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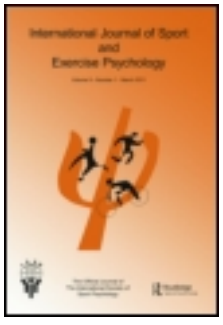

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Understanding variations in exercise-identity strength through identity theory and self-determination theory

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Understanding variations in exercise-identity strength through identity theory and self-determination theory

Shaelyn M. Strachan[a]*, Michelle S. Fortier[b], Mélanie G.M. Perras[b] and Carrie Lugg[b]

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Using identity theory and self-determination theory (SDT), this study examined whether exercise-identity strength was associated with behavioural regulations for exercise (including integrated regulation). Further, this study assessed whether exercise identity and behavioural regulations interacted in their relationship with the self-regulation of exercise. This study was observational involving self-report. Data were collected at two time points, 1 month apart. Community exercisers ($N = 100$; mean age = 32.71 years) completed validated measures of identity strength, behavioural regulations, and self-regulation relative to exercise. As hypothesized, exercise identity was most significantly correlated ($p < 0.001$) with the more self-determined forms of behavioural regulation including identified ($r = 0.72$), integrated ($r = 0.82$), and intrinsic ($r = 0.58$) regulations. Further, identified regulation moderated the relationship between exercise identity and self-regulation ($p < 0.001$). Overall, this study suggests that variations in exercise-identity strength may be characterized by differential regulation of exercise. Further, exercise-identity strength and identified regulation may interact in their relation to exercise self-regulation. Finally, results support the complementary use of identity theory and SDT; ideas to advance this line of inquiry are discussed.

Keywords: Exercise identity; identity theory; self-determination theory; self-regulation

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1. Introduction

As physical activity rates in Canada decline (Katzmarzyk & Tremblay, 2007), so too does the opportunity to accrue individual and public health benefits derived from regular exercise (Haskell, Blair, & Hill, 2009). Amidst this trend, self-research presents a promising avenue to understand exercise behaviour. The self has been identified as the psychological apparatus that allows individuals to think consciously about themselves (Leary & Tangney, 2003). Self-related variables are recognized as important in understanding adherence to health behaviours including exercise (Fox & Wilson, 2008). *Identity* is one self-related variable that is receiving increased research attention in relation to health in general (Schwartz et al., 2010) and exercise in particular (Carraro & Gaudreau, 2010).

1.1 *Identity theory*

Identity theory (Burke, 1991) posits that identities are meanings that define who one is in the context of a given role (Burke & Stets, 2009; Stets & Burke, 2003). Furthermore, Burke

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(2006) warrants that identities function as dynamic, self-regulating control systems by providing identity-relevant behavioural standards (Stryker & Burke, 2000). For example, individuals who identify as "exercisers" are expected to seek congruency between this identity (e.g. I am an exerciser; exercisers engage in regular exercise) and their behaviour (e.g. I engage in exercise five times a week). Individuals can vary in the *strength* of their endorsement of a given identity (Ryan & Deci, 2003), which is thought to influence the probability that behaviour will agree with identity meanings (Anderson, Cychosz, & Franke, 1998; Ryan & Deci, 2003). Therefore, having a strong exercise identity may aid in the self-regulation of exercise.

1.2 *Exercise identity*

The association between exercise-identity strength and the self-regulation of and engagement in exercise behaviour has been steadily documented. Namely, exercise-identity strength has been found to predict exercise-related outcomes such as weekly frequency of exercise behaviour (Wilson & Muon, 2008), duration and frequency of vigorous physical activity (Strachan, Woodgate, Brawley, & Tse, 2005), muscular endurance, and percent body fat (Anderson et al., 1998). Moreover, exercise-identity strength has been associated with adherence-related social cognitions such as self-efficacy, intentions (Strachan & Brawley, 2008; Strachan, Brawley, Spink, & Glazebrook, 2010), and self-regulatory actions (Carraro & Gaudreau, 2010) that may be instrumental in helping individuals self-regulate towards identity-relevant exercise behaviour. Considering the established link between exercise-identity strength and exercise behaviour, exercise identity appears to serve as an important construct in the promotion of exercise adherence. Few studies, however, have examined *why* individuals differ in terms of the strength of exercise identity. A better understanding of factors impacting this variance may increase our understanding of the foundation of strong exercise identities (Leary & Tangney, 2003).

1.3 *Self-determination theory*

One theory that has proven useful in understanding the *why* of behaviour is self-determination theory (SDT; Deci & Ryan, 1985). SDT is a macro-theory of human motivation comprising varied "mini-theories". One sub-theory within SDT, organismic integration theory, acknowledges that the extent to which an individual identifies with an activity can vary according to the *behavioural regulations* underlying the given behaviour (Ryan & Deci, 2003). Behavioural regulations reflect the extent to which an identity has been internalized and integrated into the self. Within SDT, organismic integration theory has outlined a continuum of behavioural regulations (for a more detailed description, see Ryan & Deci, 2003). *Amotivation* concerns the most unregulated and least self-determined form of behaviour. Relative to exercise, amotivated individuals fail to articulate reasons why they engage or do not engage in exercise. *External regulation* represents exercise behaviour performed because of what others think or say; reward and punishment contingencies (e.g. being frowned upon by other exercisers) are also typical in this form of regulation. Individuals who exercise for *introjected* reasons are regulated by inner pressures (e.g. exercising to relieve guilt). The next three regulations are considered more self-determined since behaviours (i.e. exercise) are "enacted with a full sense of volition and choice" (Deci & Ryan, 2000, p. 237). With respect to *identified* regulation, individuals perceive exercise as being instrumental in reaching a personal goal (e.g. exercising for well-being). *Integrated* regulation depicts a regulation where exercise is carried out because it has become part of one's self and aligns with one's values (e.g. exercising because one is an exerciser). Finally, *intrinsic* motivation is the most self-determined regulation since exercise is performed solely for pleasure or for the sake of the activity (e.g. a runner runs for the pure enjoyment derived from running).

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Relative to the exercise domain, SDT posits that intrinsic motivation, the more self-determined forms of extrinsic motivation (e.g. identified and integrated), or a combination thereof (i.e. autonomous motivation) is likely to facilitate exercise initiation and maintenance of exercise behaviour (Ryan, Williams, Patrick, & Deci, 2009). Several findings have garnered support for this assertion. For example, the most self-determined forms of regulation have been found to predict the initiation of exercise (Fortier, Sweet, O'Sullivan, & Williams, 2007; Fortier et al., 2011). Further, other research suggests that sustained or regular engagement in exercise can also be predicted by the most self-determined forms of regulation (Standage, Sebire, & Loney, 2008; Thøgersen-Ntoumani & Ntoumanis, 2006).

Through its detailed articulation of how individuals internalize an identity, SDT may complement identity theory by providing explanatory information on why individuals adopt an exerciser identity and, further, what behavioural regulations differentiate the strengths of identity. Very few studies have examined exercise identity within an SDT perspective. This is surprising given that both theories share a common focus on the self, identity, motivation, and self-regulation of behaviour. Further, and in relation to health behaviour research specifically, the examination and integration of concepts from different theories have been advocated (Hagger, 2009; Noar & Zimmerman, 2005).

Recently, through the validation of the Exercise Motivation Scale, Wininger (2007) has examined exercise identity in relation to behavioural regulations posited by SDT and found significant moderate-to-large correlations between exercise identity and regulations. Another recent study employed SDT to investigate the strength of exercise identity (Vlachopoulos, Kaperoni, & Moustaka, 2011) and found that behavioural regulations for exercise (as assessed by the Behavioural Regulation in Exercise Questionnaire (BREQ)) predicted exercise-role identity. These findings suggest that, in the context of exercise, identity strength is characterized by more self-determined forms of regulation. Of worthy note, the study by Vlachopoulos et al. (2011) did not examine the relationship between integrated regulation and exercise identity. Integrated regulation—which underlines behavioural engagement because an activity has become part of one's self—seems particularly relevant to the exercise-identity construct since it captures the incorporation of role meanings into the self. We aimed to follow Wininger's (2007) lead of examining identity and integrated regulation but using the updated version of the BREQ-2 (Markland & Tobin, 2004) featuring the addition of the integrated regulation subscale (Wilson et al., 2006). Therefore, the first purpose of our study was to expand on previous findings by examining the relationships between the behavioural regulations—including integrated regulation—and exercise-identity strength.

1.4 *Exercise self-regulation*

Self-regulation entails a number of processes (i.e. planning and monitoring) that individuals undertake to successfully engage in a behaviour, such as exercise. Self-regulation has been argued to be critical to the long-term self-management of health behaviours (Bandura, 2004; Maddux & Gosselin, 2003). Ryan and Deci (2003) argue that identities "once adopted, play a significant role in the organization and regulation of people's everyday lives" (p. 253). In the exercise domain, for example, Carraro and Gaudreau (2010) found that young adults who identified as exercisers were more likely to form implementation plans for physical activity. These plans, in turn, yielded continued physical activity participation in the 4 weeks that followed. Strachan, Brawley, Spink, and Jung (2009) found that individuals with a higher exercise identity boasted more confidence in using self-regulatory strategies to manage exercise behaviour during challenging times than individuals with a lower exercise identity (Strachan & Brawley, 2008). These results suggest that holding a strong exercise identity may aid in the self-regulation of exercise

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behaviour. Past research has also linked the behavioural regulations as per SDT to important self-regulation outcomes such as barriers to self-efficacy and future intentions to exercise (Sweet et al., 2009; Thøgersen-Ntoumani & Ntoumanis, 2006).

Although preliminary past research suggests that exercise identity may be related to more self-determined forms of regulations for exercise, to our knowledge, research to date has not examined whether exercise identity and specific regulations for exercise work together in facilitating exercise self-regulation. Given that both behavioural regulations for exercise and exercise identity have been found to influence the regulation of exercise, we reasoned that these two self-related variables may have an additive enhancing effect on exercise self-regulation when both are in place. Specifically, exercise-identity strength may vary in its influence on the self-regulation of exercise depending on the level of various behavioural regulations; exercise identity may have its most beneficial impact on exercise self-regulation when it is also accompanied by higher levels of the self-determined forms of regulation for exercise. For example, a person who strongly identifies with exercise but is strongly regulated by introjected reasons (e.g. to avoid guilt) may demonstrate less ability in the self-regulation of exercise than an individual who also strongly identifies with exercise but is regulated by identified reasons (e.g. exercise is in line with a personal goal). Therefore, a second purpose of this study was to investigate whether identity strength and behavioural regulations interacted in their association with the self-regulation of exercise. To our knowledge, no previously published study has examined the interaction between identity strength, behavioural regulations for exercise, and self-regulation.

The overall purpose of this paper was to use both identity theory and SDT as compatible theoretical frameworks to increase understanding of why individuals differ in the strength of their exercise identities and determine whether strength of exercise identity (identity theory) and forms of behavioural regulation for exercise (SDT) interact in predicting the self-regulation of exercise. Accordingly, and based on previous research, we hypothesized that (1) strength of exercise identity would be positively associated with more self-determined forms of behavioural regulation (including integrated regulation) and (2) strength of exercise identity would interact with behavioural regulations in predicting exercise self-regulation such that individuals who identify strongly as exercisers and report higher levels of more self-determined behavioural regulations for exercise (e.g. identified, integrated, and intrinsic regulations) would report higher self-regulation of exercise than those who report lower levels of the less self-determined regulations for exercise.

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2. Method

2.1 *Participants and procedure*

Upon receiving ethics approval, 100 exercisers (78% women) were recruited from university- and community-based exercise contexts for participation in this observational study. Interested participants were e-mailed a link to a secure online website to complete the first set of measures (at the outset of the test period). Eligible participants had engaged in at least one weekly exercise session over the past month and intended to continue exercising over the following four weeks (reported via two dichotomous (yes/no) eligibility questions). The aim of these criteria was to sample from people who had a wide range of physical activity levels, yet had some experience with exercise. The average age of the sample was 32.71 years (SD = 12.04). The majority of the participants were single and Caucasian and reported working (51%) or studying full-time (31%). Attrition was low as only one individual decided to withdraw from the study (between time 1 and time 2). The participants received a small honorarium (CAD$10) for their participation.

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2.2 *Measures*

2.2.1 *Exercise identity*

The Exercise Identity Scale (Anderson & Cychosz, 1995) was used to assess the degree to which the participants identified with being an exerciser. The scale comprises nine items, each answered on a seven-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7). Sample items include the following: *I consider myself an exerciser* and *when I describe myself to others, I usually include my involvement in exercise*. Anderson and Cychosz (1995) reported strong Cronbach's α and test–retest reliability for items on this scale in a similar sample (0.94 and 0.93, respectively). Cronbach's α of 0.93 was demonstrated with the present sample, indicating good internal consistency (Tabachnick & Fidell, 2007).

2.2.2 *Behavioural regulation for exercise questionnaire*

An updated version of the BREQ-2 (Markland & Tobin, 2004) featuring an integrated regulation subscale (Wilson et al., 2006) was used to assess individuals' motives for engaging in exercise. The scale, which boasts good factorial validity (Markland & Tobin, 2004; Wilson, Rodgers, & Fraser, 2002), comprises 23 items organized into six subscales, each reflecting a behavioural regulation along the continuum of self-determination: amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation. The sample items include *I exercise because other people say I should* (external regulation) and *it's important to me to exercise regularly* (identified regulation). The participants provided answers on a Likert scale with values ranging from *not true for me* (0) to *very true for me* (4). The scores obtained for this scale were more or less reliable for the data of this sample. Cronbach's α's originally varied between 0.47 and 0.89 (see Table 1 for all α's). Item reduction was performed on the amotivation subscale; a three-item combination yielded a better α value (0.58). The new three-item subscale was used for the analyses.

2.2.3 Exercise self-regulation

The planning and self-monitoring subscales from the Goal Systems Assessment Battery (GSAB; Karoly & Ruehlman, 1995) were combined to depict exercise self-regulation at time 2 (1-month follow-up provided a reasonable time within the future to demonstrate a meaningful prediction). The GSAB scale is a validated measure of exercise self-regulation (Karoly & Ruehlman, 1995; Karoly et al., 2005; Lecci, Karoly, Ruehlman, & Lanyon, 1996) and has been used to measure aspects of self-regulation in other studies (e.g. Lutz, Karoly, & Okun, 2008). Eight items (four items per subscale) are administered and answers could range from *Not at all accurate for me* (0) to *Extremely accurate for me* (4). The sample items include *I am aware of my day-to-day behaviour as I try to be regularly physically active* and *I keep track of my overall progress towards being regularly physically active*. The scores obtained with this combined scale were reliable for the data of this sample (Cronbach's $\alpha = 0.90$). Given that the subscales demonstrated a strong correlation ($r = 0.68$, $p < 0.01$), the two subscales were combined to depict self-regulation.

2.3 *Analytical plan*

Data screening and cleaning procedures as per Tabachnick and Fidell (2007) were performed on the data set. To determine whether the strength of exercise identity was associated with more self-determined forms of behavioural regulation for exercise (purpose 1), bivariate (Pearson's) correlations between exercise identity and behavioural regulations (e.g. amotivation, external, introjected, identified, and intrinsic) were calculated. Confidence intervals spanning each bivariate correlation were also calculated. In an effort to determine whether an individual's behavioural regulations moderated the relationship between exercise identity and exercise self-regulation (purpose 2), a separate moderated regression analysis was conducted (as per recommendations

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Table 1. Means (SD), α coefficients, and correlations (and 95% confidence intervals) between variables of interest.

Variables	*M* (SD)	α	1	2	3	4	5	6	7
1. $EIS_{Exercise\ identity}$	5.32 (1.28)	0.93							
2. BREQ-$2_{Amotivation}$	0.02 (0.08)	0.58[a]	−0.27** (−0.44 to −0.08)						
3. BREQ-$2_{External}$	0.54 (0.75)	0.87	−0.17 (−0.35 to 0.03)	0.18 (0.01 to 0.37)					
4. BREQ-$2_{Introjected}$	1.69 (1.01)	0.79	0.32** (0.13 to 0.49)	−0.10 (−0.29 to 0.10)	0.29** (0.10 to 0.46)				
5. BREQ-$2_{Identified}$	3.55 (0.51)	0.73	0.72** (0.61 to 0.81)	−0.47** (−0.61 to −0.30)	−0.11 (−0.30 to 0.09)	0.33** (0.14 to 0.5)			
6. BREQ-$2_{Integrated}$	3.04 (0.95)	0.89	0.82** (0.75 to 0.88)	−0.18 (−0.36 to −0.02)	−0.04 (−0.24 to 0.16)	0.35** (0.16 to 0.51)	0.75** (0.65 to 0.83)		
7. BREQ-$2_{Intrinsic}$	3.41 (0.59)	0.83	0.58** (0.43 to 0.70)	−0.23* (−0.41 to −0.03)	−0.16 (−0.34 to 0.05)	0.11 (−0.09 to 0.30)	0.54** (0.37 to 0.67)	0.68** (0.56 to −0.78)	–

Notes: Mean scores for exercise identity could vary between 1 and 7. For the regulations (variables 2–7), mean scores could vary between 0 and 4.
EIS, Exercise Identity Scale. BREQ-2 = Behavioural Regulations for Exercise Questionnaire-2.
[a]Amotivation subscale was reduced to three items (instead of four) given the low original α value (0.47).
*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).

by Frazier, Tix, & Barron, 2004) for each of the behavioural regulations. We standardized all continuous variables to reduce data to a mean of 0 and a standard deviation of 1. We then created a product term by multiplying the predictor variable (e.g. exercise identity) and the proposed moderator variable (e.g. identified regulation). Finally, we structured the equation and tested for moderation. For each moderation analysis, variables were entered into separate blocks within a hierarchical regression analysis. In block 1, the standardized predictor and moderator variables were entered. Subsequently, the product term of the two predictor variables was entered in block 2.

3. Results

3.1 *Correlations between exercise identity and behavioural regulations for exercise*

Concurrent levels of exercise identity and behavioural regulations posited as per SDT were assessed for correlations. Correlation coefficients and confidence intervals are presented in Table 1.

3.2 *Moderated regression analyses*

As for the proposed moderation analyses, we tested separate moderation equations for each behavioural regulation proposed by SDT as a possible moderator of the exercise identity–self-regulation relationship. Only the equation with identified regulation emerged significant, with the overall model accounting for almost 30% of the total variance in self-regulation (Adj. $R^2 = 0.29$, $p < 0.001$, $F(2,89) = 19.73$). Significant main effects were noted for exercise identity (standardized $\beta = 0.51$, $p < 0.001$) and identified regulation (standardized $\beta = 0.30$, $p = 0.03$) in their prediction of self-regulation. Moreover, the interaction between exercise identity and identified regulation accounted for a statistically significant amount of variance in self-regulation ($R^2\ \Delta = 0.09$, $F\Delta = 13.23$, $p < 0.001$). The final model explained 38% of the variance in self-regulation. Since the interaction term was significant, we concluded that a moderation effect was present. As a result, further interpretation of the interaction term was warranted.

Statistical procedures recommended by Aiken and West (1991) were used to interpret significant interaction terms. The values of the moderator variable (exercise-identity strength) at ±1 standard deviation and the mean were substituted into the simple regression equation. These means were then plotted to display the interaction (see Figure 1). Subsequently, *t*-tests were used to determine whether the slopes for each line significantly differed from zero (as indicated by a *p* value of less than 0.05). No slope differed from zero; however, the line depicting a "high" level of identified regulation appeared to have the steepest slope between identity and self-regulation relative to the other levels of identified regulation.

4. Discussion

This investigation used both identity theory and SDT as compatible theoretical frameworks to address two purposes. First, this study sought to determine whether variations in the strength of exercise identity (as per identity theory) were associated with variations in behavioural regulation (as per SDT). Related to this, the examination of integrated regulation, measured as per the BREQ-2, was unique as no previous studies have looked at its possible relationship with exercise identity. Second, this study sought to assess whether an individual's behavioural regulation and exercise-identity strength interacted in their relationship with the self-regulation of exercise.

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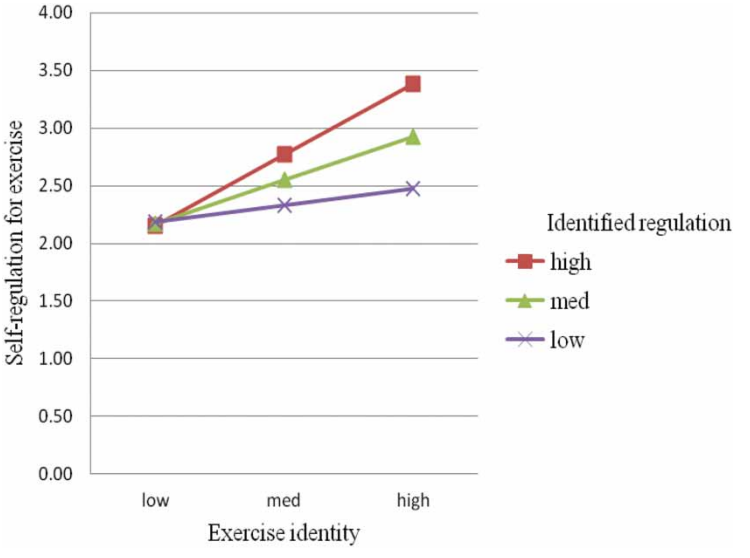

Figure 1. Identified regulation moderates the relationship between exercise identity and self-regulation.

This study is the first to examine the synergistic effect of exercise identity and specific regulations on the facilitation of exercise self-regulation.

4.1 *The relationship between exercise identity and behavioural regulations*

We hypothesized that the strength of exercise identity would be positively associated with more self-determined forms of behavioural regulation. Our results generally support this hypothesis as strong, positive relationships between exercise-identity strength and the more self-determined forms of exercise regulation were found. Further, exercise identity was negatively related to amotivation and external regulation (although in the case of the latter not significantly), the least self-determined behavioural regulations. A positive albeit weaker association was found between exercise identity and introjected regulation.

In the present study, positive associations were found between exercise identity and the more self-determined forms of behavioural regulation. This finding is in line with both identity theory and SDT. According to identity theory, individuals who identify as "exercisers" seek congruency between their identity and their behaviour because doing so leads to feelings of *authenticity* or "the feeling[s] that one is being one's true self" (Burke & Stets, 2009, p. 125). From an SDT perspective, self-determined motivation depicts the spectrum of goal-directed activities enacted out of choice and volition (Deci & Ryan, 2000); these activities are also increasingly internalized to the self (Ryan & Deci, 2003). Thus, our findings are consistent with behaviour motivated by and resulting in authenticity or an "integrated sense of self" (Deci & Ryan, 2000, p. 231).

Our findings generally align with past research. As with past studies (Vlachopoulos et al., 2011; Wininger, 2007), the same negative association with non-self-determined forms and positive association with self-determined forms of regulations and exercise identity were found. A few differences should be noted. In the study by Vlachopoulos et al. (2011), but not in ours, correlations between exercise-role identity and the behavioural regulations increased in strength from low to high self-determination. Our failure to find this perfect simplex pattern is likely due to the fact that we assessed integrated regulation, whereas Vlachopoulos et al. (2011) did

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not. We found that integrated regulation—rather than intrinsic regulation—was the regulation that most strongly correlated with exercise identity. This finding is consistent with that of Wininger (2007); however, Wininger's results were obtained with the Exercise Motivation Scale, while ours were obtained with the BREQ-2. These converging findings are not surprising given that motivation for exercise associated with this regulation aligns with the identity theory notion of "authenticity" or behaving in accordance with one's true self, which is achieved when one behaves consistently with his/her identity (Ryan & Deci, 2003).

It is interesting that the most self-determined form of motivation, intrinsic motivation, was not the one that most strongly correlated with exercise identity. Intrinsic motivation, which captures pursuits driven for and by their own value, may have less relevance to one's sense of self than, for example, integrated regulation. However, the differences in the strength of associations between exercise identity and the various self-determined forms of regulation were small and, in general, exercise-identity strength was characterized by strong scores on each of the more self-determined regulations. Given both conceptual and empirical support for the idea that integrated regulation may be the regulation that most strongly correlates with exercise identity, future research examining exercise identity and behavioural regulations should include this regulation.

Both our results and those of Vlachopoulos et al. (2011) report a positive relationship between exercise identity and introjected regulation. Introjected regulation depicts behaviour enacted to avoid guilt or shame. From an identity theory perspective, this positive association may not be surprising. People seek to behave consistently with endorsed identities; failure to achieve this consistency should result in negative affect such as guilt, which is thought to motivate identity-consistent behaviour to renew identity–behaviour consistency (Burke & Stets, 2009). For individuals who strongly identify with exercise, avoidance of the negative affective reactions of not behaving consistently with one's identity may be a viable factor in regulating exercise behaviour and may explain why, in the present and other research, introjected regulation is associated with holding a strong exercise identity. Nevertheless, in the present study, the strongest correlations with exercise identity were found in the cases of the more self-determined behavioural regulations.

4.2 *Exercise identity and behavioural regulations: impact on the self-regulation of exercise*

This study also assessed whether an individual's behavioural regulation and exercise-identity strength would interact in their relationship with the self-regulation of exercise. As hypothesized, our results showed that one form of self-determined regulation—identified regulation—moderated this relationship. This interaction seems to be driven mainly by individuals who strongly identified with exercise and reported high levels of identified regulation of exercise; strongly seeing oneself as an exerciser is associated with a strong capacity for the self-regulation of exercise, but this capacity is further enhanced when the exerciser engages in exercise that is strongly motivated by identified reasons. Identity theory posits that identities are meanings that define who one is in the context of a given role (Burke & Stets, 2009; Stets & Burke, 2003). Accordingly, the interaction of exercise identity and identified regulation is fitting since this regulation is depicted as the "internalization of the personal importance of the activity (e.g. exercise) through consciously identifying with its *meaning* and value" (Ryan & Deci, 2003, p. 260). Furthermore, the self, in broader terms, is considered "active, involved, and responsive, intentionally engaging in volitional processes to change, alter, or modify itself" (Baumeister & Vohs, 2003, p. 197). As a result, the interaction between identity and identified regulation taps into their inherent instrumentality in maintaining the self via self-regulatory processes (Gebhardt, 2006).

We hypothesized that exercise identity would interact with *all* self-determined forms of motivation in predicting the self-regulation of exercise. It is surprising therefore that exercise identity

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did not interact with integrated and intrinsic motivation for exercise. We offer a possible explanation for these unexpected findings. Individuals motivated to exercise for intrinsic (the inherent enjoyment of an activity) and integrated (in line with one's true self) reasons may benefit from the inherent and less-intentional motivating properties of these forms of motivation rather than from the purposeful and intentional self-regulation of exercise that may be associated with exercise for identified reasons (i.e. in pursuit of personally relevant goals). For example, an individual who is motivated for intrinsic or identified reasons may easily pursue exercise without much self-regulatory effort (prioritizing exercise in one's schedule and goal-setting) given its inherent value or because it is a part of who he/she is. A person motivated for identified reasons such as the value that he/she places on his/her health may benefit more from active self-regulation. Therefore, we speculate that identity may only be enhanced in its relationship with the self-regulation of exercise when the behaviour is also pursued for identified reasons. Finally, power to detect statistical interactions using hierarchical multiple regression is acknowledged to be low, even though this method has been identified as the preferred statistical method for testing moderator effects (Frazier et al., 2004).

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4.3 *Strength and limitations*

A strength of the current study is that it builds on the scant research that has examined exercise identity in relation to behavioural regulations by examining complementary and theoretically driven motivational factors that are associated with strength of exercise identity in community-level exercisers. Further, this study is the first, to our knowledge, to examine this relationship with all behavioural regulations posited by SDT (as measured with the BREQ-2). Further, the examination of exercise identity, self-regulation of exercise, and identified regulation and their interaction is novel; to our knowledge, no studies have addressed these concepts simultaneously. Finally, this study utilized a prospective design, examining exercise self-regulation at one-month follow-up.

The strengths of this study should be viewed in light of limitations. Along these lines, greater examination of exercise identity and integrated regulation is warranted. Specifically, the integrated subscale of the BREQ-2 garnered some criticisms, prompting the creation of a new integrated subscale for the exercise domain (McLachlan, Spray, & Hagger, 2011). Additional inquiries should examine the relationship between exercise identity and integrated regulation as per this new scale. It must also be pointed out that the amotivation subscale of the BREQ-2 did not yield a strong α coefficient; cautious interpretation of the results is warranted. Moreover, the present study aimed to understand the *self-regulation* of exercise. The study lacked the actual measurement of exercise behaviour (marker of successful behavioural regulation). The present study also has limited generalizability since the sample was predominantly female; data collection was also limited to one Canadian city.

4.4 *Future directions*

Our results extend previous research that has established a clear association between exercise identity and exercise behaviour by demonstrating that the strength of exercise identity is associated with more self-determined forms of motivation that might be instrumental in helping individuals self-regulate towards identity-relevant exercise behaviour (Strachan & Brawley, 2008; Strachan et al., 2010; Strachan et al., 2005). If future research provides additional support for these preliminary findings, the results could be used to inform interventions to increase exercise-identity strength. For example, physical activity interventions that focus on fostering self-determined exercise may be a viable means of increasing identity strength, a known correlate

of exercise adherence. Further, the present study highlights the complementary nature of both identity theory and SDT and warrants more research driven by the complementary use of these theoretical perspectives.

4.5 *Conclusions*

Overall, this study suggests that variations in exercise-identity strength may be characterized by differential regulation of exercise. For the most part, a stronger exercise identity is characterized by more self-determined regulations for exercise. Further, exercise-identity strength and identified regulation may have an interactive effect in their relation to exercise self-regulation. Finally, the current study supports the complementary use of identity theory and SDT and suggests that future research utilizing these theoretical approaches in a complementary fashion is warranted.

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