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1 **Abstract**

2 The benefits of exercise are well documented, nevertheless, physical activity (PA)
3 decreases progressively with age, a trend exacerbated in those who have fallen. An important
4 predictor of exercise behaviour is the extent to which motivation for exercise has been
5 internalized into one's identity, however, we know little about changing health behaviours in
6 older people, with calls for longitudinal studies to aid understanding (e.g., Strachan et al.,
7 2010). Grounded in self-determination theory (SDT: Deci & Ryan, 1985, 2000), the present
8 study explored the role of self-talk in the process of identity change during the initial ten
9 weeks of an exercise referral falls prevention programme. Six participants identified at risk of
10 falling completed weekly measures of their PA-related cognition and identity; in-depth
11 interviews were completed at course commencement and ten weeks later. During this initial
12 phase of the behaviour change programme, participants developed stronger physical activity
13 identities, with themes reflecting a transition from a physically-impaired and negative self to
14 a more future-orientated, capable, and integrated self-identity. Concurrently, autonomy
15 supportive and competence-reinforcing self-talk significantly increased, with nonsignificant
16 increases and decreases in controlling and amotivational self-talk, respectively. The data
17 suggest that self-talk may be usefully conceptualised as a process through which social
18 messages are interpreted and internalised to integrate a new behaviour into one's existing
19 self-concept.

20

21 **KEYWORDS:** physical activity, motivation, self-talk, identity.

22

23

24 **Introduction**

25 The benefits of physical activity and exercise are well-documented, for instance,
26 improved quality of life, muscle strength and joint flexibility, and decreased likelihood of
27 depression and cardiovascular disease (e.g., Aoyagi, Park, Park, & Shephard 2010; Barreto,
28 2009; Barbour, Edenfield, & Blumenthal, 2007). These benefits have been demonstrated in
29 both clinical and non-clinical populations across the lifespan. Nevertheless, physical activity
30 levels decrease progressively with age, with many older adults perceiving age and/or poor
31 health as barriers that prevent them from being physically active (Whaley & Ebbeck, 2002;
32 Wurm, Tomasik, & Tesch-Römer, 2010).

33 Improving physical activity participation in older people is increasingly pertinent in
34 the context of a rapidly ageing global population, with the number of individuals over 60
35 years of age projected to surpass 1 billion within 10 years (United Nations Population Fund
36 [UNPF], 2012). The UNPF has argued that good health must lie at the core of society's
37 response to population ageing, and governmental policies should promote healthy lifestyles.
38 The challenge of optimising physical activity in an increasingly elderly and sedentary
39 population is exacerbated as traditional models of service delivery may not adequately meet
40 the needs of older people (e.g., due to poor access or transport; [Victor, 2014](#)). Thus exploring
41 how older people experience and respond to physical activity programmes informs both
42 public health promotion and service design, potentially reducing health inequalities evident in
43 this group.

44 A consequence of ageing for many is the experience of a fall, with one out of three
45 adults over 65 years of age falling each year (Masud & Morris, 2001). The problem of
46 physical inactivity is exacerbated in older people who have fallen, as falling often has a
47 number of psychological consequences (fear of falling, loss of confidence, and activity
48 avoidance) that present further barriers to being physically active (see Jørstad, Hauer, Becker,

49 & Lamb, 2005). However, at-risk elderly people, including falls patients, can benefit from
50 physical activity and exercise interventions, achieving improvements in functional status,
51 physiological and psychological health (e.g., perceived health status; Barreto, 2009) and
52 reducing decrements arising from secondary ageing (environmental and lifestyle factors;
53 Hunter, McCarthy & Bamman, 2004).

54 Experiencing a fall clearly has implications for the individual's social, physical, and
55 psychological well-being and places demands on healthcare resources (National Service
56 Framework for Older People, DoH, 2001). Therefore it is important to ensure that older
57 individuals, including those who have fallen, initiate and adhere to physical activity
58 programmes, and maintain physical activity on programme completion. For at risk elderly
59 people developing a physically active identity and transforming the traditional view of the
60 ageing body from rest, incompetence, and increasing immobility, to malleable bodies, prone
61 to improved physiological and biomechanical functioning (Tulle, 2008) is especially
62 important.

63 **Physical Activity Identity**

64 It has been argued that examining the development and maintenance of an exercise
65 identity in older adults is critical to understanding their physical activity behaviour (Whaley
66 & Ebbeck, 2002). Older adults who more strongly associate with a physical activity identity
67 (identified via a higher rating on physical activity identity scales) report higher levels of
68 physical activity, well-being, more physical activity-related goals, and higher levels of self-
69 regulatory self-efficacy (i.e., confidence that they could remain physically active even when
70 faced with barriers such as bad weather; Strachan et al., 2010). There are, however, some
71 nuances in terms of how older populations might view exercise and physical activity. The
72 few studies that have focused on older people have identified that they may see developing an
73 exercise identity as less important than avoiding an identity as someone who is old, and, that

74 they associate themselves more with a physical activity identity than with the identity of a
75 traditional ‘exerciser’ (Strachan, Brawley, Spink, & Glazebrook, 2010; Whaley & Ebbeck,
76 2002). This creates sociodemographic and intrapersonal barriers when attempting to engage
77 older adults in leisure-based schemes (Victor, 2014), which is the standard practice for
78 exercise referral programmes. Whilst it is the norm for older adults not to see a physically
79 active self as central to their identity, this is not the case for all older adults. A number of
80 recent studies have presented evidence of alternative identities in older adults that place
81 physical activity at the core of their identity. These include older adults for whom a
82 physically active lifestyle and participation in sport are integral to their well-being and
83 competitive Masters Bodybuilders (Phoenix, 2010; Phoenix & Smith, 2011; Phoenix &
84 Sparkes, 2009)^[LT1]. Thus, it seems that no single physical activity identity encapsulates this
85 aspect of self in older adults, and, in the present study we focus on physical activity in its
86 broadest sense, and not restricted to structured exercise, sports or competitive activities.

87 Identifying ways to promote and support the internalisation of an active identity is
88 particularly relevant for an ageing population given that, as previously discussed, these
89 individuals are likely to have low physical activity levels and may have dissociated from
90 physical activity. However, as O’Brien Cousins (2003) has highlighted, we know little about
91 the ways in which older people think about their health behaviours, and prospective studies
92 that explore change in motivation and physical activity over time will add considerably to our
93 understanding (Strachan et al., 2010). Hence, the primary aim of the present study was to
94 examine changes in older adults’ physical activity-related identities during the early phases of
95 an exercise referral programme. We aimed to identify the ways in which a novel behaviour
96 promoted by an intervention (in this case, a physical activity programme for fallers or those at
97 risk of falling) was internalised into participants’ identities. A key aim of the study was to

98 explore the cognitions of the participants during this transitional period, and to identify
99 whether they might underpin any identity changes observed.

100 **Cognition and Identity Change.**

101 Cognition relating to goal-directed behaviour can be conceptualised as self-talk, that
102 is, the internal dialogue we have with ourselves. Self-talk has previously been shown to
103 mediate the relationship between social messages and changes in one's self-concept (Burnett,
104 2003), suggesting that cognitions may help drive changes in the way we see ourselves.
105 Indeed, work by Lawrence and Valsiner (2003) models self-talk as a way in which new ideas
106 are interpreted, assessed and debated internally, before becoming fully integrated into the
107 self. Given that the process of internalising new behaviours, such as physical activity,
108 requires people to understand and synthesise both the values of and the behaviour itself (Deci
109 & Ryan, 2000), we posit that self-talk might act as a mechanism through which identity
110 change occurs through enabling this understanding to develop. Studying cognitions related to
111 exercise during a period of behaviour change would seem useful for understanding how
112 motivation for physical activity is internalised. This is consistent with claims that studying
113 the inner dialogue of newly active individuals may help to understand why people fail or
114 succeed in their attempts to be physically active (O'Brien Cousins & Gillis, 2005).

115 Recent work (e.g., Oliver et al., 2010) has suggested employing a framework
116 provided by cognitive evaluation theory (CET: Deci & Ryan, 1985) to explain how
117 intrapersonal events such as self-talk might facilitate internalisation and behaviour change.
118 Housed within self-determination theory (Deci & Ryan, 1985; 2000), CET argues that if
119 events support innate basic needs for autonomy and competence, this enables individuals to
120 actively transform the values of significant others into their own (Deci & Ryan, 2000). That
121 is, if events create a sense of freedom, volition, and self-endorsed action (autonomy) and
122 provide feedback engendering effectiveness and mastery over ones surroundings

123 (competence), these conditions will support internalisation. In the context of new identities,
124 need supporting conditions will facilitate an integrated and endorsed identity, need thwarting
125 conditions will not.

126 Importantly, CET makes no distinction between external social contextual events,
127 such as the provision of feedback or rewards by others, and intrapersonal events such as self-
128 monitoring, self-reinforcement, and self-control (Deci & Ryan, 1985). Instead, CET proposes
129 a distinction between internally informational regulating episodes processed by the individual
130 and experienced as free from pressures, and internally controlling regulation in which the
131 individual pressurises themselves to act (Ryan, 1982). Deci and Ryan (1985) argue that to
132 regulate oneself informationally is quite different from regulating oneself controllingly, and
133 that controlling self-regulation is likely to have negative consequences for motivation and
134 well-being.

135 Drawing on this theoretical framework, the present study adopts the position that
136 self-talk represents an internal regulatory event that can be experienced as informational
137 (need supportive) or controlling (need thwarting), with subsequent differential consequences
138 for behavioural and affective outcomes. Importantly, the emphasis in CET is on the
139 functional significance of events, that is, how one experiences or interprets specific events
140 rather than their nature per se. In the context of self-talk, it is proposed that how one
141 interprets or experiences self-talk is considered to be independent of its content. For example,
142 the phrase “concentrate” may be experienced as pressurising and commanding, or as
143 supportive and encouraging. This is aligned with contemporary literature which emphasises
144 the need to consider the significance and meaning of inner speech to the individual. For
145 example, Wiley (2006) argues that our self-speech is intra-subjective, as a result of obtaining
146 its meaning from events peculiar to us, and therefore it is necessary to examine the
147 interpretation and experience of such speech from the perspective of the individual.

148 Thus, informational self-talk (that supports basic needs) is likely to facilitate identity
149 change and to increase as a behaviour becomes more internalised. Conversely, negative or
150 controlling self-talk (e.g., pressurising statements that undermine autonomy) is likely to be
151 associated with a non-internalised exercise identity and resistance to change. Some support
152 for this can be drawn from findings in an educational context linking informational self-talk
153 with more positive affective states, and controlling self-talk with greater anxiety (Oliver,
154 Markland, & Hardy, 2010), when learning novel material.

155 In sum, the aim of the present study was to respond to calls for research that explores
156 how health behaviours are changed in older people (Strachan et al., 2010), potentially
157 informing the delivery of public health interventions for this sector of the population.
158 Understanding the thought processes underlying identity change may enable more targeted
159 and effective support during such interventions; the study focused on exploring the self-talk
160 and concurrent identity changes of participants referred to an exercise-focused behaviour
161 change intervention. As previously noted, current understanding of active identities in older
162 people is weak and to an extent focuses on atypically highly active individuals (e.g., masters
163 athletes), thus the study sought to obtain rich and detailed data by following a specific cohort
164 through a programme typifying standard referral scheme delivery. The research employed a
165 mixed method approach to facilitate depth of understanding of the nature of the identity
166 changes as well as enable application of an existing theoretically-grounded model classifying
167 types of self-talk. The corroboration and convergence of the two strands of self-talk and
168 identity-related data (cf. Bryman, 2007) allowed for augmented interpretation and greater
169 confidence in the results; giving meaning to the numbers, but also precision to the narrative
170 data (Collins, Onwuegbuzie, & Sutton 2006; Jick, 1979; Rossman & Wilson, 1985).

171

172

173 **Method**

174 *Participants*

175 Six participants (1 male, 5 females) aged between 79 and 89 years were recruited
176 from a cohort registered on a Postural Stability Instruction (PSI) course of 32 weeks duration.
177 All participants had been referred to the programme based on a rating of between 1 and 3 on
178 the Falls Risk Assessment Tool (FRAT), that is, they had either had no previous falls ($n = 3$),
179 a fall resulting in soft tissue injury ($n = 1$), or a fall resulting in a fracture ($n = 2$). Referral
180 routes were based on a perceived need and varied from primary care to leisure services. The
181 course was held in a local leisure centre in a rurally located coastal town and all participants
182 were living independently in the community, either alone or with a spouse. None of the
183 participants were living with a disability but all were diagnosed with comorbidities, as might
184 be expected given the age range of the group. All programme participants were initially
185 approached individually by the programme instructors, with a follow up by the research team,
186 and provided written consent to take part in the research. Ethical approval was provided by
187 the XXX XXXX Research Ethics Committee.

188 *Quantitative Measures*

189 *Physical activity identity:* Strachan et al.'s (2010) modified version of the Exercise
190 Identity questionnaire (Anderson & Cychosz, 1994) was administered. The 9-item
191 questionnaire focused on an over-arching physical activity identity (rather than exercise
192 identity per se), and was scored on a 7-point Likert scale (1 = strongly disagree; 7 = strongly
193 agree). Participants rated the extent to which they identified with being a physically active
194 person on items including "I consider myself a physically active person"; with higher scores
195 indicating a stronger identity. The modified scale has demonstrated internal consistency,
196 validity, and structural integrity (Strachan et al., 2010).

197 *Self-talk:* The informational and controlling nature of participants' self-talk was
198 assessed using the functional significance of self-talk questionnaire (FSTQ: Oliver,
199 Markland, & Hardy, 2010). Based on CET principles, the FSTQ assesses the motivational
200 interpretation of an individual's self-talk and has demonstrated reliability and structural
201 validity in an educational sample (Oliver et al., 2010). In the present study, minor
202 amendments were made to the instructional set to make the FSTQ applicable to an exercise
203 context. The original informational and controlling self-talk questionnaire was comprised of
204 11 items, loading onto two subscales (7 informational items, 4 controlling items).
205 Participants were asked to rate the extent to which their self-talk "told me what I should be
206 doing" [controlling], or "made me feel I was in control" [informational], using a 5-point
207 Likert-type scale ranging from 1 (not at all) to 5 (very much so). Ongoing development of the
208 FSTQ has resulted in the addition of a third subscale, aligned with the original triadic
209 conceptualisation of functional significances in CET (i.e., events vary in terms of their
210 informational, controlling, and amotivational significance). Amotivational events facilitate
211 perceptions of incompetence and promote amotivation, that is, a state in which people lack an
212 intention to engage in behaviour. Amotivational items generated from pilot work (Oliver,
213 2010) were included in this study: "made me feel incompetent", "made me feel I could not do
214 the exercises", "made me feel useless" and "made me feel unable to complete the class".¹

215 Participants also completed a number of physical and functional tests (e.g., 'timed up
216 and go', functional reach) as part of the PSI course itself; these data and a longitudinal
217 examination of changes throughout the 32 week programme are reported elsewhere (Hudson,
218 Oliver, & Higgs, 2011).

219 *Qualitative Interviews and Procedure*

¹ Questionnaire items are available on request from the corresponding author.

220 Following receipt of informed consent, participants completed the study measures
221 prior to starting the programme, and then weekly following their exercise class. Participants
222 attended an individual interview with a member of the research team at the commencement of
223 the PSI programme and at week ten, which was conducted either face-to-face or via the
224 telephone. In addition, at each of weeks 1-6 participants completed the self-talk measure
225 (FSTQ) immediately after their exercise session.

226 A semi-structured interview guide was developed in line with the recommendations of
227 Morgan and Krueger (1998), focusing on six key questions. The first three related to self-talk
228 and cognition more broadly, for example ‘describe some of the things that go through your
229 mind (1) before; (2) during; and (3) immediately after, and (4) in the days following an
230 exercise session’. The second three key questions focused on identity, for example, ‘how
231 would you currently describe yourself at the moment?’ Participants were presented with a
232 summary of their comments at the end of the interview and asked whether there was anything
233 they would like to add or that they felt the researchers might have missed or misinterpreted.
234 Consent for further contact was sought after every interview. Interviews were recorded or
235 shorthand notes made where recording was not feasible.

236 *Analyses*

237 The qualitative data were analysed using thematic content analysis and a deductive
238 approach was adopted. Interview notes and transcripts were read and re-read to gain a full
239 sense of the participant’s background, physical activity history, reasons for attending the PSI
240 programme, and experiences on the programme. Deductive analysis then involved
241 highlighting quotes that referred to two themes: (1) identity and (2) self-talk or cognitions
242 relating to physical activity. These raw data were clustered into emergent themes which
243 shared similar meaning across participants. This process was carried out on the data obtained
244 at both interview points and the themes identified at these two points were then compared to

245 explore changes or similarities evident between the two. Interviews were initially analysed by
246 the co-authors independently of each other and these analyses were then discussed between
247 researchers to allow the themes and interpretations of these to be challenged for integrity and
248 meaning by each researcher acting as a critical friend. Any divergence in terms of
249 interpretation between researchers was discussed until consensus was reached. This approach
250 was implemented as it allowed a more thoughtful conceptualisation of the resulting themes
251 than agreement methods with a nomothetic base (Hill, Thompson, & Williams, 1997). The
252 qualitative data themes are presented below in narrative form, and, to represent the
253 developmental experiences of the participants most appropriately and comprehensively, data
254 from both interview time points are integrated and discussed in tandem. This qualitative data
255 analysis was supplemented by analysis of changes in quantitative data drawn from existing
256 measures of physical activity identity and self-talk. Where appropriate below, to add further
257 insight into participants' experiences, qualitative and quantitative findings are discussed
258 alongside each other.

259 SPSS® version 21 was used to conduct quantitative analyses. Repeated measures
260 analyses of variance (one per self-talk type: informational, controlling, autonomous; with 6
261 levels of the independent variable, weeks 1-6) were conducted to explore weekly changes in
262 participants' self-talk. Paired samples t-tests were employed as post-hoc follow ups of
263 significant effects. A paired samples t-test was also employed to compare physical activity
264 identity at weeks 1 and 10. However, given the lack of power the reader may wish to refer
265 primarily to the percentage changes in variables as these provide information in a clinically-
266 relevant format (cf. Vickers, 2001, for a discussion of issues associated with percentage
267 change).

268 The reader should be aware that although both the FSTQ and the exercise identity
269 scale have demonstrated validity in their unmodified forms, their use has been limited; hence,

270 results pertaining to these variables should be interpreted with caution. Analysis of the
271 reliability of the measures using conventional methods (e.g., Cronbach's alphas) was
272 unsuitable given the small sample size. Indeed, minimal sample sizes of 300 have previously
273 been advocated for reliable estimation of population coefficient alphas (Kline, 1986). Hence,
274 descriptive changes of sample means and standard deviations are presented with the intention
275 that these are interpreted in conjunction with the qualitative data.

276

277 **Results and Discussion**

278 **Physical Activity Identity**

279 *Initial self-perceptions* At week one, descriptions of the self tended to be negative
280 (e.g., "I'm slow", "I don't do anything"); even positive comments were phrased within the
281 context of expected age-related decline (e.g., "I've still got all my marbles"; "I was part of
282 the air force...they got us quite fit for that, probably why I've lasted so long"). In contrast,
283 quantitative assessment suggested that participants embarked on the programme with already
284 high self-ratings of physical activity identity that underwent little change, with only an 8.35%
285 increase for the group between weeks 1 and 10 of the programme ($M = 4.43$, $SD .78$, and, M
286 $= 4.80$, $SD .72$; maximum = 5). Not surprisingly, this difference was nonsignificant, $t_5 = -$
287 $.961$, $p = .381$.

288 *Dissociation from the physical self (the "me" I've become)* Participants spoke of a
289 separation of the physical self from 'who they were' due to a sense of unhappiness with this
290 aspect of their identity. For example, one participant described how when seeing one's
291 reflection, "shop windows are dreadful and you get an awful shock", with another stating that
292 they consciously "don't look" at themselves. Linguistically one interesting comment was
293 made, before being corrected, that "my legs couldn't control me... I couldn't control them".

294 This again suggests the separation of the self, ‘me’, from the physical body, and implies a
295 lack of control over the physical self, to the extent that it becomes the controller. This sense
296 of unease or unhappiness with the self appeared linked to negative affective outcomes, with
297 participants feeling “bored”, “fed up with self” or more generally that “I don’t feel right”.

298 Despite this, there was also some humour evident in comments relating to physical
299 identity (e.g., “getting to 80, I wouldn’t recommend it” and “pure fat, I have more spare tyres
300 than ATS [car tyre supplier]”). Nevertheless, these asides conveyed a certain dehumanisation
301 or degradation of the physical self. For some participants, feeling disappointed in one’s self
302 was expressed explicitly, and one noted that they felt like a burden “holding everyone back”.
303 In terms of defining their identity participants tended to use past comparisons at week 1, for
304 example “I was only a skinny thing when I was young”.

305 *Rejuvenation of a previous self* By week ten clear changes in participants’ identity
306 were evident, with participants reporting feeling “more confident”, “exhilarated” and
307 “happier”, with some referencing the change that had occurred - “instead of feeling sorry for
308 myself I’m getting a bit of ‘I can do everything’”. Although comparisons to past identities
309 were still made, these tended to employ a more positive reference point (e.g., “when I stand
310 up straight I look ten years younger”) and for some the new self was incomparable to
311 previously held beliefs, suggesting a change in personal narratives of decline: “I’m doing
312 things which I would never have dreamt of doing”. These changes are in contrast to
313 quantitative physical activity identity ratings, suggesting that changes in self-perception did
314 occur during this period but these were more complex than a shift in degree of association of
315 physical activity with one’s personal identity.

316 As the first examination of older adults within this context, these findings highlight
317 some considerations for intervention design, health promotion, and optimal service delivery.
318 With regard to the flux in identity participants experienced during the programme, service

319 providers may wish to consider how best to integrate wider support systems during lifestyle-
320 changing interventions. Mobilising peer support networks, using virtual communities, or
321 utilising partnerships with the voluntary sector may be viable ways of doing this given cost
322 implications of accessing formal psychological support from the health or care sectors.
323 Further, although this represents an attempt to explore behaviour change as a process,
324 examining internalisation over a longer time period (e.g., 6, 12 and 18 months), may provide
325 a ‘fuller’ picture of how identity is adapted. Given that internalising new behaviours requires
326 people to understand and synthesise new values (Deci & Ryan, 2000), this may not be linear,
327 as individuals reflect on, assess, debate and evaluate the novel behaviour whilst attempting to
328 integrate it with existing value systems. The ten-week duration of the present study may only
329 illustrate initial fluctuations in identity rather than the full internalization process.

330

331 **Self-talk**

332 *Initial self-control and criticism* Initial self-talk was reported as being negative (e.g.,
333 “I don’t think I can do this”) and was “very critical” during the classes. There were also
334 examples of a defeatist approach when things were not going well (“oh sod it”), and some
335 indication of a lack of perceived competence and control (“I just hope I can do it, I don’t
336 think I can do it”). By week ten there was an absence of these types of phrases, with
337 participants instead reporting more positive reassurances (e.g., “it’s alright”). One participant
338 recalled that, in comparison to week 1, “I don’t say ‘I can’t be fagged [bothered] to go’, but I
339 don’t say the opposite yet” – the use of ‘yet’ perhaps implying an expectation that this will
340 develop in time. It should be noted that not all participants reported a change in their self-talk,
341 with one individual reporting that his thoughts were “perfectly positive” from the outset.

342 It was also noticed that participants’ self-talk at week 1 was frequently discursive in
343 nature with an apparent function to exert self-control. For example, one participant described

344 an internal conversation in which one voice queried, “do I have to go out on a day like
345 today?” with a second voice arguing “yes you have [to]”. Second person phrasing was also
346 used within the class, particularly when participants were struggling with exercises, in
347 phrases such as “pull yourself together” and “you could have done better here”.

348 Much of this second person self-talk seemed to be self-critical in nature. Such
349 dualistic self-talk or internal ‘dissenting voices’ are a characteristic of Lawrence and
350 Valsiner’s (2003) model associated with the early stages of processing of social messages.
351 Importantly, Deci and Ryan (1985) argue that controlling self-regulation is likely to have
352 negative consequences for motivation and well-being, and controlling environments and
353 stimuli have negative effects on long-term persistence, engagement, and health (e.g., Pelletier
354 et al., 2001). Given clear evidence of deleterious effects of controlling health messages (e.g.,
355 Miller, Lane, Deatrick, Young, & Potts, 2007; Vansteenkiste, Lens, & Deci, 2006), raising
356 practitioner and client awareness of these is important. Thus, we suggest that instructors
357 should be aware of the potential for participants to engage in controlling self-talk and help
358 them to restructure this into more informational self-talk. That is, participants should aim to
359 use self-talk to encourage and inform, rather than to self-control. Further, health promotion
360 campaigns, intervention literature and leaflets, and verbally delivered instruction should take
361 care to emphasise empowerment and autonomy, as controlling environments have been
362 shown to engender more controlling intrapersonal self-talk (Oliver et al., 2008).

363 The importance of external encouragement to avoid the use of controlling self-talk
364 seems particularly pertinent when quantitative reports on its use are considered. Ratings of
365 controlling self-talk use were low and did not change significantly throughout the assessment
366 period ($F_{(5,15)} = .519, p = .758$), clearly contrasting with the controlling self-talk discussed in
367 interviews. Our interview data also indicate that some participants struggled with the

368 identification and reporting of specific self-talk phrases. Indeed, several participants initially
369 indicated that they did not recall using any purposeful self-talk, with one noting “no, I
370 concentrate and watch X [the instructor] most of the time”. This highlights a potential
371 problem with self-report measures of self-talk and the need for multiple methods in its
372 assessment, to which we return later.

373 *Progression in self and self-talk: “I can do this”* As might be expected, when
374 discussing their self-talk use throughout the first ten weeks of the programme, participants
375 reported that the majority of their physical activity-related self-talk took place on the day of,
376 during, or immediately after the classes, while physical tests that were part of course
377 participation also acted as prompts for specific reflection for some individuals, particularly
378 with respect to their progress (e.g., “there’s a way to go yet before I can do this”).
379 Participants mainly reported using self-talk prior to classes as a stimulant for action, for
380 example to “egg myself up” or that “[I] geared myself up to come”. This motivational aspect
381 of self-talk was also reported during classes as participants both encouraged and berated
382 themselves (e.g., “I can do this”; “[I] got cross with myself deliberately”).

383 These qualitative data are corroborated by the quantitative reports of self-talk use.
384 Already low levels of amotivational self-talk did not change ($F_{(5,15)} = 1.76, p = .181$) but
385 informational self-talk significantly increased over the six week period, $F_{(5,15)} = 3.56, p =$
386 $.026$; differences were significant between weeks 3 and week 6, with differences between
387 weeks 1 and both weeks 5 and 6 approaching significance ($p = .036, .083, \text{ and } .061,$
388 respectively).

389 < INSERT TABLE 1 ABOUT HERE >

390 With respect to self-talk the clearest change during the examined period was the
391 progression from amotivational, competence-undermining phrases to more informational,

392 supportive phrases. Although the decrease in amotivational self-talk was not statistically
393 significant, the percentage change is noteworthy especially when considered in conjunction
394 with the qualitative data. When commencing a novel behaviour or any new activity, it is not
395 surprising that initially self-talk may reflect a lack of perceived competence, with a focus on
396 perceived problems and task failures. By engaging in the classes participants gained tangible
397 evidence they could complete the exercises, with the resulting physical improvements
398 enabling greater participation in a range of activities outside of the classes. The observed
399 shift in self-talk to focus on succesful task completion and ability gains is therefore logical.
400 This pattern mirrors improvements in efficacy observed in individuals taking part in exercise
401 intervention programmes (e.g., McAuley, 1992), and suggests the importance of a
402 progressive progamme enabling participants' improvements to be noted and reinforced. In
403 addition it highlights the need for instructors to target participants' amotivation in early
404 classes to avoid potential decreases in engagment and scheme withdrawals (e.g., Thøgersen-
405 Ntoumani & Ntoumanis, 2006).

406 *Talking it up: Self-talk and identity development* Self-talk was of particular interest
407 in the present study as a process by which social messages and promoted values might be
408 internalized and a coherent, endorsed physical activity identity developed. Consistent with
409 Valsiner's (1997) laminal model, self-talk seemed to reflect the processing stage between the
410 perception of a social message, and its integration into a personal position. Reported self-talk
411 changes mirrored the progressive development described in Valsiner's model as initially
412 statements tended to be more generalised, subsequently developing into a critical dialogue
413 integrating existing knowledge and emotional reflections. Although the design of the study
414 was not intended to explicitly test mediational models, it is notable that there was some
415 consistency in changes in individuals' self-talk and the extent to which they endorsed and felt
416 comfortable with a physically active identity. For example, the quantitative data support a

417 concurrent increase in the informational nature of participants' self-talk and their physical
418 activity identity. Further, the observed shifts in self-talk phrasing (e.g., 'I was' to 'I am') and
419 progression from a rejected physical self to an accepted physical state, imply a less
420 fragmented and more confident, active, and present-focused self.

421 *Study reflections* Whilst the interviews quite literally gave participants a voice to
422 share their experiences, the qualitative exploration of self-talk use was limited by a reliance
423 on retrospective recall, a particular challenge in an ageing population as many struggled to
424 remember if and when they had used self-talk. Self-talk is difficult to recall and report as it
425 has been estimated that inner speech takes place approximately ten times faster than outer
426 speech (Korba, 1990), with internal utterances condensed and abbreviated for efficiency
427 (Wiley, 2006). In the present study the use of weekly questionnaires that focused on the
428 overall interpretation of self-talk, rather than specific phrases, was designed to obtain
429 theoretically meaningful information, supplemented by in-depth interview recall. We
430 recognise the inherent limitations and difficulties when exploring self-talk, and endorse the
431 perspective that multiple methods of investigation are best combined to obtain a full picture
432 of self-talk and its effects (Hardy, Oliver, & Tod, 2009). Future work audibly monitoring on-
433 task self-talk (e.g., via worn recorders) and activation of language centres in the brain (for
434 static tasks) is particularly promising in this regard.

435 Despite the emergence of useful findings pertaining to the changes older adults
436 experience when adopting a novel behaviour, the sample size and its homogeneity raise
437 problems if seeking to form generalised opinions regarding the experiences of older adults on
438 behaviour change programmes. Far from claiming to provide a conclusive representation of
439 these, the present study merely provides insight into the degree of identity changes
440 experienced by such participants, and provides some data to suggest that changes in
441 cognitions related to physical activity are linked to identity formation. Given this, application

442 of the study's findings should not overreach. Whilst traditional tests of significance are
443 reported for the quantitative data, we reiterate that data trends (i.e., the direction and degree
444 of change) are best interpreted in terms of clinical rather than statistical significance.

445 Our sample was drawn from a rural community where changes in population
446 demographics are exacerbated, with a growing imbalance in the age profile (Hartwell,
447 Kitchen, Milbourne, & Morgan, 2007). This is typically attributed to out-migration of
448 younger groups for employment or housing reasons (Stockdale, 2004), and in-migration of
449 older individuals (e.g., those retiring). As such, understanding how best we can deliver and
450 support lifestyle change for older individuals in such communities is important for policy-
451 makers and practitioners alike. In the context of reducing health inequalities, it has been
452 estimated that up to 70 per cent of those classed as living in poverty in developing countries
453 are living in rural areas (International Fund for Agricultural Development, 2011); although
454 beyond the scope of the present study optimising health service provision for hard-to reach
455 groups including both the elderly and those living in rural areas is an important issue for
456 future research to consider.

457

458 **Concluding comments**

459 The present study explored changes in older adults' physical activity-related cognition
460 and subsequent identity changes during the early stages of uptake of physical activity.
461 Collectively, participants' use of informational self-talk significantly increased over the
462 initial six weeks of the programme, with a trend for participants to develop a stronger, more
463 active and empowered physical identity. Qualitatively-derived identity themes reflected the
464 transition from the traditional view of the ageing body; a physically impaired, fragmented,
465 and negative self, to a more future-orientated, capable, and integrated self (Tulle, 2008). In
466 sum, the emergent findings of the present study add to a sparse literature about how novel

467 health behaviour interventions are experienced at an advanced age. Researchers and
468 practitioners applying health behaviour models with this population should be aware of the
469 cognitive processes underlying complex identity change that is required for long-term
470 behavioural engagement, and should be aware that identity remains dynamic throughout later
471 life.

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