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## The Systematic Identification of Content and Delivery Style of an Exercise Intervention

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**Keywords:** Health Promotion, Exercise, Methodology, Public Health

### Abstract

**Objective:** This study explored the utility of using behaviour change taxonomies and checklists to systematically assess the content and delivery of behavioural support for physical activity delivered through an established exercise-referral scheme.

**Design:** An observation study was conducted whereby 22% of initial consultations were observed and audio-recorded, using quota sampling stratified by exercise-referral advisor.

**Main Outcome Measures:** Content was independently coded by two researchers, to assess; i) completeness in delivering the programme protocol, ii) behaviour change techniques delivered (defined using the CALO-RE taxonomy), and iii) delivery style according to the Behaviour Change Counselling Index (BECCI).

**Results:** Protocol completeness was 63.6% (range 35.6%-74.6%). The behaviour change techniques delivered most consistently were '*providing information about where and when to perform the behavior*' (86%) and '*setting outcome goals*' (82%). Other evidence-based techniques such as self-monitoring were infrequently observed. Variation in BECCI scores indicated that advisors could, but did not consistently, provide a client-centred service.

**Conclusion:** This study highlights how theoretically informed taxonomies can be useful in evaluating service delivery within applied practice, providing a meaningful way of assessing the completeness of protocol delivery relative to evidence. The provision of feedback to practitioners based on such objective criteria also facilitated positive academic-practitioner communication.

**Keywords:** Exercise referral, Evaluation, Behaviour Change Taxonomies, Observational Study, Physical Activity

## Introduction

The benefits of physical activity for physiological and psychological health have been well documented (Haskell et al., 2007; Penedo & Dahn, 2005). Globally, physical inactivity is estimated to account for 6-10% of deaths from non-communicable diseases (e.g. cardiovascular disease, cancer, chronic respiratory diseases and diabetes) (Lee et al., 2012). Within the UK, it has been reported that only 4-6% of adults meet the government guidelines for physical activity (Department of Health, 2011); such inactivity is estimated to cost the UK economy £8.3 billion every year (Department of Health, 2009).

Lifestyle interventions (defined here as '*coordinated sets of activities designed to change specified behaviour patterns*'; Michie, van Stralen, & West, 2011, p. 42) aimed at enhancing physical activity levels represent a non-invasive and potentially cost-effective means of disease prevention. Within the UK, many public health departments deliver exercise referral services enabling general practitioners and other health professionals to refer patients who are 'at risk' of cardiovascular disease for behavioural support and subsidized access to leisure centres to increase their physical activity levels (UK National Institute of health and Care Excellence, [NICE] 2014). Although guidelines exist with regards to the format and broad characteristics of exercise referral services (NICE, 2006, 2014), there is a lack of clarity as to how these recommended characteristics link to the evidence base, and which behaviour change techniques (e.g. goal setting, self-monitoring, promoting self-efficacy) should be used by exercise referral schemes to reflect effective evidence-based best practice. Without such guidance, exercise referral services may not be comparable, as they will inevitably employ a heterogeneous set of behaviour change techniques which may have varying outcomes. Thus, while efficacy reviews suggest that exercise referral services may have a limited impact on physical activity outcomes (Pavey et al., 2011), such comparisons may not be a fair assessment of their *potential* if the services included do not represent a standardised intervention and/or do

not represent best (evidence-based) practice. Such uncertainties are reflected in calls from NICE (2006, 2014) for all exercise referral services to be formally evaluated. Thus, research to explore the active components of exercise referral schemes when delivered in practice relative to the available evidence from behavioural medicine is urgently called for to inform decisions for future services.

Behaviour change taxonomies (e.g. CALO-RE) provide standardised definitions of intervention components developed for use in intervention design (Michie, Ashford, et al., 2011). Using standardised techniques and descriptions facilitates the comparison of the efficacy of different strategies across research evaluations and provides clearer insight into the application of theories of behaviour change. Through linking specific behaviour change techniques to the theoretical mediators that they aim to directly influence (e.g., self-efficacy, motivation), hypothesised effects can be more clearly tested (Michie & Johnston, 2012). Behaviour change taxonomies are not normally applied outside research settings, but could be beneficial within applied practice; if incorporated into routine service evaluation, they would allow researchers and practitioners to identify and better describe the core components of exercise referral services. Although service protocols may rarely explicitly include or describe behaviour change techniques in the same standardised language used in research, many such techniques may still be present and clearly observable during client meetings. For example, the use of goal setting is standard practice among dieticians (Funnell et al., 2009). Mapping existing protocol components to behaviour change techniques may help public health departments to establish whether their programmes are evidence based, and identify where services could be enhanced to evidence-based practice.

Although the specific components of an intervention or lifestyle service are important in determining its success, its impact may also be affected by the interpersonal style in which

it is delivered. For example, a protocol may suggest that advisors encourage patients to engage in self-monitoring, but it is possible to do so in either coercive or more autonomy supportive ways (e.g. endorsing choice and personal agency). Supportive styles that foster autonomy and are client-centred are associated with improved intervention outcomes (Duda et al., 2014; Rouse, Ntoumanis, Duda, Jolly, & Williams, 2011).

A further consideration in service evaluation is the degree of consistency in what is delivered on a day to day basis (Mars et al, 2013). Variability in service provision clearly limits our ability to map the support provided to an evidence base, and could lead to inequity in terms of client experience and outcomes. Extending the examination of consistency in service delivery to include assessment of the style and content (in terms of behaviour change techniques) may provide a more meaningful assessment of service performance than examining the completeness of protocol delivery alone. Thus, incorporating delivery style assessment tools in combination with behaviour change taxonomies as part of service evaluation could facilitate more informative service evaluation. These assessments in turn may generate insight with the potential to direct service improvements to where they may be most effective (Moore et al, 2013). To date, such tools have not been used widely within clinical and community settings.

The aim of the present study was to explore the utility of behaviour change taxonomies and counselling style checklists in the evaluation of a local authority exercise referral scheme. Our definition of ‘utility’ incorporated an assessment of whether reporting service content and consistency (using standardized behaviour change checklists) was comprehensible, acceptable, and relevant to local authority stakeholders (e.g. service managers, commissioners) as part of routine service evaluation. The incorporation of stakeholder perspectives is essential for the successful conduct and reporting of research; as it should improve the relevance and impact of findings (Lavis et al, 2002). A secondary aim was therefore to provide the local authority of

the target exercise referral service with feedback generated by the evaluation on the degree to which their service reflected the current evidence base, and provide recommendations for improvement based on this assessment.

The study had four objectives: (1) To conduct a content analysis of exercise referral consultations using the service protocol, behaviour change taxonomies and a delivery style checklist to identify the content and assess the delivery style of the intervention; (2) To compare the behaviour change techniques observed within the service, against the techniques identified as effective in promoting physical activity within evidence based literature; (3) To use the content analysis data to assess service consistency; and (4) To explore the acceptability and perceived utility of presenting the data generated through objectives 1-3 to service providers.

## **Method**

### ***Setting***

The research was conducted with an exercise referral scheme in south west England (i.e., Passport to Health; P2H). P2H is primarily a facility-based exercise referral service which is co-ordinated by the local authority. Individuals who are inactive and who also meet specified health criteria (primarily high cardiovascular risk) can be referred by their General Practitioner or Practice Nurse for 12 weeks subsidized access to a local leisure facility where they receive support to increase their physical activity levels. Patients are screened for eligibility and enrolled into the programme by service co-ordinators via telephone, and once approved are allotted an exercise referral advisor and given an initial 1-hour consultation appointment.

The majority of patient contact within the service is provided through the initial consultation with an advisor, guided by a service protocol (see coding frameworks). Advisors then offer clients telephone support after two and six weeks, and conduct a formal progress review upon a client's completion of the scheme (12 weeks). Clients unable to access leisure

facilities (due to low income or psychological/physical restrictions) are offered six one-to-one behavioural support consultations with a similar content/focus in their own home. Consultations in either the facility or home setting were eligible for inclusion in the study.

### ***Procedure***

Ethical approval was obtained from the University of ..... Research Ethics Committee prior to data collection. Exercise referral advisors provided written consent to participate in the study, and clients attending observed initial consultations were given advance notice that their consultation would be observed and the opportunity to opt out from the study (continuing with their consultation as planned). Data were collected by audio-recording a sample of initial consultations. An independent researcher (..) was present for each observation to obtain contextual information and audio record sessions, but did not contribute to the consultation.

### ***Participants***

All exercise referral advisors (3 men, 3 women), employed within the P2H service participated in the study. Exercise referral advisors were registered fitness professionals (Register of Exercise Professionals, Level 3) who had received nationally recognised training in delivering an exercise referral programme, and had a range of five to 15 years' experience of working within an exercise referral setting. No bespoke site-specific training was provided in addition to national qualifications, however advisors met one-to-one with local authority service co-ordinators upon taking up their roles to familiarise themselves with local requirements, and met as a group for regular updates and CPD.

### ***Sampling strategy***

A quota sampling technique was implemented to maximise the representativeness of the sample relative to feasibility of obtaining observations (i.e., given the additional demands on advisor time in scheduling 3-way appointments, and allowing for client non-attendance and



refusals). The quote target of 20-40% was set in line with published recommendations in assessing treatment integrity (Schlosser, 2002). The sample of initial consultations was first stratified by advisor, and to minimise advisor burden and potential bias across days/times, observation of every second qualifying consultation for each advisor was attempted until the sampling quota was met. Only initial consultations were observed, as this session includes the majority of behavioural support input from the exercise referral advisor (i.e., attempts to motivate and engage the client to change their behaviour).

### ***Coding frameworks***

*Service Protocol:* The protocol was included to record consistency in delivery relative to explicit requirements. It was designed by service co-ordinators within the local authority, drawing on tacit knowledge of what should be included within an initial consultation based on experience and generic professional training, rather than behaviour change literature. The protocol consisted of five sections that encompassed the intended administrative and behaviour support elements of the initial consultation; (i) an introduction, (ii) provision of programme information, (iii) discussion of the basis for medical referral, (iv) assessment of baseline physical activity levels, biometric measures (weight, body fat percentage, body mass index, waist circumference and blood pressure), and self-reported psychosocial measures (confidence, self-esteem, perceived health status), and (v) goal setting.

*Behaviour change technique analysis:* The CALO-RE taxonomy (Michie, Ashford et al., 2011) was developed to assist researchers to describe behaviour change interventions. It is a refinement and extension of the Behaviour Change Technique taxonomy (Abraham & Michie 2008) and was developed by assessing the core behaviour change techniques provided within 50 physical activity and dietary interventions. The CALO-RE measure contains 40 techniques (e.g., setting outcome goals, providing information on the consequences of behaviour, planning social support etc) and has been shown to have good inter-rater reliability (Michie, Ashford et

al., 2011). It was used within this study to describe the content of the initial consultations delivered within the P2H service using standardised descriptors and facilitate a review of service content in the context of available alternatives. It was not expected that the service would include all possible effective behaviour change techniques, as within a relatively short initial consultation only some techniques would be appropriate (i.e., there is no opportunity to review goals), or feasible (i.e., no opportunity to model lifestyle behaviours).

*Assessment of counselling style:* The Behaviour Change Counselling Index (BECCI) was included within the study to provide an indication of the delivery style used by the exercise referral advisors when delivering the P2H intervention. The nine-item BECCI measures health professional competence at delivering patient-centred behaviour change counselling (Lane et al., 2005). Sessions are rated on a 5-point Likert scale relating to the presence of key skills; ranging from 0 (*not at all*) to 4 (*a great extent*). Mean scores are calculated for each consultation to reflect an advisor's overall delivery style. Ratings generated using the BECCI have been shown to have acceptable levels of reliability and validity when used in simulated consultations (Lane et al., 2005).

### ***Evidence-base for comparison***

The national guidance for exercise referral schemes (British Heart Foundation, 2010; Department of Health, 2001, 2009) relates solely to the structure and implementation of programmes, and does not specify the behaviour change techniques which should be delivered. As such, the comparison evidence base was constructed from (a) behaviour change techniques shown to increase physical activity levels in research trials extracted from recent meta-analyses (Michie, Abraham, Whittington, McAteer & Gupta, 2009; Olander, et al., 2013), and (b) evidence highlighting the most effective characteristics of behaviour change counselling style extracted from two recent systematic reviews (Ng et al., 2012; Teixeira, Carraca, Markland, Silva & Ryan, 2012). Meta-analyses were selected as all those available at the time of the study

that specifically reported on the performance of individual components of physical activity interventions.

### *Analysis*

Two researchers (.. and ..) trained in the implementation of behaviour change techniques coded the observations. After coding the first six consultations, findings were compared to ensure consistent application of taxonomy definitions. A third researcher (..) was consulted when further clarity was required. Definitions were refined where necessary, and consultations re-analysed accordingly. Details of coding definitions are provided in a supplementary table. Inter-rater reliability was calculated using Kappa statistics (Cohen, 1960).

Given the small number of observations available (i.e., due to a limited number of advisors within the service), variability of intervention content and delivery style were explored by computing coefficients of variance (Hopkins, 2000). The occurrence (presence/absence) of items from the (i) BECCI checklist, and (ii) CALO-RE taxonomy were recorded for each consultation. Consistency was then estimated by calculating standardised coefficients of variance ( $SD/\sqrt{2}$ ) in the occurrence of each element, expressed as a percentage of the mean for each individual advisor (to explore within-advisor variability), and for all sessions delivered (to explore between-advisor variability). To facilitate an indicative comparison of within- and between-advisor variance, variance was partitioned using sum of squares/df.

## **Results**

Twenty-two consultations were recorded (22.4% of consultations taking place over one month), of mean duration 43 minutes (SD = 12; range = 17-67 minutes).

### *Reliability of data extraction*

Kappa statistics (Landis & Koch, 1977) showed excellent inter-rater agreement between the two coders in relation to the programme protocol ( $\kappa = .82$ ) and the CALO-RE taxonomy ( $\kappa = .94$ ). Agreement was only moderate when applying the BECCI ( $\kappa = .51$ ).

### ***Content Analysis***

*Use of Behaviour Change Techniques:* The two techniques delivered most consistently in observed consultations were *providing information about where and when to perform the behaviour* (86%) and *setting outcome goals* (82%) (see Table 1). These techniques were used by all advisors, with four advisors using these techniques in all observed sessions. *Providing information on the consequences of behaviour to the individual* was the only other technique used by all advisors, but only in 55% of observed consultations.

[Table 1 near here]

*Consultation Style:* Mean practitioner scores showed that delivery styles were not client-centred, as scores averaged at approximately 2 'to some extent' (see Table 2). Three advisors demonstrated the ability to deliver aspects of the intervention in a client-centred format, however their approach was not consistent. Field notes suggested that advisors were less client-centred when dealing with more challenging clients (i.e., less motivated or less educated).

[Table 2 near here]

*Comparison with the evidence base:* The purpose of comparing the component behaviour change techniques of P2H with the evidence base was not to imply all should be present, but to clarify what techniques were present as a basis for identifying additional potentially useful techniques. One of the most commonly observed techniques delivered by advisors (*provide information on when and where to perform the behaviour*) was not associated with success in the evidence-base review (Table 3). Furthermore, one strategy found to result

in *lower* levels of physical activity (*prompt generalisation of target behaviour*; Olander et al., 2013) was observed in 23% of consultations. All other techniques delivered in  $\geq 50\%$  of consultations were supported by research evidence as effective in promoting behaviour change. The most consistently supported technique within the evidence base (self-monitoring; Michie et al., 2009) was implemented in only 18% of consultations.

[Table 3 near here]

Comparison of behaviour change techniques with the evidence base revealed a further level of variability beyond that identified by the protocol; although goal setting was delivered in the majority of consultations, the type of goal setting implemented was not consistent. The majority of goals set were outcome orientated (i.e., focussed on the end-points that participants aimed to achieve, rather than more immediate progress points), and primarily focussed on weight loss rather than physical activity.

### **Consistency**

*Programme Protocol:* Advisors delivered an average (median proportion) of 63.6% of the intended protocol elements across all sessions observed (IQR= 52.5%-69.1%; see Figure 1). Some elements were more consistently delivered than others; frequency of delivery was highest for assessing self-esteem, confidence and perceived health (100%) and discussing reasons for referral (Median=82% of all consultations, IQR= 79%-83%), and lowest for physical activity assessment (Median= 59% of all consultations, IQR= 39%-65%) and goal setting (Median= 52% of all consultations, IQR= 38%-65%).

*Within- and Between-Advisor Variability:* There was considerable variation in content and delivery style across sessions; coefficient of variance = 33% for the BECCI and 61% for CALO-RE. There was a trend for greater variation in service content at the within- rather than between-advisor level (Tables 2 and 3); variation within advisors ranged from 1.00 to 1.53 for

the BECCI, and 0.55 to 2.25 for prevalent techniques (i.e., those used in  $\geq 20\%$  sessions) from the CALO-RE, whereas variation between advisors ranged from 0.07 to 0.75 for the BECCI, and 0.11 to 0.60 for CALO-RE. While insufficient numbers of observations were made to consider these findings robust, they indicate that the core techniques delivered were similar across advisors, even if they were not delivered consistently (i.e., advisors were selecting from the same pool of techniques).

### *Acceptability*

Initially the findings were formally presented to the two local authority managers who co-ordinated the service and 2 NHS service commissioners as frequency tables of protocol components, behaviour change techniques (accompanied by CALORE descriptors) and the highest and average scores for each item on the BECCI. The anonymised findings were also presented to all advisors. Acceptability and relevance was established through a) discussion of the findings relative to service providers'/advisors' priorities and concerns, and b) recording actions taken by service co-ordinators following this feedback.

The co-ordinators particularly valued the feedback linking the service content to evidence, which was considered relevant as a result of NICE requirements for public health services (NICE, 2006). The use of standardised definitions of behaviour change techniques led to discussion among co-ordinators as to how to refine the intended definitions and content of the service protocol. Subsequent clarification of the core content (i.e., redrafting of the protocol) with reference to definitions provided in behaviour change taxonomies (such as process goals and the use of self-monitoring) was subsequently conducted. In addition, mandatory bi-annual team away days with exercise referral advisors were established to focus on refreshing advisors' skills and providing opportunities for peer discussion and supervision.

Feedback from the presentation of findings to exercise referral advisors indicated that evaluating performance against objective indicators represented by behaviour change taxonomies appeared to be acceptable (i.e, advisors discussed the findings openly, without evidence of reactance/defensiveness), credible (i.e, advisors appeared convinced that changes in the protocol to reflect the evidence-based strategies presented was warranted) and provided a stimulus for advisors to reflect upon their own practice. All advisors requested further training on adopting a patient-centred approach, and some requested feedback about their individual performance.

### **Discussion**

This study demonstrates how behaviour change taxonomies and delivery style checklists can be used within applied services as part of process evaluation to assess the consistency with which programmes are delivered (Mars et al., 2013), and to map the content and style of delivery to standardized descriptors of behaviour change techniques. By facilitating a link between service content and intervention research, this process provides an example of how services could become more aligned with evidence-based practice, and suggests a means of collating the detailed information called for by recent checklists for the improved reporting of applied interventions (Hoffmann et al., 2014). The real impact of this approach can ultimately only be established relative to the impact of service improvements on physical activity levels; however undertaking this form of process evaluation ahead or in parallel with an outcome evaluation ensures greater confidence that results reflect the impact of a service providing comparable evidence-based support across patients.

#### ***Insights into the content of standard care***

Considerable variation existed in the content and delivery style of the exercise referral scheme, suggesting that clients are not receiving a standard service. Exercise referral advisors

appear to be tailoring interventions to perceived client needs. While such professional discretion may be appropriate to some degree given support for the tailoring of interventions (Greaves et al., 2011), the advisors in the present study were not trained in behaviour change theory and practice so would be unlikely to tailor according to theoretical constructs (e.g., level of self-efficacy) as is primarily associated with improved outcomes (Noar, Benac & Harris, 2007). Providing training on how to tailor strategically to include key techniques of behaviour change support may boost service efficacy.

By comparing service content relative to established taxonomies in this study, a meaningful process for evaluating the implications of service consistency was established which allowed content (and omissions) to be linked to theory and research. For example, matching content to detailed taxonomy definitions exposed how the goal setting commonly conducted did not align with best practice; evidence suggests that goals that are specific, measurable and controllable (i.e., process goals such as weekly target step counts) have more positive behavioural outcomes than more general goals (Bravata et al., 2007). A large proportion of the goals observed in the present study were outcome focussed, and did not relate to controllable behaviours. For example, many goals set related to 'ideal' long-term weight loss. Such insight would not have been possible through simply affirming that 'goal setting' had taken place on a protocol checklist.

Recent advances in behavioural science emphasize the importance of including techniques to target multiple behavioural determinants (e.g., Michie et al, 2011; Schwarzer & Luszczynska, 2008). For example the COM-B model sets out the evidence base for ensuring support is provided for capability, opportunity and motivation to support behaviour change (Michie, et al., 2011). The evaluation approach used in the present study facilitated an analysis of the intervention's completeness in terms of the range of behavioural determinants supported. For example, the evaluation identified that P2H consultations included few techniques to



promote self-efficacy (i.e., capability), suggesting that the quality of support could be enhanced by the addition of behaviour change techniques predicted to enhance this (e.g., action planning, reinforcing effort towards behaviour, self-monitoring) (Williams & French, 2011). While the addition of numerous techniques may not be feasible or appropriate within available timeframes of a pragmatic service, substitution for less helpful (evidence-based) components may be possible, and the systematic mapping of service content could help to highlight evidence-informed options to inform service improvement. However, we would advocate caution in excluding certain techniques reported to be ineffective in promoting physical activity as a result of meta-analytic findings, as it is likely that some techniques are useful for other service aims and objectives. For example, where facilities are shared with the general public rather than offered as part of a supervised referral service, and clients are encouraged to use exercise facilities for the first time, additional techniques simply to promote initial attendance may be crucial to service uptake and engagement. In addition, for many individual behaviour change techniques the power of analyses was low due to a lack of available evidence, and thus a null finding may not imply that a definitive conclusion of no effect can be made (Michie et al., 2009).

Evidence suggests that adopting a client-centred approach will result in more positive behaviour change outcomes (Greaves et al., 2008; Rubak, Sandbaek, Lauritzen & Christensen, 2005). Our findings showed that while most practitioners were able to deliver part or all of the session in a client-centred fashion (i.e., incorporating techniques within motivational interviewing), they did not consistently do so. No advisor had received specific motivational interviewing or similar client-centred training, so it was a positive finding that they were nonetheless able to adopt an autonomy supportive approach to some degree. However, training and support for advisors to do so more consistently may bring about greater benefits in terms of enhanced motivation and lower reactance (Patrick & Williams, 2012).

***Service implications***

Our findings suggest that exploring how protocols are interpreted and delivered is an important part of service evaluation. Without establishing this, one cannot assume that patients reliably receive the support intended. Findings of a shortfall between design and delivery are unsurprising; advisors in the present study had little prior training in what constitutes a client-centred approach or the theoretical rationale for the protocol they had been asked to deliver. Additional training to clarify why staff are asked to deliver techniques in certain ways (i.e., providing clear rationales for adhering to protocols; Ng et al, 2012) and assisting with setting up systematic, theoretically-informed requirements for tailoring (Noar et al., 2007), may help to improve both the consistency and the impact of the service.

However, while the approach described in the present study has many benefits, it involved a significant investment of time; each consultation took approximately 1.5 hours to code by postgraduate-level health psychologists, (e.g. in establishing inclusion/exclusion criteria for each definition). This is therefore an unrealistic approach for public health services to resource as part of routine monitoring and a simpler and quicker method is needed for such an approach to be widely useful in practice. From discussion with the practitioners involved in this study, we believe much could be gained from recording single sessions with advisors and reviewing these with senior public health specialists as part of an annual review; such a process would reveal deviations from intended strategies (i.e., outcome vs process goal setting), provide an indication of advisor style (i.e., time spent listening, provision of choice), and allow advisors to raise queries and discuss uncertainties in a supportive developmental environment.

***Study limitations***

The use of selected meta-analyses to provide evidence against which the findings of the content analysis could be compared may have introduced bias in terms of which techniques were supported by evidence, if differences in the techniques considered effective emerge from

other systematic reviews. However, this approach did allow a comparison to take place within a more acceptable timeframe and budget than would be required to conduct a bespoke systematic review, and did not affect the main research question of whether such an approach was useful within an applied setting. Additionally, it is potentially a limitation the the the evidence drawn on within the meta-analytic studies drew on interventions tested with a range of different populations, not only those at high cardiovascular risk as in the present application. There is insufficient evidence drawn solely from populations with similar characteristics to those using exercise referral services (e.g., age, health status and reason for participation) to restrict assessments of the evidence base with this level of specificity.

A further limitation is the relatively small number of observations conducted. Observing more sessions would have led to more reliable estimates of variation and the prevalence of different components. Moreover, assessing the usefulness of this approach using more than one exercise referral service and over an increased number of sessions may have furthered understanding about the components used within exercise referral settings more generally. A further limitation was the low inter-rater reliability in the application of the BECCI. The coders' reflections on this deviation suggested that this was due to the lack of guidance in distinguishing between the characteristics associated with each of the numbers on the rating scale (i.e., differentiating between the labels of '*minimally*' and '*to some extent*', scored 1 and 2); the low reliability score somewhat masks a much stronger level of agreement in differentiating between the extremes of the scale (i.e., if a client-centred approach was present at all). Improved guidance would facilitate the utilisation of the BECCI in applied practice. Finally, despite the implementation of a rigorous coding process by two independent researchers, it remains the client's subjective perception of the support provided by an advisor that will predict their motivation and engagement for changing their behaviour.

### ***Conclusions***

This study shows the potential contribution that the application of behaviour change taxonomies can make in service monitoring and improvement practices; they provide a means of assessing alignment with evidence-based practice, a means of assessing the consistency of services in terms of the meaningful, active components, and can provide a credible output to service providers as a basis for service improvement.

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***Competing interests:*** None

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Table 1: Behaviour change techniques observed in consultations <sup>+</sup>

CALO-RE taxonomy							Overall	
							Total N = 22	
	Advisor number	1	2	3	4	5	6	
	<i>Number of sessions observed</i>	7	2	5	2	3	3	
		<i>Percentage of sessions (N)</i>			<i>Percentage of sessions (N)</i>			
1.	Provide information on where and when to perform the behaviour	100(7)	100(2)	80( 4)	100(2)	100(3)	33(1)	86(19)
2.	Goal setting (outcome)	71(5)	100( 2)	100( 5)	100(2)	100, (3)	33(1)	82(18)
3.	Provide information on the consequences of the behaviour to the individual	43(3)	50(1)	40(2)	100(2)	67(2)	67(2)	55(12)
4.	Goal setting (behaviour)	29(2)	100(2)	60(3)	0	67(2)	33(1)	45(10)
5.	Action planning	29(2)	100( 2)	60(3)	0	67(2)	33(1)	45(10)
6.	Plan social support/social change	57(4)	100(2)	0	50(1)	0	33(1)	36(8)
7.	Time management	14(1)	50(1)	40(2)	0	33(1)	33(1)	27(6)
8.	Prompt generalisation of target behaviour	0	0	0	50(1)	67(2)	67(2)	23(5)
9.	Barrier identification/problem solving	0	0	0	100(2)	33(1)	33(1)	18(4)

10. Prompt self-monitoring of behaviour	0	0	0	0	100(3)	33(1)	18(4)
11. Prompt focus on past success	14(1)	50(1)	0	50(1)	33(1)	0	18(4)
12. Stimulate anticipation of future rewards	14(1)	0	20(1)	0	33(1)	33(1)	18(4)
13. Provide normative information – others' behaviour	0	0	20(1)	50(1)	0	33(1)	14(3)
14. Model/demonstrate the behaviour	0	0	0	50(1)	0	33(1)	9(2)
15. Teach to use prompts/cues	0	0	0	50(1)	0	33(1)	9(2)
16. Prompt practice	0	0	0	0	33(1)	33(1)	9(2)
17. Facilitate social comparison	14(1)	0	0	0	0	33(1)	9(2)
18. Prompt identification as a role model	14(1)	0	0	0	33(1)	0	9(2)
19. Fear arousal	0	0	40(2)	0	0	0	9(2)
20. Information on the consequences of the behaviour in general	0	0	20(1)	0	0	0	5(1)
21. Set graded tasks	0	0	0	0	0	33(1)	5(1)
22. Prompt rewards contingent on successful behaviour	0	0	0	0	0	33(1)	5(1)
23. Prompt self-monitoring of behavioural outcomes	0	0	0	0	0	33(1)	5(1)
24. Provide instruction on how to perform the behaviour	0	0	0	0	0	33(1)	5(1)

+Note: only the CALO-RE items observed are reported here. Items from the taxonomy not observed are excluded.

Table 2 Observed consistency of advisors with the BECCI checklist of counselling style

BECCI CHECKLIST							Within advisor	Between advisor
							variability	variability
	P1	P2	P3	P4	P5	P6		
Number of sessions	n =7	n =2	n=5	n=2	n=3	n=3		
	Mean scores (and range)							
<b>Agenda setting</b>								
1. Invitation to talk about behaviour change	1.4 (1-2)	1.0	1.0	2.0	2.3 (2-3)	1.3 (0-2)	1.00	0.07
2. Demonstrated sensitivity to talk about other issues	3.1 (3-4)	1.5 (1-2)	2.0 (1-3)	2.0	3.0	2.0 (0-3)	1.47	0.75
<i>Mean practitioner score for agenda setting</i>	<i>2.3 (1-4)</i>	<i>1.3 (1-2)</i>	<i>2.2 (1-3)</i>	<i>2.0</i>	<i>2.7 (2-3)</i>	<i>1.7 (0-3)</i>		
<b>The why and how of behaviour change</b>								
3. Talk about current behaviour/status quo	1.9 (1-3)	1.5 (1-2)	2.2 (1-3)	3.0	3.0 (2-4)	2.0 (1-3)	1.53	0.46
4. Talk about the positive and negative aspects of change	1.9 (1-3)	1.5 (1-2)	1.6 (1-2)	1.5 (1-2)	3.0	2.3 (1-3)	1.32	0.67
5. Feelings about behaviour change	1.7 (1-3)	1.5 (1-2)	1.4 (1-2)	2.0 (1-3)	2.7 (2-3)	1.7 (0-3)	1.19	0.28
6. Empathic listening statements	3.0 (2-4)	1.0	1.8 (1-3)	3.5 (3-4)	3.0 (2-4)	2.0 (0-3)	1.34	0.48
7. Summaries to bring together what the participant says	0	0	0	0	0	0.7 (0-2)	1.00	0.07

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<i>Mean practitioner score for the why and how of behaviour change</i>	1.7 (0-4)	1.1 (0-2)	1.4 (0-3)	2.0 (0-4)	2.3 (0-4)	1.7 (0-3)		
<b>The whole consultation /target setting</b>								
8. <b>Acknowledges challenges that the client faces</b>	2.1 (1-3)	1.0	1.6 (1-2)	3.0	2.7 (2-3)	2.0 (0-3)	1.14	0.59
9. <b>Providing information that is sensitive to concerns</b>	2.1 (1-3)	2.0	1.4 (1-2)	2.5 (2-3)	3.0	2.3 (1-3)	1.16	0.57
10. <b>Convey respect to individual choice about change</b>	2.7 (2-4)	0.5 (0-1)	2.2 (2-3)	3.0	2.3 (2-3)	1.3 (0-3)	1.45	0.43
11. <b>Exchange ideas about how to change current behaviour</b>	1.0 (0-2)	1.5 (1-2)	1.6 (1-2)	1.5 (1-2)	2.3 (2-3)	1.7 (0-3)	1.25	0.11
<i>Mean practitioner score for the whole consultation/target setting</i>	2.0 (0-4)	1.3 (0-2)	1.7 (1-3)	2.5 (1-3)	2.6 (2-3)	1.8 (0-3)		
<i>Overall mean practitioner score</i>	1.9	1.2	1.5	2.2	2.5	1.8	1.26	0.41

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Table 3: Matrix of effective behaviour change techniques for promoting physical activity for comparison against observed P2H content

Technique	Supporting evidence <sup>1</sup>	% frequency in P2H consultations	% of P2H advisors demonstrating technique	Within-advisor variation	Between advisor variation
Provide information on where and when to perform the behaviour	NS (k=3)	86%, N = 19	100% N=6	0.55	0.27
Goal setting (outcome)	***	82%, N = 18	100% N = 6	0.78	0.28
Provide information on the consequences of the behaviour to the individual	**	55%, N = 12	100% N = 6	1.82	0.24
Goal setting (behaviour)	***	45%, N =10	83% N = 5	2.25	0.44
Action planning	NS	45%, N = 10	83% N = 5	2.25	0.44
Plan social support/social change	***	36%, N = 8	67% N = 4	1.27	0.53
Time management	NS	27%, N = 8	83% N = 5	2.25	0.11
Prompt generalisation of target behaviour	<i>negative effect*</i> (k=3)	23%, N = 5	50% N = 3	0.87	0.42
Barrier identification/problem solving	***	18%, N = 4	50% N = 3	0.50	0.56
Prompt self-monitoring of behaviour	Olander*** / Michie*	18%, N = 4	33% N = 2	1.00	0.60
Prompt focus on past success	-	18%, N = 4	67% N = 4	1.13	0.20
Stimulate anticipation of future rewards	-	18%, N = 4	67% N = 4	1.94	0.10

Provide normative information – others' behaviour	-	14%, N = 3	50% N = 3	1.00	0.18
Model/demonstrate the behaviour	***	9%, N = 2	33% N = 2	0.62	0.18
Teach to use prompts/cues	***	9%, N = 2	33% N = 2	0.62	0.18
Prompt practice	***	9%, N = 2	33% N = 2	1.25	0.11
Facilitate social comparison	***	9%, N = 2	33% N = 2	1.32	0.07
Prompt identification as a role model	-	9%, N = 2	33% N = 2	1.32	0.07
Fear arousal	-	9%, N = 2	17% N = 1	1.24	0.04
Provide information on the consequences of the behaviour in general	***	5%, N = 1	17% N = 1	1.05	0.04
Set graded tasks	***	5%, N = 1	17% N = 1	1.00	0.07
Prompt rewards contingent on successful behaviour	***	5%, N = 1	17% N = 1	1.00	0.07
Prompt self monitoring of behavioural outcomes	** (k=2)	5%, N = 1	17% N = 1	1.00	0.07
Provide instruction on how to perform the behaviour	***	5%, N = 1	17% N = 1	1.00	0.07

Notes: <sup>1</sup>All techniques except those followed by a dash '-' were included within the Olander et al, 2013 review, and the significance of the association of each with positive physical activity outcomes indicated by asterisks (where k<5 this qualification is added in brackets). Support was only found for *self-monitoring of behaviour* in Michie et al, 2009 (meta-regression), though all others were considered; however, for the majority of techniques low power meant no definitive conclusion as to efficacy can yet be made; \* small effect size/p<.05 within one or more meta-analyses, \*\* medium effect size, \*\*\* large effect size/p<.001, <sup>NS</sup>no significant effect.