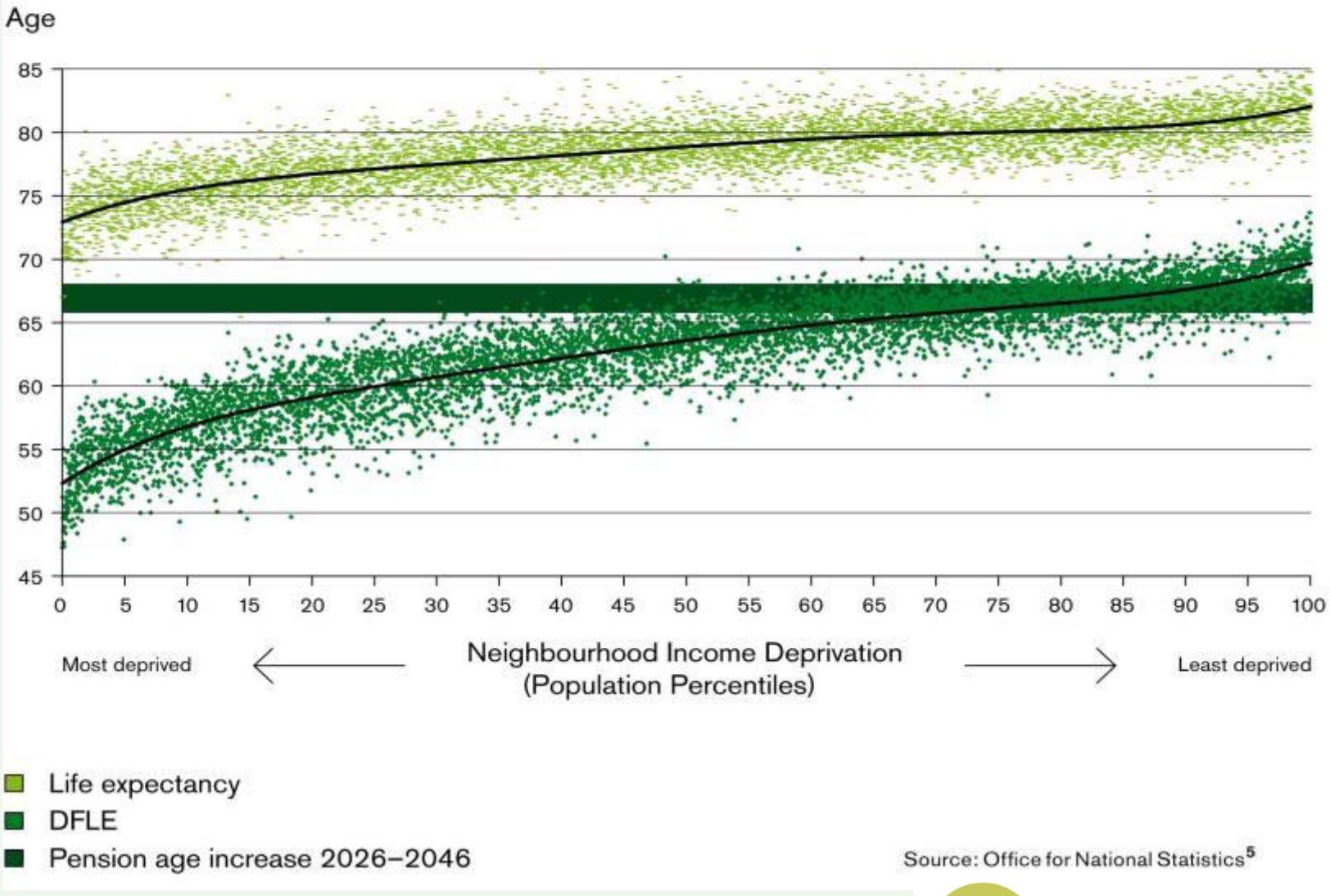
WHY NEED PROPORTIONATE UNIVERSAL POLICIES?

THE SOCIAL CLASS GRADIENT

TO FACILITATE WIDE SCALE BEHAVIOUR AND OTHER CHANGE
THE DESIGN AND SUCCESS OF POLICIES

Figure 1 Life expectancy and disability-free life expectancy (DFLE) at birth, persons by neighbourhood income level, England, 1999–2003



Source: Office for National Statistics[5]

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Children achieving a good level of development at age five, local authorities 2011

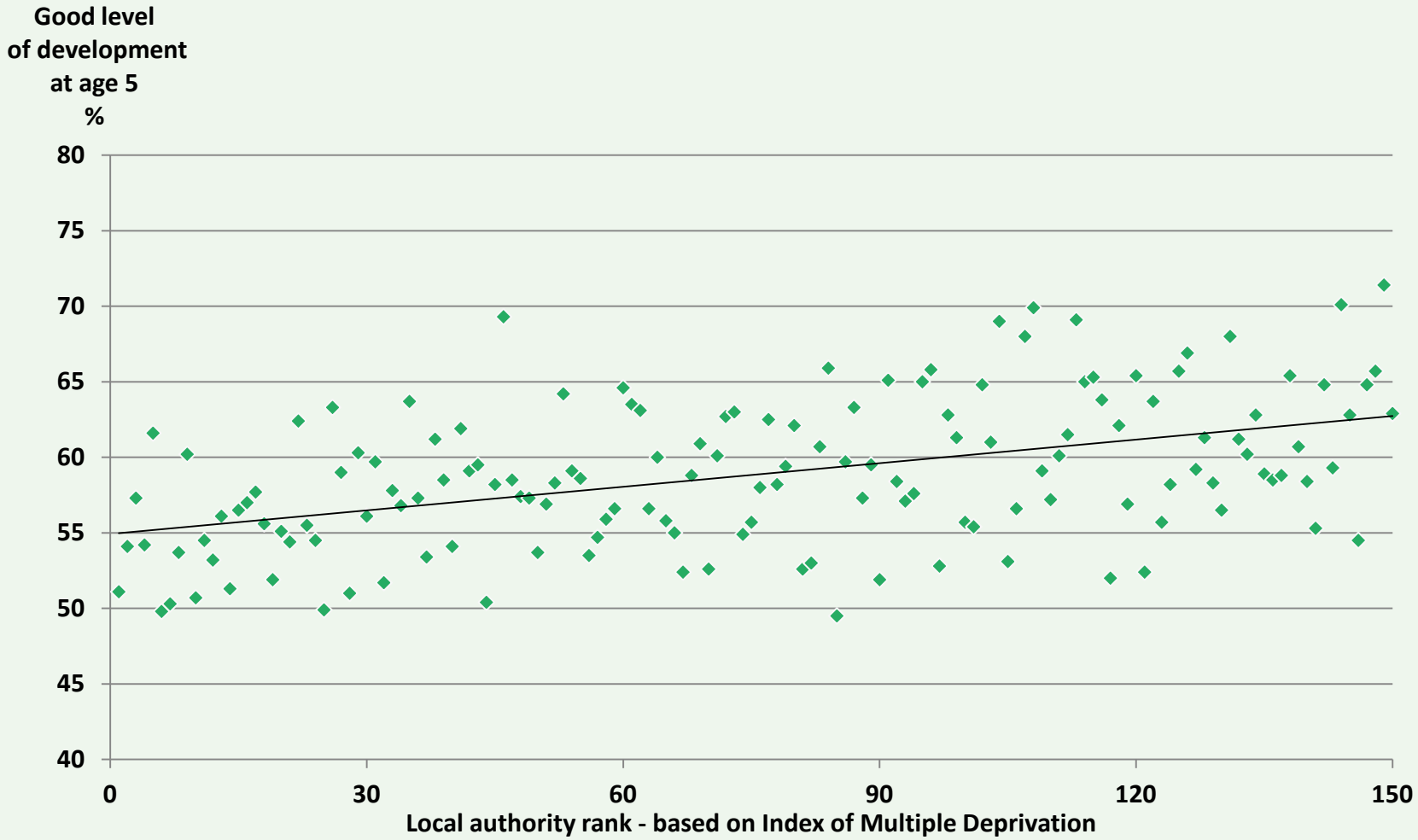
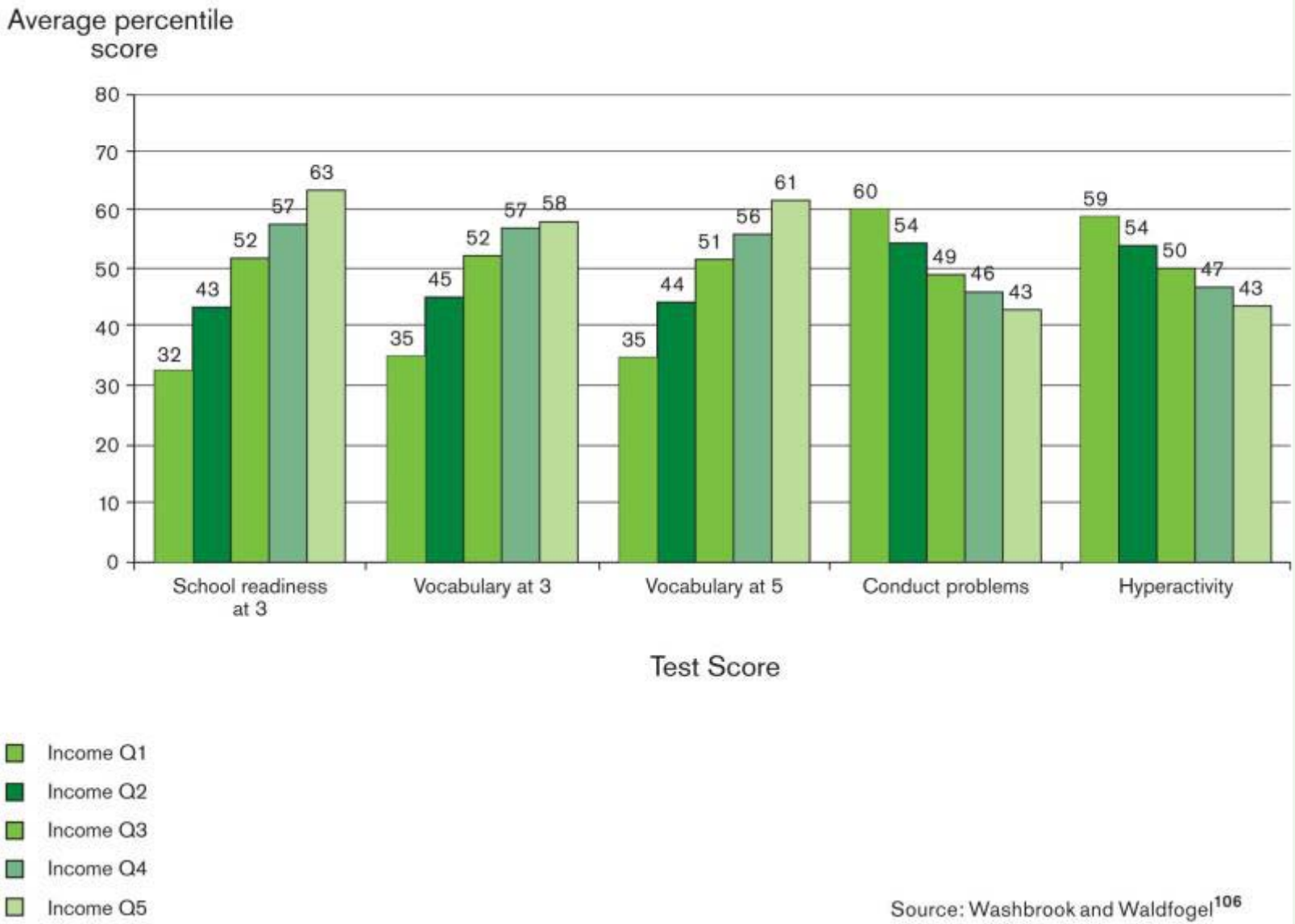


Figure 2.22 Indicators of school readiness by parental income group, 2008



Source: Washbrook and Waldfogel[106]

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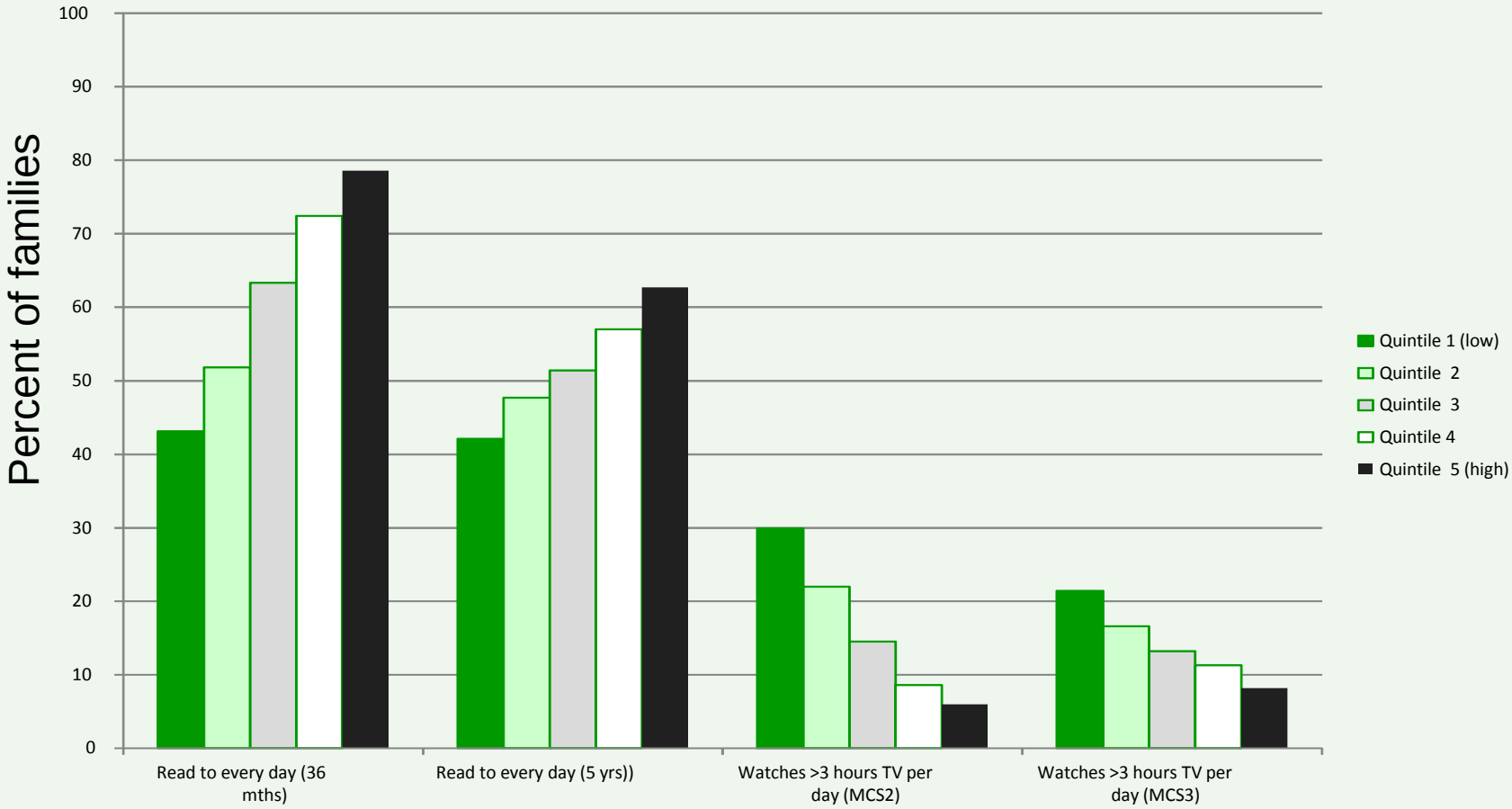
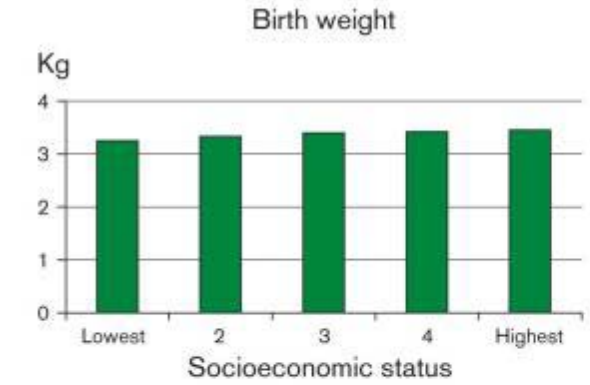
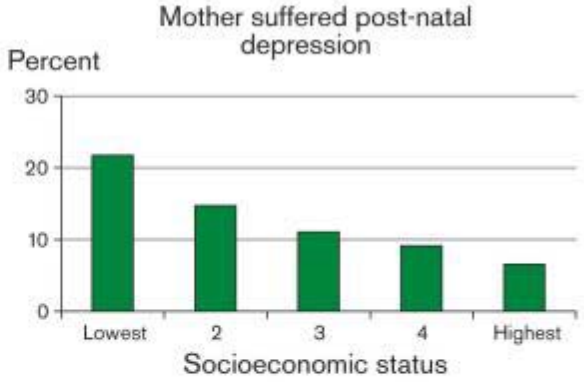
% of families reading to their children every day and level of TV viewing by socio –economic status

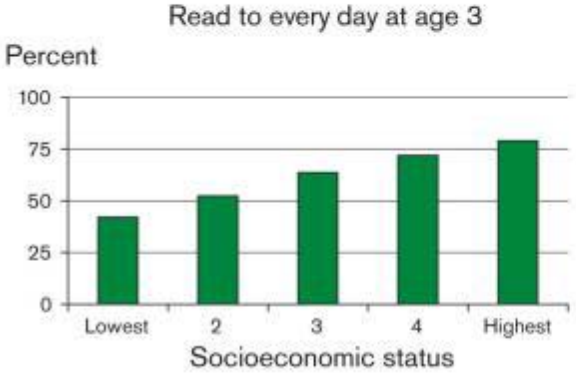


[i]Dearden L, Sibieta L and Sylva K (2011) The socio-economic gradient in early child outcomes: evidence from the Millennium Cohort Study. Longitudinal and Life Course Studies 2(1): 19-40.

Figure 2.20 Links between socioeconomic status and factors affecting child development, 2003–4







Source: Department for Children, Schools and Families[93]

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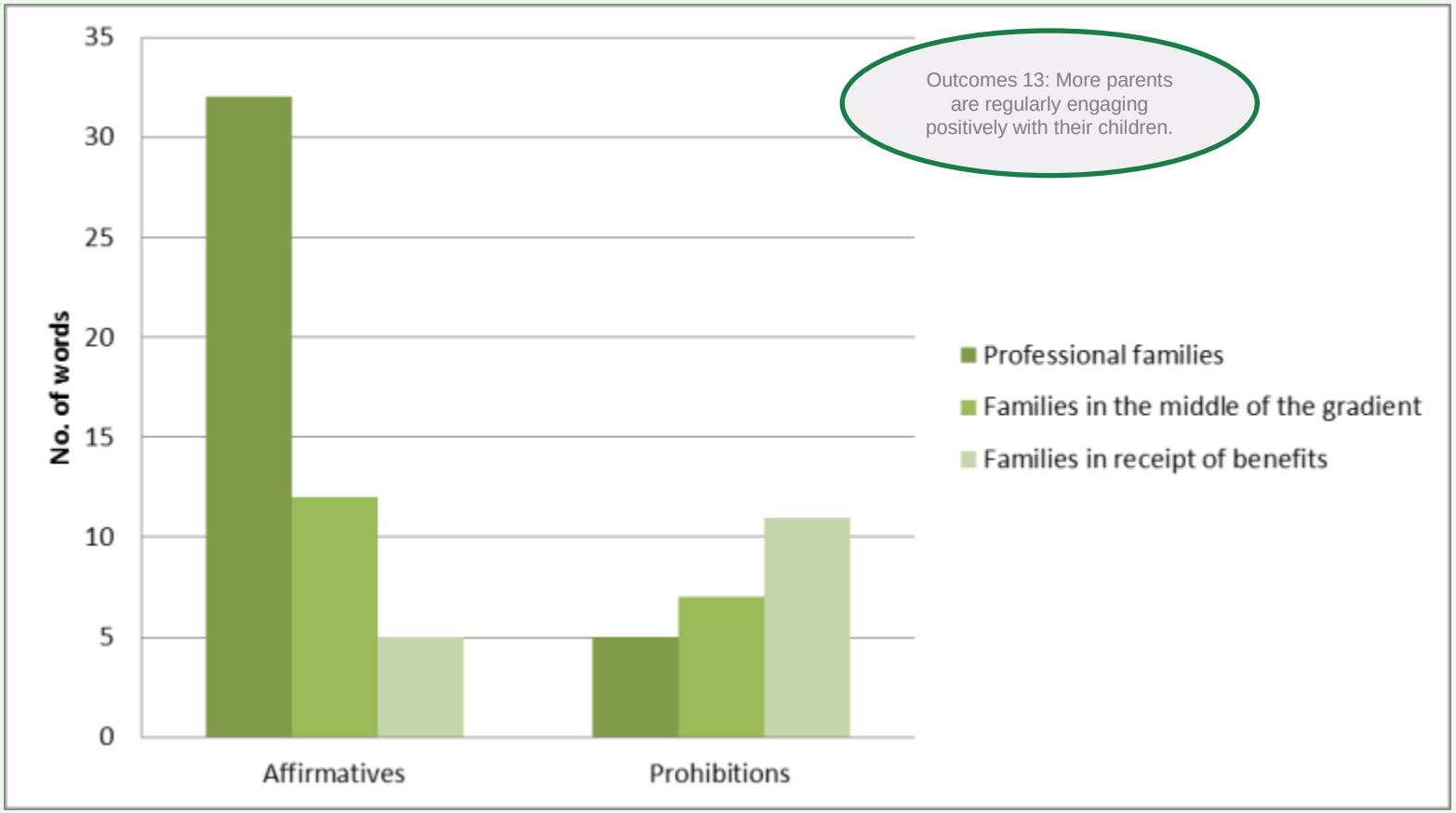
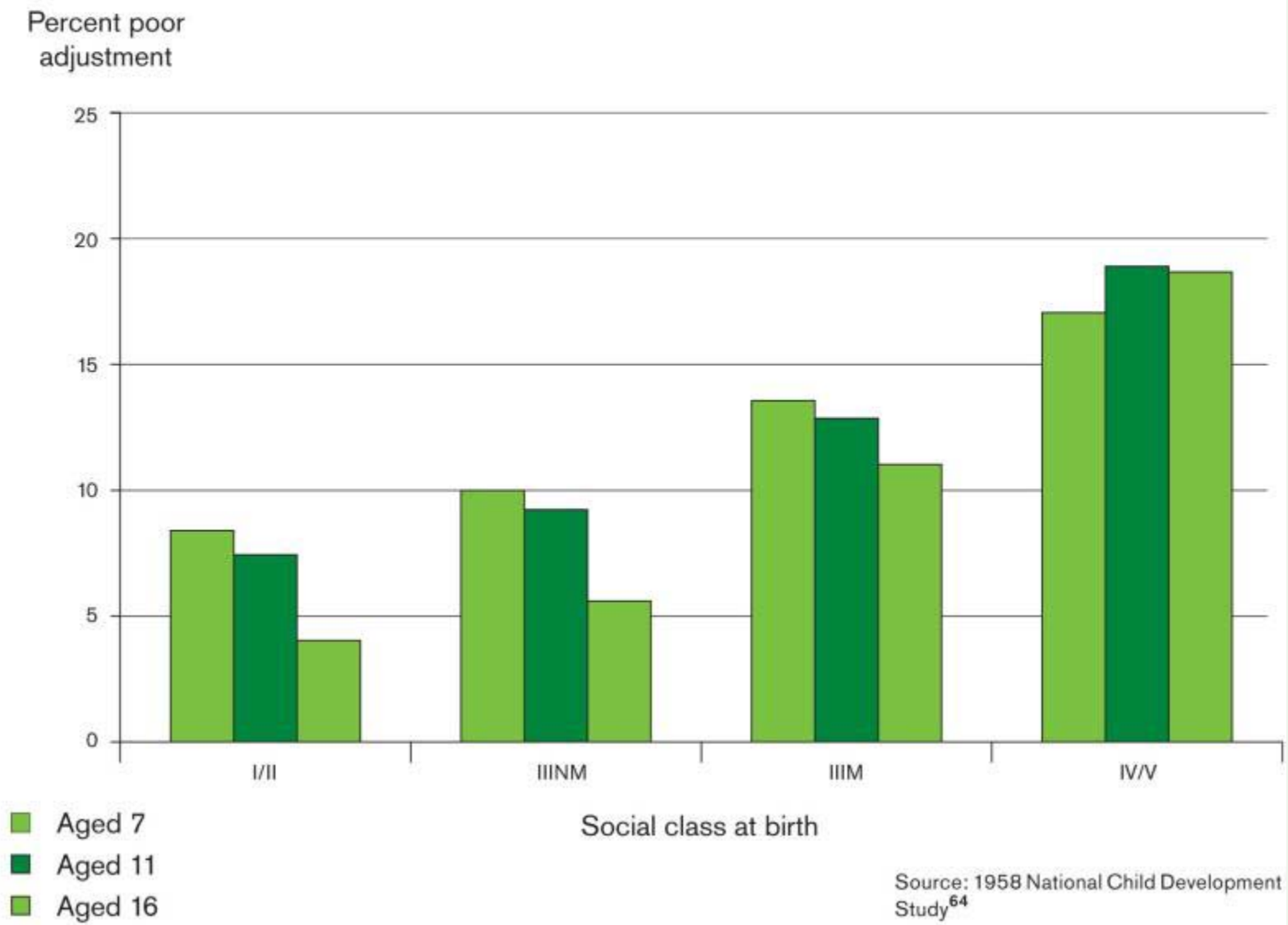
Average affirmations and prohibitions per hour by socio-economic status in the US.



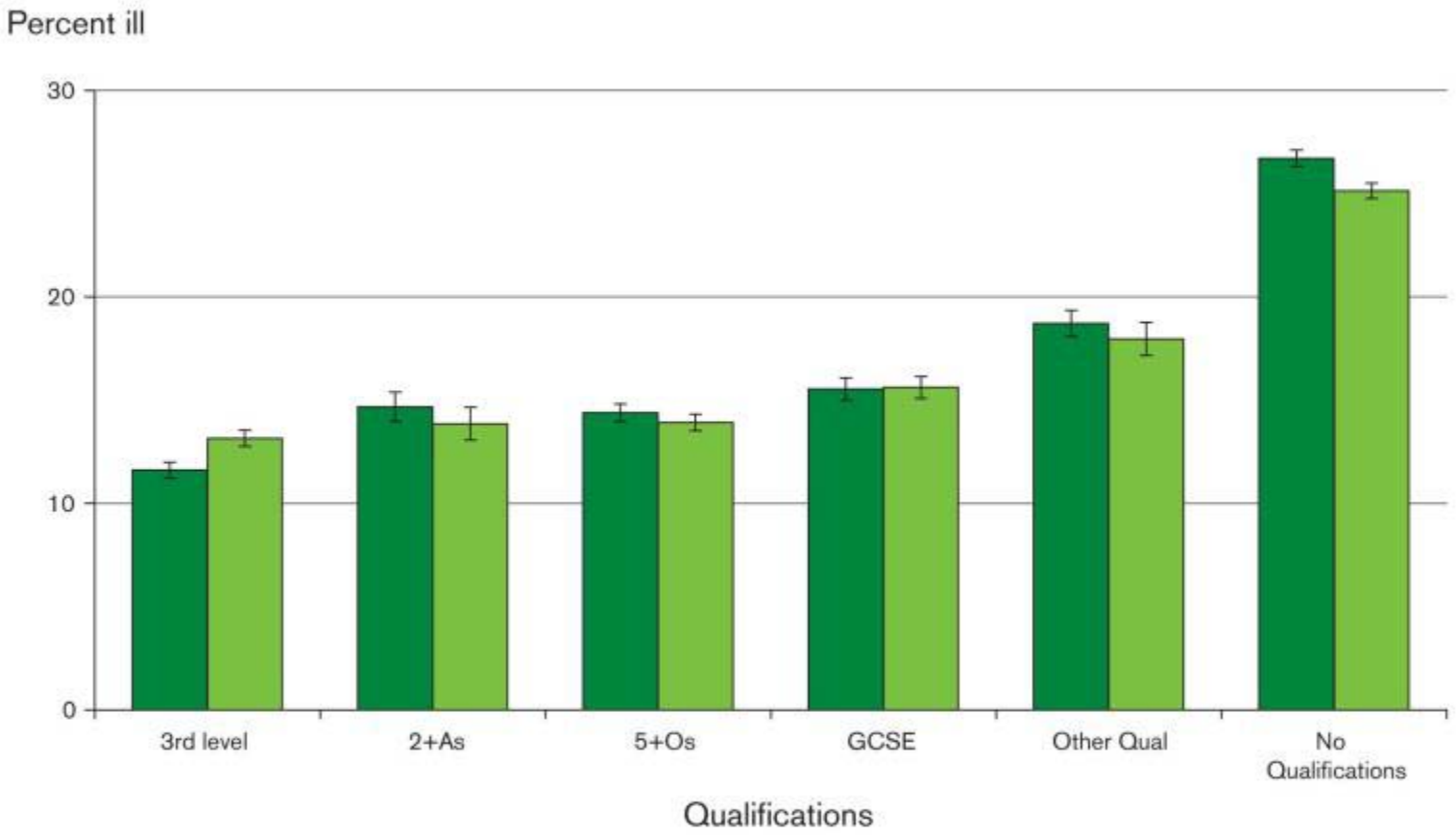
Source Hart B and Risely T R (2003) The early catastrophe: the 30 million word gap by age 3.

Figure 2.12 Rates of poor social/emotional adjustment at ages 7, 11 and 16, by father's social class at birth, 1958 National Child Development Study



Source: 1958 National Child Development Study[64]

Figure 2.26 Standardised limiting illness rates in 2001 at ages 16–74, by education level recorded in 2001



Note: Vertical bars (I) represent confidence intervals
Source: Office for National Statistics Longitudinal Study[112]

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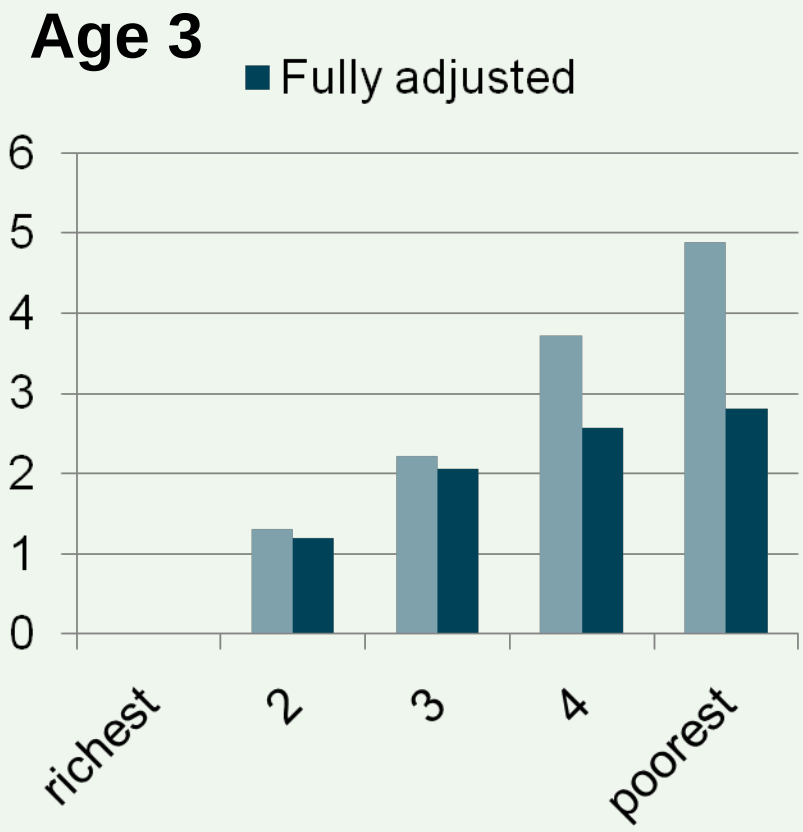
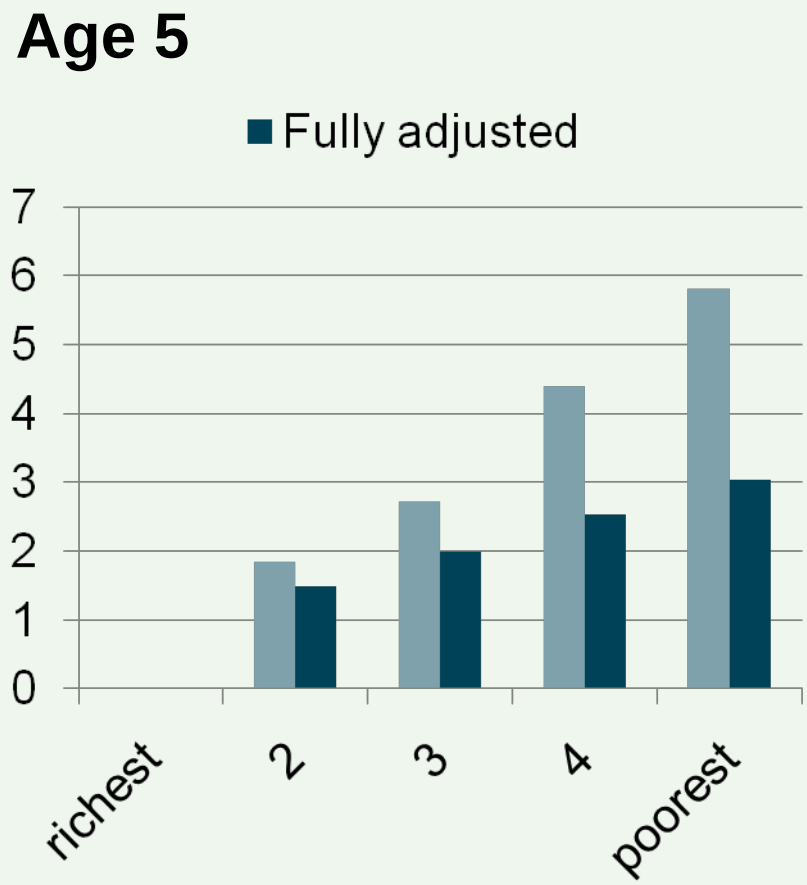
A. Give every child the best start in life. Socio-emotional difficulties at age 3 and 5: Millennium Cohort Study





Fully adjusted = for parenting activities and psychosocial markers
Kelly et al, 2010

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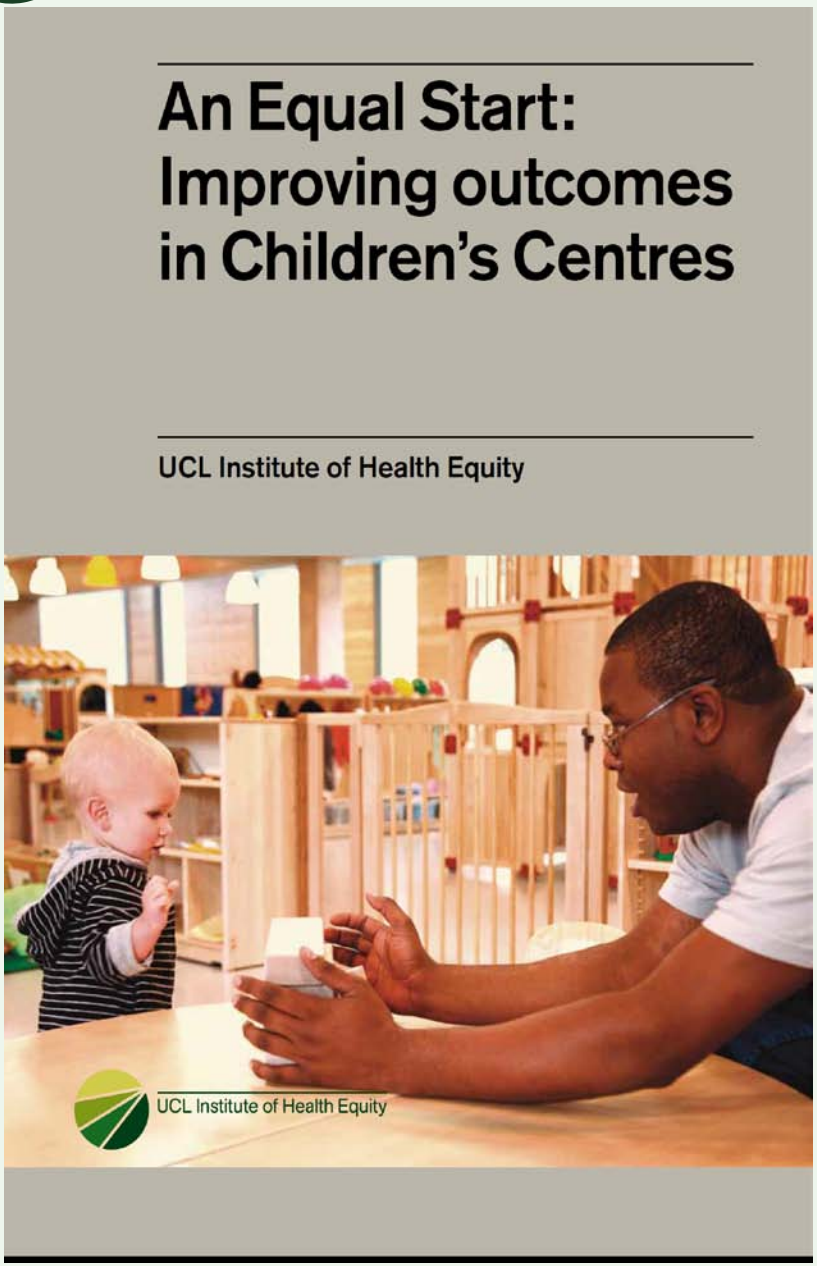
Approach to behaviour change

1. **creating conditions which allow people to take control over their own lives (SDH)**

2. **Capabilities approach** – (Sen) build control and well being through structural factors (the SDH) and **education, facilitation, assets based**.

3. **Design of policies:**
    1. population wide and universal
    2. Differential for need



Areas for outcomes:

- Development
  - Cognitive
  - Communication & language
  - Social & emotional
  - Physical
- Parenting
  - Safe and healthy environment
  - Active learning
  - Positive parenting
- Parent's lives
  - Mental wellbeing
  - Knowledge & skills
  - Financially self-supporting

21 Proposed outcomes see page 8

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Birmingham Brighter Futures

- Aims to improve the lives of all the city's children and young people;
- Focus on improving children’s physical health, literacy and numeracy, behaviour, emotional health, social literacy, and job skills.
- Specific programmes relevant to early years include: Family Nurse Partnership (FNP), Incredible Years Parenting Programme, Promoting Alternative Thinking Strategies (PATHS), Triple P Parenting Programme.

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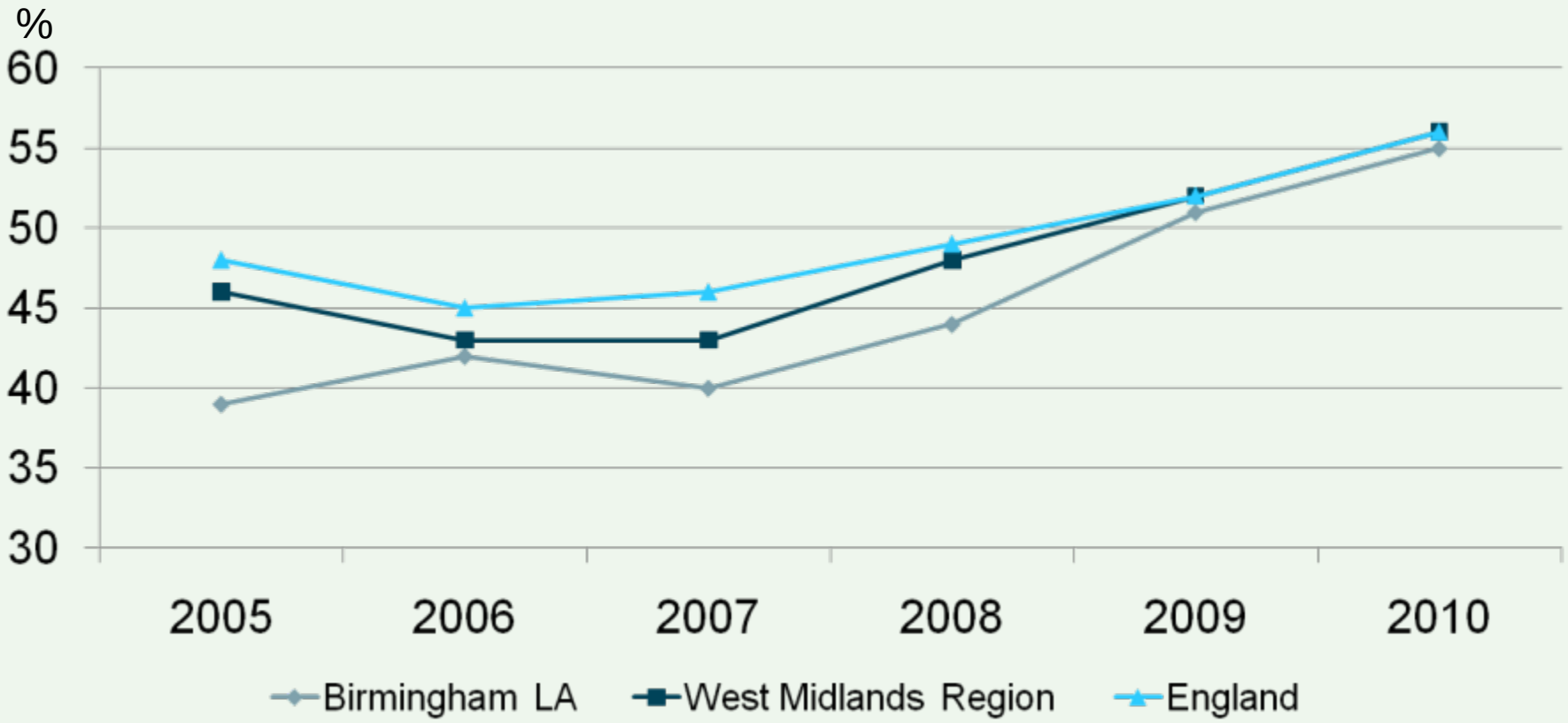
Per cent 5 year olds achieving 'good development score',* Birmingham LA, West Midlands & England



*in personal, social and emotional development and communication, language and literacy

Source: Department for Education

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Approaches to Behaviour Change

1 Creating conditions which allow people to take control over their own lives

- SDH
- Life Course
- Different approaches (regulatory, incentives, policies, education)

Proportionate universalism

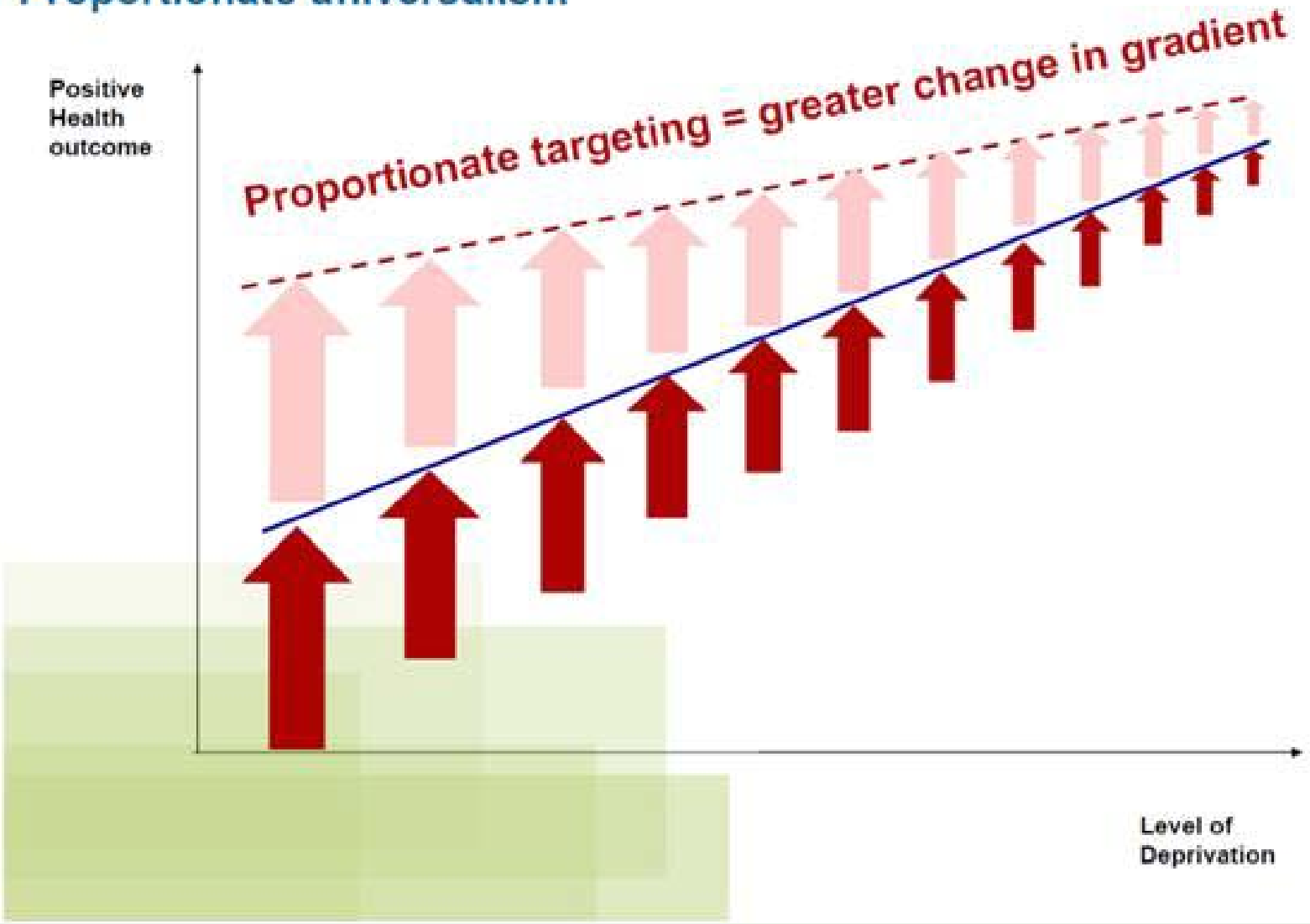
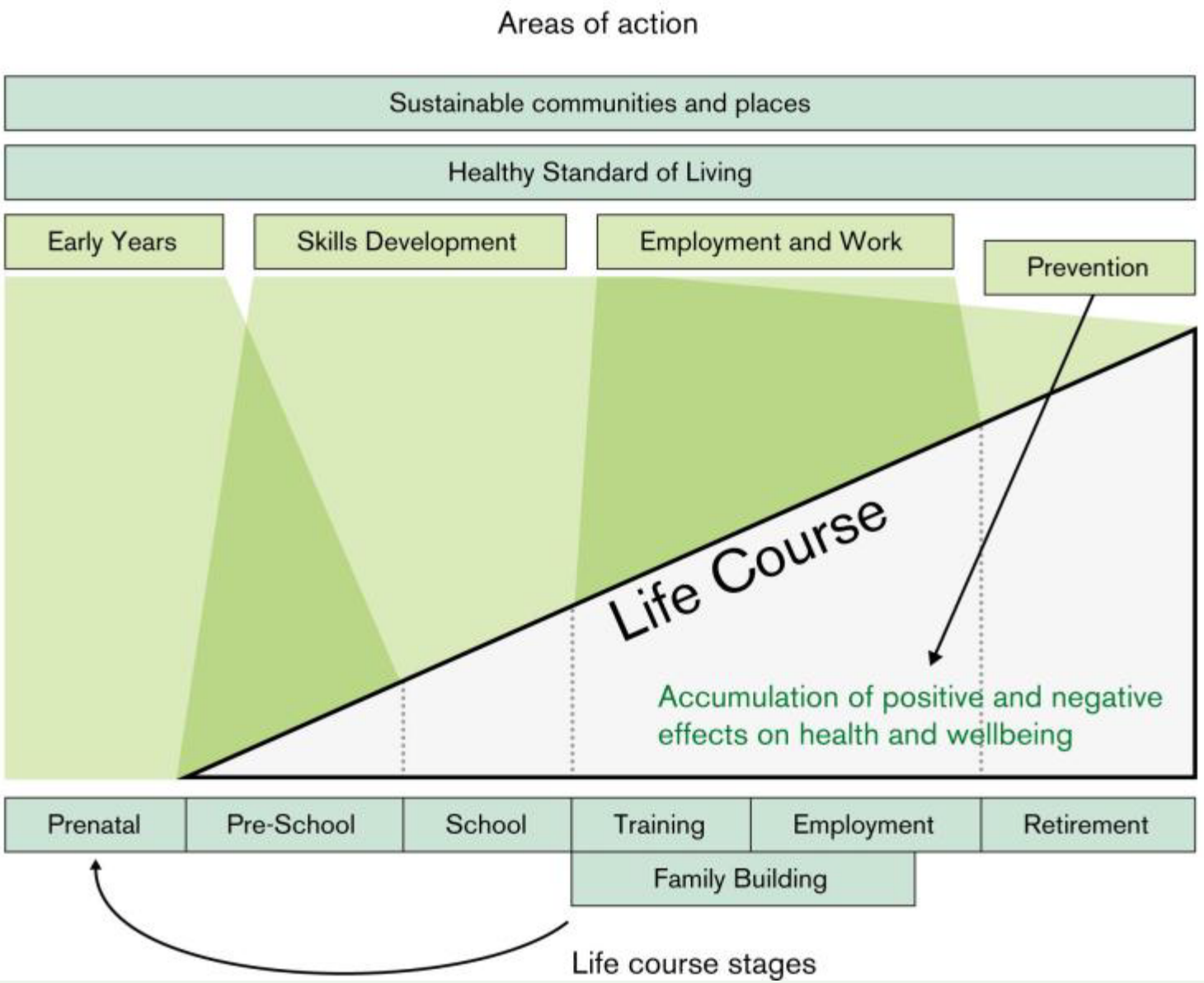


Figure 5 Action across the life course



SD of capabilities

- Align with SDH

- Education, early years, good employment, income and preventive approaches.

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Strengthen the role and impact of ill-health prevention

- **Implement programmes that work to reduce obesity, alcohol misuse, smoking and to increase physical activity**.
- Include a health equity impact assessment when deciding on policies
- **Proportionate universalism.** Need population wide programmes, but with more with more focus on those at the lower end of the socio-economic gradient.

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The Most Vulnerable – fallen off the gradient

Processes of Exclusion – universal approach to this:

- Debt
- Poverty
- Unemployment
- Discrimination
- Mental health
- Substance misuse
- Early years, education etc

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Approaches to Alcohol, smoking and obesity

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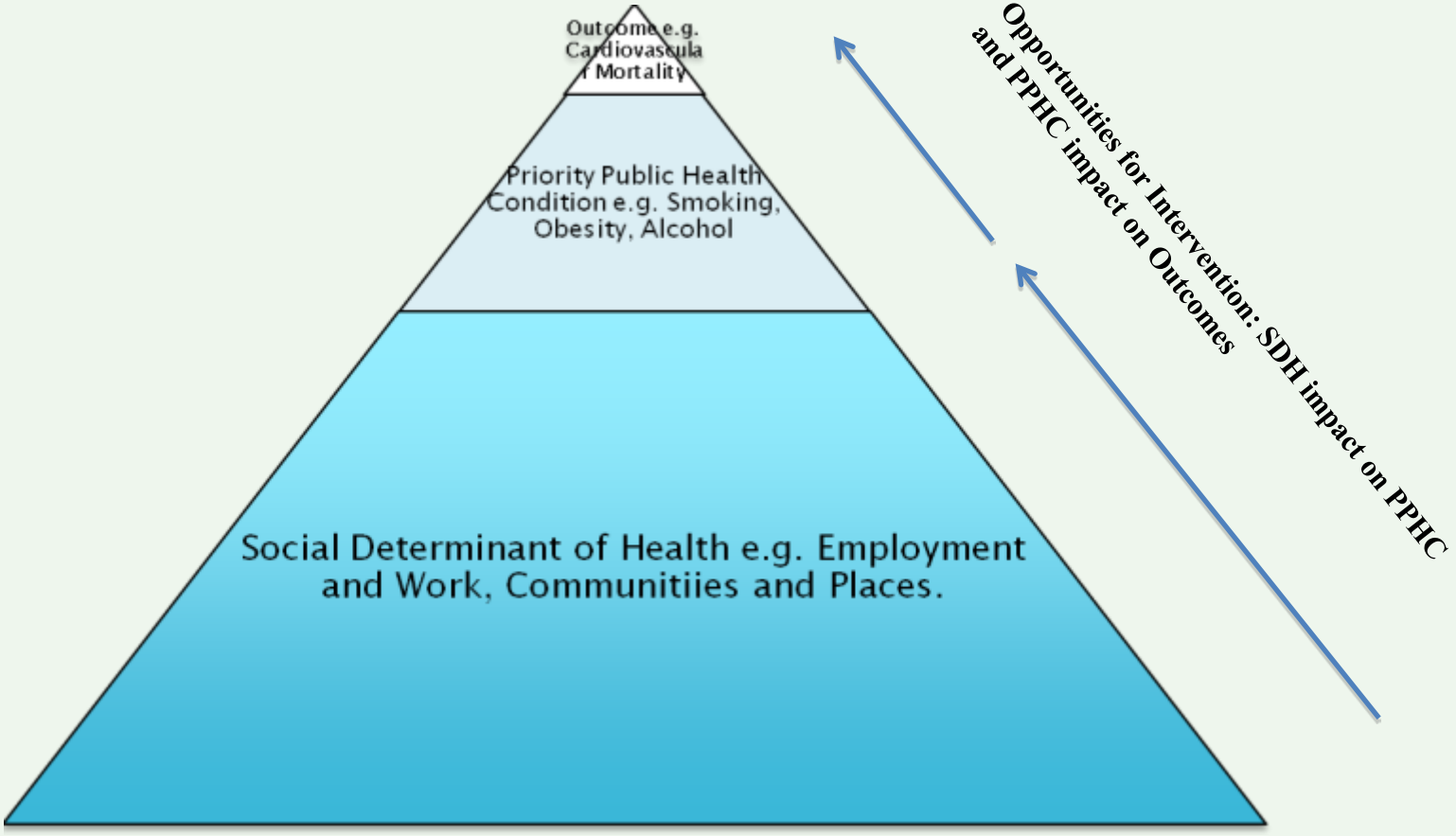
• Key examples of link between SDH and Smoking, Obesity and Alcohol

- Smoking accounts for over 50% of the difference in early deaths between socio-economic groups (ref Jarvis and Wardle)
- There is a clear social gradient between adolescent smoking rates and socio-economic status (ref: Jarvis and Wardle)
- Adolescents are more likely to smoke if they have poor school performance, low self -confidence or social competence and psychosocial stress (ref. Jarvis and Wardle, 2006, Appendix)
- 30% of female obesity is attributable to socio-economic inequalities (Robertson Lobstein 2007 Appendix)
- Socio-economic inequities in childhood and adult obesity have grown in the last five years (National Obesity observatory and Bambra et al Strategic review post Marmot, Appendix)
- There are pronounced socio-economic inequities in alcohol related health outcomes (NICE PH guidance 24, Appendix)


Outcome e.g. Cardiovascular Mortality
Priority Public Health Condition e.g. Smoking, Obesity, Alcohol
Social Determinant of Health e.g. Employment and Work, Communitiies and Places.
Opportunities for Intervention: SDH impact on PPHC and PPHC impact on Outcomes

Approach

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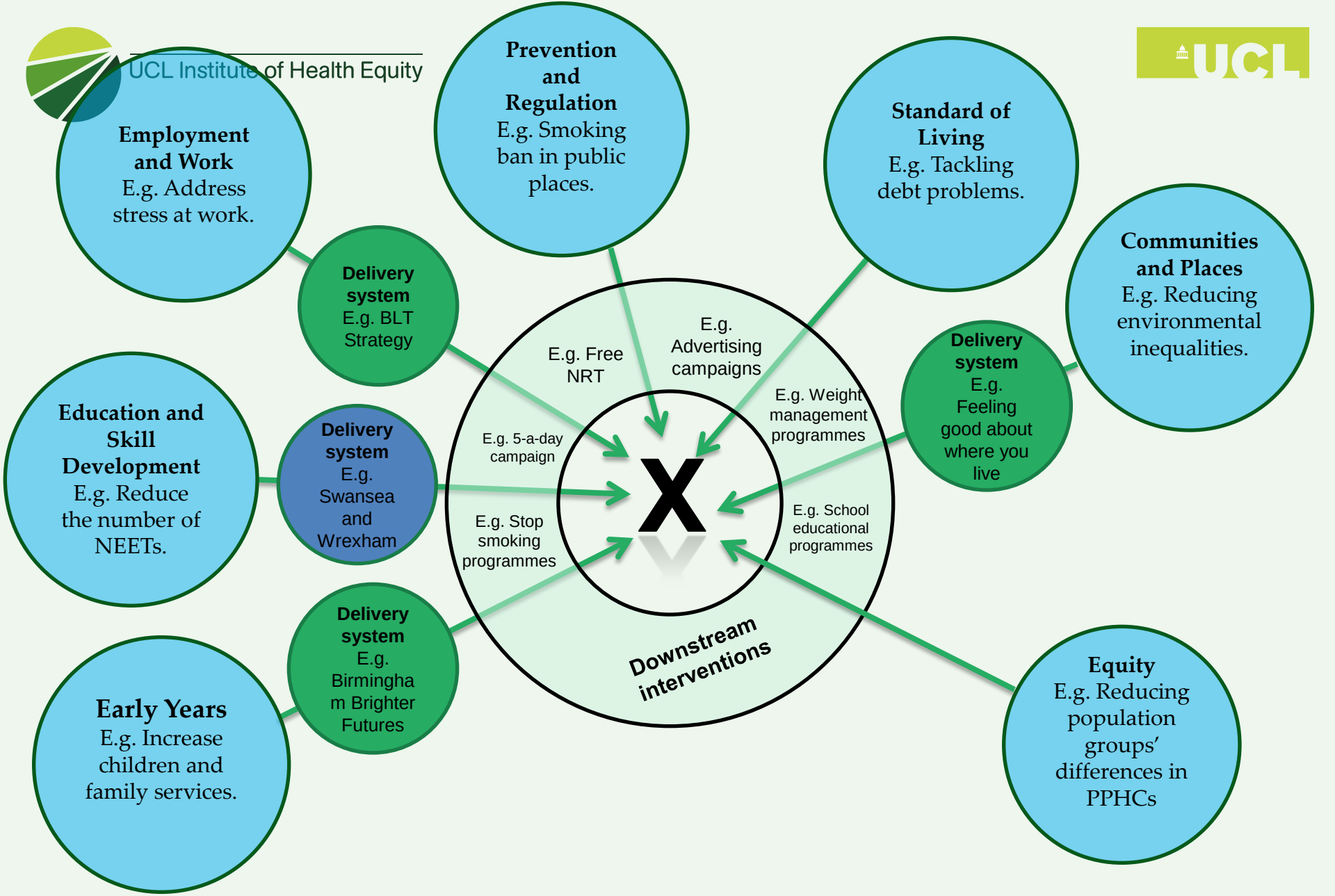

Approach

Case study	Smoking	Obesity	Alcohol	Multiple& general health	Early yr	Education	Employment	Communities	Stds of living	Prevention	Gradient category
Active travel challenge		X						X		X	Universal
Affordable Warmth				X				X	X		Targeted - population
Alcohol awareness training			X		X	X					TBC
Altogether Better				X				X	X		Universal
Apprenticeship Schemes				X							Universal
AWARM				X							Universal
Benefits Take Up				X					X		Targeted - deprived areas
Brighter Futures				X	X	X					Socially Graded
Bromley by Bow				X	X	X	X	X	X	X	Socially Graded
CABS		X								X	TBC
Community Houses		X						X		X	Targeted - deprived areas
Curves Project		X						X		X	Targeted - population
Cycling loan scheme		X						X		X	
Decent and Safe Homes				X				X		X	Universal
Earning and Learning Strategy				X		X	X			X	Universal
Engaging Non NHS		X								X	
Family Nurse Partnership				X	X						Universal
FAST - submitted to IHE				X	X	X					
Feeling Good about where you live				X				X			Targeted - deprived areas

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Matrix to completed locally to help prioritise actions

	Priority need	Proportionate universalism	Policy allignment	Level of evidence (Strong, moderate, weak)	Cost benefits	Assets	Control	Unifying themes	Integrated
E.g. Minimum income for healthy diet									
E.g. Reducing crime and fear of crime									

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Matrix to completed locally with actions to address key Priority Public Health Conditions through

Interventions Addressing the Social Determinants of Health

	Alcohol (Lead*)	Obesity (Lead*)	Smoking (Lead*)
SDH	A-F based upon 6 key areas for action of the "Marmot Review". * Add named leads in the council for each item		
A.Early Years		E.g. Universal free school meals	E.g. improved access to early years education.
B.Education and Skills Development	Eg Reducing the number of NEETs (* add named lead)		
SDH			
C.Employment and Work	E.g. Managing stress at work.		E.g. Develop pathways to work
D.Standard of living		E.g. Minimum income for healthy diet	E.g Reduce debts
E.Communities and Places	E.g. Reducing environmental inequalities	E.g. Planning walkable neighbourhoods.	E.g. Increase exposure to green spaces
F.Prevention and Regulation	E.g. Reducing crime and fear of crime	E.g. Reducing salt and fat content in processed foods	E.g. Fire fighters in the community

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Measuring Value:

"the best ways to measure and target health inequalities"

- we may give different weights to the improvements in life expectancy or health of the groups.
- we attach a declining weight as we move up the distribution – to activity, outcomes and other aspects.
- there are important outcomes that do not lend themselves to quantitative measures. It is important that non-quantifiable elements need to be taken into account.

- Information
- Capabilities
- Regulation – behaviours and conditions
- Creating conditions
- Measuring and rewarding and commissioing
- Evidence base
- Innovation
- Joined up approaches.

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ENABLE ALL CHILDREN, YOUNG PEOPLE AND ADULTS TO MAXIMISE THEIR CAPABILITIES AND HAVE CONTROL OVER THEIR LIVES.

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Section A: CPHE to complete	
Name:	Susan Michie and Robert West
Job title:	Professor of Health Psychology
Address:	Department of Clinical, Educational and Health Psychology University College London
Guidance title:	Behaviour change
Committee:	Programme Development Group (PDG)
Subject of expert testimony:	Behaviour change – effectiveness of specific behaviour change techniques
Evidence gaps or uncertainties:	[Please list the research questions or evidence uncertainties that the testimony should address]

Provide the PDG with an overview of your work on behaviour change techniques (BCTs):

- Types of evidence of effectiveness of specific behaviour change techniques in each of the five behaviours covered in the guidance and strengths and limitations of these approaches

- commentary on the second commissioned evidence Review findings in the light of the above

- discussion of other factors apart from BCTs that are key to effectiveness

Section B: Expert to complete	
Summary testimony:	[Please use the space below to summarise your testimony in 250 – 1000 words – continue over page if necessary]

This document provides testimony on:

1. Types of evidence of effectiveness of specific behaviour change techniques in each of the five behaviours covered in the guidance and strengths and limitations of these approaches
2. commentary on Bazian's Review 2 findings in the light of the above
3. discussion of other factors apart from the BCTs that are key to effectiveness

1. Methods of detecting BCT effectiveness: a critical appraisal

Behaviour change interventions are complex in that they involve multiple interacting components. Progress in developing more effective interventions has been hampered by lack of a methodology for unpacking the "black box" of complex interventions. Specifying intervention content in terms of behaviour change techniques (BCTs) provides a basis for such a methodology.

Behaviour Change Techniques (BCTs) are irreducible components of BCIs targeting one or more mechanisms of change. Several different taxonomies of BCTs have

been proposed to date, some generic and others specific to particular behavioural targets (see Michie et al, 2013). BCIs typically involve 6-24 component BCTs (Michie et al, 2009; Lorencatto et al, in press).

When included within an intervention a BCT of a given type may a) increase the effect in an additive manner, b) act with one or more other BCTs to increase the effect of the intervention, c) make no difference, d) decrease the effect, or e) reduce the effect of one or more other BCTs. Where effects occur these may be larger or smaller than effects arising from inclusion of alternative BCTs, for example those used in control conditions of RCTs.

There is a considerable challenge to determining which of the above is true for a given BCT in a given intervention. Yet the efficient design and implementation of BCIs requires that we have an understanding of what BCTs should be included.

There are, in principle, several ways of attempting to assess BCT effectiveness. Each has strengths and limitations. None are guaranteed to provide a definitive answer but each can increase or decrease confidence that a particular BCT can be effective in a particular kind of intervention for a particular kind of target behaviour in a given population and context (Table 1).

Table 1: Methods of evaluating effectiveness of BCTs and their strengths and limitations

Evaluation methods	**What they involve**	**Strengths**	**Limitations**
Experiments (including RCTs) e.g. providing feedback on expired air carbon monoxide concentrations to aid smoking cessation (Shahab et al, 2011)	Adding or removing one or more BCTs under experimenter control and looking for differences in effectiveness	Provides a high degree of confidence in effectiveness of a specific example of a BCT, implemented in a particular way with a particular population in a given context	Only feasible for evaluating small numbers of BCTs at any one time Can only evaluate specific examples of BCTs implemented in a given way in specific contexts with specific populations (most problematically, populations willing to volunteer for experiments) Can require more time or resources than are available Control conditions may contain effective BCTs (de

			Bruin et al, 2010) Unlikely to be able to detect small but important effects Fidelity of delivery of BCTs may be low or unknown
Meta-analyses of experimental studies e.g. Implementation intentions as actions plans to promote behaviour change (Gollwitzer & Sheeran, 2006)	Statistically pooling the results or two or more experiments evaluating one or more BCTs as above	Can provide highest level of confidence in effectiveness of BCTs. Has the potential to make generalisations concerning effectiveness of BCTs across specific instances, with specific populations and contexts.	Will be very sparse given the resources required by, and limitations of, experiments Results may not generalise beyond contexts, implementation and populations studied May involve pooling of studies that should not be pooled because of heterogeneity of target behaviours, interventions, populations, contexts or methods Control conditions may contain effective BCTs that are not identified in reports Can suffer from 'file drawer' effect Fidelity of delivery of BCTs may be low or unknown or variable
Correlational studies	Using naturally occurring variation in clinical or public	Can make use of very large data sets to identify small	Relies on complete and accurate coding of BCTs

e.g. Identification of BCTs associated with higher success rates of stop smoking services in England (West et al, 2010a)	health practice in inclusion of BCTs and outcomes to identify associations between BCT inclusion and intervention effectiveness	effect sizes Very inexpensive Provides an estimate of the 'real world' effectiveness, in non-volunteer populations	Relies on sufficient naturally occurring variation in inclusion or exclusion of BCTs, and outcomes Causality has to be inferred (usually by statistical adjustment for potential confounding variables such as mode of delivery, setting, population and other BCTs) Can result in false positives from multiple comparisons May not be able to pick up synergistic or moderating effects of BCTs Fidelity of delivery of BCTs may be low or unknown
Meta-regressions e.g. Identification of self-monitoring, goal setting and actions plans as effective BCTs in promoting physical activity and healthy eating (Michie et al, 2009)	Identifying inclusion vs exclusion of BCTs or their combinations as moderators of effect sizes in meta-analyses of multi-component interventions	May detect effects that are too small to be picked up in individual studies Very inexpensive Uses data collected under reasonably well controlled conditions	Relies on sufficient numbers of studies including and excluding each BCT Relies on sufficient variation in inclusion vs exclusion of BCTs or their combination and outcomes Relies on complete and accurate coding of BCTs

			Causality has to be inferred (usually by adjusting for other potential confounding moderators such as mode of delivery, setting, population and other BCTs) Control conditions may contain effective BCTs that are not identified in reports Can result in false positives from multiple comparisons May not be able to pick up synergistic or moderating effects of BCTs Fidelity of delivery of BCTs may be low, unknown or variable
Characterising effective interventions e.g. identifying BCTs included in effective behavioural support interventions for smoking cessation (Michie et al, 2011a).	Identifying BCTs included in interventions found to be effective in RCTs May vary in implementation from inclusion of BCTs that are present in at least one effective intervention to those that have been present in all effective interventions	Likely to pick up BCTs and BCT combinations that contribute to effective interventions	Suffers from all the limitations of RCTs Depends on complete and accurate coding of BCTs Could include BCTs that do not contribute to effectiveness but tend to get included Could miss BCTs that effective but have not been widely tested

A method is required for combining data from these various sources to arrive at judgements of the likely effectiveness of particular BCTs. Such a method should enable a confidence rating to be given to a statement of the following kind:

'Inclusion of [BCT or BCT combination] in a behaviour change intervention to achieve [behavioural target] in [population] [under given conditions] is expected to increase the effectiveness of that intervention by [effect size/confidence interval].'

The proposed method is as follows:

a. Assess what sources of evidence can be used for the confidence rating
b. Apply these sources of evidence, giving priority to meta-analyses of specific BCTs (for efficacy) combined with adequately powered correlational studies (for generalisability), but these will be rare for the reasons outlined in Table 1
c. Where there are no meta-analyses, prioritise experimental studies of specific BCTs combined with adequately powered correlational studies; again these will be rare
d. Where there are no experimental studies, prioritise adequately powered correlational studies but apply caveats in relation to: a) potentially missed BCTs because of lack of inclusion, variation, or fidelity, b) potentially missed combinations of BCTs, c) false positives because of multiple comparisons (where appropriate); these will also be rare
e. Where there are no correlational studies, and to add further evidence to correlational studies, use meta-regressions applying appropriate caveats from Table 1
f. Where there are no meta-regressions or where meta-regressions cannot address the questions (e.g. because of lack of variability), use studies characterising effective interventions, again apply appropriate caveats from Table 1

This method should not be used in an exploratory way to 'fish' for associations, but to test hypotheses about the effectiveness of specific BCTs or their combinations for which there are grounds for believing they would or would not be effective.

Even with access to large amounts of high quality data, identification of BCT effectiveness will have to take account of the heterogeneity of delivery of the BCT (as demonstrated in the case of the BCT 'goal setting' for smoking cessation (Lorencatto et al, submitted) across a range of target behaviours, populations and contexts. To the extent that such heterogeneity exists, analysis at a finer-grained level than the BCT category is warranted. Progress in this field will be enhanced by development of an ontology of BCTs in which BCT categories of different levels of generality are linked.

2. Commentary on Bazian's Review 2 findings in the light of the above

Bazian's Review 2 reports on meta-regression analyses attempting to identify effective BCTs from the Michie et al (2013) taxonomy for a) smoking, diet, physical activity, sexual health, and alcohol consumption collectively, and b) each of these target behaviours individually.

The first step in the process of evaluating the results is to assess whether there is

sufficient heterogenity in the meta-analysis to provide a basis for undertaking a meta-regression (Table 2). It is apparent that there is sufficient heterogeneity for all except for sexual health and alcohol.

Table 2: Viability of each target behaviour for meta-regression

Target behaviour	N of studies	Heterogeneity	Viability for meta-regression
All 5 behaviours	197 studies	I2=66.0%, p<0.001	High
Sexual health	15 studies	I2=45.9%, p=0.027	Low
Alcohol	50 studies	I2=24.7%, p=0.062	Low
Smoking	80 studies	I2=68.1%, p<0.001	High
Diet	27 studies	I2=76.1%, p<0.001	High
Physical activity	63 studies	I2=83.9%, p<0.001	High

The observed lack of heterogeneity for alcohol is surprising given that heterogeneity was observed in Cochrane reviews and these have been used in a meta-regression to identify self-monitoring as a BCT that accounted for a significant amount of variance in effect size (Michie et al, 2012).

This raises a question as to the search strategy and it may be helpful to compare the studies identified with relevant Cochrane and high quality reviews where these exist for the target behaviours.

In cases where there is heterogeneity in the meta-analysis, the next step is to establish for each BCT or BCT cluster to be considered:

a. whether it is applicable on grounds of theory or in practice (e.g. pharmacological support is not applicable to the combined behavioural target, physical activity, or sexual health)
b. if it is applicable, whether it is evaluable based on whether there are sufficient studies with and without the BCT (see Table 1). As a suggested rule of thumb, a BCT may not be evaluable if there were fewer than 10 studies in which it was present in the experimental condition but absent in the control condition and 10 studies in which it was absent in both conditions. (If it were present in both experimental and control conditions the study should be omitted from the analysis.)

For BCTs and BCT clusters that are applicable and evaluable (which is likely to be a relatively small subset of all BCTs for any given behavioural target and even smaller for the combined behavioural target), the next step should be to undertake a meta-regression in which effect size is regressed on to each BCT or BCT cluster/intervention function after adjusting for non BCT moderators such as type of sample, mode of delivery, setting etc.

This would create a list of BCTs for each behavioural target for which there was some evidence that its inclusion was associated with increased or decreased effectiveness. This list would include false positives and false negatives for reasons set out in Table 1. However, it would modestly change the confidence ratings given to the key effectiveness statement about the BCT.

A further meta-regression should be conducted for each behavioural target. In that analysis, BCTs found in the previous meta-regression would be entered in a forward stepwise manner. This could build a parsimonious, though not necessarily theoretically coherent, model of BCTs or BCT clusters/intervention functions that may add to intervention effectiveness.

The approach adopted in Bazian's Review 2, does not appear to permit this information to be extracted. The focus on the multi-variate model without presenting

uni-variate results or theory-informed combinations of predictors creates potential for interference between BCTs that tend to appear together. This could lead to failure to detect associations or paradoxical associations because of high collinearity.

Following the analysis strategy proposed above, it will be important to set the meta-regression findings in the context of other research and sources of evidence as set out in Table 1.

Thus, to increase confidence in results of meta-regressions, three approaches are helpful: (i) replication of a finding across studies contributing to the meta-regressions, (ii) the use of "forensic" theory-guided analyses and (iii) triangulation with other sources of evidence.

In the absence of analyses as recommended above in Bazian's Review 2, the following discussion considers the likely validity of their findings in the light of other evidence.

(i) Replication:

One of Bazian Review 2's finding that has been replicated is the identification of **self-monitoring** as an effective BCT. This BCT has been found to be associated with effective interventions in interventions targeting physical activity and healthy eating amongst the general adult population (Michie et al, 2007) and amongst obese adults with co-morbidities (Dombrowski et al, 2012). This has also been identified as an effective BCT in interventions aimed at reducing excessive alcohol consumption (Michie et al, 2012). The replication across review, population and behavioural domain provides enough confidence for this to be a recommended technique in interventions seeking to help individuals to change their health-related behaviours. A similar analysis is being conducted for smoking cessation, but the results will not be available in time to inform this guidance.

The Bazian review found that the BCT cluster 'Feedback & self-monitoring' accounted for only 3% of variance in adjusted univariate analysis and was in an unexpected direction, whereas Repetition & substitution accounted for 19.2%. The negative association between Feedback & self-monitoring and outcome suggests that these findings should be carefully checked and the component BCTs and interventions should be examined to try to understand the reason for this discrepant result. It is not possible from the report to link findings with the relevant interventions and examine their characteristics to try and understand the findings.

(ii) Theory guided analyses

In the Michie et al (2007) meta-regression, the BCT of self-monitoring was found to be associated with positive outcomes; a theory of behaviour change was then used to guide the further analysis, one in which self-monitoring is a key construct in people's efforts to self-regulate their behaviour (Control Theory; Carver and Scheier, 1982). A set of BCTs that are theoretically predicted to act together in synergistic fashion in the self-regulation of behaviour were identified. Interventions containing 3 or more of BCTs in this set were compared with those containing 2 or fewer of these BCTs. The former were twice as effective as the latter.

A similar approach (described in Gardner et al, 2010) was used to identify effective BCTs within 'audit and feedback' interventions aimed at improving the performance of professionals. When the Cochrane review of audit and feedback was updated, this theory-guided analysis was conducted with the new finding that the most effective interventions were those that included goal setting and action planning with feedback (Ivers et al, 2012).

These findings across two different behavioural domains and populations suggest that interventions aiming to help people manage their own behaviour should consider including *self-monitoring, goal setting, goal review, feedback* and *action planning*.

(iii) Triangulation with other sources of evidence

An example of triangulation comes from work identifying BCTs associated with effective interventions for smoking cessation. Two sources were used to identify BCTs supported by strong evidence a) inclusion in treatment manuals of programmes that have consistently been found to be effective in clinical trials, and b) inclusion in treatment manuals of stop smoking services that have higher success rates, using Department of Health national quit rate data. Both methods used multi-level modelling. BCTs were identified using a smoking-specific taxonomy of BCTs (Michie et al, 2011b; this preceded and informed BCT Taxonomy v1 used by the Bazian review). Considering these two sources, the BCTs with the strongest overall evidence for effectiveness are: providing information on the consequences of smoking and smoking cessation, rewarding abstinence (usually socially), strengthening ex-smoker identity, assessing expired-air carbon monoxide, providing advice on coping with urges to smoke, setting clear goals, advising on changing routines, advising on effective use of stop smoking medication, asking about experiences of current stop smoking medication, providing options for additional or later support, assessing current and past smoking behaviour, assessing current readiness and ability to quit, offering or directing towards appropriate written materials, and eliciting clients' views.

This evidence is judged sufficiently strong to form the core of behavioural support programmes to aid smoking cessation (Michie et al, 2011a).

Overall, the meta-regression approach adopted in Bazian's Review 2 is a useful first step in piloting a method for assessing whether BCTs or BCT clusters/intervention functions may add to intervention effectiveness, but for the reasons given in Table 1 and the analysis described above, the analytical strategy may be weaker than other studies that have been conducted. To the extent that Bazian's Review 2 arrives at conclusions that are discordant with other studies, these should be viewed with caution.

In these circumstances, it is sensible to include the approach of 'Characterising effective interventions' (Table 1). As suggested by the NICE team, this could translate into identifying BCTs that were "found in studies with only a significant intervention effect and in more than one study (i.e. BCTs coded as A2) and BCTs found in more than one intervention with a significant positive effect, but across studies with positive and negative directions of effect (i.e. BCTs coded as C2). So for example for smoking, it may be possible to recommend that interventions should include, but not necessarily be limited to, the following techniques: Social support – practical (A2), Social support – unspecified (C2), Pharmacological support (C2), Reduce negative emotions (C2), Behaviour practice/rehearsal (A2), Instruction on how to perform a behaviour (A2), Review behaviour goal (A2), Commitment (A2), and Framing/reframing (A2); and providing practical definitions and examples of these techniques (Linked evidence: Review 2, ES 3.2, 3.3)."

3. Discussion of other factors, apart from the BCTs, that are key to effectiveness

Use of Theory

Bazian review 2 only coded interventions in terms of whether they mentioned theory or not; they did not use the Theory Coding Scheme to assess the extent to which theory had been used. It identified that the majority of reports did not mention theory, only two theories had been frequently mentioned (Social Cognitive Theory and the TransTheoretical Model) and there was no association between mention of either of these theories and evidence of effectiveness. These findings are consistent with a recent review of interventions to increase physical activity and healthy eating (Prestwich et al, in press). The only conclusion that can be drawn is that mention of

one of these two frequently used theories in intervention reports is not associated with more effective interventions. Mentioning a theory in a report does not mean that the theory was applied in a systematic or appropriate way to designing the intervention. No conclusions can therefore be drawn about use of theory in intervention development or about associations with mentioning theories in published reports beyond SCT and TTM.

Intervention reporting and fidelity of delivery

In interpreting the findings of evaluations of behaviour change interventions, two methodological limitations need to be borne in mind:

a. Intervention content is poorly reported, with an analysis of smoking cessation interventions finding 75% of BCTs mentioned in the protocol were in the published report (Lorencatto et al, 2013).

b. Fidelity of delivery of the intervention specified in the protocol is rarely assessed; where it is, most delivery is of 1/3 to 2/3 of the planned content (BCTs) (Borelli et al, 2011; Hardeman et al, 2008; Lorencatto et al, 2012). In Hardeman et al's study of an intervention to increase physical activity, fidelity of delivery was 42% of the BCTs specified in the protocol; in Lorencatto et al's study of a smoking cessation intervention, fidelity was 48%.

Thus, there may be very little correlation with the BCTs specified in intervention reports and those actually delivered. For example, if both reporting and fidelity are at 50%, it is hypothetically possible that the 50% BCTs delivered are not those in the published report; in other words, the published report bears absolutely no relation to the delivered intervention. Whilst fidelity is rarely assessed and full protocols are rarely provided, our ability to draw robust conclusions from systematic literature reviews is seriously constrained.

It is therefore very important to recommend that interventions should be documented in protocols (or treatment manuals), including the component BCTs, in sufficient detail to enable faithful replication. These should be publicly available. In addition, the fidelity of delivering the specified BCTs should be assessed and reported.

Quality of delivery of BCTs

For BCTs for which there is confidence about their effectiveness, there is still the question as to how they are delivered; are they delivered to the same standard as those in the trial evidence? For BCTs to be effective, they need to be delivered well. This raised the question as to what "delivered well" means. A mixed methods study of smoking cessation interventions, including multi-level modelling, guidance document analysis and expert consultation, identified competences within general aspects of the interaction necessary for the effective delivery of specific BCTs and adjuvant activities (such as social support, pharmacological intervention) (Michie et al, 2011a). These are:

(a) Delivery of the intervention: adapt the intervention according to the client and context

(b) Information gathering: acquire relevant information

(c) General communication: give relevant information and verbal and non-verbal behaviour underpinning effective delivery of specific behaviour change techniques and adjuvant activities.

Competences for the delivery of BCTs are outlined in much more detail by Johnston and Dixon in their work for the Scottish Government (see expert testimony to PDG).

The importance of considering the *quality* of delivery of BCTs comes from a study of

the delivery of a key BCT in smoking cessation, goal setting, that is, setting a quit date. Lorencatto et al (submitted) found that higher quality of setting a quit date was significantly associated with increased likelihood of smokers quitting as planned on the quit date (p=0.03; OR 1.5, 95% CI: 1.03-2.22). However, the average quality score for its delivery was low: 1.5 out of the possible 7 (range: -1 to 6).

Research recommendations

The above observations suggest that there should be more investment in methodological research to develop and evaluate methods for identifying effective BCTs within complex, multi-component interventions and to investigate their interactions with contextual factors such as mode of delivery, population and setting. Two suggested areas are

1. Experimental methods, where individual BCTs, or groups of BCTs are added in controlled conditions, preferably guided by theoretical assumptions as to the reason for the added value and mechanism of action of a BCT. An example of this approach is the Multiphase Optimisation Strategy, which includes fractionated factorial designs (Collins et al, 2011) or n-of-1 studies (intra-individual RCTs) (Johnston and Johnston, under review).
2. Evidence synthesis methods, where choice and conduct of meta-regression analyses are guided by a theoretical understanding of the target behaviours and of putative mechanisms of action of the BCTs.
3. Optimal use of large observational data sets as the basis for correlational studies where there is rigorous collection of data on participant characteristics, intervention content, contextual factors and outcomes. (West 2010a,b)

A second area of research that would advance behaviour change research is to develop our conceptual and empirical understanding of context: how BCTs interact with each other and with variables such as mode of delivery, population and setting.

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