

# Feasibility Study on the Relationship Between Aerobic Capacity and Intrinsic Motivation Associated with Task Self-Regulation

Direct Original Research

Open Access



Submitted: December 23, 2025

Accepted: February 24, 2026

Published: March 3, 2026



Copyright, 2026 by the authors. Published by Pinnacle Science and the work is licensed under the Creative Commons Attribution 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

Research in  
Psychology and  
Behavior: 2026,  
Volume 6 (Issue 1): 3

ISSN 3069-0757

Mindy H. Mayol<sup>1</sup>, Trent E. Cayot<sup>1</sup>, Nathaniel R. Eckert<sup>1</sup>, Candice Burkett<sup>2</sup>, Kendall Ellis<sup>1</sup>, Kelsey Stamm<sup>1</sup>, Emma Petersen<sup>1</sup>, Sebastian Murillo<sup>1</sup>, Christopher Miller<sup>1</sup>, Ines Oliveira<sup>1</sup>, Delaney Muldoon<sup>1</sup>

<sup>1</sup>University of Indianapolis, Department of Kinesiology Health & Sport Sciences, Indianapolis, Indiana/USA

<sup>2</sup>University of Indianapolis, Department of Psychology, Indianapolis, Indiana/USA

## Abstract

**Introduction:** Law enforcement officers (LEOs) face demands that require optimal task performance despite possible motivational challenges. This feasibility study's purpose was to investigate the relationship between  $VO_{2max}$  and four motivation-based constructs in healthy, similar-aged individuals as LEO cadets. A better understanding of the relationship between physical fitness and intrinsic motivation is imperative in the future facilitation of LEO studies regarding task self-regulation.

**Methods:** 16 students ( $n_{males}=9$ ,  $n_{females}=7$ ; age= $23\pm 3$  yr) attending a private, Midwestern university completed a graded exercise test to volitional fatigue on a stationary cycle ergometer and the Task Evaluation Questionnaire designed to measure four motivational constructs after performing a given activity: interest/enjoyment (I/E), perceived competence (PCo), perceived choice (PCh), and pressure/tension (P/T). Due to non-normally distributed data, a Spearman's rank-order correlation was performed with an alpha level of  $p<0.05$  set for statistical significance.

**Results:** Findings suggested that there was a positive, strong relationship between  $VO_{2max}$  ( $42.0\pm 10.6$ ) and I/E ( $34.8\pm 6.7$ ), which was statistically significant,  $r_s(14)=-.639$ ,  $p=.008$ .

**Conclusions:** Overall, a monotonic association was found illustrating that as the I/E motivation construct increased,  $VO_{2max}$  also tended to increase in the same relative direction at differing rates.

**Key Words:** pilot study,  $VO_{2max}$ , self-determination

Corresponding author: Mindy Hartman Mayol, [mmayol@uindy.edu](mailto:mmayol@uindy.edu)

## Introduction

Law enforcement officers (LEOs) face both physical and psychosocial demands while in training and on the job and are required to optimally perform tasks despite possible motivational challenges. Past research has demonstrated that regular physical activity was associated with significant, positive effects on mental health and motivation in LEOs<sup>1</sup>. The stressful impacts and job strain that LEOs have been known to experience present various health and well-being concerns (e.g., poor diet, infrequent exercise, inadequate sleep, mental and physical exhaustion) in an occupation that requires optimal functioning<sup>2</sup>. Moreover, research also has suggested that LEO physical training programs can significantly improve measures of physical fitness, increase cadet passing rates on required fitness assessments, and improve performance in simulations of occupationally specific tasks indicating high task self-regulation and persistence<sup>2</sup>.

According to the Self-Determination Theory (SDT), intrinsic motivation and self-regulation are closely related concepts where intrinsic motivation is known to facilitate effective self-regulation by making the process of pursuing task-specific goals more self-determined and aligned with personal values<sup>3</sup>. Additionally, those who are intrinsically motivated are more inclined to demonstrate high self-control and provide their own reinforcement with robust task and goal-related habits (e.g., consistent physical activity without immediate rewards) streamlining the self-regulation process<sup>4-5</sup>. Evidence suggests that intrinsically motivated individuals are more likely to possess and deploy self-regulation resources in order to remain psychologically flexible when responding to and managing situational demands (e.g., persistence when conflict is present)<sup>6-8</sup>. Thus, there is a great need for a better understanding of how intrinsic motivation and task self-regulation play a role in the physical and metacognitive training of LEO cadets.

The purpose of this feasibility study was to examine the relationship between aerobic capacity ( $VO_{2max}$ ) and four motivation-based constructs relating to task self-regulation in healthy, similar-aged individuals where  $VO_{2max}$  served as the task in connection with task self-regulation. Interest/enjoyment (I/E) is a measure of intrinsic motivation, PCo measures feelings of being skilled in executing the task, and PCh measures feelings of autonomy for task engagement while P/T measures negative affective states experienced during the task (e.g., stress, nervousness)<sup>9-10</sup>. Past studies have shown that perceived competence (PCo) and perceived choice (PCh) are known positive predictors of measures of intrinsic motivation, and pressure/tension (P/T) is a known negative predictor of intrinsic motivation<sup>9-10</sup>. The findings from this study are expected to inform future research investigations in the law enforcement population.

## Methods

### *Participants*

Sixteen college students ( $n_{males} = 9$ ,  $n_{females} = 7$ ; age =  $23 \pm 3$  yr) were recruited from a single, private Midwestern university and voluntarily participated in this feasibility study. Study participation eligibility included that participants a) not have a diagnosis or signs/symptoms of cardiorespiratory, neurological, metabolic, musculoskeletal, or renal disease, b) reported no diagnosed musculoskeletal injuries within the past 6 months, and c) were between the ages of 18 and 40 years old. After Institutional Review Board approval, those who agreed to participate read and signed an informed consent form before testing commenced.

### *Protocol*

Once the informed consent form was completed, each participant was asked to provide information about their medical and physical training history. Next, participants were asked to complete a ramp (20 W/min) graded exercise test (GXT) to volitional fatigue on a stationary cycle ergometer while wearing a face mask that collected oxygen intake and carbon dioxide output and a chest strap that measured heart rate. The ramp GXT was performed to physically fatigue the participants and to quantify the participants'  $VO_{2max}$ .

After participants cooled down following the GXT, participants were then asked to complete the online, self-report Task Evaluation Questionnaire, a specific 22-item version of the 45-item Intrinsic Motivation Inventory (IMI) Scale<sup>9-10</sup>, designed to measure four motivational constructs closely aligned with the SDT (I/E, PCo, PCh, and P/T) after performing a given activity or task. The IMI is a validated, multi-dimensional measurement used to assess participants' subjective experience related to a target activity allowing for an understanding of differentiating between positive engagement (interest, competence) and negative compliance (pressure, lack of choice)<sup>9-10</sup>. The Task Evaluation Questionnaire is measured on a 7-point Likert-type scale (1 = not at all to 7 = very true) with six items needing reverse scored before the four constructs can be formed (I/E = 7 items; PCo = 5 items; PCh = 5 items; and P/T = 5 items).

### *Statistical Analysis*

Due to the data demonstrating a non-normal distribution, Spearman's rank-order correlation test was performed with an alpha level of  $p < 0.05$  set to examine if relationships existed between  $VO_{2MAX}$  and I/E, PCo, PCh, and/or P/T. All data were analyzed via SPSS version 28.0 (IBM Corp., Armonk, NY).

## Results

Findings suggested that there was a positive, strong monotonic correlation between  $VO_{2max}$  ( $42.0 \pm 10.6$ ) and I/E ( $34.8 \pm 6.7$ ), which was statistically significant ( $r_s(14) = 0.639$ ,  $p = 0.008$ ). No other statistically significant relationships were observed between  $VO_{2max}$  and PCo ( $r_s(14) = 0.370$ ,  $p = 0.159$ ), PCh ( $r_s(14) = 0.032$ ,  $p = .905$ ), and P/T ( $r_s(14) = -0.288$ ,  $p = 0.280$ ).

## Discussion

The aim of the current feasibility study was to assess if relationships existed between  $VO_{2MAX}$  and I/E, PCo, PCh, and P/T in healthy, similar-aged individuals to that of law enforcement cadets. Study results showed one positive, strong, monotonic, and statistically significant correlation between  $VO_{2MAX}$  and I/E. No other statistically significant correlations were revealed between  $VO_{2max}$  and PCo, PCh, or P/T. Overall, the current study's findings illustrated that as the I/E motivation construct increased,  $VO_{2max}$  also tended to increase in the same relative direction but at different rates.

Past studies have demonstrated a cyclical relationship between task self-regulation being associated with enhanced performance and intrinsic motivation<sup>11</sup>. The current study's findings demonstrated a paralleled relationship to previous studies that suggest that individuals who are intrinsically motivated to reach a specific task goal may ascribe in self-regulatory activities in the pursuit of that task<sup>6-7, 12-14</sup>. Specifically, the feasibility study's trend and participant population of healthy, similar-aged persons to LEO cadets may present potential connections to future studies with the LEO cadets population examining physical fitness and intrinsic motivation associated with task self-regulation.

However, the other three constructs of task evaluation that includes perceived competence and feelings related to autonomy and pressure (PCo, PCh, or P/T) showed a lack of relationship with  $VO_{2max}$ . Future investigations into these motivational constructs and their association with physical fitness measures in the LEO population need to be examined further as factors such as reward structures, instructional devices, time constraints, or feedback in order to understand the extent to which a specific task supports or undermines a cadet's intrinsic motivation and sense of task self-efficacy<sup>12-14</sup>. Evidence suggests that LEOs who are physically fit demonstrate enhanced motivation, mental health, and self-regulation<sup>1</sup>. In addition, previous studies indicated that physical fitness programming provided for law enforcement cadets showed improvements in a multitude of physical and occupational-based performance measures with researchers recommending that institutional policies be established to promote physical and mental performance-enhancing behaviors among tactical operators<sup>1-2</sup>.

This study was not without its limitations. The study's measurement tools (i.e., demographics/historical items and Task Evaluation Questionnaire) were self-reported in nature posing a risk of social desirability bias (truthfulness of answering questionnaire items). In addition, the healthy, similar-aged-to-cadet participants in this study completed the aerobic capacity task voluntarily whereas LEO cadets complete their physical fitness tests as an academy requirement which, in turn, could influence intrinsic motivation and self-regulation differently. Moreover, the current study design cannot determine whether higher intrinsic motivation led to greater aerobic capacity, whether higher fitness levels increased enjoyment of the task, or whether both were influenced by prior training history. Environmentally, the study was completed under strict, controlled conditions of which would likely be impractical in nonlaboratory based space. Therefore, the mode of  $VO_{2max}$  testing may be a limiting factor depending on equipment availability. However, the study was designed as a feasibility study in a healthy population with a smaller sample size for the purpose of these results being used to inform the researchers in potential future law enforcement cadet studies with larger sample sizes.

## Conclusions

Results indicated a strong, positive monotonic correlation between  $VO_{2max}$  and I/E. Further research should seek research designs experimental in nature to examine task self-regulation as well as motivation sources over multiple time points throughout a cadet's physical and metacognitive training and expand the range of participants to include active LEOs in order to produce more generalized results on behalf of the law enforcement community. Additionally, collecting information about cadets' self-regulatory habits and strategies employed during fatiguing demands (e.g., physical fitness tests) would give a more comprehensive view of the relationship between self-regulation and successful physical fitness outcomes as a whole. Findings from this study may be useful in developing future research studies as previously mentioned to best inform those in law enforcement leadership of the interplay between physical fitness, task self-regulation, and intrinsic motivation.

**Acknowledgements.** The authors would like to sincerely thank the participants for their time and efforts during the research investigation.

**Conflict of Interest.** The authors declare no conflicts of interest.

## References

1. Lin P-Y, Tseng P, Liang W-M, Lin W-Y, Cheng Y-P, Kuo H-W. The mediating effect of health behaviors on the association between job strain and mental health outcome: a national survey of police officers. *Sci Rep*. 2015;14(1), 1–8. Doi: 10.1038/s41598-024-60746-8.
2. Cocke CW, Orr RM. The impact of physical training programs on the fitness of tactical populations: A critical review. *Aust J Strength Cond*. 2015;23(1), 39–52.
3. Werner KM, Ford BQ. Self-control: An integrative framework. *J Pers Soc Psychol*. 2023;17. Doi: 10.1111/spc3.12738.
4. Radel R, Pelletier L, Pjevac D, Cheval B. The links between self-determined motivations and behavioral automaticity in a variety of real-life behaviors. *Motiv Emot*. 2017;41, 443–454. Doi: 10.1007/s11031-017-9618-6.
5. Saunders B, More KR. Some habits are more work than others: Deliberate self-regulation strategy use increases with behavioral complexity, even for established habits. *J Pers*. 2025;93, 233–246. Doi: 10.1111/jopy.12926.
6. Leduc-Cummings I, Werner KM, Milyavskaya M, Dominick JK, Cole S. Experiencing obstacles during goal pursuit: The role of goal motivation and trait self-control. *J Res Pers*. 2022;99. Doi: 10.1016/j.jrp.2022.104231.
7. Inzlicht M, Roberts B. The fable of state self-control. *Curr Opin Psychol*. 2024; 58. Doi: 10.31234/osf.io/9x6a5.
8. Werner KM, Berkman, ET. Motivational dynamics of self-control. *Curr Opin Psychol*. 2024;8, 59. Doi: 10.1016/j.copsy.2024.101859
9. McAuley E, Duncan T, Tammen VV. Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Res Q Exerc Sport*. 1989;60, 48-58.
10. Ryan RM, Koestner R, Deci EL. Varied forms of persistence: When free-choice behavior is not intrinsically motivated. *Motiv Emot*. 1991;15, 185-205.
11. Callan G, Rubenstein LD, Barton T, Halterman A. Enhancing motivation by developing cyclical self-regulated learning skills. *Theory Into Practice*. 2021;61(3). Doi: 10.1080/00405841.2021.1932153.
12. Maillet MA, Grouzet FME. Healthy eating in daily life: the role of relative autonomous motivation when it is difficult. *Motiv Emot*. 2022;46, 640–657. Doi: 10.1007/s11031-022-09960-3.
13. Van Gestel LC, Adriaanse MA, De Ridder DTD. Who accepts nudges? nudge acceptability from a self-regulation perspective. *PLoS ONE*. 2021;16. Doi: 10.1371/journal.pone.0260531.
14. Duckworth AL, Gross JJ. Behavior change. *Organ. Behav. Hum. Decis. Process*. 2020;161, 39–49. Doi: 10.1016/j.obhdp.2020.09.002.