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Abstract

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Background: Recent physical activity research is limited by intention-behaviour discordance and is beginning to recognize the importance of automatic processes in exercise. The purpose of the current study was to examine the role of multidimensional exercise self-efficacy, explicit-implicit evaluative discrepancies (EIEDs) for health and appearance on the intention-behaviour gap in exercise.

Methods: A total of 141 middle aged inactive participants ( $M_{age} = 46.12 \pm 8.17$ ) completed measures of intentions, self-efficacy, and explicit and implicit evaluations of exercise outcomes. Participants were classified as inclined actors ( $n=107$ ) if they successfully started the exercise program and inclined abstainers ( $n = 35$ ) if they were not successful.

Results: Inclined actors and abstainers did not differ on intentions to exercise, however, inclined actors had higher coping self-efficacy and lower EIEDs for health. In addition, coping self-efficacy ( $\text{Exp } (\beta) = 1.03$ ) and EIEDs for health ( $\text{Exp } (\beta) = -.405$ ) were significant predictors of being an inclined actor.

Conclusions: The interaction between explicit and implicit processes in regard to health motives for exercise appears to influence the successful enactment of exercise from positive intentions. As most physical activity promotion strategies focus on health as reasons to be active, the role of implicit and explicit evaluations on behavioural decisions to exercise may inform future interventions.

24 The Relationship of Self-efficacy, and Explicit and Implicit Associations on the Intention  
25 Behaviour Gap

26 The physical and mental health benefits of regular physical activity have been well  
27 documented.<sup>1</sup> Only 5% of Canadian adults have little or no intention to be physically active,  
28 however, only 20% are meeting recommended 150 minutes of moderate to vigorous physical  
29 activity per week,<sup>2</sup> and this is consistent with physical activity patterns around the world.  
30 This discordance between intentions and behaviour is referred to as the intention-behaviour  
31 gap.<sup>3,4</sup>

32 The intention-behaviour gap has important implications for health research as most  
33 popular theories on human behaviour indicate that intentions are the most proximal and  
34 therefore most important predictor of health behaviours. One such health behaviour is  
35 exercise which is a subset of physical activity that is planned, structured and repetitive with  
36 the goal of improving or maintaining physical fitness.<sup>5</sup> The most recent review examining the  
37 effect of intentions on behaviour found a moderate effect size ( $r = .48$ ) explaining 23% of the  
38 variance in exercise behaviour.<sup>6</sup> Although meaningful there is still 77% of the variance that  
39 is left unexplained. The discordance between intention and behaviour is even more  
40 noteworthy in light of interventions that have targeted intentions to enact exercise behaviour  
41 change,<sup>7</sup> which often result in a significant increase in intentions but no subsequent change in  
42 exercise behaviour.<sup>6</sup> These findings suggest that intentions may be necessary but not  
43 sufficient to ensure exercise behaviour.<sup>8</sup> The majority of research examining the translation  
44 of intentions into behaviour has focused on explicit processes that rely on deliberation and  
45 reasoning.<sup>9,10</sup> The current research looked at both explicit and implicit (i.e., automatic  
46 processes that are not deliberate or reasoned) processes that may influence the fulfilment of  
47 exercise intentions in inactive, middle-aged adults.

48           One approach used to understand intention behaviour discordance is multi-process  
49 action control (M-PAC).<sup>11</sup> M-PAC proposes that the initiation of behaviour requires both  
50 reflective and reflexive processes. Within the model reflective processes refer to reasoned  
51 approaches to behaviour, whereas reflexive processes arise from both contextual factors and  
52 existing associations.<sup>11</sup> Two key reflective processes in the M-PAC model are self-regulatory  
53 and motivational constructs that help people translate their intentions into action. Self-  
54 efficacy (SE) is a self-regulatory mechanism that has been linked with intention-behaviour  
55 consistency, specifically, for overcoming barriers to exercise. Indeed, one potential self-  
56 regulatory technique postulated by Rhodes<sup>11</sup> is that of coping. SE, operationalized as the  
57 ability to maintain behaviour in the face of obstacles, has relatively strong support as a  
58 predictor of physical activity beyond intentions.<sup>12</sup> Similarly, maintenance self-efficacy  
59 which has some likeness to coping self-efficacy has been linked with the prediction of  
60 behaviour from positive intentions.<sup>13</sup> Within the exercise context, self-efficacy has been  
61 examined as a multidimensional construct, comprising three types: a) task SE, the confidence  
62 to complete basic exercise skills and movements; (b) coping SE, confidence to exercise in the  
63 face of challenges, such as lacking energy and; (c) scheduling SE, confidence to regularly  
64 schedule exercise sessions.<sup>14</sup>

65           Extensive evidence demonstrates that the types of self-efficacy differentially predict  
66 exercise behaviour<sup>15-18</sup> which suggests that self-efficacy beliefs may have important  
67 implications for understanding the discordance between exercise intentions and behaviour.  
68 Indeed, researchers<sup>10,16</sup> have argued that assessing the roles of multiple efficacy constructs  
69 should prove useful in understanding complex behaviours such as the initiation of exercise,  
70 which requires effort, time, energy, and skills. Specifically, task self-efficacy is important in  
71 the formation of exercise intentions and in the early phases of exercise.<sup>16</sup> Task self-efficacy in  
72 the M-PAC model is expected to influence the translation of intentions to behaviour,

73 however, based on previous research findings and the inclusion of coping as a self-regulatory  
74 mechanism or strategies within the M-PAC,<sup>11</sup> coping and scheduling self-efficacy may also  
75 influence the transition of intentions into action.

76 Most action control models, such as the health action process approach,<sup>13</sup> indicate that  
77 motivational constructs are expected to contribute to the formation of intentions. The M-  
78 PAC model highlights that an individual will enact physical activity behaviour from positive  
79 intentions when motivational factors (e.g., affective judgements, perceived opportunities, and  
80 expected outcomes) also occur after intentions have been formed. As such, the reasons why  
81 people want to engage in exercise may be an important facilitator of the successful translation  
82 of intentions into behaviour. Although previous research has found that motivational  
83 constructs are related to intentions but not fulfilment of these intentions,<sup>19</sup> motivation was  
84 measured as pros and cons of exercise engagement. However, participatory motives reflect  
85 the contents of peoples' goals for exercise behaviour and what people aim to attain or avoid  
86 through exercise participation.<sup>20</sup> Two often cited reasons for exercise are appearance and  
87 health reasons. Appearance motives tend to be more dominant at the initiation of exercise  
88 behaviour,<sup>21</sup> therefore intention-behaviour consistency may be influenced more by  
89 appearance motives than positive health motives (e.g., stress management, improving health,  
90 and fitness).

91 Recent theoretical advances suggest that intention may influence behaviour in  
92 conjunction with automatic processes. For example, the Associative and Propositional  
93 Evaluation Model<sup>22</sup> includes implicit processes that occur from the interaction of activation  
94 of available mental representations in memory with contextual stimuli. Implicit evaluations  
95 are effortless, whereas explicit attitudes reflect the process of validation or truthfulness of the  
96 automatically activated associations.<sup>23</sup> The operationalization of reflexive factors in the M-  
97 PAC is similar to implicit processes in the Associative and Propositional Evaluation Model.

98 Both models recognize that the implicit processes are based on contextual cues and past  
99 experiences, whereas the reflective/explicit processes are based on reasoning using available  
100 information. For instance, a commercial gym might automatically activate associations of  
101 exercise with appearance, but a person might reject that association after thinking about it and  
102 reflecting on other reasons to go to the gym, such as health (e.g., reduced stress, being  
103 healthy). Implicit processes have been shown to differentiate exercisers from non-  
104 exercisers.<sup>24</sup> Exercisers tend to hold positive implicit evaluations with exercise<sup>25</sup> and these  
105 positive evaluations predict exercise frequency and duration, whereas non-exercisers hold  
106 negative associations with exercise.<sup>26</sup> Implicit evaluations also predicted decisions to engage  
107 in intended exercise in the face of competing behavioural options.<sup>27</sup> Consistency between  
108 explicit and implicit evaluation is used for future behavioural decisions.<sup>28</sup>

109 The M-PAC model recognizes the role of reflexive processes in intention translation  
110 suggesting that reflexive and reflective processes do not act in isolation and interact on each  
111 other and behaviour. This contention is supported by the Associative-Propositional  
112 Evaluation model that suggests that consistency between implicit and explicit evaluations  
113 influences behavioural decisions.<sup>28</sup> Implicit evaluations inform explicit attitudes and when  
114 these are discrepant, explicit-implicit evaluative discrepancies (EIEDs) can arise. Research  
115 has begun to examine the effects of discrepancies on exercise behaviour. In fitness club  
116 members, the magnitude of EIEDs was related to the gap between intended number of  
117 exercise sessions and actual frequency of exercise<sup>29</sup> and achieving intended duration of  
118 exercise sessions.<sup>30</sup> Larger gaps between intended and actual exercise sessions was associated  
119 with greater EIEDs and more negative implicit associations.<sup>29</sup> In previous research using the  
120 current data set, the authors<sup>31</sup> found that higher discrepancy between explicit health motives  
121 and implicit health associations was associated with drop out from a year-long exercise  
122 program and having combined high explicit and implicit appearance associations were

123 associated with adherence to the exercise program.<sup>31</sup> Researchers have argued that EIEDs can  
124 hinder self-regulatory mechanisms for behaviour.<sup>32,33</sup> Therefore, achieving goal-directed  
125 movements such as the translation of intentions into action may be affected by discrepancies  
126 between explicit and implicit motives for exercise engagement.<sup>34</sup>

127 The majority of research on implicit processes related to exercise intentions has been  
128 done within already exercising populations.<sup>24,26,27,29,35</sup> Research has suggested that  
129 intervening on implicit processes may be an avenue to increase exercise participation.<sup>26,32</sup> An  
130 understanding of how implicit and explicit factors facilitate or impede the translation of  
131 exercise intentions into behaviour in inactive individuals is needed. The purpose of the  
132 current research was to assess how a) multiple self-efficacy constructs, b) EIEDs for health  
133 and EIEDs for appearance, c) the combined value of explicit and implicit evaluations for  
134 health and for appearance, and d) the direction of the EIEDS for health and appearance are  
135 related to intention-behaviour consistency. It was hypothesized that task and coping self-  
136 efficacy, and lower EIEDs would be associated with fulfilment of exercise intentions.

## 137 **Method**

### 138 **Design and Procedure**

139 This research is part of a larger project.<sup>31,36,37</sup> This current paper was designed to  
140 examine the relationship between positive intentions, and fulfilment of intentions in a sample  
141 of inactive adults (aged 35-65 years) recruited via newspaper advertisements and posters to  
142 complete a study entitled “thoughts on exercise.” A number of participants were also  
143 recruited via word of mouth (e.g., through friends, family, co-workers). This study received  
144 ethical approval from the University of Western Ontario and University of Alberta University  
145 Research Ethics Board. Prior to data collection participants provided written informed  
146 consent. The initial data collection session included demographic questions and measures of

147 implicit evaluation, intentions to exercise, self-efficacy and exercise motives. At the end of  
148 the initial data collection the participants were invited to enrol in a yearlong exercise  
149 program. The invitation described details about the program that included both cardiovascular  
150 and strength training exercises and required attendance at private training facilities, located in  
151 research labs on university campuses, three times per week for a full year. The facilities are  
152 used primarily by research participants, and occasionally staff and students when not in use  
153 by participants. The facilities were open access, similar to a public gym space, during certain  
154 hours (e.g., 9am-7pm) and participants were able to drop in and exercise at a time of their  
155 convenience. As such, they may be exercising alone or with other people. The exercise  
156 facilities included choice of cardio equipment (i.e., treadmill, bike, rower, elliptical or stair  
157 climber) and weight machines (i.e., leg extension, hamstring curl, seated chest press, seated  
158 back row, seated bicep curl and triceps extension machines). Participants were asked not to  
159 complete additional exercise; however, they were not banned from doing so. Rather we asked  
160 them to note any additional exercise in their training logs. Participants were informed of the  
161 exercise facility characteristics and programs, which were outlined in the letter of information  
162 for consent document. The first part of the study took place in a room attached to the exercise  
163 facility so participants who signed up for the program were able to view the facility and ask  
164 any questions. Participants were asked if they knew about the exercise program prior to  
165 attending the data collection session (e.g., a friend had told them about the study and the  
166 opportunity for the exercise program). Prior knowledge of the exercise program was assessed  
167 after participants had completed the testing and made their choice to join or not. Those who  
168 had previous knowledge of the exercise program were not included in the sample reported  
169 here.

170 Participants who enrolled in the exercise program were randomized into either a  
171 primarily cardio or primarily strength exercise groups and made aware of their program



172 following randomization. Based on recommendations from <sup>4</sup> and in line with the M-PAC  
173 model,<sup>11</sup> participants were categorized as either inclined actors or inclined abstainers.  
174 Participants who signed up or enrolled in the exercise program demonstrates that they are  
175 inclined to and have the intention to participate. Participants were classified as inclined actors  
176 if they had started the exercise program. Participants were considered as starting the exercise  
177 program after completion of their first week. Participants who enrolled in the exercise  
178 program but did not start the program were classified as inclined abstainers. Baseline data  
179 were analysed to assess differences in the constructs of interest between the two groups. The  
180 influence of explicit and implicit evaluations on adherence to the exercise program over 12  
181 months are reported elsewhere.<sup>31</sup>

## 182 **Materials**

183 *Demographic information.* Participants self-reported their sex, age, race, and yearly family  
184 income (on a nine increment scale, from less than \$5000 to greater than \$100,000), education,  
185 number of children, and marital status. They also self-reported their weight and height,  
186 which was used to calculate body mass index (BMI).

187 *Intentions.* Exercise intentions was measured with the mean of three items, scored on a 9-  
188 point Likert scale anchored from 1 (strongly disagree) to 9 (strongly agree): “I intend to  
189 exercise regularly in the next month,” “I intend to exercise at least 3 times per week over the  
190 next month,” and “I intend to participate in regular exercise as much as I can every week over  
191 the next month.” Internal consistency was demonstrated with Cronbach’s alpha = .95.

192 *Self-efficacy.* Participants completed the Multi-Dimensional Self-Efficacy for Exercise Scale  
193 (MSES).<sup>14</sup> The MSES consists of nine items and is scored on a 100% confidence scale  
194 ranging from 0 = “no confidence” to 100 = “completely confident.” Following the stem:  
195 “How confident are you that you can exercise when...” participants responded to three items

196 for each of task SE (3 items; e.g., “complete exercise using proper technique”), coping SE (3  
197 items; e.g., “exercise when you lack energy”) and scheduling SE (3 items; e.g., “arrange your  
198 schedule to include regular exercise”). The MSES has demonstrated strong factorial validity  
199 through EFA and CFA.<sup>14</sup> The current study demonstrated acceptable reliability with  
200 Cronbach’s alphas ranging from .83 - .85.

201 ***Implicit evaluations.*** Two Go/No Go tasks (GNATs)<sup>38</sup> were completed by participants. The  
202 GNATs comprise a target category of exercise, comprising seven words (e.g., workout, run)  
203 and two poles of an evaluative attribute dimension (i.e., desirable-undesirable). There is also  
204 a distractor category that consisted of seven of generic words (e.g., table, flannel). The two  
205 tasks consisted of four blocks of trials, including practice trials followed by experimental  
206 trials. Each block consisted of practice trials and 48 experiential trials with equal number of  
207 target and distractor trials. The order of the blocks was counterbalanced so some participants  
208 categorized exercise and desirable words first and others exercise and undesirable words first.  
209 In addition, the GNAT tasks (health or appearance) was also counterbalanced across  
210 participants. One GNAT task measured health-related associations (e.g., healthy-unhealthy,  
211 fit-unfit) and the other measured appearance and body shape associations (e.g., attractive-  
212 unattractive, fat-thin). Participants were given a target category and an evaluative attribute to  
213 which they were instructed to respond (go) by hitting the space bar if the word matched the  
214 target or attribute category. For example, for the target of exercise, participants would hit the  
215 space bar if the word ‘run’ appeared. Participants were also instructed to ignore those words  
216 (no go) that did not fit into the target categories. The response deadline was 850 milliseconds  
217 (msec) for categorizing words. Consistent with previous research odd/even experimental  
218 trials were used to calculate reliability.<sup>31,39</sup> Response time differences between associations  
219 of exercise as desirable or undesirable were used as the within-subjects variables for implicit  
220 health and appearance/body shape associations. Faster response times equate to a positive

221 association between exercise and health or appearance/body shape as desirable. The health  
222 related GNAT demonstrated reliability with interclass correlations for exercise and desirable  
223 = .89 and undesirable = .76. Similarly, the appearance/body shape GNAT had interclass  
224 correlations of .88 for exercise and desirable and .79 for exercise and undesirable.

225 **Explicit motives.** Explicit motives were assessed with two subscales of the Exercise Motives  
226 Inventory-2 (EMI-2<sup>20</sup>): 1) Positive health (2 items; e.g., “to have a healthy body” and “to feel  
227 more healthy”), and 2) Appearance (2 items; e.g., “to have a good body” and “to improve my  
228 appearance”). Two items per scale were used, based on unpublished psychometric work by  
229 Markland that demonstrated strong factor loadings (>.71) across three different samples (DM,  
230 personal communication, January, 2013). The items are scored on 5-point Likert scales  
231 ranging from 0 (not at all true for me) to 5 (very true for me). Reliability was demonstrated  
232 with interclass correlations ranging from .57 - .63.

### 233 **Data analysis**

234 GNAT data were screened for response times faster than 250msec. Three key  
235 variables were calculated: 1) the discrepancy between implicit and explicit evaluations which  
236 were calculated as the absolute difference between standardized (z-scores) implicit and  
237 explicit health evaluations (EIED health) and between implicit and explicit appearance  
238 evaluations (EIED appearance), 2) interaction terms were calculated between standardized  
239 explicit and implicit scores which indicate the direction of the discrepancy, and 3) the sum of  
240 implicit and explicit evaluations for health (Health sum) and appearance (Appearance sum)  
241 which indicates where each individual score is on a factor that is the sum of implicit and  
242 explicit evaluations. Following procedures outlined in previous work<sup>31</sup> and in line with Brand  
243 and Anotniewicz,<sup>29</sup> the sum score was created using a principle component analysis on the  
244 standardized implicit and explicit scores. Importantly, this procedure takes into account  
245 differences in measurement scales between implicit and explicit evaluations.<sup>40</sup>

246 An ANOVA was used to assess differences in intentions and self-efficacy between  
247 groups and repeated measures MANOVA was used to examine differences in explicit and  
248 implicit processes. Binary logistic regression was used to examine if self-efficacy, implicit  
249 and explicit evaluations predicted whether someone would be an inclined actor or an inclined  
250 abstainer. Inclined actor was coded as 1 and inclined abstainer as 0. Demographic variables  
251 (age, gender, income, education and self-reported BMI) were entered in the first step and  
252 coping self-efficacy, scheduling self-efficacy, and task self-efficacy, EIED health, EIED  
253 appearance, the health sum score, the appearance sum score, and the interaction terms for  
254 health and appearance were entered in the second step into the logistic regression model.

255

### Results

256 A total of 465 participants enrolled in the “Thoughts on Exercise” study, of whom 301  
257 participants enrolled in the exercise program. Participants were not included in the following  
258 analyses if they previously knew about the exercise program ( $n = 119$ ) or if it was unknown if  
259 they had previous knowledge about the program ( $n = 75$ ). The final sample included 142 (107  
260 inclined actors and 35 inclined abstainers) male and female (68.4%) participants with an  
261 average age of 46.12 (SD = 8.17) years. Income was the only demographic variable that was  
262 significantly different between groups (Mann Whitney U = 1443.50;  $z = -2.065$ ,  $p = .039$ ).  
263 Specifically, participants that enrolled in the study and exercise program had a higher income  
264 than those who did not enrol in the exercise program. The demographics by group (inclined  
265 actors and abstainers) are presented in Table 1. Assessment of inclined actors and inclined  
266 abstainers revealed no differences between groups on any demographic variables ( $p > .05$ ).  
267 Missing data (2.7%;  $n = 19$ ) were missing completely at random (Chi-square = 53.422,  $df =$   
268 42,  $p = .111$ ). For inclined actors there was missing data for education ( $n = 6$ ) and ethnicity ( $n$   
269 = 7) and for inclined abstainers there was missing data for income ( $n = 2$ ) and ethnicity ( $n =$   
270 4).

271 **Differentiating inclined actors from abstainers**

272           There was no between group (inclined actors compared to abstainers) differences in  
 273 exercise intentions ( $F_{(1,139)} = 1.182, p = .278, \eta^2 = .008$ ). Coping self-efficacy was significantly  
 274 different between inclined actors and abstainers ( $F_{(1,139)} = 4.12, p = .044, \eta^2 = .029$ , Hedges'  
 275  $g = .35$ ) indicating the inclined actors had higher coping self-efficacy than inclined abstainers.  
 276 However, there were no significant group differences for task ( $F_{(1,139)} = .267, p = .606, \eta^2 =$   
 277  $.002$ ) and scheduling self-efficacy ( $F_{(1,139)} = .212, p = .646, \eta^2 = .002$ ). There were no  
 278 differences found between aerobic and strength training groups ( $F_{(1,139)} = .97, p = .512$ )

279           For implicit and explicit evaluations, the multivariate effect for group (inclined actors  
 280 and inclined abstainers) differences was significant ( $F_{(6,122)} = 3.16, p = .006, \eta^2 = .13$ ).  
 281 Inclined actors scored lower ( $F_{(1,127)} = 18.17, p < .001, \eta^2 = .125$ ) on health EIEDs than  
 282 inclined abstainers. EIEDs for appearance ( $p = .764$ ), interaction scores (health,  $p = .614$ ;  
 283 appearance,  $p = .985$ ), or sum scores (health sum,  $p = .991$ ; appearance sum,  $p = .350$ ) were  
 284 not significantly different between inclined actors and abstainers. Means and standard  
 285 deviations are presented in Table 2. Correlations between EIEDs, interaction terms, sum  
 286 scores, self-efficacy and group are presented in Table 3.

287           Results of the binary logistic regression indicated that both coping self-efficacy (Exp  
 288 ( $\beta$ ) = 1.03) and EIEDs for health (Exp ( $\beta$ ) = -.405) were significant predictors of whether  
 289 participants who enrolled in the program were inclined actors. There were no  
 290 multicollinearity concerns with all tolerance values  $> .44$  and variance inflation factors  $<$   
 291 2.26. The overall model log likelihood was = 133.24 and accounted for 24% of the variance  
 292 (Nagelkerke  $R^2 = .243$ ) and was able to correctly classify 35% of those who were abstainers  
 293 and 94% of those who acted. Demographic variables did not significantly predict how likely  
 294 participants were to act on their intentions. Participants with higher coping self-efficacy were

295 1.03 times more likely to act on their intentions, and those with higher EIEDs for health were  
296 .405 times less likely to become an inclined actor (Table 4).

## 297 **Discussion**

298 This research examined the relationship between exercise self-efficacy, explicit  
299 exercise motives, and implicit evaluations on exercise intentions and behaviour. By doing so,  
300 understanding of the relationship between self-regulatory and implicit processes with exercise  
301 was extended. It is important to note that inclined actors and abstainers did not differ on their  
302 level of intentions, highlighting the importance of post intentional processes. In support of  
303 our hypothesis, coping self-efficacy differentiated between inclined actors and abstainers and  
304 was a predictor of successful translation of intentions into exercise behaviour, albeit to a  
305 small extent. Although coping self-efficacy has previously been found to be important in later  
306 stages of exercise participation, as participants begin to face challenges of continued exercise  
307 participation,<sup>17</sup> the current finding as well as past work<sup>10,41</sup> indicate that coping self-efficacy  
308 is also important for translation of intentions into behaviour. In the current study, coping  
309 self-efficacy explained a small but significant proportion of the variance between inclined  
310 actors and abstainers. This indicates that post-intentional processes are influenced by  
311 intenders possessing the skills to translate their intentions into action. In addition, the odds  
312 ratio for coping self-efficacy was relatively small but significant. It is important to note that  
313 the mean for coping self-efficacy was also fairly low (48% in inclined actors), which may  
314 explain why coping self-efficacy has a small influence. However, it also highlights the  
315 potential of coping self-efficacy. The role of coping self-efficacy in the enactment of  
316 behaviour is in line with tenets of the M-PAC model that highlight the importance of  
317 behavioural regulation in the translation of intentions. Thus, coping self-efficacy may be a  
318 worthwhile target of interventions. If relatively low coping self-efficacy positively impacts  
319 successful translation of intentions into behaviour, it is possible that increasing coping self-

320 efficacy prior to enactment of behaviour may have even greater impact on intention-  
321 behaviour consistency.

322         The discrepancy between implicit and explicit health motives differentiated between  
323 groups and was a significant predictor of being an inclined actor. Specifically, the greater the  
324 discrepancy, the less likely people were to translate their intentions into behaviour. Similarly,  
325 examining intended exercise frequency with actual exercise frequency, Brand and  
326 Antoniewicz (2016) found that discrepancies between explicit and implicit affect towards  
327 exercise are associated with less exercise frequency than intended. In addition, EIEDs for  
328 health were associated with drop out from the exercise program <sup>31</sup>. The health benefits of  
329 being active are generally well known and often form the basis of campaigns to increase  
330 physical activity behaviour. As such, the explicit endorsement of health outcomes of exercise  
331 is typically high, and indeed the endorsement of explicit health outcomes in the present study  
332 were quite high across groups (inclined actors mean = 4.55 out of 5; inclined abstainers mean  
333 = 4.58 out of 5). Therefore, discrepancies appear to be the results of low implicit associations  
334 with health outcomes of exercise. Implicit attitudes towards the outcomes sought from  
335 exercise influences subsequent behaviour. The discrepancy between explicit and implicit  
336 evaluations may result in unsuccessful translation of exercise intentions as a result of  
337 cognitive dissonance that leads to increasing information processing of attitude relevant  
338 information. Given that the current sample comprised inactive adults with limited exercise  
339 experience, it is possible that health outcomes as reasons to exercise may not have been  
340 implicitly valued. Previous research on explicit participatory motives found that health  
341 outcomes for exercise were not a predictor of intentions or initial engagement in physical  
342 activity, whereas health pressures (e.g., pressures arising from medical advice/medical  
343 condition), enjoyment, and appearance motives were <sup>21</sup>. However, maintaining regular  
344 exercise was associated with positive health outcomes <sup>21</sup>.

345 Researchers have also argued that discrepant explicit and implicit evaluations result in  
346 less behaviour when self-regulatory mechanisms are low <sup>32,33</sup>. Research in dietary behaviours  
347 has found that the influence of explicit processes on dietary behaviour are reduced when self-  
348 regulation is depleted, whereas the effects of implicit processes are increased <sup>42</sup>. EIEDs can  
349 result in reduced behavioural motivation and self-regulatory mechanisms can compensate for  
350 this reduction in motivation by supporting explicit processes in behavioural decisions in the  
351 face of competing options <sup>43</sup>. EIEDs can lead to conflicting behaviour choices and to resolve  
352 this conflict, self-regulatory mechanisms are required, which deplete self-regulatory  
353 resources. Kehr (2004) demonstrated that in workplace managers EIEDs for behavioural  
354 motives (e.g., dominance, affiliation and achievement) were predictive long term reductions  
355 in self-regulatory strength. Engaging in exercise is a complex process that requires planning  
356 and repeated effort. Therefore, EIEDs in health motives for exercise may contribute to  
357 reduced self-regulatory mechanisms and the implicit evaluations may, therefore, have more  
358 influence on the behavioural decision to engage in exercise. Indeed, within the present study,  
359 coping self-efficacy was lower in inclined abstainers, it is possible that without the belief in  
360 their abilities to exercise in difficult circumstances, EIEDs influenced the behavioural  
361 decision to not engage in exercise behaviour. Indeed, within the M-PAC model reflexive  
362 processes (i.e., implicit evaluations) are expected to have reciprocal relationships with both  
363 self-regulatory and reflective (i.e., explicit evaluations) processes. In addition, implicit and  
364 explicit processes predict in the moment behaviours <sup>33</sup>. As such, the EIEDs may have been  
365 related to the decision to act when the time came, while explicit process may have been more  
366 salient during the decision to enrol in the exercise program, as people decided on the reasons  
367 to engage in exercise or not. M-PAC suggests that behavioural regulation, such as self-  
368 efficacy, should be associated with initiation of behaviours. Although the M-PAC posits that  
369 reflexive processes (e.g., implicit evaluations) should follow reflective and self-regulatory



370 processes, a key tenant of the model suggests that these relationships influence each other. In  
371 line with this tenant of the M-PAC model, the current findings suggest that the relationship  
372 between explicit and implicit evaluations are related to the adoption of exercise from positive  
373 intentions and highlights that implicit processes may influence action adoption as well as  
374 sustained exercise behaviour.

375         The prospective analysis employed in the present study provided information about  
376 what differentiates those who fulfill their intentions from those who do not. The theoretically  
377 derived constructs and analyses, and the sample of inactive middle-aged adults are strengths  
378 of this study. In addition, there were relatively low levels of education and income in this  
379 sample compared to national estimates<sup>44</sup>. It is well known that persons in lower  
380 socioeconomic brackets are harder to reach and face greater challenges and barriers to  
381 participation. The findings of this study indicate that health and motivational issues explored  
382 here are important to those with lower incomes, as would be expected with higher incomes.  
383 In addition, interventions based on automatic processes are less reliant on conscious processes,  
384 including levels of literacy, numeracy, and cognitive function. Thus, interventions that target  
385 automatic processes are scalable and replicable to diverse populations (age, cultural differences),  
386 including those with the largest health inequalities. Findings from this study support this contention  
387 and provide initial targets for interventions such as reducing discrepancies between explicit and  
388 automatic reasons for being active. Importantly, public health, policy, and government are  
389 recognizing the potency in behaviour change strategies focused on automatic processes<sup>45</sup>.

390         A limitation of this study is the context in which the study was conducted. The data  
391 collection occurred in a research setting that included an exercise facility. Implicit  
392 evaluations are subject to contextual factors that change the activation pattern of automatic  
393 representations<sup>23</sup>. As such, being in an exercise facility may have primed participant's  
394 implicit responses to exercise, as exercise related associations might be more accessible at the

395 time of participation <sup>23</sup>. Other important limitations are related to the EMI-2. Only two items  
396 per subscale were used which may have reduced the reliability and validity of the subscales,  
397 although good psychometric justification for the use of two items has been provided (DM  
398 Personal communication, January 2013). It is important to note that reliability for the  
399 measures for the two explicit motives were low, which may have impacted the EIED scores.  
400 As such appearance EIEDs may be a significant predictor if reliability was higher. Berry et  
401 al., found that reliability was high in the explicit items and appearance EIEDs were not  
402 associated with the decision to engage in the exercise program or not. Likely the current  
403 findings represent conservative estimates. Finally, it is important to note the unequal sample  
404 sizes between inclined actors and abstainers and the relatively small sample size of inclined  
405 abstainers ( $n = 35$ ). Sample sizes are more likely to results in type 1 errors and  
406 multicollinearity in MANOVA analysis, however, multicolineraty tests indicate that this is  
407 not the case in the current findings. In addition, the relatively larger number of inclined actors  
408 suggests that they may be more highly motivated with stronger intentions to participate in a  
409 year-long exercise program. However, findings from this study indicate that explicit motives  
410 and intentions were not significantly different.

411         The current research contributes to the literature examining the intention-behaviour  
412 gap in inactive middle-aged adults by demonstrating the role of coping self-efficacy and  
413 health evaluations. This may lead to refinements in thinking about exercise interventions  
414 among middle-aged inactive adults. For those not yet exercising, interventions may want to  
415 focus on increasing coping self-efficacy. The results of this study are important because they  
416 suggest that inactive adults intending to exercise need to have sufficient beliefs in their ability  
417 to regularly cope with the demands of engaging in exercise behaviour. The need for coping  
418 self-efficacy may occur earlier in the behaviour change process than previously thought. In

419 addition, the results highlight the role of implicit evaluations, and in particular discrepancies  
420 in health evaluations, in engaging in exercise behaviour from positive intentions.

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422

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Table 1

*Demographic information by inclined actors and abstainers*

Variable	Inclined Actors	Inclined Abstainers
N (% female)	107 (66.9%)	35 (69.9%)
Age (SD)	46.39 (7.93)	45.41 (9.02)
BMI (SD)	29.44 (6.81)	29.64 (6.62)
Education		
High School or college	53 (49.5%)	21 (60.0%)
Bachelor degree	28 (26.1%)	8 (22.8%)
Graduate or professional degree	20 (18.7%)	4 (11.4%)
Yearly household income		
<35,000	20 (18.7%)	12 (34.2%)
35,000-75,000	44 (41.1%)	11 (31.4%)
>75,000	43 (40.19%)	12 (34.2%)
Ethnicity		
Caucasian	77 (72.0%)	20 (57.1%)
Asian	15 (8.5%)	5 (14.3%)
Hispanic	6 (3.2%)	0 (0.0%)
Aboriginal	0 (2.2%)	2 (5.7%)
African	1 (1.3%)	1 (2.8%)
Middle Eastern	0 (2.9%)	1 (2.8%)
Other	1 (0.6%)	2 (5.7%)

Note: For inclined actors there was missing data for education ( $n=6$ ) and ethnicity ( $n=7$ ).

For inclined abstainers there was missing data for income ( $n=2$ ) and ethnicity ( $n=4$ ).

Table 2. Means and standard deviations of self-efficacy, explicit and implicit evaluations stratified by group

Variable	Inclined actors	Inclined abstainers
Task self-efficacy	75.55 ± 19.22	73.48 ± 24.46
Coping self-efficacy	48.82 ± 23.54	39.31 ± 25.47
Scheduling self-efficacy	54.91 ± 24.66	54.34 ± 27.52
Health sum score	-.03 ± .90	-.03 ± 1.01
Health EIEDs	-.26 ± .91	.54 ± 1.06
Health Interaction	-.02 ± .83	.07 ± 1.26
Appearance sum score	.05 ± .97	-.14 ± 1.07
Appearance EIEDs	.08 ± .97	-.20 ± 1.08
Appearance interaction	.10 ± 1.12	.10 ± 1.45

Note: EIEDs; explicit-implicit evaluative discrepancies. Sum scores, EIEDs, and interactions scores for both health and appearance are standardized z-scores.

Table 3. Correlations between group and self-efficacy, explicit, and implicit variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Group	1													
2 Task self-efficacy	.048	1												
3 Coping self-efficacy	.173*	.562**	1											
4 Scheduling self-efficacy	.039	.387**	.709**	1										
5 Health sum score	.017	.032	-.097	.011	1									
6 Health EIEDs	-.318**	.018	-.085	-.061	.000	1								
7 Health Interaction	-.043	.028	.054	.025	-.045	.079	1							
8. Appearance sum score	.083	-.042	-.024	-.003	.302**	-.096	-.076	1						
9 Appearance EIEDs	.125	.096	.203*	.129	-.017	-.145	.178*	.000	1					
10 Appearance interaction	.002	.137	.106	.044	-.013	.091	.255**	-.024	.309**	1				
11. Implicit health	-.012	.051	.193*	.078	-.118	-.009	.000	-.143	.069	.044	1			
12 Implicit appearance	.010	.073	.089	.075	-.002	-.032	-.097	-.059	-.047	-.104	.145	1		
13 Explicit health	-.025	.179*	.133	.366**	.031	.030	-.156	-.132	-.053	-.052	-.013	.171	1	
14 Explicit appearance	-.117	.122	.080	.183	.001	.026	-.126	-.115	-.028	-.059	.025	.038	.399	1

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Note: EIEDs, Explicit-implicit evaluative discrepancies. Significance is denoted with: \* Correlation is significant at the 0.05 level and \*\* correlation is significant at the .001 level.

Table 4: Binary regression model for predicting group (inclined actors or inclined abstainers)

Variable	$\beta$	SE	$p$	Exp ( $\beta$ )	95 % Confidence interval for Exp ( $\beta$ )
Age	-.02	.03	.430	.97	.92, 1.04
Income	-.11	.10	.259	.89	.73, 1.09
Education	-.14	.17	.423	.87	.62, 1.22
BMI	.01	.04	.886	1.0	.94, 1.08
Task self-efficacy	.00	.01	.887	1.00	.97, 1.03
Coping self-efficacy	.03	.01	<b>.024</b>	<b>1.03</b>	<b>1.00, 1.06</b>
Scheduling self-efficacy	-.02	.01	.190	.98	.96, 1.01
Health sum score	-.08	.23	.710	.92	.59, 1.43
Health EIEDs	-.90	.26	<b>.001</b>	<b>.41</b>	<b>.24, .68</b>
Health Interaction	-.22	.21	.340	.80	.51, 1.24
Appearance sum score	.16	.22	.516	1.16	.75, 1.78
Appearance EIEDs	.09	.24	.698	1.10	.68, 1.77
Appearance interaction	.01	.19	.938	1.01	.71, 1.46
Constant	.53	.80	.513	1.69	

Note: EIEDs, Explicit-implicit evaluative discrepancy