Why do You Run? Comparing Identified and Intrinsic Motivation in Runners

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By
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WHY DO YOU RUN?

COMPARING IDENTIFIED AND INTRINSIC MOTIVATION IN RUNNERS

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Submitted in partial fulfillment of the requirements for the degree of Master of Arts in Psychology at the State University of New York at New Paltz
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Abstract

Considering only half of the United States population engages in the recommended amount of exercise (Centers for Disease Control and Prevention, 2014), and the dangerous implications of a sedentary lifestyle (Ekelund et al., 2015), it becomes imperative to investigate the motivations behind sport, exercise, and physical activity. Due to the mixed findings regarding different types of motivation in Self-Determination Theory (SDT) (Ryan & Deci, 1985), the present study attempted to show that identified regulations would predict and account for more variance in behavior adherence, intensity of exercise, and life satisfaction than would intrinsic regulations. An online survey was used to collect data from individuals who had participated in a 5K race, 10K race, half-marathon, or marathon. Correlation and regression analyses supported the above hypothesis. These results indicate SDT, as it is currently conceptualized, may not be as applicable to the domain of sport and exercise behavior as previously thought.

Keywords: Motivation, Self-Determination Theory, Identified Regulation, Intrinsic Motivation, Exercise, Running, Behavior Adherence, Exercise Intensity, Life Satisfaction
Why do You Run? Comparing Identified and Intrinsic Motivation in Runners

In a massive longitudinal study of over 500,000 participants and spanning ten European countries, it was found that physical inactivity predicted mortality at twice the rate of obesity, even when taking into account such covariates as age, gender, education and health habits like smoking tobacco and drinking alcohol (Ekelund et al., 2015). These statistics are concerning considering only half (50.8%) of United States citizens 18 years and older met the 2008 Physical Activity Guidelines for Americans in 2014 (Centers for Disease Control and Prevention, 2014). Findings such as these highlight the importance of understanding the mechanisms that promote exercise adherence, such as motivation. Self-determination theory (Ryan & Deci, 1985), a significant theory of human motivation, can provide a theoretical, motivation-based framework with which to interpret the varied reasons that individuals exercise.

Theories of Motivation

Motivation can generally be defined as the willingness or desire of an individual to engage in a given behavior. Many theories have attempted to account for and explain motivation in various different domains, one of these being Self-Efficacy Theory (SET). Based in social cognitive theory, Bandura (1977) purposed that expectations of performance, or self-efficacy, influence individuals’ ability to cope and expend effort when adversity arises. Several different types of self-efficacy contribute to an individual’s motivation to exercise (Ajzen, 2002). These include exercise efficacy, the belief that one can successfully engage in physical activity, barrier self-efficacy, the belief that one can overcome obstacles specific to exercise, scheduling efficacy, the belief that one can make time to exercise, and perceived behavioral control, belief about the degree of personal control in the decision to engage in exercise. Previous literature, based on both longitudinal and cross-sectional studies, has shown that self-efficacy corresponds to long-
term exercise adherence and exercise frequency (Warner, Shuz, Knittle, Ziegelman, & Wurm, 2011; Warner et al., 2014).

A more comprehensive model of motivation that takes into account behavioral, cognitive, and temporal aspects of behavioral change and adherence as the Trans Theoretical Model (TTM) (Prochaska & Marcus, 1994). Originally proposed to help aid in smoking cessation, TTM argues that individuals move through six different stages of varying levels of motivation beginning with precontemplation and ending with behavior maintenance. Individuals move through the stages based upon temporal engagement of the behavior. TTM incorporates self-efficacy into its model and considers certain experiential and behavioral processes as critical in moving individuals through the stages of change. Although this type of model provides practitioners with specific strategies to help individuals maintain behavior adherence, the model has been critiqued for assigning individuals to a stage of change based on their arbitrary days of behavior maintenance as well as the rigidity of the model (Brug, Conner, Harré, Kremers, McKellar, & Whitelaw, 2005). Additionally, this model tends to account for short-term behavior adherence, but does not explain or encourage long-term behavior adherence (Brug et al., 2005).

Self-Determination Theory

When it comes to understanding physical activity, perhaps the best-known theory of motivation is Self-Determination Theory. As proposed by Ryan and Deci (1985), Self-Determination Theory (SDT) is a model used to explain an individual’s willingness to engage in a given behavior, or motivation. Individuals who are more intrinsically motivated are said to be more “self-determined.” Ryan and Deci (2000) distinguish between two types of motivation: intrinsic and extrinsic. Those people who experience intrinsic motivation will engage in a behavior simply for the enjoyment of and inherent satisfaction with the activity. For example,
Alice is intrinsically motivated to exercise because she simply enjoys physical activity. Individuals who are intrinsically motivated tend to seek out and engage in novel behaviors and challenge themselves more frequently (Ryan & Deci, 2000).

At the other end of the motivation spectrum is extrinsic or external motivation. Extrinsic motivation details the willingness to engage in a behavior because external pressure is present. Ryan and Deci (2000) propose four main types of external motivation or regulations, each decreasing in external motivation and increasing on intrinsic motivation. External regulation, the most extreme form of external motivation, may take the form of complying with others’ wishes to avoid punishment or shame, in essence, being forced to engage in a behavior. For example, a child, who plays baseball because his parents want him to, is externally motivated. Similarly, a woman receiving monetary incentives to go to the gym at her place of work, is also externally motivated. Such motivation is not conducive to long-term behavior adherence and often correlates with poor well-being and life satisfaction (Ryan & Deci, 2000; Teixeira, Carraça, Markland, Silva, & Ryan, 2012).

Introjected regulation is dominated by external motives, but to a lesser extent than that of external regulation. Whereas external regulation may involve the appeasement of others, introjected regulation revolves around appeasement of the self. Feeling as though an individual must engage in exercise because of social pressures or to avoid the anxiety not exercising would induce would be considered an introjected motive. For example, an individual may perceive societal pressure to lose weight, and so attends the gym. Again, individuals continue behaviors primarily through feelings of guilt and internal pressures and rewards. As seen with external regulation, individuals motivated by introjected regulation often show low well-being and life
satisfaction and are less likely to adhere to a behavior long-term (Ryan & Deci, 2000; Teixeira et al., 2012).

Although dominated by internal motives, identified regulation still maintains elements of external motivation. Identified motives become more about the values a person holds, and personal goals; the behavior becomes personally important to the individual. Elements of guilt, avoidance and punishments/rewards are no longer motives involved in the behavior. Regularly participating in a study group to meet the goal of passing a class might be an example of identified regulation, so long as the individual views attending the study group as a way to meet one’s goals, and is not pressured by others or oneself to attend. Similarly, a man may exercise because he values the health benefits derived from physical activity. This would be an example of an identified regulation. Identified regulations have correlated both with high and low well-being and life satisfaction as well as behavior adherence (Teixeira et al., 2012). This is discussed further in SDT’s application to exercise behavior.

Lastly, integrated regulation details motivations that are primarily intrinsic and occur when an individual’s behavior aligns with personal values and beliefs. An individual with these types of motivations will not engage in a behavior for the internal pleasure of the experience, but also does not feel external or internal pressure to engage in the behavior. An apt example of this type of regulation might be a young adult who exercises because physical activity has become integrated with the self: they are an exerciser. Another example might be a woman who runs simply because she is a runner. In statistical analyses, integrated and intrinsic regulations are collapsed due to their similarity in motives and positive correlates with well-being, life-satisfaction, and behavior adherence (Ryan & Deci, 2000).
Self-Determination Theory in Exercise Adherence

SDT has historically been used to explain motivation in academic and educational settings (Ryan & Deci, 2000). Recently, SDT has expanded to make sense of motivation and adherence to health behaviors, like exercise. As detailed above, intrinsic motivation is the most optimal regulation, and behavior motivated intrinsically will, generally, lead to long-term adherence, with identified and integrated regulations correlating with long-term adherence to lessening degrees, respectively (Ryan & Deci, 2000). However, an increasing number of studies suggest this may not be the case when considering exercise adherence (Crespin, Abraham & Rothman, 2016; Long, Readdy, & Raabe, 2014; Ng, Ntoumanis, Thøgersen-Ntoumani, Deci, Ryan, Duda & Williams, 2012; Schutte & McNeil, 2015; Teixeira, et al., 2012).

Long et al. (2014) conducted a qualitative study on a firefighter population. They were primarily interested in how autonomy, competence and relatedness (the three basic psychological needs) manifested in this specific population to help increase exercise adherence. Contrary to Ryan and Deci's (2000) model, the less autonomy firefighters felt they had in their exercise behavior, the more likely the firefighters felt they would engage in that behavior. For example, if a superior prompted subordinates to do a certain exercise for a given amount of time, those instructed individuals felt more inclined to exercise than if they had not been told to do so. However, while these results may be specific to the population studied, they raise interesting questions regarding the role of external motivation and lesser forms of intrinsic regulations in exercise adherence.

During an incentive-based intervention, where employees were monetarily compensated for gym attendance, Crespin et al. (2016) found that employees who did not engaging in exercise pre-intervention exercised one more day a week than those who did not participate in the
intervention. Participants who were already engaging in exercise pre-intervention, however, were not influenced by the introduction of the incentive program. According to Ryan and Deci (2000) individuals motivated externally (monetarily) should not continue a behavior long-term. However, these results persisted for three years, post-intervention and serve to show that external motivation may be sufficient in increasing exercise adherence long-term.

Several meta-analysis have looked into long-term exercise adherence and motivation regulations. Ng et al. (2012) reviewed 48 data studies and found that identified regulation correlated more strongly with exercise than either intrinsic motivation, or integrated motivation. These correlations may suggest, contrary to SDT, that external elements of motivation are important when considering long-term adherence to exercise programs.

Similarly, Teixeira et al. (2012) found intrinsic motivation, in addition to integrated motivation, predicted exercise adherence in longitudinal studies. Further, mild intensities of exercise corresponded to identified regulation, but moderate and high intensities of exercise corresponded to both identified and intrinsic motivation (Teixeira et al., 2012). These results suggest that not all forms of motivation are created equal. Although higher forms of internal regulation may result in more vigorous exercise, even lesser forms of internal regulation, identified, result in exercise adherence.

Lastly, of the studies in this meta-analysis that examined specific motives to exercise, findings were inconclusive when analyzing specific motives to exercise. Specifically, studies that reported body-related and health/fitness participant motives to exercise (introjected and identified regulations) shared both positive and negative relationships with long-term exercise adherence. Interestingly, half of the study samples also showed no relationships between the above mentioned motives and long-term exercise adherence (Teixeira et al., 2012). Results such
as these highlight the complex relationships between adherence to and motives of exercise behavior. Additionally, these results show that external motives can lead to exercise adherence, contrary to SDT.

**Current Study**

Given that SDT (Ryan & Deci, 2000) would suggest these lesser forms of intrinsic motivation do not lead to long-term behavior adherence, there is evidence to suggest that SDT, as it pertains to exercise, may be more nuanced than previously thought. A well-designed study may show that integrated and identified motivation may predict exercise behavior on par with intrinsic motives or even to a greater extent than intrinsic regulation. The study investigated the relationships that identified motivation shares with behavior adherence, intensity of exercise and life satisfaction, and evaluated motivation in a sample of runners who vary in degree of expertise.

**Hypotheses**

H1: Identified regulations will correlate positively with miles run per week, moderate intensity exercise, strenuous intensity exercise and life satisfaction.

H2: Identified regulations will account for more variance in miles run per week, degree of moderate intensity exercise, degree of strenuous intensity exercise and life satisfaction than will intrinsic regulations.

**Methodology**

**Participants**

Participants were all runners who had completed either a 5K, 10K, half-marathon or full marathon. Participants were primarily recruited through online social media platforms, (Facebook, Instagram, Reddit) targeting runners of varying levels of expertise. Please reference
Appendix 1 for recruitment script. In total, 169 runners volunteered and completed at least one measure of the survey. The majority of respondents (71%) indicated they had been raised within the United States (N = 120). The sample was equally represented by males and females with 52% (N = 88) males and 47% (N = 80) females, with one participant indicating “genderless” as their preferred gender. Over 95% of participants were either married (N = 75) or had never been married (N = 87) with less than 4% of participants having been divorced (N = 6) or separated (N = 1). This sample was generally well educated: More than 81% of participants had completed at least a Bachelor’s degree or equivalent (N = 138) and less than 3% of the sample had completed only a high school degree or equivalent (N = 4). Additionally, participants represented a wide range of gross household income ($M = 92,284.77, SD = 78,840.97$) and were generally younger ($M = 31.66, SD = 8.89$).

To assess the level of expertise of this sample, participants were asked several questions exploring the amount of running they engage in, assessed in several parameters (days, miles and minutes) over the course of the last two months. Additionally, participants were asked to report the number of times they had completed a 5K, 10K, half marathon and full marathon as well as their best and average finish times for each of the above mentioned race lengths. For means and standard deviations of running demographics, see Table 1.

<table>
<thead>
<tr>
<th>Table 1</th>
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<tr>
<td>Means and Standard Deviations for Running Demographics</td>
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<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days run per week in past two months</td>
<td>4.63</td>
<td>8.89</td>
<td>168</td>
</tr>
<tr>
<td>Miles run per week in past two months</td>
<td>25.22</td>
<td>16.75</td>
<td>167</td>
</tr>
<tr>
<td>Minutes run per week in past two months</td>
<td>273.59</td>
<td>198.44</td>
<td>166</td>
</tr>
<tr>
<td>Completed 5Ks in last 24 months</td>
<td>4.01</td>
<td>9.63</td>
<td>146</td>
</tr>
<tr>
<td>Best 5K finish time</td>
<td>24.72</td>
<td>5.59</td>
<td>130</td>
</tr>
<tr>
<td>Average 5K finish time</td>
<td>26.10</td>
<td>5.73</td>
<td>119</td>
</tr>
<tr>
<td>Completed 10Ks in last 24 months</td>
<td>2.11</td>
<td>6.56</td>
<td>145</td>
</tr>
<tr>
<td>Best 10K finish time</td>
<td>51.94</td>
<td>12.52</td>
<td>87</td>
</tr>
<tr>
<td>Average 10K finish time</td>
<td>54.46</td>
<td>11.95</td>
<td>80</td>
</tr>
<tr>
<td>Completed half marathons in last 24 months</td>
<td>1.64</td>
<td>2.83</td>
<td>147</td>
</tr>
<tr>
<td>Best half marathon finish time</td>
<td>116.63</td>
<td>25.41</td>
<td>98</td>
</tr>
<tr>
<td>Average half marathon finish time</td>
<td>119.94</td>
<td>27.47</td>
<td>86</td>
</tr>
<tr>
<td>Completed marathons in last 24 months</td>
<td>0.89</td>
<td>2.61</td>
<td>126</td>
</tr>
<tr>
<td>Best marathon finish time</td>
<td>244.04</td>
<td>52.86</td>
<td>45</td>
</tr>
<tr>
<td>Average marathon finish time</td>
<td>250.41</td>
<td>54.67</td>
<td>39</td>
</tr>
</tbody>
</table>

On average, participants ran 4.63 (SD = 4.91) days per week, 25.22 (SD = 16.75) miles per week, and 273.59 (SD = 198.44) minutes per week over the past two months. At least 23% (N=34) had completed at least one 5K race, with over 55% (N = 80) of participants having completed more than one 5K race, and 21% (N = 31) never having completed a 5K race. A little more than 21% (N = 36) of the sample completed a 10K race, with 34% (N = 49) having completed more than one 10K race and 36% (N = 60) never having completed a 10K race. A quarter of participants (N = 43) completed at least one half marathon, while 44% (N = 52) of participants had completed more than one half marathon, and a little over 30% (N = 52) of the sample did not complete a half marathon. Lastly, 11% (N = 19) of participants completed at least one full marathon, with 18% of the sample having completed more than one full marathon, and half of participants (N = 84) not having completed any full marathons.
Measures

General demographic questions were given to participants regarding gender, age, height, weight, education, income, marital status, ethnicity, and geographical location (state) if located within the United States (please refer to Appendix 3). Additionally, participants answered questions regarding their running careers, assessing number of races ran at four different distances (5K, 10K, half-marathon, marathon) over the last twenty-four months, as well as best times received at each of the four race types. Other questions assessing running career included number of days, miles and hours ran in the past two months and, whether participants were involved in a running team or club (please refer to Appendix 4).

The Behavioral Regulation in Exercise – 3 (BREQ3) (Markland & Tobin, 2004) addressed what type of motivation each participant experiences. It is a 24-item questionnaire where participants are asked to rate each item on a 0 – 4 Likert scale. The anchors are “not true for me” and “very true for me.” An example item from the inventory is “I value the benefits of exercise.” Items across each type of motivation are averaged with a possible range of scores from 0 – 5, where 0 indicates a participant does not experience that type of motivation at all, and 5 indicates a participant is extremely motivated by the given regulation. For the complete questionnaire, please refer to Appendix 5.

The Godin Leisure-Time Questionnaire (GLTEQ) (Godin & Shephard, 1997) assessed vigor of exercise. Participants were asked to report the number of times, weekly, they engage in each type of exercise (strenuous, moderate, mild), and were also asked to indicate how often in a week they engage in activities “long enough to work up a sweat.” This scale is a four-item questionnaire where higher scores indicate more frequency of the given intensity of exercise. For the complete questionnaire, please refer to Appendix 6.
To assess life satisfaction, the Satisfaction with Life Scale (SLS) (Diener, Emmons, Larsen & Griffin, 1985) was given to participants. The SLS is a five-item questionnaire where participants are asked to rate their level of agreement with statements such as “In most ways my life is close to my ideal.” The Likert scale being used ranges from 1 “strongly agree” to 7 “strongly disagree.” All scores were reversed and summed across the five items. Possible scores ranged from 5, indicating deep dissatisfaction with life, to 35, indicating extreme satisfaction with life. For the complete questionnaire, please refer to Appendix 7.

**Procedures**

Participants were recruited utilizing the recruitment script in Appendix 1 via the Reddit #Running thread, several Facebook groups and pages with “running” in the title, and via Instagram using hashtags of the various forms of the word “running,” (e.g., #run, #runner, #running). Participants were asked to complete a survey concerning the psychological characteristics of runners and told that it would take approximately 35 minutes to complete. After participants had completed the survey, they were thanked and debriefed (please refer to Appendix 8).

**Results**

**Predicting Miles Run per Week**

To evaluate whether miles run per week was positively correlated with identified regulations, a Pearson correlation coefficient was conducted. The results show a weak positive relationship that was significant, $r = 0.23, p = .002$, one-tailed. These results show that as identified regulations increase, the number of miles run per week is likely to increase as well. Please reference Table 2 for these correlations.
To assess whether intrinsic regulations would account for more variability in miles run per week, a multiple linear regression was conducted with miles run per week entered as the dependent variable. Identified regulation and intrinsic regulation were entered as predictor variables. The multiple regression revealed that the model was significant, $R^2 = 0.05$, $F (2,162) = 4.31$, $p = .015$, and accounted for a total of 5% of the variability in miles run per week. Additionally, identified regulations significantly predicted miles run per week, independently, while intrinsic regulations did not.

Next, semi-partial correlations were conducted to explore the unique variance contributed by each variable to miles run per week. Identified regulation accounted for a significant amount of variability, $sr^2 = 0.03$, $p = .031$. However, intrinsic regulation did not account for a significant amount of variability in miles run per week, $sr^2 < 0.01$, $p = .635$. This information is summarized in Table 3. These results suggest that intrinsic motivation does not account for more variability in miles run per week than identified regulation. Additionally, these results suggest that identified regulations predicts miles run per week more strongly than does intrinsic regulations.
Table 3
Summary of Multiple Regression Predicting Mile Run per Week from Identified and Intrinsic Regulations

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>$b$</th>
<th>$\hat{\beta}$</th>
<th>$t$</th>
<th>$sr^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified Regulation</td>
<td>3.39</td>
<td>0.20</td>
<td>2.18*</td>
<td>0.03</td>
</tr>
<tr>
<td>Intrinsic Regulation</td>
<td>2.38</td>
<td>0.04</td>
<td>0.48</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*Note.* $N = 165$; *$p < .05$

**Predicting Intensity of Exercise**

A Pearson correlation coefficient was performed to evaluate whether the number of weekly times participants engaged in moderate exercise was positively correlated with identified regulations. The results suggest a weak, negative relationship between the number of times participants engaged in moderate exercise weekly, and identified regulations, however, the results were inconclusive, $r = -0.04$, $p = .317$, one-tailed, therefore, no further analyses were conducted.

It was also hypothesized that the number of times participants engaged in weekly strenuous exercise would be positively correlated with identified regulations. A Pearson correlation coefficient was performed to evaluate this hypothesis. The results show a weak, positive relationship that was significant, $r = 0.20$, $p = .006$, one-tailed, such that as identified regulations increase, participants are likely to engage in more strenuous exercise throughout the week. Please refer to Table 4 for these correlations.
To assess whether intrinsic regulations would account for more variability in the number of times participants engaged in strenuous exercise per week than identified regulations, a multiple linear regression was conducted with strenuous exercise entered as the dependent variable. Identified regulation and intrinsic regulation were entered as predictor variables. The multiple regression revealed that the model accounted for a significant amount of variability in strenuous exercise, $R^2 = 0.04$, $F(2,156) = 3.36$, $p = .037$.

Next, semi-partial correlations were conducted to explore the unique variance contributed by each variable to amount of strenuous exercise participants engaged in weekly. Identified regulation did not account for a significant amount of variability in strenuous exercise, however, it did trend towards significance, $sr^2 = 0.02$, $p = .084$. Intrinsic regulations did not account for a significant amount of variability in strenuous exercise, $sr^2 < 0.01$, $p = .545$. This information is summarized in Table 5. Taken together, these results suggest that intrinsic motivation does not account for more variability in the number of times participants engaged in strenuous exercise throughout the week than identified regulation. Additionally, these results suggest that identified regulations may predict strenuous exercise more strongly than intrinsic regulations.
Table 5
Summary of Multiple Regression Predicting Strenuous Exercise from Identified and Intrinsic Regulations

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>$b$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$sr^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified Regulation</td>
<td>0.70</td>
<td>0.17</td>
<td>1.74</td>
<td>0.02</td>
</tr>
<tr>
<td>Intrinsic Regulation</td>
<td>0.16</td>
<td>0.06</td>
<td>0.61</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*Note. $N = 159$*

**Predicting Life Satisfaction**

A Pearson correlation coefficient was used to evaluate the hypothesis that life satisfaction and identified regulations would be positively correlated. A very weak, positive relationship emerged, which was statistically significant, $r = 0.16, p = .024$, one-tailed. These results support the above hypothesis such that as identified regulations increase, participants are likely to experience more satisfaction with life. Please refer to Table 6 for a summary of these correlations.

Table 6
Summary of Pearson Correlation Coefficients among Identified Regulations, Intrinsic Regulations and Life Satisfaction

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intrinsic Regulations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Identified Regulations</td>
<td>0.53**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Life Satisfaction</td>
<td>0.10</td>
<td>0.16*</td>
<td></td>
</tr>
</tbody>
</table>

*Note. $N = 165; * p < .05, ** p < .01*
To assess whether intrinsic regulations would account for more variability in satisfaction with life, a multiple linear regression was conducted with life satisfaction entered as the dependent variable. Identified regulation and intrinsic regulation were entered as predictor variables. The multiple regression revealed that the model did not account for a significant amount of variability in life satisfaction, $R^2 = 0.03$, $F (2,155) = 1.97$, $p = .143$, and accounted for less than 3% of the variability in life satisfaction.

Next, semi-partial correlations were conducted to explore the unique variance contributed by each variable to life satisfaction. Identified regulations did not account for a significant amount of variability in life satisfaction, $sr^2 = 0.02$, $p = .121$. Similarly, intrinsic regulations did not account for a significant amount of variability in strenuous exercise, $sr^2 < 0.01$, $p = .858$. This information is summarized in Table 7. These results suggest that neither intrinsic regulations nor identified regulations explain a significant amount of variability of life satisfaction in this sample of runners.

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>b</th>
<th>$\beta$</th>
<th>t</th>
<th>$sr^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified Regulation</td>
<td>2.00</td>
<td>0.15</td>
<td>1.56</td>
<td>0.02</td>
</tr>
<tr>
<td>Intrinsic Regulation</td>
<td>0.16</td>
<td>0.02</td>
<td>0.18</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*Note. N = 158*

**Exploring Running Expertise and Motivation**

To explore whether motivation differed as a function of running expertise, all participants were categorized into four levels of expertise, where participants assigned a value of one had not
completed any races longer than a 5K (N = 29), participants assigned a value of two had not completed any races longer than a 10K (N = 23), participants assigned a value of three had not completed any races longer than a half-marathon (N = 63), and individuals assigned a value of four had completed at least a full marathon (N = 46).

Six independent sample, one-way ANOVAs were conducted. All models were statistically non-significant, however, the model exploring integrated motivation as a function of running expertise approached significance, $F(3,157) = 2.18, p = .093$. After conducting Bonferroni post hoc analyses, it appeared that individuals who had completed race lengths no longer than 10K were less motivated with integrated motivations ($M = 3.91, SD = 0.71$) than participants who had ran marathons, ($M = 4.32, SD = 0.73$). However, this comparison only approached significance, $p = .172$. No other post hoc comparisons were statistically significant.

Please refer to Table 8 for all means and standard deviations.

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amotivation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td>1.07</td>
<td>0.16</td>
</tr>
<tr>
<td>10K</td>
<td>1.09</td>
<td>0.23</td>
</tr>
<tr>
<td>Half-Marathon</td>
<td>1.07</td>
<td>0.20</td>
</tr>
<tr>
<td>Marathon</td>
<td>1.09</td>
<td>0.21</td>
</tr>
<tr>
<td><strong>External Regulations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td>1.47</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>5K</td>
<td>10K</td>
</tr>
<tr>
<td>---------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Identified Regulations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td>3.36</td>
<td>3.63</td>
</tr>
<tr>
<td>10K</td>
<td>3.37</td>
<td>3.49</td>
</tr>
<tr>
<td>Half-Marathon</td>
<td>3.63</td>
<td>3.49</td>
</tr>
<tr>
<td>Marathon</td>
<td>3.91</td>
<td>4.32</td>
</tr>
<tr>
<td>Identified Regulations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td>4.49</td>
<td>4.63</td>
</tr>
<tr>
<td>10K</td>
<td>4.62</td>
<td>4.67</td>
</tr>
<tr>
<td>Half-Marathon</td>
<td>4.62</td>
<td>4.32</td>
</tr>
<tr>
<td>Marathon</td>
<td>4.67</td>
<td>4.32</td>
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<tr>
<td>Integrated Regulations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td>3.76</td>
<td>3.91</td>
</tr>
<tr>
<td>10K</td>
<td>4.34</td>
<td>4.67</td>
</tr>
<tr>
<td>Half-Marathon</td>
<td>4.31</td>
<td>4.32</td>
</tr>
<tr>
<td>Marathon</td>
<td>4.41</td>
<td>4.41</td>
</tr>
</tbody>
</table>
To further evaluate whether motivation differed as a function of running expertise, all participants were assigned to either a high level of expertise or low expertise per race type (e.g., 5K, 10K, half-marathon, and marathon) based upon their best race finish times. Participants were assigned high level of expertise if their finish times were one standard deviation below the mean, and assigned low level of expertise if their finish times were at or above the mean. Independent-samples t-tests were then conducted comparing high and low levels of expertise of all four race types across all six dimensions of motivation.

Motivation for all six dimensions did not differ as a function of expertise at the 5K, 10K or marathon race lengths. However, individuals with low half-marathon running expertise experienced more external motivation ($M = 1.59, SD = 0.73$) than did individuals with high half-marathon running expertise ($M = 1.10, SD = 0.17$). This was a statistically significant difference, $t(48) = 2.09, p = .042$. No other comparisons were statistically significant.

**Discussion**

Overall, these findings support the hypothesis that identified regulations can account for more variance than that of intrinsic regulations across several different dependent variables in a sample of runners who vary in their expertise of running.

**Miles Run per Week**

It was hypothesized that the number of miles run per week, a measure of running expertise, would be positively correlated with identified regulations, and the results support this hypothesis. Participants who were highly motivated with identified regulations tended to run more miles per week. Additionally, it was hypothesized that identified regulations would
account for more unique variance than intrinsic regulations and this hypothesis was also supported. Identified regulations accounted for a significant amount of variance in the number of miles participants ran per week, while intrinsic regulations did not.

The number of miles participants ran in a week acted as an indicator of behavior adherence in this study, where participants who ran more miles per week had higher adherence to running than those participants who ran fewer miles in a week. These results support the idea that identified regulations are increasingly important as adherence to running increases, while intrinsic regulations seem to influence adherence to a lesser extent. Although SDT, as it has been conceptualized by Ryan and Deci (1985), posits that intrinsic regulations are the most critical in exercise adherence, these results fall in line with more current literature that show support for identified regulations in behavior adherence rather than intrinsic regulations (Ng et al., 2012; Teixeira et al., 2012).

**Intensity of Exercise**

It was hypothesized that the number of times participants engaged in moderate exercise would be positively correlated with identified regulations. The results from this sample suggest a non-relationship between these two variables. Interestingly, there was a similar non-relationship between moderate exercise and intrinsic regulations. These results are not supported by previous literature where both intrinsic and identified motivations correlate with moderate intensity exercise (Ryan & Deci, 2000; Teixeira et al., 2012). It might be that because this study was targeting individuals who specifically engage in strenuous exercise, running, individuals did not actually engage in as much moderate exercise, resulting in the non-relationship. Indeed, participants generally engaged in less moderate exercise than strenuous by almost three occurrences per week.
It was also hypothesized that the number of times participants engaged in strenuous exercise would be positively correlated with identified regulations, and the results support this hypothesis. A weak relationship emerged, such that participants who were more motivated by identified regulations engaged in more strenuous exercise throughout the week. Considering the findings with miles run per week, this is not a surprising relationship. Running is a strenuous activity, so miles run per week and strenuous exercise should share similar relationships with identified regulations. Although previous literature proposes mixed findings regarding this type of exercise and its relationship with identified regulations (Teixeira et al., 2012), these results support the idea that identified regulations are more critical than intrinsic regulations in the domain of exercise behavior.

The hypothesis that identified regulations would account for more unique variance in strenuous exercise than intrinsic regulations was also supported. However, identified regulations did not contribute a significant amount of unique variance, but it did trend towards significance. Intrinsic regulations did not contribute a significant amount of unique variance to strenuous exercise. Although both regulations together did significantly predict the number of times participants engaged in strenuous activity weekly. Together, these results suggest that identified regulations are a stronger predictor and account for more variance in the amount of strenuous exercise participants engage in than intrinsic regulations.

**Life Satisfaction**

It was hypothesized that identified regulations and life satisfaction would have a positive relationship, and this hypothesis was supported. Similarly, intrinsic regulations had a positive relationship with life satisfaction, however it was not significant. These results indicate that identified regulations and life satisfaction are related, while intrinsic regulations and life
satisfaction are not. Satisfaction with life acted as an indicator of well-being for this study. Previous literature has not clearly indicated what type of relationship identified regulations shares with well-being (Teixeira et al., 2012; Schutte & McNeil, 2015), however previous literature has found that the more intrinsically motivated an individual is, the higher that person’s well-being (Ryan & Deci, 2000; Teixeira et al., 2012), so the present relationship is interesting in that intrinsic regulations were not related to life satisfaction. Further research is warranted to fully understand these relationships.

It was hypothesized that identified regulations would account for more unique variance of life satisfaction than intrinsic motivation. Although the results support this hypothesis, neither predictor accounted for a significant amount of variance of life satisfaction, nor was the overall model predictive of life satisfaction. These results show, again, that identified regulations are a stronger predictor and can account for more variance in life satisfaction than does intrinsic regulations, at least in this sample of runners. However, the relationship identified regulations shares with life satisfaction is very weak, accounting for less than five percent of the variance in life satisfaction. Possible explanations for this weak relationship are discussed further in limitations and future directions.

**Running Expertise and Motivation**

Recall that exploratory analyses were conducted to see if different types of motivation varied as a function of running expertise. After attempting to break down running expertise in several different ways, it appears that level of motivation does not generally vary due to running expertise. There was one exception: When comparing high expertise (one standard deviation above the mean best finish time) and low expertise (at or below the mean best finish time) runners of half-marathons, individuals with less expertise experienced more external regulations.
than half-marathon runners with a high level of expertise. This finding seems to fall in line with previous literature which shows that individuals with more intrinsic regulations, and less extrinsic regulations, tend to challenge themselves more and engage in more difficult tasks (Ryan & Deci, 2000; Teixeira et al., 2012). Perhaps half-marathon runners with high levels of expertise and better finish times are able to physically challenge themselves more due to fewer external regulations, whereas half-marathon runners with low levels of expertise and below mean finish times do not because of higher levels of external regulations. However, further research is warranted to understand this relationship, and to evaluate whether motivation type differs by running expertise.

Limitations and Future Directions

Although these results appear to support the idea that identified regulations may be a better predictor and account for more variability of exercise adherence, strenuous exercise and life satisfaction than does intrinsic regulations, this study was not without limitations.

Even though data were primarily collected via online social media platforms, this sample was fairly representative of competitive runners with nearly a quarter of participants having been raised outside of the United States. However, data were collected in the late winter months of February and March. Trends show that people are generally less active during this time (Atkin, Sharp, Harrison, Brage, & Van Sluijs, 2016; Mendes, 2011) which may have influenced several variables measuring exercise activity, resulting in weak relationships with the different types of motivations measured. Future research might benefit from taking this into account and sampling running populations over the course of several months.

This study was primarily interested in exploring motivation in a sample of runners. Therefore, it is unclear whether individuals who exercise in various other ways are motivated
differently than was observed in this study. Current research shows mixed findings regarding the relationship between identified regulations and general exercise (Ng et al., 2012; Teixeira et al., 2012). Future research should expand the participant pool to include more diverse types of recreational and competitive exercise in order to further understand the types of motivations that exist in the different ways that people exercise.

It should be noted that the BREQ3 (Markland & Tobin, 2004) was used to evaluate motivations in this sample of runners. Although designed to evaluate exercise generally, a more telling measure might have been a questionnaire designed to evaluate motivations in competitive sport individuals. The Sport Motivation Scale (SMS) (Pelletier, Fortier, Vallerand, Brière, Tuson, & Blais, 1995) or Behavioral Regulations in Sport Questionnaire (BRSQ) (Lonsdale, Hodge, and Rose, 2008) may yield different results than were observed in this study.

Relatedly, ceiling effects were observed in several different types of motivation, namely identified regulations. To this researcher’s knowledge, this issue has not been observed in other similar studies utilizing the BREQ3. It is unclear whether this is due to the nature of the population and exercise of focus, where runners are generally motivated through identified regulations, or an anomaly. Future research may find it useful to explore identified and intrinsic regulations with a different measure of motivation that allows for a wider range of variability. Effects observed in this study may be even stronger for measures that fit the above criteria.

Lastly, this was only a correlational study and did not explore why identified regulations may be more important than intrinsic motivations in the context of exercise behavior. Future research might consider exploring these motivations in a longitudinal study to see if and how these motivations change over time. Additionally, it would be useful to see if encouraging
identified motivations in an experimental setting might be beneficial, as compared to encouraging individuals to exercise for intrinsic motivations.

**Conclusions**

In sum, these results suggest that SDT may not be as applicable to exercise behavior as previously thought. Identified regulations appear to predict a number of different variables to a greater extent than intrinsic motivations. In exploring the types of regulations that individuals are motivated to exercise by, health care professionals, can more adequately and accurately encourage individuals to exercise, ultimately reducing the mortality caused by physical inactivity and the health issues associated with sedentary lifestyles.
References


Appendix 1

Recruitment Script

Hello. My name is Kassandra Cousineau and I am a graduate student in the Psychology MA program at SUNY New Paltz. I am conducting a research study studying runners at varying levels of expertise. If you have participated in a 5k, 10k, half-marathon, and/or a marathon, and are 18 years or older, you are eligible to participate in this study. It should take you no more than 35 minutes to complete the survey.

Your participation is completely voluntary and you may stop the survey at any time. There are no foreseeable risks involved with participating in this study. Although the results of this study will contribute to our understanding of runners, these results will probably have no direct benefits to you as a participant. The findings from this study may be published, but it will not contain any identifying material. All of your responses will be kept anonymous.

This survey has been approved by the SUNY New Paltz Human Research Ethics Board.

If you have any questions or concerns, please contact myself, Kassandra Cousineau, at cousinek1@hawkmail.newpaltz.edu, or my advisor, Glenn Geher, at geherg@newpaltz.edu.

Please use the following link to access the survey:
https://newpaltz.co1.qualtrics.com/SE/?SID=SV_4SoZLneDYKQzoBT

Or the following link to access the survey via our webpage:

Thank-you for your time and consideration!
Appendix 2

Directions for participants

This is a research study exploring the psychological characteristics of runners at varying levels of expertise. It involves simply filling out the questions below. In all, your participation should take only 40 minutes to complete.

There are no foreseeable risks involved with participating in this study. Although the results of this study will contribute to our understanding of runners, these results will probably have no direct benefits to you as a participant. The findings from this study may be published, but it will not contain any identifying material. All of your responses will be kept anonymous.

We would be pleased to answer any questions you have now, or you may contact me, Kassandra Cousineau, at cousinek1@hawkmail.newpaltz.edu, or my advisor, Glenn Geher, at geherg@nawpaltz.edu, with questions about this research.

Your participation is completely voluntary; you may stop participating at any time prior to the completion of the survey.

By continuing on to the first section of this survey, you have read the above and give your consent to participate in this study.
Appendix 3

General Demographics

What is your gender?

How old are you?

What is your height?

What is your weight?

What is your gross household income?

What is your nationality?

If located within the United States, what state do you currently reside in?

What is your ethnicity?
- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian / Pacific Islander
- Other

What is your marital status?
- Married
- Widowed
- Divorced
- Separated
- Never Married

What is the highest degree, or level of schooling, you have received?
- No schooling completed
- 8th grade
- High school graduate, or equivalent (GED)
- Some college
- Associate degree (AA, AS)
- Bachelor’s degree (BA, AB, BS)
- Master’s degree (MA, MS, MEng, Med, MSW, MBA)
- Professional degree (MD, DDS, DVM, LLB, JD)
- Doctorate degree (PhD, EdD)
Appendix 4

Running Demographics

Do you participate in a running club or team?
- Yes
- No

Do you have a coach, an individual who instructs or trains you, in running?
- Yes
- No

How much have you run during the past two months in the various parameters that follow? Please estimate if you do not know exactly.
- Days per week
- Miles per week
- Hours per week

How much have you cross-trained (e.g., cycled) during the past two months in the various parameters that follow? Please estimate if you do not know exactly.
- Days per week
- Miles per week
- Hours per week

In the past 24 months, how many times have you completed a:
- 5K race
- 10K race
- Half-marathon
- Marathon

In the past 24 months, what was your best finish time (hours followed by minutes) for the following race lengths? (i.e., 3:15:33 or 0:22:25). Please estimate if you do not know exactly.
- 5K race
- 10K race
- Half-marathon
- Marathon

In the past 24 months, what was your approximate average finish time (hours followed by minutes) for the following race lengths? (i.e., 3:15:33 or 0:22:25). Please estimate if you do not know exactly.
- 5K race
- 10K race
- Half-marathon
- Marathon
### Behavioral Regulations in Exercise Questionnaire – (BREQ3)

Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about exercise.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not true for me</th>
<th>Sometimes true for me</th>
<th>Very true for me</th>
</tr>
</thead>
<tbody>
<tr>
<td>It’s important to me to exercise regularly.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I don’t see why I should have to exercise.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I exercise because it’s fun.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I feel guilty when I don’t exercise.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I exercise because it is consistent with my life goals.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I exercise because other people say I should.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I value the benefits of exercise.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I can’t see why I should bother exercising.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I enjoy my exercise sessions.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I feel ashamed when I miss an exercise session.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I consider exercise part of my identity.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I take part in exercise because my friends/family/partner say I should.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I think it is important to make the effort to exercise regularly.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I don’t see the point in exercising.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I find exercise a pleasurable activity.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I feel like a failure when I haven’t exercised in a while.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I consider exercise a fundamental part of who I am.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Statement</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>I exercise because others will not be pleased with me if I don’t.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I get restless if I don’t exercise regularly.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I think exercising is a waste of time.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I get pleasure and satisfaction from participating in exercise.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I would feel bad about myself if I was not making time to exercise.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I consider exercise consistent with my values.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I feel under pressure from my friends/family to exercise.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Appendix 6

Godin Leisure-Time Exercise Questionnaire (GLTEQ)

During a typical 7-day period (a week), on how many occasions, on average, do you do the following kinds of exercise for more than 15 minutes during your free time (write in each box the appropriate number). (It is possible to have more than one occasion in a single day).

a) Strenuous exercise (heart beats rapidly) e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling

b) Moderate exercise (not exhausting) e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing

c) Mild exercise (minimal effort) e.g., easy walking, yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling

During a typical 7-day period (a week), in your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

Often          Sometimes          Never/Rarely
Appendix 7

**Satisfaction in Life Scale (SLS)**

Using the scale, please indicate your agreement with each statement below.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Somewhat agree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most ways, my life is close to my ideal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>The conditions of my life are excellent.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I am satisfied with my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>So far, I have gotten the important things I want in life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>If I could live my life over, I would change almost nothing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
Appendix 8

Debriefing Statement

Thank-you for your participation.

Please do not hesitate to contact Kassandra Cousineau, the principal investigator of the study, at cousinek1@hawkmail.newpaltz.edu, or Glenn Geher, thesis advisor, at geherg@newpaltz.edu with any questions regarding this survey or research.