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Determinants of physical activity promotion by smoking cessation advisors as an aid for quitting:  
Support for the Transtheoretical Model

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Abstract

**Objectives:** Physical activity (PA) can reduce cigarette cravings and aid quitting but little is known about its promotion by smoking cessation advisors. This study aimed to: (1) determine the extent to which smoking cessation advisors promote PA; and (2) examine the relationship between PA promotion as a cessation aid and advisor characteristics and cognitions, within the Transtheoretical Model (TM) framework.

**Methods:** Self-report surveys assessing PA promotion, TM variables, advisors' own PA levels and demographics were completed by 170 advisors in England and Scotland.

**Results:** Advisors reported spending 29 minutes promoting PA over a 6/7-week clinic. Those in later stages of readiness for promoting PA as a cessation aid and those spending more time promoting PA held more positive beliefs regarding pros and cons, self-efficacy, outcome efficacy and importance of PA within smoking cessation. Time spent promoting PA and stage of readiness were strongly associated. There was a trend for the more physically active advisors to promote PA more often.

**Conclusions:** About half the advisors promoted PA and TM variables predicted this variability.

**Practice Implications:** PA promotion among smoking cessation advisors may be facilitated by enhancing self-efficacy, outcome efficacy and pro and con-beliefs related to PA promotion.

**Key words:** multiple health behaviour change, stage of change, self-efficacy, outcome efficacy, pros and cons, lifestyle, counseling, exercise, beliefs

## 1. Introduction

Physical activity (PA) may be a useful aid for smoking cessation [1, 2], but little is known about whether smoking cessation advisors promote PA (e.g. provide brief counseling and advice towards a PA program for aiding cessation) and the factors associated with promoting PA. Such information may be useful for changing practitioner behaviour, which typically focuses on offering pharmacological and behavioural individual and group support in Stop Smoking Services (see 3 for more details). The Transtheoretical Model (TM)[4] has been widely used as a framework for explaining both smoking cessation and PA [5], as separate behaviours. Also, studies of practitioners have examined the cognitions (e.g. self-efficacy) associated with stage of readiness to promote smoking cessation and PA within the TM framework [6, 7, 8], again as separate behaviours. To date, no study has investigated the readiness of smoking cessation practitioners to promote PA as an aid to cessation. Those who are considered as less ready to promote PA might be expected to have weaker self-efficacy, outcome efficacy and beliefs about the pros of doing PA, and stronger beliefs about the cons, compared with those actively promoting PA for smoking cessation. It might also be expected that stop smoking advisors who are more active would be more likely to hold positive beliefs about PA and to promote PA to their clients [6]. The present study assessed the extent to which PA was promoted in UK smoking cessation clinics. Additionally, in this context, we examined the relationship between advisor characteristics and cognitions within the TM.

## 2. Methods

### 2.1 Participants, Design and Procedure

The study was approved by the local ethics committee. Five hundred and forty-seven questionnaires were distributed at training events and a smoking practitioner national conference. Questionnaires were completed by 170 advisors (31% response<sup>1</sup>) in primary care trusts (PCTs)

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<sup>1</sup> This is the most conservative estimate based on the number of questionnaires distributed to lead advisors who agreed to circulate them among their fellow advisors in the PCT. Using this sampling method we cannot be certain of the number of advisors who declined to complete the survey.

throughout England and Scotland. Surveys were anonymous, but advisors had the option of indicating their PCT. Responses were received from at least 25 PCTs.

## 2.2 Measures

### Physical activity promotion

For a 6-7 week group format clinic, advisors stated the overall time they usually spent promoting PA and how much time they typically spent promoting PA during each week of a clinic.

Additionally, we asked: 'Please circle the letter next to the statement which is closest to how you feel about promoting exercise (that is, spending at least 10 minutes in each session of a 6-week clinic trying to motivate people to be more active) FOR THE MANAGEMENT OF CRAVINGS AND WITHDRAWAL SYMPTOMS (and in a separate question; '...FOR WEIGHT MANAGEMENT') in your smoking cessation group clinic. The 5 options were: I do not promote exercise and I don't intend to start (A); I do not promote exercise but I'm thinking about starting (B); I promote exercise once in a while but not regularly (C); I promote exercise in every group clinic I run, but only started doing so in the past six months (D); I promote exercise in every group clinic I run and have been doing so for longer than six months (E).

### Beliefs about physical activity promotion in smoking cessation

Pro and con-beliefs were measured using a 15-item pros scale and a 10-item cons scale (1 'strongly disagree' to 5 'strongly agree'), adapted from scales used in smoking cessation [9]. Principle components analysis revealed a single factor solution for the pros scale ( $\alpha=0.94$ ) and a two-factor solution for the cons scale. The first factor with 4 items was concerned with processes of change ('cons processes';  $\alpha=0.72$ ) and the second with 6 items was concerned with advisor delivery or competence ('cons advisor';  $\alpha=0.79$ ). Self-efficacy was conceptualised in terms of an advisor's confidence in their own ability to promote PA using a 4-item scale (0 'cannot do at all' to 10 'highly certain can do'), encompassing motivational and practical aspects of PA promotion ( $\alpha=0.84$ ). The same 0-10 scale assessed outcome efficacy, using three items to assess efficacy of PA for helping

quitters to maintain their weight, cope with withdrawal symptoms and remain abstinent ( $\alpha=0.86$ ). A single-item (1 'not at all' to 5 'very important') assessed advisor importance of promoting PA in smoking cessation clinics. Personal PA [10] and demographics were also reported.

### 2.3 Data analysis

Data was analysed using SPSS v.13. The data for time spent promoting PA was skewed; therefore we used quartiles: <5 minutes; 5-19 minutes; 20-44 minutes;  $\geq$  45 minutes. The predictor variable scores for self-efficacy, outcome efficacy, and pro and con-beliefs were converted into T scores and compared across the four categories using analysis of variance (ANOVA), with Bonferroni-corrected post-hoc tests. Since the findings were similar for stage of readiness for promoting PA for weight management and for craving management, we have focused on craving management. Due to the small number of respondents classed as Pre-contemplation and Contemplation these stages were merged to form a 'pre-preparation' stage. The predictor variables self-efficacy, outcome efficacy, pro-beliefs and con-beliefs, and also importance of promoting PA and advisors' own PA behaviour, were compared across stage of readiness using ANOVAs, with Bonferroni-corrected post-hoc tests. Chi<sup>2</sup> analysis determined the association between time spent promoting PA and stage of readiness to promote PA.

## 3. Results

### 3.1 Sample characteristics

The characteristics of the sample are presented in Table 1. Advisors reported, on average, spending 29 minutes promoting PA throughout a typical 6-7 week clinic. Data (N=70) from respondents who provided information for each week, across the 6-7 week clinic, indicated little variation (between 5.6-6.0 mins per week), except in week 3 (Mean =4.5 mins; SD=0.8) and week 4 (Mean=8.8 mins; SD=1.7). Fifty-six percent of advisors were engaged in PA promotion for smoking cessation (i.e. in action or maintenance stage). Mean scores for self-efficacy, outcome efficacy and pros were moderately high and moderately low for cons processes and cons advisor scores.

### 3.2 Differences by time spent promoting physical activity

Those reporting spending more time promoting PA reported stronger pro beliefs ( $F_{3,165}=2.83$ ,  $p<0.05$ ), self-efficacy ( $F_{3,164}=5.57$ ,  $p<0.01$ ), outcome efficacy beliefs ( $F_{3,164}=3.54$ ,  $p<0.05$ ), and beliefs in the importance of promoting PA ( $F_{3,164}=3.36$ ,  $p<0.05$ ; 1<sup>st</sup> and 4<sup>th</sup> quartile different;  $P<0.05$ ) and weaker beliefs in cons related to processes of change ( $F_{3,163}=6.66$ ,  $p<0.001$ ) and cons related to the advisor ( $F_{3,163}=4.71$ ,  $p<0.01$ ) (see Figures 1 and 2). Those spending more time promoting PA reported more time engaged in moderate intensity activity ( $F_{3,158}=3.05$ ,  $p<0.05$ ; 2<sup>nd</sup> and 4<sup>th</sup> quartile different;  $P=0.057$ ).

### 3.3 Stage of readiness for physical activity promotion for craving management

Pros ( $F_{4,156}=11.42$ ,  $p<0.01$ ), cons processes ( $F_{4,156}=15.14$ ,  $p<0.01$ ), cons related advisor ( $F_{4,156}=7.38$ ,  $p<0.01$ ), self-efficacy ( $F_{4,156}=8.05$ ,  $p<0.01$ ), outcome efficacy ( $F_{4,156}=22.71$ ,  $p<0.01$ ), and perceived importance of PA promotion in smoking cessation ( $F_{4,156}=12.19$ ,  $p<0.01$ ) were all associated with stage of readiness in the expected direction (Table 2). There was also a strong association between time being active and stage of readiness ( $\text{Chi}^2=50.6$  ( $df=9$ ),  $p<0.01$ ).

## 4. Discussion and conclusion

### 4.1 Discussion

This is the first study to examine smoking cessation practitioners' beliefs and behaviour concerning PA promotion specifically as a smoking cessation aid. Clearly practitioners spend on average relatively little time in a typical 70-90 min clinic promoting PA as an aid, which matches national guidelines and training [3] but there was a good deal of variability across the sample. The sample was drawn from advisors working in both deprived and more affluent areas, but a fairly low response rate may have inflated reports of the amount of PA promotion. However, the findings are comparable with a survey of 497 UK smoking cessation practitioners who attended a national smoking cessation conference and responded to a broader on-line survey, with only one item on PA promotion. This revealed that 46.8% reported promoting PA [11]. Those spending more time promoting PA were

more likely to hold favourable beliefs about PA as a smoking cessation aid and about their ability to promote PA, demonstrating support for the TM in this context. The present study supports a new approach to multiple health behaviour; namely, readiness to promote one behaviour (PA) specifically to regulate another (smoking). Previous studies have only considered readiness to promote separate behaviours.

There were no significant differences in the advisors' PA levels across stages of change for promoting PA. This is inconsistent with previous research (e.g. 19) demonstrating that more active practitioners (e.g. general practitioners) are more likely to promote PA. However, large variance in the measures limited the scope for identifying statistical differences and there was a trend for more active advisors spending longer promoting PA.

The study was cross-sectional and further research is needed to explore the prospective relationship between cognitions and PA promotion, the effects of interventions targeted at changing practitioners' cognitions that may mediate behaviour, and qualitative views of advisors.

#### 4.2. Conclusion

Many advisors promote PA to facilitate their clients' cessation attempts, although there is a considerable variation in the time spent promoting PA. Advisors were more likely to promote PA if they had greater belief in their ability to promote PA and in the ability of PA to help smokers to quit.

#### 4.3 Practice implications

Practitioners recognise that PA can have many benefits during smoking cessation. It is possible to integrate PA promotion into smoking cessation clinics and those who deliver the clinics believe it is worthwhile. Our findings suggest that advisor training should aim to increase self-efficacy and outcome efficacy beliefs regarding PA promotion as a smoking cessation aid.

Acknowledgments:

We are grateful for funding for research from collaborators in the National Prevention Research Initiative (NPRI), namely: British Heart Foundation; Cancer Research UK; Department of Health; Diabetes UK; Economic and Social Research Council; Medical Research Council; National Cancer Research Institute; Research and Development Office for the Northern Ireland Health and Social Services; Chief Scientist Office, Scottish Executive Health Department; Welsh Assembly Government.

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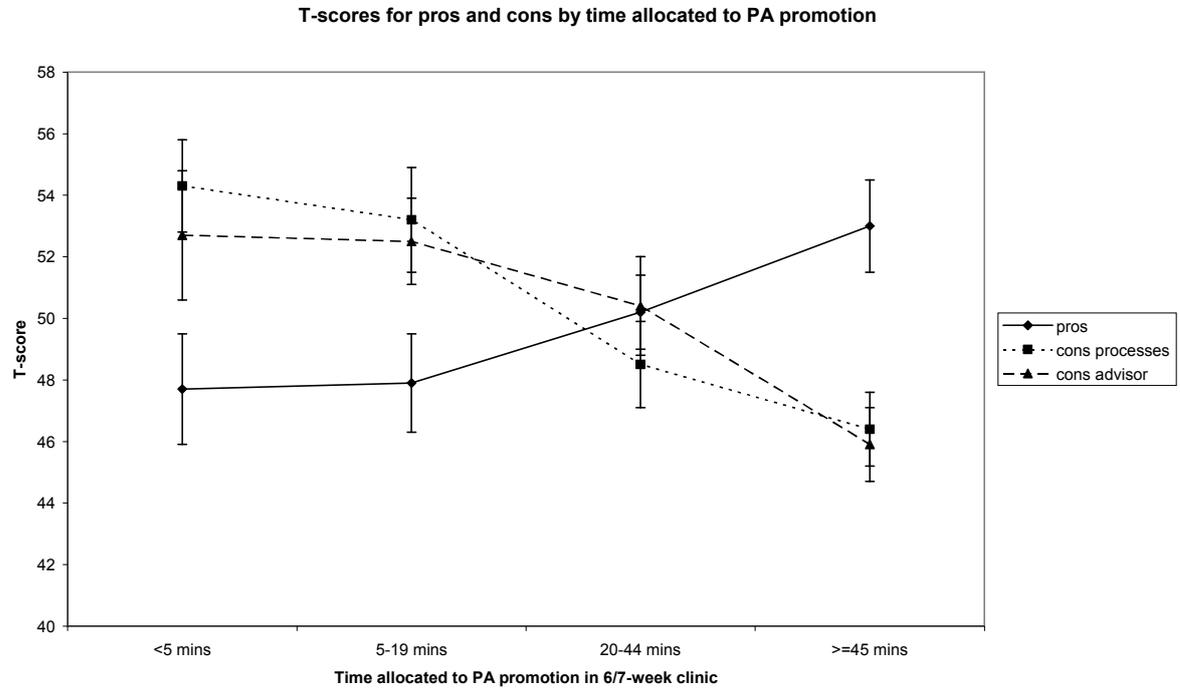
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Figure 1 Pros and cons for promoting physical activity by minutes spent promoting physical activity

Figure 2 Self-efficacy and outcome efficacy for promoting physical activity by minutes spent promoting physical activity

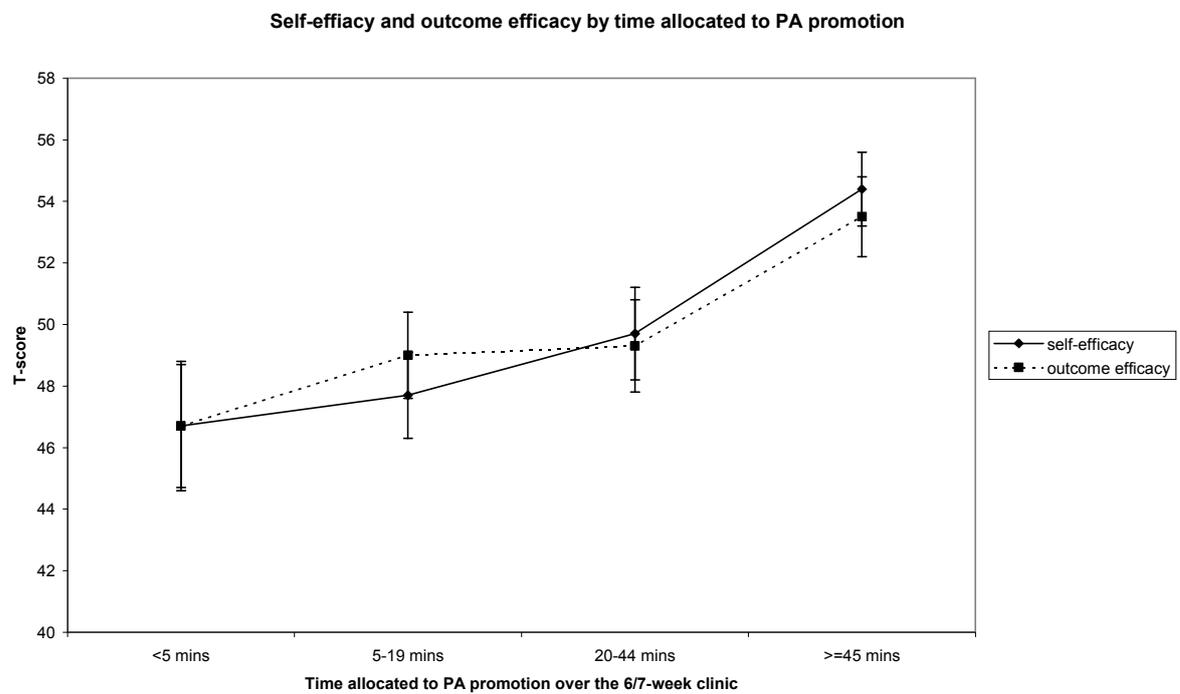


Notes: Post hoc t tests revealed the following significant between quartile differences:

Pros; No differences (but quartile 2 < 4,  $P = 0.078$ )

Cons processes; 1 > 4 ( $P = 0.002$ ), 2 > 4 ( $P = 0.004$ )

Cons advisor; 1 > 4 ( $P = 0.018$ ), 2 > 4 ( $P = 0.008$ )



Notes: Post hoc t tests revealed the following significant between quartile differences:

Self-efficacy; quartile 1 < 4 (P = 0.004), 2 < 4 (P = 0.006)

Outcome efficacy; 1 < 4 (P = 0.017)

Table 1: Sample characteristics (N=170)

	Mean (SD)	Percentage (n)
Age (years)	39.4 (11.0)	
Gender		
Male		19% (32)
Female		81% (134)
Ethnicity		
White		87% (147)
Asian		6% (10)
Black		4% (6)
Other		2% (3)
Job title		
Smoking cessation co-ordinator		7% (11)
Smoking cessation advisor/counsellor		74% (121)
Other (e.g. nurse practitioner)		19% (32)
Current job experience		
<1 year		32% (52)
1-3 years		30% (49)
>3 years		38% (62)
Smoking history		
Quit >6 months ago		48% (78)
Never smoked		52% (84)
Personal vigorous PA in week (mins)	93.5 (134.0)	
Personal moderate PA in week (mins)	133.0 (138.9)	
BMI	24.4 (3.2)	
Mins spent promoting PA in 6/7-week clinic	29.3 (29.6)	
Perceived importance of promoting PA (1-5)	4.1 (0.9)	
Stage of change for PA promotion as a smoking cessation aid (for weight management)	3.7 (1.2)	
Precontemplation		5% (8)
Contemplation		11% (18)
Preparation		29% (46)
Action		15% (24)
Maintenance		40% (64)
Stage of change for PA promotion as a smoking cessation aid (for craving management)	3.6 (1.3)	
Precontemplation		6% (9)
Contemplation		14% (23)
Preparation		28% (45)
Action		17% (28)
Maintenance		39% (56)
Mean self-efficacy score (1-10)	6.7 (1.8)	
Mean outcome efficacy score (general) (1-10)	6.5 (1.7)	
Mean pros score (1-5)	3.7 (0.6)	
Mean cons (processes) score (1-5)	2.7 (0.7)	
Mean cons (advisor) score (1-5)	2.9 (0.8)	

Table 2 Means (SDs) for variables by stage of change for promoting PA for craving management

n & %	Prepreparation 32 (20%)	Preparation 46 (29%)	Action 24 (15%)	Maintenance 64 (40%)	F	df
Self-efficacy (1-10)						
Average scores	5.8 (1.9) <sup>d,e**</sup>	6.2 (1.7) <sup>b,f**</sup>	7.5 (1.6) <sup>b,d**</sup>	7.3 (1.6) <sup>e,f**</sup>	8.05**	3,157
t-scores	45.1 (10.4) <sup>d,e**</sup>	47.1 (9.5) <sup>b,f**</sup>	54.1 (8.9) <sup>b,d**</sup>	53.0 (8.9) <sup>e,f**</sup>		
Outcome efficacy (1-10)						
Average scores	4.9 (1.6) <sup>a,d,e**</sup>	6.2 (1.3) <sup>a**,b*,f**</sup>	7.1 (1.2) <sup>b*,d**</sup>	7.5 (1.6) <sup>e,f**</sup>	22.71**	3,157
t-scores	40.7 (9.1) <sup>a,d,e**</sup>	48.1 (7.7) <sup>a**,b*,f**</sup>	53.4 (6.9) <sup>b*,d**</sup>	55.3 (9.3) <sup>e,f**</sup>		
Pros (1-5)						
Average scores	3.3 (0.8) <sup>a*,d,e**</sup>	3.6 (0.5) <sup>a,b*,f**</sup>	3.9 (0.4) <sup>b*,d**</sup>	4.0 (0.5) <sup>e,f**</sup>	11.42**	3,157
t-scores	43.1 (13.2) <sup>a*,d,e**</sup>	47.9 (8.2) <sup>a,b*,f**</sup>	52.7 (6.7) <sup>b*,d**</sup>	54.2 (8.5) <sup>e,f**</sup>		
Cons – process (1-5)						
Average scores	3.2 (0.7) <sup>d,e**</sup>	3.0 (0.6) <sup>b,f**</sup>	2.3 (0.5) <sup>b,d**</sup>	2.5 (0.7) <sup>e,f**</sup>	15.14**	3,157
t-scores	56.0 (9.4) <sup>d,e**</sup>	54.4 (8.1) <sup>b,f**</sup>	44.4 (10.0) <sup>b,d**</sup>	46.5 (10.0) <sup>e,f**</sup>		
Cons – advisor (1-5)						
Average scores	3.3 (0.8) <sup>d,e**</sup>	3.2 (0.7) <sup>b*,f**</sup>	2.7 (0.8) <sup>b*,d**</sup>	2.7 (0.8) <sup>e,f**</sup>	7.38**	3,157
t-scores	54.7 (9.9) <sup>d,e**</sup>	53.1 (9.3) <sup>b*,f**</sup>	47.1 (9.6) <sup>b*,d**</sup>	46.5 (9.8) <sup>e,f**</sup>		
Mins spent promoting PA <sup>1</sup>	14.2 (27.3) <sup>d,e**</sup>	22.3 (26.0) <sup>b,f**</sup>	42.9 (35.0) <sup>b,d**</sup>	38.9 (25.4) <sup>e,f**</sup>	8.09**	3,148
Advisor importance <sup>2</sup> (1-5)	3.7 (1.0) <sup>d,e**</sup>	3.8 (0.8) <sup>b,f**</sup>	4.4 (0.9) <sup>b,d**</sup>	4.6 (0.6) <sup>e,f**</sup>	12.19**	3,156
Advisor mins of doing vig intensity PA in past week	45.9 (83.6)	90.5 (119.1)	105.7 (108.5)	99.7 (114.8)	2.02	3,154
Advisor mins of doing mod intensity PA in past week	114.5 (132.6)	113.1 (126.8)	126.5 (117.7)	155.9 (130.2)	1.15	3,151

<sup>a</sup> prepreparation vs. preparation

\* p&lt;0.05

<sup>b</sup> preparation vs. action

\*\* p&lt;0.01

<sup>c</sup> action vs. maintenance<sup>1</sup> In a 6/7 week clinic<sup>d</sup> prepreparation vs. action<sup>2</sup> Perceived importance of promoting PA<sup>e</sup> prepreparation vs. maintenance<sup>f</sup> preparation vs. maintenance



**SCHOOL OF SPORT AND HEALTH SCIENCES**

**09/02/2009**

**Patient Education & Counselling**

PEC-08-2609: Determinants of physical activity promotion by smoking cessation advisors as an aid for quitting: Support for the Transtheoretical Model

Dear Editor,

Pleased find enclosed a revised manuscript to be considered for Patient Education & Counselling. Given the significant work needed to reduce the manuscript to the requested 1500 words we were not able to identify where specific changes were made in response to the reviewers comments. However, we can say that we have provided more detail on what is happening in these smoking cessation programs, and make reference to a text by McEwen et al (2006) which guides training and practice for Stop Smoking Services. Clearly, we are limited by space to fully describe the content of NHS stop smoking clinics. The clinics of interest involve behavioural support which does not include any actual exercise sessions. We were interested in the attempts made by the advisors to promote physical activity as part of their clients abrupt quit attempt. Also, in response to a reviewer's comments, a paper on the qualitative views of advisors on multiple health behaviour change is currently under review in another journal.

All the authors have been personally and actively involved in the revisions, and will hold themselves jointly and individually responsible for its content.

We hope that the revised version will now be acceptable for publication in PEC.

Best wishes,

Prof Adrian Taylor

(Professor of Exercise & Health Psychology)

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