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UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

Abstract

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±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 (Exp *(β)* =1.03) and EIEDs for health (Exp *(β)* = -.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.

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

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

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

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

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

however, based on previous research findings and the inclusion of coping as a self-regulatory mechanism or strategies within the M-PAC,[11] coping and scheduling self-efficacy may also influence the transition of intentions into action.

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

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

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

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

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

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

Method

Design and Procedure

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

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

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

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

Materials

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

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

Self-efficacy. Participants completed the Multi-Dimensional Self-Efficacy for Exercise Scale (MSES).[14] The MSES consists of nine items and is scored on a 100% confidence scale ranging from 0 = "no confidence" to 100 = "completely confident." Following the stem: "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.[14] The current study demonstrated acceptable reliability with
200 Cronbach's alphas ranging from .83 - .85.

201 ***Implicit evaluations.*** Two Go/No Go tasks (GNATs) [38] 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 categized 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. [31,39] 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[20]): 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[31] and in line with Brand
243 and Anotniewicz,[29] 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.[40]

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

Results

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

Differentiating inclined actors from abstainers

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

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

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

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

Discussion

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

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

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

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

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

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

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

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

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

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

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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).

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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 an appearance are standardized z-scores.

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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

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.

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

Variable	β	SE	*p*	Exp (β)	95 % Confidence interval for Exp (β)
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	**.024**	**1.03**	**1.00, 1.06**
Scheduling self-efficacy	-.02	.01	.190	.98	.96, 1.01
Health sum score	-.08	.23	.710	.92	.59, 1.43
Health EIEDs	-.90	.26	**.001**	**.41**	**.24, .68**
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

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