Factors Affecting the Teachers' Use of Motivational Strategies in the Physical Education Class

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Abstract

The purpose of the current study is to examine the factors influencing Physical Education (PE) teachers' use of motivational strategies in the PE classes. Using Self-Determination Theory (SDT; Deci, Ryan, 1985a) as a theoretical framework, this study determines if teachers' autonomous causality orientation, perceived job pressure and perceptions of student self-determined motivation, need satisfaction and self-determined motivation predict PE teachers' use of the motivational strategies that facilitate competence, autonomy and relatedness. A total of 101 PE teachers took part in the study. The results of the hierarchical multiple regression found that teachers' autonomous causality orientation, their perceptions of student self-determined motivation, need satisfaction and self-determined motivation, were positive and significant predictors of teachers' use of motivational strategies the PE classroom. The perceptions of job pressure did not predict the use of motivational strategies among the PE teachers in Singapore. Overall, the results showed the three step regression models predicted a total of 38 % variance in teachers' use of motivational strategies in the PE classroom. Therefore, it is important to take into consideration the provision of a working environment for PE teachers where their needs of autonomy, competence and relatedness are facilitated.

Keywords: autonomous causality orientations, self-determined motivation, need satisfaction, use of motivational strategies

1. Introduction

Given the emphasis on nurturing students to be self-directed learners through Singapore's education system (Ministry of Education, 2015) in recent years, it is vital to understand how students' motivation and interest for learning can be enhanced. Since teachers bear the responsibility of contributing significantly to the development of students, it is imperative to understand how student motivation can be nurtured from a teachers' perspective. Studies have shown that Physical Education (PE) teachers' utilisation of motivational strategies does have a

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positive impact on students' motivation in PE (e.g., Papaioannou et al., 2004; Taylor et al., 2008). A wealth of research thus far has applied self-determination theory (SDT) by Deci and Ryan (1985a) in understanding motivation in educational, sports and healthcare settings. The purpose of this study was to examine the personal and contextual factors that could influence the use of motivational strategies by teachers in a PE class using the SDT framework.

2. Theoretical Framework

SDT (Deci, Ryan, 2000; Ryan, Deci, 2017) postulates that an individual has three inherent psychological needs namely autonomy, competence and relatedness, and the satisfaction of these three needs is essential for optimal human functioning and development. Autonomy refers to the need to experience free will or control over one's actions (Deci, Ryan, 2000; deCharms, 1968). Competence refers to the need to experience mastery and generate intended effects (Deci, Ryan, 2000; White, 1959). Relatedness refers to the need to feel affiliated towards others (Deci, Ryan, 2000; Baumeister, Leary, 1995). Fulfilment of these three needs would facilitate intrinsic motivation.

In addition, SDT places motivation along a continuum with amotivation at one end, followed by extrinsic motivation and finally the ideal state of intrinsic motivation is at the opposite end of the continuum. The sequence for the different types of motivation stems from the degree to which the motivation for one's action emerges from oneself (Ryan, Deci, 2000). Amotivation, which is the absence of motivation, refers to one's inadequate desire to participate in an activity. Extrinsic motivation can be further broken down into external regulation, introjected regulation, identified regulation and integrated regulation. Firstly, external regulation refers to the motivation to act so as to fulfil an external mode of contingency such as threats, rewards or deadlines. Secondly, introjected regulation refers to incorporation in which one accepts a value or regulatory process but does not personally identify or acknowledge it as one's own (Deci et al., 1994). Thirdly, identified regulation refers to actions that are executed when one consciously values a behavioural goal, where one acknowledges or deems it as personally significant. Fourthly, integrated regulation refers to one who has completely assimilated the regulatory process and has accepted it as one's values after deliberation. Finally, intrinsic motivation refers to the inherent enjoyment and gratification gained from participating in an activity (Ryan, Deci, 2000; 2017).

Past research have reported that fulfilment of the fundamental needs of autonomy, competence and relatedness would result in intrinsic motivation and intrinsic motivation in turn facilitates more productive learning (Ryan, Deci, 2000; 2017). In a study done by Spray and Wang (2001), it was revealed that students with greater autonomy-related intentions for being engaged in PE class had higher levels of perceived competence and were predisposed towards contrasting their performance with normative expectations in contrary to their friends. In addition, Chatzisarantis, Biddle and Meek (1997) found that autonomous motives in contrast to controlling ones, significantly predicted subsequent behaviour in a physical activity setting. Because intrinsic motivation is integral in enhancing learning and teachers play the vital role of nurturing students, it is essential to understand how students' motivation can be developed from a teachers' perspective.

Studies have highlighted the positive impact of teachers' use of motivational strategies on students' motivation in PE. In a study done by Papaioannou et al. (2004), it was reported that adaptive motivational strategies employed by physical educators led to positive motivation-related experiences for students. In addition, in a study done by Taylor and Ntoumanis (2007), students reported that their autonomous motivation in PE was positively predicted by their perceptions of teachers' employment of autonomy support, structural and involvement motivational strategies. In Taylor et al.'s study (2008), it was reported that teachers' autonomous causality orientation, perceived job pressure and perceptions of student self-determined motivation predicted teachers' need satisfaction. In turn, when teachers' needs were fulfilled, they were self-determined and hence they engaged in motivational strategies such as gain understanding of students, provide instrumental help and support and provide a meaningful rationale for students. In addition, studies have shown that the type of motivational strategy used by teachers does have significant consequences on students (Wang et al., 2019).

The purpose of the current study was to replicate and extent Taylor et al.'s study (2008) in Singapore setting. Specifically, this study examined the influence of teachers' autonomous causality

orientation, perceived job pressure, perceptions of student self-determined motivation, need satisfaction and self-determined motivation on the use of motivational strategies in PE classroom.

3. Methods
Participants

A total of 101 PE teachers (64 males, 36 females, 1 missing) with a mean age of 38.46 years (SD = 7.78) volunteered to participate in this study. PE teachers were sampled from primary and secondary schools in Singapore. The teachers had a mean teaching experience of 11.54 years (SD = 7.61). They are all qualified PE teachers who gone through their teacher training programme at the National Institute of Education, Singapore.

Procedures

Following the ethics approval by the university's Institutional Review Board, a multi-section questionnaire and assent forms were given to the teachers. In the assent forms, purpose of study, no foreseeable risk involved, voluntary participation and anonymity were stated and guaranteed. Participants were instructed to return the signed assent form and completed questionnaire to the researcher and to keep a duplicate copy of the assent form for their reference. The participants took about 25 minutes to complete the questionnaire in a quiet meeting room.

Measures

Perceived Job Pressure. We used the 10-item questionnaire by Taylor and his colleagues (Taylor et al., 2008) to assess three work-related types of pressure (time constraints, school authorities, and evaluation based on students' performance) that physical education teachers have reported as affecting their choice of motivational strategies. There were four items measuring perceived time constraints (e.g. "I wish there was more time in PE lessons"), three items for evaluation based on students' performance (e.g. "If student don't perform, it looks bad on my record") and three items for pressure from school authorities (e.g. "My teaching methods are dictated by school policy"). Participants indicated their responses on a 7-point scale with a range of 1 (not at all true) to 7 (completely true).

Autonomous Causality Orientation. The General Causality Orientations Scale (GCOS) by Deci and Ryan (1985b) was adopted to evaluate the autonomous causality orientation in teachers. The actual GCOS inventory comprises of 12 scenarios and 36 questions. Each scenario illustrates a conventional social or achievement circumstance in which the participant responds with three kinds of answers namely, autonomous (i.e. degree to which one "is oriented towards things in the environment"), controlled (i.e. degree to which one "feels controlled by external factors") and impersonal (i.e. degree to which one "experiences behaviour as out of his or her control"). An example of a scenario includes, "You are embarking on a new career and the most important consideration is likely to be how interested you are in that kind of work" (i.e. autonomous response). Only 8 scenarios and teachers' autonomous responses were used for this study. Answers ranged from 1 (very unlikely) to 7 (very likely) on a 7-point scale.

Teachers' Perceptions of Student Self-Determination. The perceived locus of causality scale (PLOC; Goudas, Biddle & Fox, 1994) was used to assess and quantify teachers' perceptions of students' motivations. The 14-item questionnaire measures external regulation (4 items; e.g. "Because they will get into trouble if they don't), introjected regulation (4 items; e.g. "Because they want me to think that they are good students"), identified regulation (3 items; e.g. "Because it is important for them to do well in PE") and intrinsic motivation (3 items; e.g. "Because they enjoy learning new things in PE"). Answers were indicated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). First, the mean score of each motivational regulation were calculated. A Relative Autonomy Index (RAI; Grolnick & Ryan, 1989) was calculated based on a weighted score of intrinsic motivation* (2), identified regulation*(1), introjected regulation* (-1) and external regulation* (-2). The RAI reflects the degree of self-determination of the students in PE with positive scores indicating more autonomous regulation and negative scores more controlling regulation.

Psychological Need Satisfaction. The Basic Need Satisfaction at Work Scale (BNSAW; Deci et al., 2001) was used to evaluate the extent of fulfilment of the three basic needs namely autonomy (3 items; e.g. "I am free to express my ideas and opinions on the job"), competence (3 items; e.g. "People at work tell me I am good at what I do") and relatedness (3 items; e.g. "I

really like the people I work with") in teachers. Answers ranged from 1 (not at all true) to 7 (completely true) on a 7-point scale. Negative statements were reverse-scored before data analysis.

Teachers' Self-Determination. The Work Motivation Inventory (WMI; Blais, Lachance, Vallerand, Brière & Riddle, 1993) was utilized to assess the self-determination of teachers. Questions were asked from the basis of "Why do I teach?" and followed by 16 items where there are 4 items for the four different categories of motivational regulations from SDT such as external regulation (e.g. "For the income it provides me"), introjected regulation (e.g. "Because my work is my life, I don't want to fail"), identified regulation (e.g. "Because I want to pursue my career in teaching PE"), and intrinsic motivation (e.g. "For the intense moments of pleasure teaching gives me"). Answers ranged from 1 (does not correspond at all) to 7 (corresponds completely) on a 7-point scale. Using the same formula in calculating teachers' perception of students' self-determination, RAI was calculated to reflect teachers' self-determination towards teaching.

Teachers' Use of Motivational Strategies. The teacher version of the Teacher as Social Context Questionnaire (TASCQ; Wellborn, Connell, Skinner & Pierson, 1988) was adapted to assess the extent of the teachers' usage of the three types of motivational strategies. Teachers answered 10 questions that measured their provision of instrumental help and support (3 items; e.g. "I show my students different ways to complete tasks"), provision of a meaningful rationale (3 items; e.g. "I encourage my students to think about how what I teach can be useful to them") and gaining an understanding of students (4 items; e.g. "I know my students well"). Answers ranged from 1 (not at all true) to 7 (completely true) on a 7-point scale.

4. Data Analysis

In the preliminary analysis, a series of Confirmatory Factor Analysis (CFA) was conducted based on all the measures using EQS for Windows 6.3 (Bentler, 2006). Subsequently, IBM SPSS Version 25 was used for the main analysis. Descriptive statistics, Cronbach's Alpha coefficients, Pearson's product-moment correlation coefficient were computed for the main variables. Finally, stepwise hierarchal multiple regression was conducted to examine the factors predicting the use of motivational strategies in PE classes.

In the evaluation of model fit to the data, the typical fit indices were used: Bentler-Bonett normed fit index (NFI), the comparative fit index (CFI); Bollen's Fit Index (IFI) and the mean square error of approximation (RMSEA). For the NFI, CFI, and IFI, the conventional cut-off values of close to 0.90 were used (Hu, Bentler, 1999). For RMSEA, we used the value close to .08 as the cut-off. The chi-square statistic and the degree of freedom are also presented for reference.

5. Results
Descriptive Statistics

The results of the Confirmatory Factory Analysis (CFA) of all the measures are shown in Table 1. All the measurement models showed acceptable fit, except with the use of motivational strategies (three-factor model). It was found that a higher order whereby the three first order factors load on a higher order factor (motivational strategies) would fit the data better (see Table 1). In subsequent analysis, we used the higher-order factor and named it as "use of motivational strategies".

Table 1. Fit indices for CFA models

Model	χ^2	df	SBχ^2/df	NNFI	CFI	IFI	RMSEA (90% CI)
Perceived Job Pressure	45.68	32	1.43	.922	.944	.947	.066 (.000, .106)
Autonomous Orientation	20.87	20	1.04	.992	.995	.995	.021 (.000, .090)
Perception of Student Self-determined Motivation	88.88	67	1.32	.927	.946	.949	.058 (.014, .088)
Need Satisfaction	31.98	24	1.33	.958	.972	.973	.058 (.000, .106)
Teachers' self-determination	119.46	93	1.28	.938	.952	.954	.054 (.016, .079)

Use of Motivational Strategies (3-factor model)	69.49	24	2.89	.769	.846	.852	.138 (.100, .175)
Use of Motivational Strategies (higher order factor)	22.33	20	1.12	.986	.992	.993	.034 (.000, .095)

Note. NNFI = Non-Normed Fit Index; CFI = robust Comparative Fit Index; IFI = Bollen's Fit Index; RMSEA (90 % CI) = robust Root Mean Square Error of Approximation (90 % confidence interval).

The descriptive statistics including internal reliabilities, range, means, standard and deviation of all the variables are presented in Table 2. The internal consistency of all subscales demonstrated acceptable internal reliability ranging from .66 to .84, except for perceived pressure from evaluation based on their students' performance (α = .48). Caution is required when interpreting the results.

Table 2. Descriptive Statistics of the Main Variables

Variable	α	Range	*M*	*SD*
Pressure from time constraints	.81	1 to 7	4.06	1.37
Pressure from evaluation	.48	1 to 7	3.80	1.11
Pressure from school authority	.74	1 to 7	3.14	1.34
Autonomous causality orientation	.77	1 to 7	5.98	.64
Perceptions of student self-determined motivation	.72 - .77	-18 to 18	6.54	4.56
Need satisfaction	.72 - .81	1 to 7	5.36	.83
Teachers' self-determined motivation	.64 - .74	-18 to 18	3.75	3.03
Use of motivational strategies	.82	1 to 7	5.70	.62

Teachers reported moderate perceived pressure from time constraints and school authorities. Additionally, teachers also revealed a high autonomous orientation and moderate perceptions of student self-determined motivation. In addition, teachers revealed a high need satisfaction and moderate level of autonomy. Finally, teachers reported a high utilisation of motivational strategies in their PE classes (see Table 2).

From Table 3, the correlation shows that teachers' autonomous causality orientation was negatively correlated with pressure from school authority, but positively correlated with the need satisfaction, self-determined motivation and the use of motivational strategies. There were positive correlations between teachers' perceptions of student's self-determined motivation, need satisfaction and teachers' self-determined motivation, and the use of motivational strategies.

Table 3. Correlations of Main Variables

Variable	1	2	3	4	5	6	7	8
1. Pressure from time constraints	--							
2. Pressure from evaluation	.04	--						
3. Pressure from school authority	.28**	.36**	--					
4. Autonomous causality orientation	-.16	.08	-.22**	--				
5. Perceptions of student self-determined motivation	-.10	.03	-.21*	.21*	--			
6. Need satisfaction	-.33**	-.12	-.36**	.27**	.31**	--		

7. Self-determined motivation	.05	-.03	.06	.28**	.35**	.16	--
8. Use of motivational strategies	-.12	.06	-.18	.40**	.45**	.40**	.39**	--

Note: **$p < .01$, *$p < .05$.

Hierarchical Multiple Regression

A hierarchal multiple regression was conducted to predict teachers' usage of the motivational strategy (see Table 4). In the first step, the predictor variables entered were namely, pressure from time constraints, evaluation, pressure associated with school authorities, autonomous causality orientation and perceptions of students' self-determined motivation. In the second step, teachers' basic need satisfaction was entered. In the third step, teachers' self-determined motivation was entered.

The first step of analysis revealed that teachers' autonomous causality orientation ($\beta = .31$, $t = 3.40$, $p < .01$) and teachers' perceptions of students' self-determined motivation ($\beta = .37$, $t = 4.18$, $p < .01$) were significant positive predictors of teachers' use of motivational strategies. The model predicted 31 % of variance in teachers' use of motivational strategies. In the second step, after controlling for the first four variables, teachers' basic need satisfaction accounted for additional 4 % of variance ($\beta = .25$, $t = 2.54$, $p < .01$, $\Delta R^2 = .04$). Similarly, in the third step, teachers' self-determined motivation was a significant positive predictor of teachers' use of motivational strategies ($\beta = .20$, $t = 2.19$, $p < .01$, $\Delta R^2 = .03$), with additional 3 % variance. Overall, the results showed the three models predicted a total of 38 % variance in teachers' use of motivational strategies in the PE classroom.

Table 4. Prediction of the Use of Motivational Strategies

Step	Variable	β	t	R^2	R^2_{adj}	ΔR^2
1						
	Pressure from time constraints	-.03	-.31	.31**	.27**	
	Evaluation	.03	.36			
	Pressure from school	-.04	-.37			
	Autonomous causality orientation	.31	3.40**			
	Perceptions of student self-determined motivation	.37	4.18**			
2						
	Pressure from time constraints	.03	.32	.35**	.31**	.04
	Evaluation	.05	.53			
	Pressure from school authorities	.01	.12			
	Autonomous causality orientation	.27	3.05**			
	Perceptions of student self-determined motivation	.32	3.60**			
	Need satisfaction	.25	2.54**			
3						
	Pressure from time constraints	.01	.06	.38**	.33**	.03
	Evaluation	.03	.72			
	Pressure from school authorities	-.01	-.05			
	Autonomous causality orientation	.22	2.47*			
	Perceptions of student self-determined motivation	.26	2.80**			
	Need satisfaction	.24	2.48**			
	Self-determined motivation	.20	2.19**			

Note: **$p < .01$, *$p < .05$.

6. Discussion

The aim of this study is to investigate the personal and contextual factors mentioned in Taylor et al.'s model (2008), in predicting the use of motivational strategies by PE teachers in Singapore. Overall, the results revealed some insights into the antecedents of teachers' use of motivational strategies in the PE classroom.

In general, Singapore PE teachers displayed high autonomous causality orientation, need satisfaction, and self-determined regulation. This is consistent with a recent study with teachers from other subject areas from Singapore (Liu et al., in press). This further supports the high degree of autonomy-support provided to the teachers in Singapore schools from the system perspective.

The results of the hierarchical multiple regression found that teachers' autonomous causality orientation, their perceptions of student self-determined motivation, need satisfaction and self-determined motivation, were positive and significant predictors of teachers' use of motivational strategies the PE classroom. These findings are critical as autonomy supportive and interpersonal involvement teaching strategies have been proven to positively impact students by enhancing intrinsic motivation (Ntoumanis, 2005), promoting self-esteem (Deci et al., 1981), experiencing competence (Connell, Wellborn, 1991) and encouraging engagement behaviours (Skinner, Belmont, 1993).

There are a few interesting results from the current study compared to an earlier study with teachers from other subject areas (Liu et al., in press). Firstly, none of the perceived job pressure factors play a significant role in determining teachers' use of motivational strategies. This could be the fact that PE is a non-examination subject in Singapore schools and therefore evaluation based on student performance, time constraints or school authority did not have an impact on teachers' motivation or need satisfaction. However, Taylor et al. (2008) did find that perceived job pressure was a significant predictor of PE teachers' use of motivational strategies through need satisfaction and teacher autonomy in the UK sample. This could be due to the fact that PE is examination subject in the UK system as an option.

Secondly, the results revealed that a teacher's autonomous causality orientation is crucial as it is a significant predictor of the use of motivational strategies. This is in line with previous studies (Liu et al., in press; Taylor et al., 2008). This is supported by literature where pre-service teachers with high autonomous orientations rather than controlling personal dispositions, exhibited more autonomy supportive behaviours (Reeve et al., 1999).

Thirdly, the findings that a teacher's perception of student self-determined motivation predicted the use of motivational strategies support Liu et al. (in press). Teachers who perceive students as high in self-determined motivation are more inclined to employ autonomy supportive and interpersonal involvement motivational strategies in a PE class. On the other hand, if teachers perceive their students to be low in self-determined motivation, they are less inclined to use these adaptive motivational strategies. This is in line with literature where past research reported that teachers who identified their students as being more involved and interested in class provided more autonomy support, structure and involvement in their teaching for these students (Skinner, Belmont, 1993). Likewise, in another study, teachers used more autonomy supportive teaching when they perceived their students as intrinsically motivated (Pelletier, Vallerand, 1996). This reaffirms the fact that teachers' motivation to teach is affected by students' motivation to learn and vice versa (Liu et al., in press).

Fourthly, this study also revealed that teachers' psychological need satisfaction and self-determined motivation are significant and positive predictor of teachers' use of motivational strategies. This implies that when teachers' fundamental needs of autonomy, competence and relatedness are fulfilled, they are more inclined to use autonomy supportive strategies in a PE class. This is consistent with one of the sub theory of self-determination theory, which is the basic psychological needs theory (Ryan, Deci, 2017). Therefore, school authorities should consider the provision of a working environment for teachers where their basic psychological needs (competence, autonomy, and relatedness) are met.

Apart from the five variables studied in this study, it is possible that other variables have influenced the prediction of teachers' use of these motivational strategies in Singapore's PE setting. Specifically, future studies may consider other factors such as PE teachers' knowledge of adaptive motivational strategies, their experience in applying motivational strategies in class and their mood or

emotional condition on the day of teaching. Hence, more studies on teachers' application of motivational strategies in Singapore's PE context are required to support the findings from this study.

There are a few limitations of this study need to be highlighted. Firstly, the sample size is relatively small in the current study. Having a larger sample size could facilitate a more accurate depiction and understanding of the perceptions of the general population of Primary and Secondary PE teachers in Singapore. Secondly, a more specific sample size could generate more accurate results as well. For example, future studies could focus entirely on one level of PE teachers (e.g. Primary school PE teachers only) as the difference in curriculum and nature of students in the Primary and Secondary context could generate unforeseen complications in the results and hence affect the authenticity of the conclusions in the study. Thirdly, this study was based on teachers' self-reported use of motivational strategies, future studies could be use other methods to eliminate the potential bias from teachers' self-accounts. Finally, another extension of this study is to include the perspective from the students, in terms of students' motivation and associated outcomes. By doing so, multilevel analysis could be conducted to examine the effects of teachers' variables on students' variables.

In summary, the findings from this study revealed that teachers' autonomous causality orientation, teachers' perceptions of student self-determined motivation are key predictors of teachers' use of motivational strategies in the PE classroom through needs satisfaction and teachers' self-determined motivation. Therefore, it is important to take into consideration the provision of a working environment for PE teachers where their needs of autonomy, competence and relatedness are facilitated.

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