

# Does motivational regulation affect physical activity patterns among Norwegian Police University College students?

International Journal of  
Police Science & Management  
1–11

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DOI: 10.1177/14613557211027189

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## Abstract

Physical readiness is important for operative police officers to cope with occupational tasks. Despite this, physical activity and physical fitness among police officers decrease throughout their occupational career. Self-determination theory (SDT) is a major theoretical approach in motivation research for sports and physical activity. SDT describes types of motivation and motivational regulation and how they are related to physical activity and physical activity adherence. This study aims to explore whether there is a relationship between motivation and the physical activity level of future police officers. The study was based on a survey design, including two questionnaires: Motives for Physical Activities Measure – Revised, measuring motivational regulation; and International Physical Activity Questionnaire – short form, measuring physical activity. Two hundred and fifty-eight students at the Norwegian Police University College (NPUC) participated in the study. Our results revealed that motivational regulation, especially intrinsic and integrated regulation, significantly predicted physical activity among NPUC students. Our findings support the basics of SDT, and how it is related to physical activity patterns and physical activity adherence. When discussing physical training and physical readiness, and to understand the reduction in physical activity and fitness among police officers, one cannot neglect the importance of exploring and understanding the motivation for physical activity among police officers. Educational institutions like the NPUC have an important role in securing minimum levels of physical fitness when graduating students, but even more importantly they can have a central part in nurturing intrinsic motivation for physical activity for the future police officers, which facilitates physical activity adherence throughout their policing career.

## Keywords

Physical readiness, policing, occupational demands, self-determination theory, fitness

Submitted 09 Jun 2020, Revise received 06 May 2021, accepted 03 Jun 2021

## Introduction

### *Physical demands and physical fitness in policing*

Today's policing is dominated by sedentary work (Lagestad, 2012) such as office tasks, interrogation and traffic patrols. However, especially in operative police work, the sedentary nature of the work is interrupted by physical tasks. The physical tasks that police officers perform most frequently have been identified as jumping, crawling, balancing,

climbing, lifting, carrying, pushing, pulling, dragging and use of force/fighting (Bonneau and Brown, 1995; Hoffman and Collingwood, 2015). Some of the tasks are performed daily, such as carrying personal gear when on foot patrol, or

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lifting and carrying equipment, for example, to the police car, when getting ready for the work shift. However, in the nature of police work situations that are more critical also occur. The use of physical force to gain control of a suspect in an arrest situation and the handling of different critical incidents, such as road traffic accidents, fires or natural disasters and search and rescue missions, are all occupational tasks that require higher levels of physical exertion from the officer. Some critical situations even demand maximal physical involvement for the officers involved (Bonneau and Brown, 1995; Boyce et al., 2009), and in some situations involving weapons such as armed robberies or terror attacks, the unpredictability of when the situations occur and what they entail can result in additional levels of stress for officers. Police officers' physical readiness for critical situations that may occur are a matter of safety for the officers themselves, and for the public involved (Bonneau and Brown, 1995; Hoffman and Collingwood, 2015).

Therefore, one can argue that despite the domination of sedentary police work, police officers should strive to uphold a certain level of fitness to meet these physically challenging tasks (Dillern et al., 2013; Hoffman and Collingwood, 2015; Lagestad, 2012; Scofield and Kardouni, 2015). A sufficient level of physical fitness needs to be acknowledged as a prerequisite for handling police work in general (Dillern et al., 2013). For each officer to develop, and sustain, the necessary level of physical fitness, regular physical training is essential. Because the physical demands required are so varied and complex, physical training must be wide-reaching with the aim of affecting general attributes of physical fitness, such as maximum and relative strength, muscular endurance, aerobic endurance, core strength, coordination and mobility. Furthermore, regular physical training is not only important to cope with physically demanding occupational tasks, but also has important health benefits. Physical activity is important to uphold good health and there are proven positive relationships between the level of physical activity and work ability index (Boni, 2004; Kaleta et al., 2004). Maintaining a physically active, fit and healthy police corps is advantageous and should be a priority for police authorities (Dillern et al., 2014).

As a response to this, physical training is a part of the curriculum at the Norwegian Police University College (NPUC). Students must pass mandatory physical fitness tests both on entrance to the NPUC and as part of graduation. In fact, students graduating from NPUC have been shown to score relatively highly in different physical tests compared with other relevant groups (Dillern et al., 2013). However, after graduation from NPUC physical fitness is found to decrease significantly (Lagestad et al., 2014). This same decrease has been found in other international studies (Burelle et al., 1987; Sørensen et al., 2000) and may have

many explanations. One is that the nature of daily police work is so physically undemanding that the work itself is not enough to maintain physical fitness. Another explanation is the lack of physical testing and demands in the Norwegian Police Force, and a lack of facilitation for exercise during work hours by police authorities and leaders (Dillern et al., 2013; Lagestad and Van Den Tillaar, 2014). For each officer to cope with the demands of the profession it is indispensable that they engage in leisure time physical activity and exercise (Smolander et al., 1984). Thus, each officer's own motivation for leisure time physical training is vital.

### *Motivation for physical activity*

Exploring the motivation for physical activity can promote a better understanding of an individual's decisions and behaviour (Pauline, 2013; Teixeira et al., 2012; Tsobatzoudis et al., 2006). One of the major theoretical approaches in motivation research in sport and physical activity is self-determination theory (SDT) (Deci and Ryan, 2004; Dyrstad et al., 2007; Wilson et al., 2008). SDT is a comprehensive and evolving macro-theory that explains human personality and motivational behaviour. SDT originates from a humanistic perspective and is centred on the fulfilment of needs, self-actualisation and realisation of human potential (Deci and Ryan, 2000; Teixeira et al., 2012). SDT explains humans as active, growth-oriented organisms who see and engage with challenges. The actualisation of a person's potential is, however, not only a result of their motivation, but is also affected by the social environment. The social environment can support and facilitate a person's development, or can block or overwhelm them (Deci and Ryan, 2004).

SDT posits three fundamental psychological needs: competence, relatedness and autonomy. These are necessary conditions for the growth and well-being of individuals' personality, cognitive structures and also for their physical development and functioning. Competence refers to feeling effective in interactions with the social environment and experiencing opportunities to be physically active and express one's capacities. This leads people to seek challenges that are optimal for their capacities. Competence is thus not an attained skill, but a felt sense of competence and an effect of one's actions. Relatedness is about feeling connected to others, and caring for and being cared for by others, and the feeling of belonging to other individuals or communities. Autonomy refers to a person's acts that result from interest and integrated values. It is the perceived origin of one's own behaviour. When autonomous, individuals experience their behaviour as an expression of the self (Deci and Ryan, 2004).

The self-determination continuum describes types of motivation that regulate human behaviour. The variety of motivation ranges from amotivation to extrinsic motivation to intrinsic motivation. Different types of motivation lead to different types of behavioural regulation. Types of regulation range from non-regulation as a part of amotivation, to external, introjected, identified and integrated regulation as a part of extrinsic motivation and intrinsic regulation as a part of intrinsic motivation (Deci and Ryan, 2004). Across the span from amotivation with non-regulation, through extrinsic motivation with external, introjected, identified and integrated regulation to intrinsic motivation with intrinsic regulation, there is a higher level of satisfaction of fundamental psychological needs the closer a person is to intrinsic motivation and intrinsic regulation. Motivation and behavioural regulation impact both the level of and adherence to physical activity (Deci and Ryan, 2004).

Amotivation is a state of lacking the intention to act. When a person is amotivated, he or she either does not act at all or acts passively (Deci and Ryan, 2004). Individuals with extrinsic motivation, however, are characterised as having external motives for their participation in physical activity. Being extrinsically motivated can often lead to less satisfaction and a feeling of lack of competence, resulting in low reports of adherence to an activity (Deci and Ryan, 2004). In extrinsic-type motivation there is a span of behavioural regulation from external regulation, which is close to non-regulation (amotivation), to integrated regulation, which is close to intrinsic regulation (intrinsic motivation). Extrinsically motivated individuals give instrumental reasons to explain their physical activity, and try to achieve an external outcome from the activity that is separate from the activity itself. For example, participating in physical activity to obtain a social reward or avoid disapproval (Teixeira et al., 2012). Instead of developing their own potential, these persons are more concerned about making a good impression on others (Kasser et al., 2004). Body-related motivations, like appearance, are considered to be extrinsic and negatively associated with hours per week of physical activity. Motivation such as improved self-image is seen as a motivational outcome independent of the activity itself (Ryan et al., 1997). Studies have indicated that exercising to improve physical fitness, associated with integrated regulation and relatively high autonomy, correlates positively with exercise attendance. However, exercising to increase one's physical appeal, associated with external regulation, is unrelated or negatively related to length of workout, exercise attendance and hours per week of participation (Ryan et al., 1997; Sebire et al., 2009; Vansteenkiste et al., 2007).

Individuals with an intrinsic motivational process are more oriented toward being involved in the activity as a reward in itself (Weissinger and Bandalos, 1995). These

individuals have strong self-determination, feel competent, and become deeply involved in and enjoy challenge in their activity (Camacho et al., 2011). A person with intrinsic motivation for physical activity is explained as being physically active because of his or her experiences of satisfaction, such as feeling enjoyment, the exercise of different skills per se, achieving a variety of different accomplishments and being in a state of feeling competent (Deci and Ryan, 2004). Further, intrinsically motivated persons can also be physically active as a personal search for excitement and challenge (Teixeira et al., 2012). Interest/enjoyment and competence motivational regulation related to physical activity associate positively with hours per week of participation in physical activity. High autonomous regulation, associated especially with intrinsic (but also to some extent extrinsic) motivation, is found to affect positively several dimensions of physical activity and adherence to physical activity. For example, people with high autonomous regulation showed self-esteem related to exercise (Wilson and Rodgers, 2004), improved physical fitness (Stanley et al., 2012; Wilson et al., 2003), more frequent self-reported exercise behaviour (Wilson et al., 2002) and more positive attitudes toward exercise (Stanley et al., 2012; Wilson et al., 2003). By contrast, as mentioned, body-related motivation negatively associates with hours per week of physical activity (Ryan et al., 1997).

To meet occupational demands, a police officer needs to maintain a certain level of fitness. At NPUC, police students undergo both physical training as a part of the study curriculum and mandatory physical fitness testing at graduation. However, when entering the Norwegian Police Force there is no systematic and unitary physical testing, and no demand from the police authorities to monitor physical fitness within the force. Studies have shown a decrease in physical activity level and fitness level in police officers throughout their occupational career (Burelle et al., 1987; Lagestad et al., 2014; Sørensen et al., 2000). It has therefore been emphasised that future studies should focus on how to increase physical activity among officers (Lagestad and Van Den Tillaar, 2014). As explained above, there is a relationship between physical activity level and physical activity adherence and types of motivation. However, to our knowledge, few or no other studies have addressed this matter within a police context. To understand better the development of physical activity and physical fitness among both police students and police officers, their motivation for physical activity should be explored.

In this study, we aim to examine whether there is a relationship between different types of motivational regulation and physical activity levels among future police officers. We also sought to explore whether there was different motivational regulation within categories of physical activity level. We hypothesised that our results would indicate a

relationship between types of motivational regulation in the self-determination continuum and level of physical activity, and that we would find different motivational regulation in different categories of physical activity level.

## Methods

### Design

The study is based on a cross-sectional survey design with two different questionnaires presented together; one questionnaire measuring motivation towards physical activity (Motives for Physical Activities Measure – Revised, MPAM-R), and one measuring physical activity level (International Physical Activity Questionnaire – short form, IPAQ-SF).

### Participants and sampling

Two hundred and eighty students at NPUC were invited to participate in the study, and of these 258 accepted, resulting in a 92% participation rate. Regarding gender distribution, there were 156 males (60%) and 102 females (40%). Mean participant age was 23.24 (SD 3.06) years (range 19–38 years). It is important to note that the study was independent of the students' 3-year bachelor course of study at the NPUC, and it was highlighted both orally in information meetings and in the written declaration of consent, that participation in the study was voluntary. The study, design and data processing were further reported and accepted by the Norwegian Centre for Research Data (Project ID: 48728).

### Questionnaires and their validity and reliability

The MPAM-R consists of 30 items assessing participation motivation for sport and exercise activities. The items are presented on a seven-point scale ranging from 1 = not at all true for me to 7 = very true of me. The items represent five subscales: Interest/Enjoyment, Competence, Appearance, Fitness and Social. The two subscales Interest/Enjoyment and Competence reflect intrinsic motivation and regulation, and the other three reflect varying levels of extrinsic motivation and regulation (Jakobsen, 2014; Ryan et al., 1997). The validity and reliability of the MPAM-R have been addressed in previous research, where it has been demonstrated that the 30 items were clearly structured into a three-factorial order (amotivation, extrinsic and intrinsic motivation), and that the internal consistency measures for each subscale achieved Cronbach's alpha scores above .80 (Frederick and Ryan, 1993, in Ryan et al., 1997). The MPAM-R has also been used in several studies over past decades (Beauchemin et al., 2019; Ryan et al., 1997; Teixeira et al., 2012; Withall et al., 2011). Cronbach's

alpha scores for the item subscales were between .78 and .92 in Beauchemin et al., (2019), above .87 for all subscales in Ryan et al., (1997) and between .84 and .89 in Withall et al. (2011).

The IPAQ-SF is a questionnaire in which study participants report their physical activity level within the prior 7 days. The questionnaire collects information on time, number of physical activity sessions conducted and average length (time) of each session conducted. It also determines the intensity level of the physical activity to four categories: low, moderate, vigorous and in-activity. In general, self-reporting study designs have limitations. However, self-reporting of physical activity is an easy and cost-effective method of examining activity patterns. In addition, although self-reporting can be imprecise, the IPAQ-SF has been proven to be an acceptable measure of physical activity (Craig et al., 2003; Kim et al., 2013; Kurtze et al., 2008).

### Statistics

Data were analysed using SPSS, version 24.

### Preliminary analyses

**MPAM-R subscale reliability.** The number of items in each of the five MPAM-R subscales, the respective Cronbach's alpha scores and correlations were as follows: Interest/Enjoyment (seven items,  $\alpha = .89$  and  $r = 0.40$ – $0.79$ ), Competence (seven items,  $\alpha = .87$  and  $r = 0.27$ – $0.75$ ), Appearance (six items,  $\alpha = .91$  and  $r = 0.50$ – $0.83$ ), Fitness (five items,  $\alpha = 0.79$  and  $r = 0.27$ – $0.71$ ) and Social (five items,  $\alpha = .82$  and  $r = 0.17$ – $0.74$ ).

**Kurtosis and skewness, normality, Normal Q–Q plots.** Neither of the variables met the assumption of normality by the Kolmogorov–Smirnov test, something often found in large samples (Pallant, 2010). When assessing the Normal Q–Q plot every variable was found to be acceptable.

## Results

### Regression analyses

To assess the relationship between physical activity and types of motivation and motivational regulation, two multiple linear regression analyses were performed. The developed regression models were checked for normality, based on the Normal P–P plot and scatterplot, as well as for multicollinearity, based on tolerance and Variance Inflation Factor (VIF) values, and found within acceptable scores. The dependent variable in the first model (Table 1) was the number of days in the preceding 7 days that the student had performed vigorous physical activity. In the second model (Table 2), the dependent variable was how much

**Table 1.** Relationship between vigorous physical activity and motivational regulation.

Motivational regulation	Beta	t	Sig	Part
Interest/Enjoyment	.202	2.021	.044**	0.116
Competence	.160	1.593	.112	0.091
Social	.069	1.066	.287	0.061
Fitness	.045	0.631	.529	0.036
Appearance	.084	1.402	.162	0.080

The dependent variable is the question 'How many days, in the last seven, have you performed physical activity with vigorous intensity?'. The independent variable is type of motivational regulation, based on the MPAM-R questionnaire, representing Fitness, Interest/Enjoyment, Competence, Appearance and Social. A significant relationship between activity level and Interest/Enjoyment was found (\*\* $p < .05$ ).

**Table 2.** Relationship between physical activity and motivational regulation.

Motivational regulation	Beta	t	Sig	Part
Interest/Enjoyment	.212	2.033	.043**	0.122
Competence	.024	0.229	.819	0.014
Social	.186	2.738	.007*	0.164
Fitness	-.053	-0.721	.471	-0.043
Appearance	.083	1.324	.187	0.079

The dependent variable is the question 'How much time (min) did you spend on physical activity, on a normal day with physical activity at a vigorous intensity?'. The independent variable is type of motivational regulation based on the MPAM-R questionnaire, representing Fitness, Interest/Enjoyment, Competence, Appearance and Social. A significant relationship between activity and Interest/Enjoyment was found (\*\* $p < .05$  and \* $p < .01$ ) for Social.

time (minutes) was spent on physical activity, on a normal day with vigorous physical activity. In both models, the five motivational subscales served as the independent variables.

A significant regression equation was found in both models with  $F(5,251) = 2.716$ ,  $p < .01$ , with an  $R^2$  of 0.174 in the first model and  $F(5,244) = 7.009$ ,  $p < .000$ , with an  $R^2$  of 0.126 in the second model. Further, in the first model, it was found that Interest/Enjoyment significantly predicted level of physical activity ( $\beta = .202$ ,  $p < .05$ ) and in the second model it was found that Interest/Enjoyment and Social significantly predicted level of physical activity ( $\beta = -.212$ ,  $p < .05$  and  $\beta = .186$ ,  $p < .01$ , respectively). We also conducted both analyses with gender and age as control variables. We found that gender significantly affected the dependent variable in both models ( $p < .000$  in model 1 and  $p < .05$  in model 2, respectively), and that including gender improved the regression equations to some extent (in model 1 it gave an  $R^2$  value of .218 and in model 2 an  $R^2$  value of .145). In terms of age, it did not specifically predict the dependent variables, nor did it

impact the regression equations in general, in any of the models. Nevertheless, due to the lack of relevance in relation to the general study design and the specific research questions, we chose not to further include gender and age in the study.

### Analyses of variance

To explore further the relationship between motivation and physical activity, both multivariate (MANOVA) and univariate (ANOVA) analyses of variance were conducted.

**Model 1: multivariate and univariate.** In the first multivariate model, the dependent variables were the mean score on each of the five motivational subscales (Fitness, Interest/Enjoyment, Competitive, Appearance and Social). The independent variable was the number of days, in the preceding 7 days, that the student had performed physical activity at moderate intensity, categorised in four groups: 0–1, 2–3, 4–5 and 6–7 days. We found a main effect, explaining that a difference existed within the model, by Pillai's trace = 0.123,  $F(15,747) = 2.127$ ,  $p = .008$ . To follow up the multivariate analysis, a univariate analysis was also conducted for each of the dependent variables. For pairwise comparisons we initially performed Tukey's HSD. However, two of the variables, Fitness ( $p = .01$ ) and Competitive ( $p = .05$ ), did not meet the assumption of homogeneity of variance, disclosed by Levene's test, so for those variables we conducted a Welch ANOVA followed by a Games–Howell test for pairwise comparison in the analyses. Our univariate analyses revealed that the students' level of motivation (for all five subscales) was significantly affected by their level of physical activity. The specific univariate results are presented in Table 3.

**Model 2: multivariate and univariate.** In the second multivariate model, the dependent variables were the same as in the first model (mean score on each of the five motivational subscales). The independent variable was the duration of a vigorous physical activity session conducted within the last 7 days. This was the same as the dependent variable in the second regression model now categorised in three similar groups, low, moderate and high, based on frequency distribution, limited by 33.33% and 66.67%. In this model we found a main effect, explaining that a difference existed within the model, by Pillai's trace = 0.103,  $F(10,488) = 2.659$ ,  $p = .004$ . We subsequently conducted a univariate follow-up analysis for each of the dependent variables as well as Tukey's HSD for pairwise comparisons. The results of these analyses are presented in Table 4.

**Table 3.** Differences in motivational regulation between groups with different moderate physical activity levels.

Motivational regulation		Mean	SD	Mean difference				
				0–1 days	2–3 days	4–5 days	6–7 days	
Interest/Enjoyment	0–1 days	5.1851	0.97795	—	0.10221	0.40764	–0.49352*	$F(3,251) = 5.657, p < .001$
	2–3 days	5.0828	0.99675	—	—	0.30543	–0.59573**	
	4–5 days	4.7774	1.08003	—	—	—	–0.90116***	
	6–7 days	5.6786	0.86079	—	—	—	—	
Competence	0–1 days	5.3511	0.91356	—	0.03079	0.25477	–0.57349*	Welch's $F(3,102.531) = 5.776, p < .001$
	2–3 days	5.3203	0.85328	—	—	0.22398	–0.60428**	
	4–5 days	5.0963	1.10644	—	—	—	–0.82826***	
	6–7 days	5.9246	0.86492	—	—	—	—	
Social	0–1 days	3.5646	1.06543	—	–0.09524	0.25293	–0.45767	$F(3,251) = 2.794, p < .05$
	2–3 days	3.6598	1.14316	—	—	0.34817	–0.36243	
	4–5 days	3.3116	1.17295	—	—	—	–0.71059*	
	6–7 days	4.0222	1.02737	—	—	—	—	
Fitness	0–1 days	6.0329	0.67818	—	0.10508	0.2143	0.27264	Welch's $F(3,103.716) = 3.837, p < .05$
	2–3 days	5.9278	0.68385	—	—	0.10923	–0.37772*	
	4–5 days	5.8186	0.94195	—	—	—	–0.48695*	
	6–7 days	6.3056	0.60942	—	—	—	—	
Appearance	0–1 days	5.0042	1.22851	—	0.54546*	0.46546	0.28663	$F(3,251) = 2.763, p < .05$
	2–3 days	4.4588	1.36995	—	—	–0.00800	–0.25883	
	4–5 days	4.5388	1.31578	—	—	—	–0.17883	
	6–7 days	4.7176	1.22008	—	—	—	—	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

The dependent variable is the mean score on the items representing types of motivational regulation in the MPAM-R questionnaire: Fitness, Interest/Enjoyment, Competence, Appearance and Social. The independent variable is the number of days in the preceding week on which physical activity at moderate intensity was conducted, categorized into four groups: 0–1, 2–3, 4–5 and 6–7 days.

**Table 4.** Differences in motivational regulation between groups with different vigorous physical activity levels.

Motivational regulation		Mean	SD	Mean difference			
				Low	Mod	High	
Interest/Enjoyment	Low	4.9230	1.04591	—	–0.36735*	–0.58655**	$F(2,247) = 6.601, p < .01$
	Mod	5.2903	0.93641	—	—	–0.21920	
	High	5.5095	0.96356	—	—	—	
Competence	Low	5.2230	0.95436	—	–0.23011	–0.45375*	$F(2,247) = 3.938, p < .05$
	Mod	5.4531	0.83209	—	—	–0.22364	
	High	5.6768	1.09933	—	—	—	
Social	Low	3.3538	1.19175	—	–0.37304*	–0.73115***	$F(2,247) = 7.430, p < .001$
	Mod	3.7269	0.96539	—	—	–0.35812	
	High	4.0850	1.11207	—	—	—	
Fitness	Low	5.9470	0.73174	—	–0.07235	–0.15299	$F(2,247) = 0.724, p = .486$
	Mod	6.0194	0.71570	—	—	–0.08065	
	High	6.1000	0.73170	—	—	—	
Appearance	Low	4.4330	1.24972	—	–0.50244*	–0.40445	$F(2,247) = 4.228, p < .05$
	Mod	4.9355	1.35468	—	—	0.09798	
	High	4.8375	1.28684	—	—	—	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

The dependent variable is the mean score on items representing the different types of motivational regulation in the MPAM-R questionnaire: Fitness, Interest/Enjoyment, Competence, Appearance and Social. The independent variable is the normal duration of vigorous physical activity conducted by respondents in the last seven days categorized into three similar groups, low, moderate and high, based on frequency distribution, with limits of 33.33% and 66.67%.

## Discussion

To understand better the development in physical activity and physical fitness among both police students and police officers, this study sought to explore police students' motivation for physical activity. We therefore examined whether there was a relationship between different types of motivational regulation and physical activity levels among future police officers. We also sought to explore whether we found different motivational regulation within categories of physical activity levels. We hypothesised that our results would indicate a relationship between types of motivational regulation in the self-determination continuum and level of physical activity, and that within different categories of physical activity level we would find different motivational regulation.

Our main results revealed that a relationship existed between different types of motivational regulation and physical activity patterns among police students. In particular, we found intrinsic motivational regulation correlating positively with level of physical activity. Our hypothesis that our results would disclose a relationship between the self-determination motivational continuum and level of physical activity was thus confirmed.

Our findings are supported by previous studies of comparable groups. A study of British university students showed that autonomous motivation positively predicted moderate-intensity exercise (Standage et al., 2008). A study of Irish college students also revealed a significant positive correlation between intrinsic motivation (fun, enjoyment, fitness, fondness of competition and interest) and physical activity/sport behaviour (Lerner et al., 2011). Their results disclosed that 'to have fun', 'to become fitter' and 'to be interested' were key correlates of physical activity adherence. In order to delve deeper into the relationship between motivational regulation and physical activity participation, Lerner et al. (2011), in the prolongation of quantitative measures, conducted interviews with the participating students. Their qualitative data further revealed that the students who participated in physical activity related to organised sport and physical activities were motivated by intrinsic motivation (interest and enjoyment), whereas those participating in unorganised sport and physical activities were more driven by motives regarding extrinsic motivational regulation, such as improved health, fitness and appearance (Lerner et al., 2011).

A study on American college students by Kilpatrick et al. (2005) also found such a relationship between participation in sport and exercise and motivational regulation. The American college students who participated in sports were more likely to report intrinsic motives such as enjoyment and desire for challenge, whereas those who participated in non-sport related exercises were more extrinsically

regulated, as they focused on appearance and weight and stress management.

Duncan et al. (2010) demonstrated that identified and integrated motivational regulation, associated with extrinsic motivation, were important contributors to exercise frequency. Their study of 1079 regular exercisers (75% of the participants were students), found that frequency, intensity and duration of exercise were more highly correlated with more autonomous than controlling regulation. Integrated and identified motivational regulation is extrinsic motivation, although placed higher and closer to intrinsic motivation on the self-determination continuum, with a quite high level of autonomy. We also found a relationship between extrinsic motivation and physical activity as did Duncan et al. (2010). However, our results indicate that motivation related to fitness and appearance, closer to extrinsic motivation in the self-determination continuum, also predicted physical activity. This follows earlier studies, revealing that extrinsic motives, when well-internalised, can be as useful for behavioural regulation as intrinsic motives, when the target behaviour may not be self-rewarding (Wilson et al., 2008).

Our data revealed a significant difference in motivational regulation between the group with the longest duration of physical activity sessions with vigorous intensity and both the group with medium and short duration for both Social and Interest/Enjoyment as a motivational regulation. In a study exploring motivational regulation in relation to exercise among random adults in Great Britain, Edmunds et al. (2006) claimed that vigorous physical activity demanded some type of motivation to be conducted at all. They stated that, in order to participate in strenuous exercise, due to the experience of the activity being both physically and mentally exhausting, participating individuals must give some value to the exercise making it important in terms of wellbeing, health, improved fitness and/or physique. A systematic review (Teixeira et al., 2012) of 66 empirical studies regarding exercise and physical activity related to self-determination theory consistently revealed a positive relation between more autonomous forms of motivation and exercise.

Regarding the intensity of the physical activity conducted, Edmunds et al. (2010) found that identified motivational regulation predicted strenuous exercise behaviour. The authors explained this finding as being due to the association between identified regulation and motives of improved health and fitness. In the same study, Edmunds et al. also found that introjected regulation, a regulation found towards the lower end of the self-determination continuum, and a regulation related to motives of improved physique and appearance, positively predicted strenuous and total exercise behaviours. This was supported by similar findings by Duncan et al. (2010) who proved that

introjected regulation was a significant predictor of exercise intensity, although only for females. In both these studies (Duncan et al., 2010; Edmunds et al., 2006), the authors revealed that relative autonomous regulation, identified and introjected motivational regulation, affected strenuous exercise behaviour. Still, these motivational regulations are a part of extrinsic motivation regulation. Our findings support the contention that more autonomous regulation predicted strenuous physical activity. However, not only for extrinsic motivation and regulation. The analyses show a significant positive relationship between Interest/Enjoyment, associated with intrinsic motivation and regulation, and the duration of strenuous physical activity.

Furthermore, we found that social engagement predicted the duration of physical activity with vigorous intensity. Social engagement can be an intrinsic participation motive for physical activity and is clearly associated with increased participation in physical activity (Teixeira et al., 2012). Perceived support from friends is associated with intrinsic, but also identified motivational regulation and this type of motivational regulation is proven to correlate with greater intention to exercise (Wilson and Rodgers, 2004). Our findings support the contention and show that this relationship is not limited to intention to exercise, but that there are also correlations between social engagement and the actual duration of physical activity with vigorous intensity. We also found correlations between appearance as a motivational regulation and duration of physical activity with vigorous intensity. Our results may therefore be explained by our students being intrinsically motivated. On the other hand, social and appearance motives can be associated with more extrinsic motivational regulation, like introjected and external regulation, which are less autonomous. However, it is important to note, controlled motivations are not necessarily problematic, if self-determined regulations are still present (Ingledeu and Markland, 2008).

To explain our findings that motivational regulation like appearance is to some extent positively related to workout duration, one must acknowledge the complexity of the motivational regulation of physical activity. Intrinsic motivational regulation, associated with autonomous motives to be physically active can interact with more controlled motives, associated with extrinsic motivation and regulation (Teixeira et al., 2012). For example, a person might be physically active to develop a physically appealing body, related to extrinsic motivational regulation. Furthermore, a person can be motivated by support for improving his or her appearance by a partner or a friend, associated with an even more controlled motivation. At the same time, the person may value enhanced fitness and might thus also be affected by integrated and intrinsic motivational regulation and more autonomous motivation.

Our findings show that different levels of both intrinsic and extrinsic motivational regulation correlate with NPUC students' physical activity. Doing police work is associated with physicality and having certain physical skills and capacities, as well as a fit appearance that results in some kind of symbolic capital (Doran and Chan, 2003). One can assume that NPUC students are influenced by this culture, and it is therefore natural that their physical activity is related to external motives such as meeting occupational demands and having a fit appearance. The students are not athletes, with traditionally intrinsic motivational regulation for their participation in physical activity, but they are also driven by external regulation for physical activity, which is more associated with exercise for improving health, fitness and appearance (Kilpatrick et al., 2005; Lerner et al., 2011). This could be related to the goals of the exercise programme, as frequency, duration and intensity of physical activity often depend on the goals of that activity (Duncan et al., 2010). An interesting aspect of our findings is that although the students at NPUC are controlled by extrinsic motivational regulation, such as occupational demands and expectations, they are also intrinsically motivated. It is, therefore, important to acknowledge and support individual motives for physical activity, especially the goal of strengthening autonomous motivation and intrinsic regulation (Teixeira et al., 2012). It is, however, important not to undermine other types of motivational regulation more associated with extrinsic motivation, as this may lead persons to feel that their autonomy is threatened, which again can lead to dropping out from physical activity (Ingledeu and Markland, 2008).

Physical activity is not only important for the police academy student. As shown earlier, regular physical activity is necessary for the police officer to gain and maintain physical readiness, and to maintain good health throughout the officer's entire career. However, this appears to be challenging, as it has been proven that there is a significant decrease in officers' physical fitness after several years of duty (Lagestad et al., 2014). However, Lagestad et al. used data from students who graduated in 1995, who followed a different study programme from today's students at NPUC, and their findings must be interpreted in relation to the study programme at that time. Nevertheless, one explanation for the decrease in physical fitness may be that finding time for physical activity and exercise in a busy schedule can be challenging (Lerner et al., 2011). From this perspective, police officers are probably not different from the normal population, decreasing physical activity and decreasing fitness levels are a major health problem (The GBD 2015 Obesity Collaborators, 2017; World Health Organization, 2019). However, the ordinary citizen, as opposed to the police officer, is not responsible for



attending emergencies, or maintaining public order and securing public safety.

A police corps that is physically active, fit and healthy throughout their career is beneficial both for society and the police organisation and should be a priority for police authorities (Dillern et al., 2013). Regular physical testing of the police force throughout their years in service is an often-used suggestion for preventing this decrease in physical fitness (Bonneau and Brown, 1995; Lagestad and Van Den Tillaar, 2014). Designing special and specific training programmes for police officers to develop and maintain their physical readiness has also been suggested (Hoffman and Collingwood, 2015; Rhea, 2015). It has also been argued that police leaders have a responsibility to arrange physical training during working hours (Lagestad, 2012). Regular testing of physical fitness and developing fitness programmes designed for police officers may be effective, and may secure a minimum level of physical fitness and physical readiness for occupational demands. However, this type of demand and facilitation is associated with extrinsic motivation and introjected and external motivational regulation. From a long-term perspective, this leads to poor adherence to physical activity (Teixeira et al., 2012; Tsorbatzoudis et al., 2006).

To develop long-lasting activity patterns and increase interest in physical activity, one should strive to develop more autonomous types of motivation and strengthen intrinsic motivation and regulation. Nurturing intrinsic motivation towards physical activity will lead to increased physical activity and physical activity adherence (Sibley et al., 2013; Teixeira et al., 2012; Tsorbatzoudis et al., 2006). After graduating from NPUC, to a greater extent than in the period of study, ordinary police officers are left to themselves regarding their physical activity and physical fitness. Their physical activity will therefore depend on individual lifestyle choices in their leisure time. Traditionally, in both a scientific and occupational context, the focus has been on monitoring physical fitness and developing specially designed fitness programmes related to handling occupational demands. However, what is important is that the physical activity and fitness programme is performed. As we have discussed in this article, it physical activity is more likely if the person is intrinsically motivated.

## Concluding remarks

Physical readiness is important to meet the occupational demands of police work. However, a decreased level of activity and decreased physical fitness are seen over the course of police officers' careers. The occupation in itself is not enough to maintain the officer fitness, and regular leisure time physical activity is needed to develop and maintain physical fitness. In this study, we found that

motivational regulations are related to physical activity patterns among NPUC students. Our findings support the basics of SDT and how it is related to patterns of physical activity. When SDT relates intrinsic motivation to physical activity adherence throughout the lifespan, exploring and understanding the motivation for physical activity among police officers cannot be neglected.

DeNysschen et al. (2018), point out that there is insufficient research into the development of higher educational-based coursework in law enforcement programmes that emphasise the development of lifelong behavioural patterns. Educational institutions like the NPUC may have a central role in nurturing intrinsic motivation for physical activity among future police officers. College students go through a period of many physical and mental changes, and these changes may have positive and negative influences on their lives (DeNysschen et al., 2018; Lerner et al., 2011; Plotnikoff et al., 2015). Thus, physical fitness courses ought to be an important part of police education. Such courses should aim to not only make future officers physically fit, but also to develop students' understanding, interest, enjoyment and mastery of physical activity and occupational skills. This approach will strengthen students' competence, relatedness and autonomy, and facilitate the development of their intrinsic motivation and regulation of physical activity and physical activity adherence.

In 10 years of managing and teaching physical training courses at the NPUC, this has been our approach. Despite this, physical training courses have been continuously downgraded within the study programme during this period. Physical training is no longer a separate and independent course within the NPUC curriculum, and the teaching hours for the subject are continuously reduced. In addition to this, NPUC has reduced the physical demands related to the curriculum. Based on this development, and due to the decreased fitness revealed throughout the careers of police officers, we are concerned about what the future holds.

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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## References

- Beauchemin JD, Gibbs TA, Granello PF and Gabana NT (2019) Motivation for movement: influences for walking event participation. *Health Education Journal* 78(2): 111–123.
- Boni N (2004) *Exercise and Physical Fitness: The Impact on Work Outcomes, Cognition and Psychological Well-Being for Police*. Marden, Australia: Australasian Centre for Policing Research.
- Bonneau J and Brown J (1995) Physical ability, fitness and police work. *Journal of Clinical Forensic Medicine* 2(3): 157–164.
- Boyce RW, Jones GR, Schendt KE, Lloyd CL and Boone EL (2009) Longitudinal changes in strength of police officers with gender comparisons. *The Journal of Strength and Conditioning Research* 23(8): 2411–2418.
- Burelle C, Ricci J and Perronet F (1987) Condition physique des policiers de la courmunauté urbaine de Montréal. *Médecine du Sport* 1: 16–18.
- Camacho ÁS, Soto CÁ, González-Cutre D and Moreno-Murcia JA (2011) Motivational factors and autotelic experience in physical exercise: an explanatory model. *Factores motivacionales y experiencia autotélica en el ejercicio físico: Propuesta de un modelo explicativo* 10(1): 125–136.
- Craig C, Marshall A, Sjöström M, Bauman A, Booth M Ainsworth B . . . Oja P (2003) International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise* 38(8): 1381–1395.
- Deci EL and Ryan RM (2000) The “what” and “why” of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry* 11(4): 227–268.
- Deci EL and Ryan RM (2004) *Handbook of Self-Determination Research*. Rochester, NY: University Rochester Press.
- DeNysschen CA, Cardina C, Sobol JJ, Zimmerman B and Gavronsky A (2018) Health, wellness and fitness training: a pilot study on preparing physically fit and police academy-ready graduates. *International Journal of Police Science & Management* 20(1): 66–79.
- Dillern T, Jenssen ORN, Lagestad P, Nygård Ø and Ingebrigtsen J (2014) Arresting a struggling subject; does the forthcoming police officers physical fitness have an impact on the outcome? *The Open Sports Sciences Journal* 7: 2–7.
- Dillern T, Norheim Jenssen OR and Ingebrigtsen J (2013) Physical fitness and anthropometric characteristics of graduating Norwegian Police University College students. *Journal of Police Studies/Cahiers Politie Studies* 1(3): 192.
- Doran S and Chan JB (2003) Doing gender. In: Chan JB, Devery C and Doran S (eds) *Fair Cop: Learning the Art of Policing*. Toronto: University of Toronto Press, 276–300.
- Duncan L, Hall GR, Wilson PM and Jenny O (2010) Exercise motivation: a cross-sectional analysis examining its relationships with frequency, intensity and duration of exercise. *International Journal of Behavioral Nutrition and Physical Activity* 7: 1–7.
- Dyrstad SM, Miller BW and Hallén J (2007) Physical fitness, training volume and self-determined motivation in soldiers during a peacekeeping mission. *Military Medicine* 172(2): 121–127.
- Edmunds J, Duda JL and Ntoumanis N (2010) Psychological needs and the prediction of exercise-related cognitions and affect among an ethnically diverse cohort of adult women. *International Journal of Sport and Exercise Psychology* 8(4): 446–465.
- Edmunds J, Ntoumanis N and Duda JL (2006) A test of self-determination theory in the exercise domain. *Journal of Applied Social Psychology* 36(9): 2240–2265.
- Frederick CM and Ryan RM (1993) Differences in motivation for sport and exercise and their relations with participation and mental health. *Journal of Sport Behavior* 16(3): 124.
- Hoffman R and Collingwood T (2015) *Fit for Duty, 3E*. Champaign, IL: Human Kinetics.
- Ingledeu DK and Markland D (2008) The role of motives in exercise participation. *Psychology & Health* 23(7): 807–828.
- Jakobsen AM (2014) Are there differences in motives between participants in individual sports compared to team sports. *LASE Journal of Sport Science* 5(2): 32–42.
- Kaleta D, Makowiec-Dąbrowska T and Jegier A (2004) Leisure-time physical activity, cardiorespiratory fitness and work ability: a study in randomly selected residents of Łódź. *International Journal of Occupational Medicine and Environmental Health* 17(4): 457–464.
- Kasser T, Ryan RM, Couchman CE and Sheldon KM (2004) Materialistic values: their causes and consequences. In: Kaner AD and Kasser T (eds) *Psychology and Consumer Culture: The Struggle for a Good Life in a Materialistic World*. Washington, DC: American Psychological Association, 11–28.
- Kilpatrick M, Hebert E and Bartholomew J (2005) College students’ motivation for physical activity: differentiating men’s and women’s motives for sport participation and exercise. *Journal of American College Health* 54(2): 87–94.
- Kim Y, Park I and Kang M (2013) Convergent validity of the international physical activity questionnaire (IPAQ): meta-analysis. *Public Health Nutrition* 16(3): 440–452.
- Kurtze N, Rangul V and Hustvedt B-E (2008) Reliability and validity of the international physical activity questionnaire in the Nord-Trøndelag health study (HUNT) population of men. *BMC Medical Research Methodology* 8(1): 63.
- Lagestad P (2012) Physical skills and work performance in policing. *International Journal of Police Science & Management* 14(1): 58–70.
- Lagestad P and Van Den Tillaar R (2014) Longitudinal changes in the physical activity patterns of police officers. *International Journal of Police Science & Management* 16(1): 76–86.
- Lagestad P, Jenssen OR and Dillern T (2014) Changes in police officers’ physical performance after 16 years of work.

- International Journal of Police Science & Management* 16(4): 308–317.
- Lerner J, Burns C and de Róiste Á (2011) Correlates of physical activity among college students. *Recreational Sports Journal* 35(2): 95–106.
- Pallant J (2010) *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS*. Maidenhead, UK: Open University Press.
- Pauline J (2013) Physical activity behaviors, motivation and self-efficacy among college students. *College Student Journal* 47(1): 64–74.
- Plotnikoff RC, Costigan SA, Williams RL, Hutchesson MJ, Kennedy SG Robards SL . . . Germov J (2015) Effectiveness of interventions targeting physical activity, nutrition and healthy weight for university and college students: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity* 12(1): 45.
- Rhea MR (2015) Needs analysis and program design for police officers. *Strength & Conditioning Journal* 37(4): 30–34.
- Ryan RM, Frederick CM, Lepes D, Rubio N and Sheldon K (1997) Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology* 28: 335–354.
- Scofield DE and Kardouni JR (2015) The tactical athlete: a product of 21st century strength and conditioning. *Strength & Conditioning Journal* 37(4): 2–7.
- Sebire SJ, Standage M and Vansteenkiste M (2009) Examining intrinsic versus extrinsic exercise goals: cognitive, affective and behavioral outcomes. *Journal of Sport and Exercise Psychology* 31: 189–210.
- Sibley BA, Hancock L and Bergman SM (2013) University students' exercise behavioral regulation, motives and physical fitness. *Perceptual and Motor Skills* 116(1): 322–339.
- Smolander J, Louhevaara V and Oja P (1984) Policemen's physical fitness in relation to the frequency of leisure-time physical exercise. *International Archives of Occupational and Environmental Health* 54(4): 295–302.
- Standage M, Sebire SJ and Loney T (2008) Does exercise motivation predict engagement in objectively assessed bouts of moderate-intensity exercise?: A self-determination theory perspective. *Journal of Sport and Exercise Psychology* 30: 337–352.
- Stanley DM, Cumming J, Standage M and Duda JL (2012) Images of exercising: exploring the links between exercise imagery use, autonomous and controlled motivation to exercise and exercise intention and behavior. *Psychology of Sport and Exercise* 13(2): 133–141.
- Sörensen L, Smolander J, Louhevaara V, Korhonen O and Oja P (2000) Physical activity, fitness and body composition of Finnish police officers: a 15-year follow-up study. *Occupational Medicine* 50(1): 3–10.
- Teixeira PJ, Carraça EV, Markland D, Silva MN and Ryan RM (2012) Exercise, physical activity and self-determination theory: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity* 9(1): 78.
- The GBD 2015 Obesity Collaborators (2017) Health effects of overweight and obesity in 195 countries over 25 years. *New England Journal of Medicine* 377(1): 13–27.
- Tsorbatzoudis H, Alexandres K, Zahariadis P and Grouios G (2006) Examining the relationship between recreational sport participation and intrinsic and extrinsic motivation and amotivation. *Perceptual and Motor Skills* 103(2): 363–374.
- Vansteenkiste M, Soenens B and Lens W (2007) Intrinsic versus extrinsic goal promotion in exercise and sport, understanding the differential impacts on performance and persistence. In: Hagger MS and Chatzisarantis NLD (eds) *Intrinsic Motivation and Self-Determination in Exercise and Sport*: Champaign, IL: Human Kinetics, 167–180.
- Weissinger E and Bandalos DL (1995) Development, reliability and validity of a scale to measure intrinsic motivation in leisure. *Journal of Leisure Research* 27: 377–400.
- Wilson KB and Rodgers WM (2004) The relationship between perceived autonomy support, exercise regulations and behavioral intentions in women. *Psychology of Sport and Exercise* 5: 229–242.
- Wilson PM, Mack DE and Grattan KP (2008) Understanding motivation for exercise: a self-determination theory perspective. *Canadian Psychology/Psychologie canadienne* 49(3): 250.
- Wilson PM, Rodgers WM, Blanchard CM and Gessell J (2003) The relationship between psychological needs, self-determined motivation, exercise attitudes and physical fitness. *Journal of Applied Social Psychology* 33(11): 2373–2392.
- Wilson KB, Rodgers WM and Fraser SN (2002) Examining the psychometric properties of the behavioral regulation in exercise questionnaire. *Measurement in Physical Education and Exercise Science* 6: 1–21.
- Withall J, Jago R and Fox K (2011) Why some do but most don't. Barriers and enablers to engaging low-income groups in physical activity programmes: a mixed methods study. *BMC Public Health* 11: 507.
- World Health Organization (2019) *Global Action Plan on Physical Activity 2018–2030: More Active People for a Healthier World*. Geneva: World Health Organization.

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