Effects of feedback on achievement goals and perceived motivational climate in physical education

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The aim of the study is to determine the effects of teacher's positive and negative feedback on high school students' perceived motivational climate and achievement goals in a physical education setting. Forty seven ninth grade students participated in the study. The design was a 2 x 2 between subjects factorial crossing feedback condition (positive, negative) with test condition (pre-test, post-test). A six week intervention program was applied to positive and negative feedback intervention groups by a pre-service PE teacher during 6 weeks, 90 minutes per week in PE lessons. Results indicated that mastery and performance approach achievement goals increased and performance avoidance achievement goal decreased in the positive feedback group, while the results were opposite in the negative feedback setting. Perceptions of mastery motivational climate increased and performance avoidance motivational climate decreased in the positive feedback group, while perceptions of performance approach achievement goal and performance approach motivational climate increased in the negative feedback group. Overall, the type of teacher feedback changes the students' achievement goals and perceptions of motivational climate in PE lessons.

Introduction

Achievement motivation in physical education (PE) settings has attracted researchers' attention for decades, due to its role in future participation in physical education (Xiang, McBride & Guan, 2004). Dweck & Elliot (1983) and Nicholls (1984) defined achievement goals as the reason for or purpose of competence-relevant activity and they stated two types of achievement goals, namely mastery and performance goals. Mastery goals are self-referential and focus on learning and developing skills, while performance goals are normative in nature and focus on demonstrating competence. Both types of goal concern the pursuit of competence and the assessment of one's own skill level, but they do so in different ways. When pursuing mastery goals, people focus on developing their skills, and define success versus failure with self-referential standards. When pursuing performance goals, they instead focus on outperforming peers and define success versus failure with normative standards (Senko & Harackiewicz, 2005). Nicholls (1989) contended that an individual's goal involvement in a particular situation is the function of both a predisposition towards particular achievement goals (goal orientation) and situational factors (motivational climate). Furthermore, Ames (1984) defined two motivational climates: a mastery climate, which induces a task focus, and a performance climate, which results in higher ego involvement.

A decade later Elliot and colleagues (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) proposed revising the two achievement goal orientation to a trichotomous framework that involves both the performance-mastery and approach-avoidance distinction. According to the trichotomous model a mastery goal, focused on attaining self- or task-referential

competence (i.e., developing competence or attaining task mastery); a performance-approach goal (PAp), focused on attaining normative competence; and a performance-avoidance goal (PAv), focused on avoiding normative incompetence (Elliot, 1999). Perceived motivational climates in school settings paralleled the trichotomous achievement goal construct. Namely, while mastery remains the same as the dichotomous model, performance was separated into approach and avoidance. A perceived motivational climate can predispose students to adopt a specific personal goal perspective and, as a consequence, adopt adaptive or maladaptive achievement strategies (Ames, 1984).

Perceived feedback given by a teacher is one of the crucial mechanisms that help students attain their personal achievement goals (Vigoda-Gadot & Angert, 2007), and teacher feedback provides information to students about their performance that they cannot receive from other sources in the school setting (Rink & Hall, 2008). Bandura (1997) stated that information regarding performance outcomes is an important source of perceived efficacy, which can be defined as a major determinant of motivation. In a PE setting, performance feedback given by a teacher changes a students perceived competence and, consequently, changes the students further pursuit of an achievement goal (Senko & Harackiewicz, 2005), and their perception of the motivational climate of the lesson. This feedback mechanism may predict a students subsequent task performance (Vigoda-Gadot & Angert, 2007).

Although there are different types of feedback, only the affective aspect of feedback (positive versus negative) was included in this study. Since feedback provides a student with information about success and failure, positive feedback should communicate that the teacher feels the student succeeded, and negative feedback should communicate that the teacher thinks the student failed (Coleman, Jussim & Isaac, 1991). However, there has been some research that examines feedback and achievement goals with an achievement goal theory framework (Pekrun et al., 2014; Cianci, Klein & Seijts, 2010; Cron, Slocum, VandeWalle & Fu, 2005; Poortvliet et al. 2009; Senko & Harackiewicz, 2005; Viciana, Cervello & Ramirez-Lechuga, 2007) and perceptions of motivational climate (Viciana, Cervello & Ramirez-Lechuga, 2007), but research examining direct effects of feedback on achievement goals and motivational climate is not very extensive. The Pekrun et al. (2014) study with Irish secondary school students indicated that self-referential feedback had a positive impact on mastery goals, while normative feedback had a positive impact on performance approach and performance avoidance goal. According to Cianci, Schaubroeck and McGill (2010), valence of performance feedback alters the effect of mastery and performance goals. Undergraduate students who adopted performance goals appear to do better after receiving positive performance feedback, whereas students who adopted mastery goals improve more than students with performance goals after receiving negative feedback. Viciana, Cervello and Ramirez-Lechuga (2007) examined the effect of a teacher's positive, negative and both types of feedback on goal orientation and perception of motivational climate with 14-16 year old students in PE lessons. Results showed that participants in the positive feedback group had significantly higher mean scores on learning-oriented motivational climate and enjoyment than the participants of the negative

feedback group. The negative feedback group reported higher mean scores on performance-oriented motivational climate than the positive feedback group.

This study aims to extend the work of Viciana et al. (2007), using the trichotomous model with Turkish high school students to analyse the effects of positive and negative feedback on achievement goals and perceived motivational climate in PE lessons. Improving our knowledge about which type of feedback contributes to which motivational climate, and also, which achievement goals in a PE setting, will help teachers to create a better learning environment and avoid potential negative outcomes for students. Specifically, in a high school physical education setting, the research questions investigate: What is the effect of a teacher's positive and negative feedback on student achievement goals? What is the effect of a teacher's positive and negative feedback on the student perceived motivational climate?

Method

Participants and setting

The participants in this study were 47 (27 female, 20 male) 9th grade students. Students were randomly divided into two experimental groups. The positive feedback group comprised 27 9th graders (15 female, 12 male; M=15.62) and the negative feedback group comprised 20 9th graders (12 female, 8 male; M=15.74). Both groups attended the same high school, where PE is a compulsory lesson, in the central district of Denizli.

Measures

Achievement goals
The Trichotomous Achievement Goal Scale (TAGS; Duda & Nicholls, 1992; Elliot, 1999; Elliot & Church, 1997) was adapted into Turkish by Agbuga and Xiang (2008) for 8th-graders and 11th-graders. Erturan Ilker, Arslan and Demirhan (2011)'s validation study revealed the Turkish version of the TAGS to be valid and reliable among Turkish high school students. TAGS consists of 16 items, and the students rated each item on a 7-point Likert scale, ranging from 1 (*not at all true for me*) to 7 (*very true for me*). It has three subscales, named mastery (6 items), performance-approach (5 items), and performance-avoidance (5 items). All items were prefaced with the wording '*In my physical education class...,*' and students rated the statements in terms of their performances in the PE lesson. Two examples of the six items assessing mastery goals are, *'It is important for me to do my very best'* and '*It is important for me to learn a new skill by trying hard'*. Examples of the five items assessing PAp goals are, '*It is important for me to do better than others'* and *'My goal is to score the most points/goals/hits/etc.'* The five items assessing PAv goals included, *'I just want to avoid doing poorly'* and '*My goal is to avoid doing poorly.'*

Perceived motivational climate
The Trichotomous Motivational Climate Scale (TMCS) was developed by Agbuga and Xiang (2008) by gathering items adapted from Duda and Nicholls (1992), Elliot (1999), and Elliot and Church (1997). TMCS consists of 29 items in three subscales, namely

mastery (10 items), performance-approach (10 items), and performance-avoidance (9 items). Each item was rated on a 7-point scale. A validation study of the scale showed that TMCS is a valid and reliable scale for Turkish high school students (Erturan Ilker, Arslan & Demirhan, 2009). All items were prefaced with the heading '*In my physical education classes…'*. Examples of the ten items assessing mastery climate are, *'Teacher notices skill development rather than being the best',* and *'Students are encouraged to try to get better'*. Examples of the ten items assessing PAp climate are, *'Students feel good when they do better than their classmates',* and *'Teacher is more interested in the students who are the best'*. The nine items assessing PAv climate included, *'Students are afraid of making mistakes',* and *'Students are ashamed when they make mistakes.'*

Feedback manipulation checklist

To check whether the feedback manipulation was perceived as it was planned to be perceived, students were asked a question about whether they had received feedback explaining that they had performed 'well' (positive feedback) or 'poorly' (negative feedback) after each task. The same question was asked to the students on the scale after each task in every lesson (6 times in each lesson) during the intervention program. Only two students indicated negative feedback in the positive feedback experimental group and one student indicated positive feedback in the negative feedback group. These students' data were removed from the study.

Procedure

The design was a pre and post-test experimental design. The experimental design was a 2 x 2 between subjects factorial crossing feedback condition (positive, negative) with test condition (pre-test, post-test). Permission to conduct this study was received from Ministry of National Education and the University's Ethics Committee. The students and parents were informed with information letters and asked for permission with consent forms.

The intervention program was applied in compulsory PE lessons. Two different classes were randomly assigned to positive and negative experimental conditions. Prior to the intervention program, a male pre-service PE teacher was instructed by the researcher about how to deliver positive and negative feedback and the intervention program to both groups, three times a week for an hour during four weeks. The intervention program was delivered and monitored by the pre-service PE teacher during six weeks, 90 minutes per week in compulsory PE lessons. During the intervention program, volleyball skill learning practices, drills, and exercises were delivered to the students. Volleyball was chosen as a subject considering it is one of the skill based activities in the high school curriculum that gives instructors opportunities for giving students feedback after each of their trial. Also the school's facilities and equipment was considered in terms of convenience for volleyball.

In the positive feedback group, students received only encouraging positive feedback statements related to their individual performance, ability and effort such as "You performed very well". In the negative feedback group, students received only negative

feedback statements related to their individual performance, ability and effort such as "Your effort was poor". According to Rink and Hall (2008), in PE lessons, feedback must be provided when the student is actually doing the task or immediately after. Thus one feedback was given to each student after each performance trial in both positive and negative feedback groups. In this way all students received the same amount of feedback (average eight feedbacks) in each lesson. Lessons of both of the groups were video recorded during the intervention program, in order to verify that students in both groups had received the same amount of feedback.

Measures were administered to the students before and after the intervention program during the PE lesson in the gym, under the supervision of the researcher. During the application of measures, students were told that their participation was voluntary, they were free to withdraw at any time from the study, and that their responses were anonymous as they were not asked for their names on the scales. They were also told that there were no right or wrong answers and to ask for help if confused concerning either instructions or the clarity of particular items. Each participant took 15-20 minutes to complete the scales. No student refused to take part and no problems were encountered in either completing the scales or understanding the nature of the questions.

Data analyses

The values of skewness for the variables ranged from -0.710 to 0.644, and kurtosis ranged from -1.05 to 0.334, indicating they were approximately normally distributed. The univariate skewness and kurtosis scores met the criterion of less than ±2 for all variables (Schutz & Gessaroli, 1993).

To analyse the effect of positive and negative feedback conditions on students' achievement goals and perceptions of motivational climate, analysis of covariance (ANCOVA) for each dependant variable were conducted. Pre-tests were used as covariates. The level of significance was set at 0.05 in all analyses. Prior to conducting ANCOVA, statistical assumptions were tested. All multivariate assumptions were met (absence of univariate and multivariate outliers, linearity, absence of multicollinearity, homogeneity of variance-covariance matrices, and homogeneity of regression).

Results

As can be seen in Table 1, alpha coefficients of pre and post tests for most of the variables were above 0.70 and showed acceptable internal consistency reliability (Nunnally, 1978). Only mastery motivational climate pretest scores of both positive and negative feedback groups showed alpha coefficients lower than 0.70 (0.68 and 0.66 respectively).

ANCOVA revealed that there were significant differences between positive and negative intervention groups' mean scores of mastery achievement goal [$F (1, 45) = 8.383$, $p = .006$, $\eta^2 = .16$], PAp achievement goal [$F (1, 45) = 4.408$, $p = .042$, $\eta^2 = .09$], PAv achievement goal [$F (1, 45) = 7.122$, $p = .011$, $\eta^2 = .14$], mastery motivational climate [F

(1, 45) = 4.758, p = .035, η^2= .10] and PAv motivational climate [F (1, 45) = 4.238, p = .046, η^2= .10] variables. The students in the positive feedback intervention group had significantly higher mastery achievement goal, PAp achievement goal, and mastery motivational climate scores than the students in the negative feedback intervention group. The students in the negative feedback intervention group had higher PAv achievement goal and PAv motivational climate scores than the students in the positive feedback intervention group. As 0.01 partial eta-squared effect size is considered a small effect, 0.06 is considered a medium effect, and 0.14 is considered a large effect (Stevens, 2002), all interaction effects can be considered as large in this study.

Table 1: Descriptive statistics of intervention groups' achievement goal and perceived motivational climate

Group	Variable	Time	*M*	*SD*	α
Positive feedback	Mastery goal	1	5.475	.907	.70
		2	5.635	.745	.73
	PAp goal	1	4.481	1.081	.70
		2	4.866	1.049	.76
	PAv goal	1	4.533	1.359	.72
		2	4.207	1.177	.79
	Mastery climate	1	5.225	.821	.68
		2	5.251	.763	.78
	PAp climate	1	4.425	1.063	.75
		2	4.444	1.185	.84
	PAv climate	1	4.189	.795	.85
		2	4.057	.928	.78
Negative feedback	Mastery goal	1	5.433	.882	.72
		2	4.958	.967	.78
	PAp goal	1	4.680	1.265	.73
		2	4.510	1.311	.86
	PAv goal	1	4.490	1.100	.72
		2	4.920	1.404	.80
	Mastery climate	1	5.070	.869	.66
		2	4.725	.819	.77
	PAp climate	1	4.205	1.241	.82
		2	4.580	1.239	.85
	PAv climate	1	4.311	1.067	.80
		2	4.633	.995	.77

PAp: Performance approach. PAv: Performance avoidance

Discussion

The current study revealed two main findings based on two research questions. Firstly, mastery and PAp achievement goals increased and PAv achievement goal decreased in the positive feedback group, while PAv achievement goal increased in the negative feedback setting. Elliot and Church (1997) suggested that people might switch from a PAp goal to a

PAv goal after receiving negative feedback, or vice versa after receiving positive feedback. Because perceived competence determines whether one frames comparisons against others in an approach or avoidance manner. This presumably also could occur between the mastery (approach) goal and the PAv goal as well. Consistent with this study, Senko and Harackiewicz (2005) provided positive and negative feedback to two different groups during one semester in an introductory psychology course. Consistent with the current study result, Senko and Harackiewicz (2005) showed that negative feedback reduced participants' mastery goal pursuit. In contrast to the mastery goal, pursuit of the PAp and PAv goals were unaffected by both positive and negative feedback.

Cron, Slocum and VandeWalle (2002) found that PAv goal increased with negative feedback. Cron, VandeWalle and Fu (2005) replicated their previous study concerning PAv goal and found that the PAv goal orientation was related significantly to the intensity of negative emotional reactions to negative feedback. These results are consistent with the current study results concerning the relationship between negative feedback and PAv goal.

Secondly, results related to students' perceptions of motivational climate showed that students' mastery motivational climate perceptions increased, and PAv motivational climate perceptions decreased with positive feedback in PE setting. The results were quite opposite in negative feedback group. Viciana et al. (2007) examined the effect of positive, negative and both types of feedback on goal orientation, perception of motivational climate, satisfaction, and boredom in PE lessons with 14-16 year old students. Results showed that participants in the positive feedback group had significantly higher scores on learning-oriented (mastery) motivational climate than the participants of the negative feedback group. The negative feedback group reported higher scores on performance-oriented (performance approach) motivational climate than the positive feedback group. However the first result is consistent with the result of current study, the second result differs. It might be related that Viciana et al. (2007) used the dichotomous achievement goal framework which unifies approach and avoidance constructs so that they have the incorporated results of PAp and PAv achievement goals.

Although the changes were not significant, perceptions of PAp motivational climate increased in both groups in this study. Because both positive and negative feedback give information related to the students' performance, learning how to do better with the help of both positive and negative feedback could support challenges between students in the learning environment. For students in the positive feedback group, PAp goal scores decreased, but in the negative feedback group, despite their perception of the climate PAp, they tended to adopt PAv goal instead of PAp goal. Avoidance of being worse than others was shaped in negative feedback PE setting, instead of being better than others, because of the structure of the negative feedback. From an applied perspective, teachers can be advised to give positive feedback due to its positive motivational outcomes in high school PE setting, and avoid giving negative feedback.

Limitations

There are several limitations in this study. Firstly, only direct effects of teachers' feedback on students' motivational variables were analysed. Alternatively, students' cognitive variables could be used as mediators between teachers' feedback in learning settings and students' perceptions related to that environment and achievement goal. In future research, student cognitive variables can be put in a model as mediators to better understand the effect of feedback mechanisms. Secondly, the trichotomous framework can be considered as a limitation. A 2x2 achievement goal framework could be used to analyse the effects of feedback types on achievement goals in more detail. Another possible limitation concerns the generalisation. Because it is an experimental study, only a small number of participants was included and results of this study cannot generalised to the populations other than Turkish high school students. Future research needs to be undertaken to be able to compare and examine the effects of different types of feedback on students from different cultures and age groups.

Conclusion

The current study incorporating a Turkish sample supported the findings from previous studies (Cron, Slocum & VandeWalle, 2002; Cron, VandeWalle & Fu 2005; Viciana et al, 2007), in terms of favourable effects of positive feedback on perceived motivational climate and achievement goals. Results of this study supported the finding that different types of feedback change the students' motivational responses, due to the influence on both the perception of success and failure in the learning of skills. In the light of these findings, the detrimental impact of PAv goal should be considered by teachers in learning environments and negative feedback should be avoided in a PE setting. Because positive performance feedback fosters mastery achievement goal and motivational climate perception, it is recommended for use by PE teachers in high school PE settings.

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