The Relationship between Middle School Students' Learning Environment Perceptions and Achievement Goals in Science

Nurcan Kahraman

Department of Math and Science Education, Bursa Uludag University, Turkey

Abstract: *This study examined the reciprocal relationship between students' perceptions of science learning environment, measured through promoting choice, interaction and mutual respect, and teacher feedback, and students' achievement goals of mastery-approach and performance-approach goals. A total of 407 sixth and eighth grade students participated in the study. Canonical analysis showed that perceived learning environment variables and approach goal orientations were reciprocally and positively related. According to the results, all the dimensions of learning environment perceptions were related to students' approach goals. For example, students who perceive right to share the control in tasks in science classroom, tend to adopt approach goals.*

Correspondence to: *Nurcan Kahraman, Department of Math and Science Education, Bursa Uludag University, Özlüce Görükle Kampüsü, 16059 Nilüfer/Bursa, Turkey. E-mail: nurcankahraman@uludag.edu.tr; ORCID: https://orcid.org/0000-0003-1009-3047*

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Introduction

ACHIEVMENT goal theory is one of the prominent theories of motivation. It was first conceptualized in the late 1970s and early 1980s by Ames and her colleagues (Elliot, 1999). The theory is concerned with individuals' reasons for pursuing an academic task (Ames, 1992; Pintrich, 2000), in other words, students' goals for achieving an academic task (Pintrich, Conley & Kempler, 2003). It emphasizes that underlying reasons to achieve a task can be different for students even though they are equally motivated to perform the task (Anderman, Urdan, & Roeser, 2003). Goal researchers, in the beginning, suggested two types of goals; students' reasons to achieve a task may be learning and understanding the task, or may be demonstrating their ability and performance to others. They called these achievement goals mastery and performance goals, respectively (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). Later, it was suggested that students may focus on approaching a positive possibility or avoiding a negative possibility (Elliot & Thrash, 2001). Hence, by combining achievement goals and approach/avoidance orientation, four types of achievement goals were suggested. Accordingly, mastery-approach goal-oriented individuals focus on mastering new skills and understanding the task; whereas individuals who pursue mastery-avoidance goals are concerned with avoiding not understanding the task. On the other hand, performance-approach goal-oriented individuals focus on demonstrating their ability to other people, while students who pursue performance-avoidance goals are concerned with avoiding to get low grades and appear incompetent (Pintrich & Schunk, 2002).

Goal researchers generally compared mastery goals and performance goals in terms of their relation to learning outcomes and they mostly suggested that mastery goals have more positive relations with students' learning outcomes than performance goals (e.g., Anderman & Maehr, 1994; Elliot & Harackiewicz, 1996). Students whose reasons for studying an academic task is learning and understanding the task (mastery-approach goal oriented) tend to use adaptive strategies and persist on the task (e.g., Ames & Archer, 1988). On the other hand, more recently, researchers emphasize performance-approach goals may also be positively related to students' adaptive outcomes (e.g., Bong, 2001). Moreover, some researchers suggest that different kinds of goals can be useful for students in a learning situation (Barron & Harackiewicz, 2001). Therefore, the present study aims to focus on approach dimensions of achievement goal orientation, mastery-approach and performance-approach goals, and their relations to students' perceptions of science learning environment.

Previous research found that students' perceptions of classroom learning environment were associated with students' achievement goals (e.g., Church, Elliot, & Gable, 2001; Greene et al., 2004). Most of the previous research investigating this relationship referred to TARGET system (Ames, 1992). TARGET is the acronym representing classroom dimensions of task, authority, recognition, grouping, evaluation, and time, which are proposed to support students' mastery and performance goals. For instance, Church et al. (2001) addressed lecture engagement, evaluation focus, and harsh evaluation factors in the learning environment. They found that evaluation focus and harsh evaluation were negative predictors of mastery goals while lecture engagement was a positive predictor of mastery goals. Evaluation focus, on the other hand, was positively associated with performance-approach goals. Similarly, Greene et al. (2004) investigated how TARGET dimensions of motivating tasks, autonomy support, and mastery evaluations were associated with high school students' motivation in English classes. Path analysis showed that motivating tasks positively predicted mastery goals while the proposed direct relationship from autonomy support and mastery evaluations to mastery goals were non-significant. However, self-efficacy mediated the relationship between autonomy support and mastery evaluations and mastery goals. Among the three learning environment dimensions, only a path from mastery evaluation to performance-approach goals was depicted. The direct relationship between the two variables was non-significant, but self-efficacy again played a mediational role in the relationship between mastery evaluation and performance-approach goals.

Although TARGET system (Ames, 1992) improved our understanding about how classroom environment factors influence students' achievement goals, there is need for more research to investigate the relationship between different dimensions of learning environment and achievement goals. Moreover, Patrick, Kaplan, and Ryan (2011) suggest that it is important to investigate achievement goals by taking into consideration the learning environment climate since it helps researcher to make specific recommendations rather than general recommendations which generally achievement goal theory does. This study points out students' perceptions of interpersonal relation variables in their science learning environment and teacher feedback. This study aims to contribute to the literature by providing empirical evidence about how students' perceptions of promoting choice, interaction and mutual respect, and teacher feedback are related to mastery-approach and performance-approach goals. Moreover, most of the goal researchers focused on the role of learning environment features in shaping individuals' achievement goals (e.g., Ames, 1992; Linnenbrink, 2004). However, there is a reciprocal relationship between the learning environment factors and student motivation (Reeve, 2006; Reeve, 2012; Reeve, Deci, & Ryan, 2004). In the present study, this reciprocal relation of learning environment and achievement goals is aimed to be investigated.

The Relation between Learning Environment and Achievement Goals

According to the dialectical framework within self-determination theory, students' motivation and learning environment perceptions are dynamically interrelated (Reeve et al., 2004). Students come to the classrooms with their needs, values, and aspirations, in other words with their inner motivation. This motivation can help students to engage constructively in the learning environment. On the other hand, learning environment features can either support or thwart students' inner motivation. Hence, the theory proposes that learning environment and motivation affects one another (Reeve, 2006; Reeve, 2012; Reeve et al., 2004). Accordingly, the features of learning environment, such as interpersonal relationships and feedback, affect and are affected from student motivation. In the present study, I will focus on the features of learning environment of interpersonal relationships in the classroom such as promoting choice, interaction, and mutual respect and feedback and student motivation will be addressesed as achievement goals.

Promotion of choice refers to students' perceptions of having right to contribute to task related choices in the classroom. People tend to prefer and persist in activities when they have opportunity to make decision, in other words, when they share the control (Condry, 1977). In the relevant literature, while some researchers discuss advantages of sharing control in the learning environment on students' achievement (e.g., Connell, 1985), others suggest that success comes with organized teaching (e.g., Brophy & Good, 1986). However, Eshel and Kohavi (2003) proposed that promotion of control does not deprive teachers of classroom control. Besides that, the same researchers draw four classroom control styles: student control style (student control is high, teacher control is low), teacher control style (teacher control is high, student control is low), high shared control, and low shared control. When they compared these groups in regard to achievement and regulated behaviors, they suggested that among these four groups, the most successful group was high shared control. Moreover, constructivism, one of the outstanding theories in science education, also underlines the importance of sharing control with students in the learning environment and recommends that teachers should encourage students to make decisions and take responsibility in school related tasks (Taylor, Fraser, & Fisher, 1997). Regarding the relation between promotion of choice and achievement goals, for instance, Kingir et. al. (2013) examined the relationship between students' achievement goals and their perceptions of constructivist learning environment among eighth grade Turkish students. Path analysis showed that shared control was a significant and positive predictor of mastery-approach goals, while it was unrelated to performance-approach goals. In another study, Yerdelen-Damar and Aydın (2015) investigated the relationship between high school students' classroom learning environment perceptions and their adoption of achievement goals. Findings of the study suggested that students' perceptions about constructivist learning environment, which also include perception of promotion of choice, are positively related to their mastery-approach goals. On the other hand, the relation between learning environment perception and performance-approach goals was non-significant. In a recent similar study, Sadi and Lee (2022) investigated the relation between learning environment perceptions and achievement goals of students with a canonical correlation analysis. The results of

the study supported the previous findings, and suggested that mastery goals are related to constructivist learning environment perceptions of students.

Promoting interaction refers to teachers' encouragement for students to interact with their peers during the learning activities (Ryan & Patrick, 2001). Actually, social constructivism assumes that children construct their own learning by interacting others (Vygotsky, 1991). This interaction may occur through sharing ideas in the class, working in a group activity, or help-giving, and underlying component of student-centered learning (Ryan & Patrick, 2001). Johnson (1981) suggested that experiences with peers is not a luxury, but is a necessity for students' maximum achievement and development. He suggested nine advantages of constructing student-student interaction in the class: it can (1) contribute to students' socialization, (2) influence achievement, (3) contribute to individuals' psychology, (4) increase students' social skills, (5) influence adolescents' potential problem behaviors, (6) help students control their aggressive impulses, (7) contribute to students' identity, (8) make students view problems from different perspectives, and (9) affect students' attitude toward school. Additionally, students' assistance to each other is different than an adults' support since it is at similar levels in terms of power (Hartup, 1989). Besides, effective student interaction encourages students task questions, share ideas, and reflect their knowledge thereby, motivate them and improve their learning (Soller, 2001). Research on the relation between promoting interaction and achievement goals suggests that promoting interaction among classmates was significantly and positively related to mastery goals while unrelated to performance-approach goals (e.g., Iverch & Fisher, 2008; Kingir et al., 2013; Patrick, Ryan, & Kaplan, 2007).

Reviewed literature points out that promoting choice and interaction, which are also constructivist learning environment variables, are generally related to mastery-approach goals while unrelated to performance-approach goals (e.g., Kingir et al., 2013). However, according to multiple goal perspective, when performance goals are accompanied with mastery goals, they may be beneficial as well (Barron & Harackiewicz, 2001; Pintrich 2000; Shih, 2005). Furthermore, these constructs are domain based (Eccles et al. 1993) and can change from culture to culture (Elliot et al., 2001). For these reasons, in the present study, besides mastery-approach goals, how performance-approach goals are related to promotion of choice and interaction was also be investigated.

Another perceived learning environment variable which is focused in this study is promoting mutual respect among classmates. Promoting mutual respect refers to students' perceptions that to what extend their teacher wants students respect other students' ideas and does not allow students make fun of other students (Ryan & Patrick, 2001). A few studies have focused on the relationship between promoting mutual respect among classmates and student motivation. For instance, Ryan and Patrick (2001) investigated eighth grade students' motivation in mathematics in relation to some classroom environment variables. Students' perceptions of their teacher as encouraging respect among classmates were significantly and positively associated with students' motivation, which was measured through academic efficacy. In another study conducted by

Patrick et al. (2007), promoting mutual respect was positively associated with peer social efficacy. Although a link between promoting mutual respect and mastery goals was hypothesized, no association was found between the two variables. On the other hand, Coker, Kiefer and Robinson (2019) investigated teacher goals by cluster analysis. Three groups were occurred; mastery oriented, multigoal (mastery and performance) and low motivation. According to the findings, although there was no significant difference between multigroup and mastery oriented, low motivation group was less adaptive compared to other two groups. Hence, I anticipate that promoting mutual respect may help to create a more supportive learning environment for students' adoption of approach goal orientations. Students' goal orientation is a key motivational construct (Pintrich & Schunk, 2002) and I think that promoting mutual respect among classmates may also relate to students' goal orientations. Students may be more focused on improving their knowledge and skills and also showing their abilities to others in science classes where students respect each other's ideas and classmates do not make fun of them or say negative things when they make mistakes.

The last perceived learning environment variable of this study is feedback. Feedback refers to "information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding" (Hattie & Timperley, 2007, p. 81). Achievement goals play role in efficiency of feedback (Kim, Lee, Chung, & Bong, 2010; Rakoczy, Harks, Klieme, Blum, & Hochweber, 2013). For instance, Rakoczy et al. (2013) investigated the effect of feedback in mathematics among ninth grade students and path analysis showed that students' mastery-approach goals moderated the relationship between feedback and students' perceptions of usefulness of the feedback. VandeWalle (2003) proposed that individuals' goal orientations influence feedback seeking behavior. Accordingly, mastery goal-oriented individuals are asserted to seek feedback more frequently than performance goal-oriented individuals. Individuals who possess learning goals seek process feedback, while individuals who possess performance goals seek outcome feedback. In fact, a positive relationship between mastery goals and constructive feedback can be expected because this kind of feedback points out the areas to be improved, which is especially desirable for mastery-oriented individuals (Jang, Dunlop, Park, & van der Boom, 2015). Since mastery-oriented individuals are concerned with improving their skills and competencies, feedback can also serve to inform about effectiveness of strategies used (Beckmann, Beckmann, & Elliot, 2009). Mastery goal-oriented students are more willing to get feedback that may have a negative sign than performance goal-oriented students. Waples (2015) pointed out that for performance-oriented individuals, sign of feedback is important for receptivity to feedback. He found that individuals who possess mastery goals reported high receptivity to specific feedback, regardless of its sign. On the other hand, individuals who possess performance goals demonstrated highest receptivity when they get specific positive feedback and lowest receptivity when they get specific negative feedback. In other words, feedback is important for both mastery oriented and performance-oriented students; however, their reaction can vary according to their goals. For example, in an earlier experimental study, Elliott and Dweck (1988) examined students' re-

sponses to feedback about their mistakes. They found that students in the performance goal highlighted condition and who low perceptions of their ability had attributed their mistakes to lack of ability and gave up easily when they encounter with obstacles. However, students in the performance goal highlighted condition but had high perceptions about their abilities persisted when they encountered obstacles and reacted in a mastery-oriented manner. The researchers concluded that students' achievement goals were important determinant factors in students' responses to achievement situations like undertaking challenging tasks. In a recent study, Winstonea et al. (2019) explored association between achievement goals and feedback. They suggested that feedback usage was higher for those who reported high level of mastery approach and performance approach goals. Hence, in this study, it is expected that teacher feedback will be positively and reciprocally related to both mastery-approach and performance-approach goals.

To sum up, this study aimed to answer following research question: What is the relationship between the set of students' achievement goals (mastery-approach and performance-approach goals) and their perceptions of the learning environment (shared control, student negotiation, teacher as promoting mutual respect, and teacher feedback)?

Method

Sample

The sample of the study consisted of 407 middle school students attending two public schools in eastern part of Turkey. There were 212 (52%) girls and 195 (48%) boys. The participants were at grade six (42.3%, n = 172) and grade eight (57.7%, n = 235). Their age ranged from 13 to 15 years and participation was voluntary.

Instruments

Students' Perceptions of Learning Environment in Science

Promotion of Choice. In order to assess students' perceptions of promoting control in science classrooms, shared control, a sub dimension of the Constructivist Learning Environment Perceptions (CLEP) scale, was used. CLEP was developed by Johnson and McClure (2004), and translated and adopted into Turkish by Yilmaz-Tuzun, Cakiroglu and Boone (2006). Moreover, Ozkal et al. (2009) revised the Turkish version of the scale. It is a five point Likert scale from 1 "absolutely disagree" to 5 "absolutely agree". It has 4 items like "In this science class, I help the teacher to decide which activities work best for me". The Cronbach's alpha reliability coefficient for the shared control subscale was 0.73 for the present study.

Promoting Interaction. In order to assess students' perceptions about how their learning environment promotes interaction with their peers, a subscale of CLEP (Johnson & McClure, 2004), student negotiation, was used. The items are like "In this science class,

I explain my ideas to other students". The Cronbach's alpha reliability coefficient for student negotiation subscale was .66 for the present study.

Promoting Mutual Respect. It is developed by Ryan and Patrick (2001) and assesses students' opinions about whether their teacher promotes mutual respect among students. It is a five point Likert scale and has 4 items like "My science teacher does not allow students to make fun of other students' ideas in class". The Cronbach's alpha reliability coefficient for the promoting mutual respect subscale was .80 for the present study.

Feedback. In order to assess students' perceptions about feedback that they receive in the learning environment, some items of previous studies (Blair, Curtis, Goodwin, & Shields, 2013; Hyland & Hyland, 2006; Kağıtçı, 2013; King, Schrodt, & Weisel, 2009) were revised by the authors of this study. It is a five point Likert scale and includes 9 items like "Written feedback on my assignment helps me in my learning." The Cronbach's alpha reliability coefficient for the feedback subscale was .84 for the present study.

Motivational Variables

Students' Achievement Goals: In order to assess students' achievement goals in science, I used two subscales of Patterns of Adaptive Learning Scales (PALS). It was developed by Midgley et al. (2000), and translated and adopted in to Turkish by Tas and Tekkaya (2010). It is a five point Likert scale from 1 "absolutely disagree" to 5 "absolutely agree". The mastery goal orientation subscale has 5 items like "It is important for me to improve my skills", and performance-approach goal orientation subscale has 5 items like "One of my goals is to look smart in comparison to the other students in my class". In the present study, the Cronbach's alpha reliability coefficients were 0.75 for mastery goals and 0.77 for performance-approach goals.

Results

Descriptive Results

Descriptive statistics including mean, standard deviation, minimum, and maximum and Cronbach alpha reliabilities for the variables of the study are presented in **Table 1**.

Inferential Statistics

Canonical correlation analysis was performed to investigate the relationship between the set of students' achievement goals (mastery-approach and performance-approach goals) and students' perceptions of learning environment (promoting choice, interaction, and mutual respect and feedback). The first canonical correlation was 0.44 (19% overlapping variance), the second was 0.17 (3% overlapping variance) accounting for the significant relationships between the two sets of variables. With two canonical correlations included, $F_{(8, 802)} = 12.91$, $p < 0.005$, and with the first canonical correlation removed, $F_{(3, 402)} = 4.36$, $p < 0.005$. Since the explained variance was low, under 9%,

Table 1. Descriptive Statistics and Reliabilities.

Variables	M	SD	Min.	Max.
Learning Environment Perception				
Promotion of choice	3.50	0.86	1	5
Promoting interaction	3.32	0.94	1	5
Promotion of mutual respect	4.52	0.73	1	5
Feedback	4.19	0.70	1.22	5
Approach Achievement Goals				
Mastery-approach	4.45	0.62	1	5
Performance-approach	3.85	0.86	1	5

Table 2. Correlations, Standardized Canonical Coefficients, Canonical Correlations, Percent of Variance, and Redundancies.

	First Canonical Variate	
	Correlation	Coefficient
Perceived Learning Environment		
Promotion of choice	0.50	0.28
Promoting interaction	0.39	0.01
Promoting mutual respect	0.82	0.59
Feedback	0.81	0.45
Percent of variance	43. 35	
Redundancy	8. 22	
Achievement Goals		
Mastery-approach goals	0.92	0.78
Performance-approach goals	0.68	0.43
Percent of variance	64. 94	
Redundancy	12. 31	
Canonical Correlation	0.44	

for the second canonical correlation (Tabachnick & Fidell, 2013), it was not interpreted in the present study

As shown in **Table 2**, with a cut off correlation of 0.30 (Tabachnick & Fidell, 2013), all of the variables in the two of sets were correlated with the first canonical variate. Concerning students' achievement goals, mastery-approach and performance-approach goals were found to be positively correlated with canonical variate. Additionally, the first pair of canonical variates indicated that perceiving higher levels of sharing control, negotiate with other students, teacher feedback and respect in the learning envi-
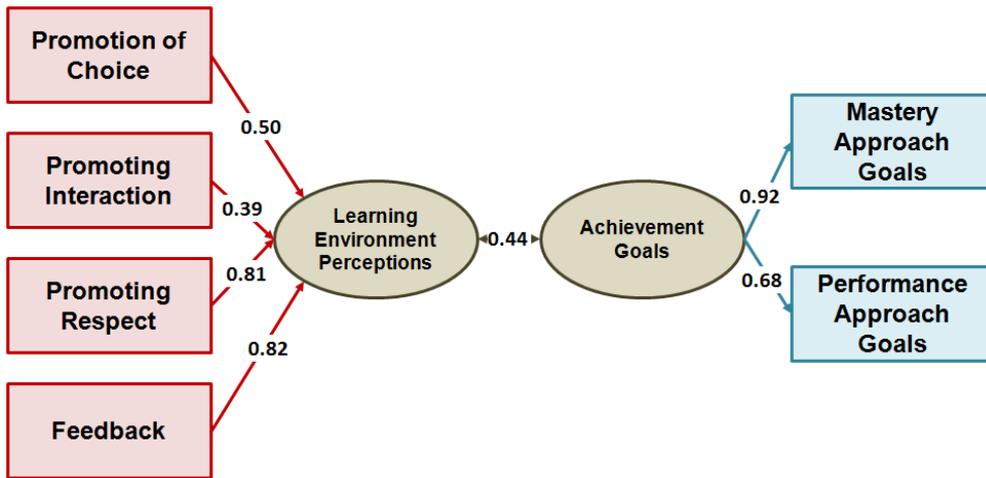
Figure 1. The Relation between the Set of Students' Achievement Goals and Students' Perceptions of Classroom Learning Environment.

ronment were significantly related to students' approach goals. Promoting mutual respect (0.82) and feedback (0.81) had the highest loading among perceived learning environment set. On the other hand, mastery approach goals (0.92) had higher loading than performance approach goals. **Figure 1** also presents graphical representation of the results.

Discussion

In the present study, I predicate on two motivation theories; achievement goal theory and student-teacher dialectical framework within self-determination theory. While achievement goal theory investigates students' motivation to complete, or to achieve a task (Elliot, 1999), student-teacher dialectical framework within self-determination theory suggests that classroom contextual factors affect students' motivation and vice versa (Reeve et al., 2004). Therefore, the current study examined the reciprocal relationship between students' learning environment perceptions and achievement goals in science. Learning environment perceptions were handled as interpersonal relationships (promoting choice, interaction and mutual respect) and feedback in science classes while achievement goals were addressed as mastery-approach and performance-approach goals.

The Relationship between Perceived Learning Environment Variables and Achievement Goals

In order to examine the nature of the relation between students' approach goals and learning environment perceptions in science, canonical analysis was performed. According to the results, all dimensions of learning environment are related to the both dimensions of approach goals. Regarding to promoting choice and interaction, results suggest that students who think that they have chance to contribute to decision making process, and there is encouragement to share ideas and discuss the topic with their peers in their science learning environment tend to adopt both mastery-approach and performance-approach goals. In other words, they tend to study science not only to learn new things, gain knowledge, and master new skills in science, but they also aim to show their ability to others and get high grades. Considering reciprocal relation perspective, it can also be suggested that students who adopt approach goals tend to perceive right to share the control in tasks in science classroom. It was an expected result that students' perceptions about shared control and encouragement to negotiate with their peers from learning environment and their adoption of mastery-approach goals are interrelated. This result is similar to the findings of previous studies (e.g., Kingir et al., 2013; Yerdelen-Damar & Aydın, 2015). Furthermore, the analysis results suggested a positive relation between the mentioned learning environment perceptions and performance-approach goals. In other words, students who think that their teacher share the control of learning environment with them, and lead them to share ideas with their peers tend to adopt not only mastery-approach goals but also performance-approach goals in science. It was an unexpected result since previous studies suggested non-significant relations between these variables (e.g., Yerdelen-Damar & Aydın, 2015). I think that in a science learning environment where students are encouraged to negotiate with each other, or to share their ideas about learning activities, they may more readily have opportunity to show their abilities to others and thus focus on performance-approach goals. Besides, for performance-approach goal-oriented students, negotiating with peers or sharing control may be a way to demonstrate their abilities.

Promoting mutual respect among classmates and approach achievement goals are positively related. As mentioned before, there is limited research which investigated the associations between promoting mutual respect among classmates and achievement goals. Previous research showed that promoting respect was positively related to student motivation such as academic efficacy (Ryan & Patrick, 2001) and peer social efficacy (Patrick et al., 2007). Although Patrick et al. (2007) depicted a link from promoting mutual respect to mastery goals; they found a non-significant relationship between the two variables. However, the present study showed that promoting mutual respect was significantly and positively associated with approach goal orientations. I think that in a science learning environment where students respect each other's ideas and do not humiliate and laugh at each other when they make mistakes, students may more comfortably focus on both developing and showing their competence. Thus, it seems important for science teachers to encourage their students to respect their peers and discourage students to say anything negative about their classmates and make fun of each other when they make mistakes.

Perceived teacher feedback and achievement goals are positively associated. The positive relationship between mastery-approach goals and teacher feedback is expected because feedback may inform students about how to improve their competence (Jang et al., 2015). I think that effective teacher feedback can be also beneficial for performance-approach goal-oriented individuals because it is clear and encouraging for students to take action. For instance, it may include some recommendations for students and following those recommendations may help students show their competence. Hence, the more mastery- and performance-approach goal-oriented students are, the more willing they are incorporate feedback to improve their abilities and to look competent, respectively. Previous research also supported the relationship between achievement goals and feedback. For instance, Merriman et al. (2012) examined effects of outcome feedback, which just includes information about results achieved, for learning goal oriented and performance goal-oriented individuals by focusing on approach dimensions of goal orientations. They found that outcome feedback moderated the relationship between learning goal orientation and task achievement. Students who adopted learning goals showed low task achievement when they were given outcome feedback, whereas showed high task achievement when they were not given outcome feedback. In the absence of outcome feedback, high learning goal-oriented individuals showed higher achievement than low learning goal-oriented individuals. Their study demonstrated that the type of feedback is important and there should be a coherence between individuals' personal goals and the feedback they receive. Outcome feedback had deleterious effects for learning goal-oriented students. In the present study, feedback items addressed processes such as how science teachers' feedback help student construct and improve their learning and include achievable recommendations rather than their outcome. Furthermore, previous studies suggest that the sign of feedback is also important. For instance, Waples (2015) found that students who pursue mastery goals demonstrated high receptivity to specific feedback, regardless of its sign. On the other hand, students high in performance goals showed highest receptivity when the feedback is positive and lowest receptivity when feedback is negative. In the present study, feedback items were rather positive and supported the positive association between positive feedback and mastery and performance goals. Hence, this study supported that feedback which is process oriented, comprehensible, and encouraging is beneficial for both mastery- and performance-approach goal-oriented individuals. Further studies can investigate the effect of different types of feedback on students' achievement goals by using experimental designs.

Moreover, according to the results, promoting mutual respect and feedback had the highest loadings among the variables in perceived learning environment set. Regarding achievement goals, mastery-approach goals had high loading. These high loadings can imply that students who perceive that their teacher promote mutual respect and give feedback in science, tend to adopt mastery-approach goals, or vice versa. In other words, students who pursue mastery-approach goals in science tend to perceive higher level of respect and feedback from their science teachers. Based on these findings, it can be suggested that teachers may create more respectful learning environments for

their students and give them process oriented feedback rather than product oriented to emphasize them focus on improving their knowledge or mastering new skills in science.

Findings of this study suggested associations between mastery-approach goals and perceived learning environment variables which is in line with previous research findings (e.g., Yerdelen-Damar & Aydın, 2015). In regard to the relation between performance-approach goals and perceived learning environment, previous studies generally suggested non-significant relations between these variables (e.g., Kingir et al., 2013). On the contrary, present results suggested that students' perceptions about the learning environment in science and their performance-approach goals are also intercorrelated. One explanation of this result may be due to investigating this relationship reciprocally. In other words, this study addressed not only how learning environment perceptions influence students' adoption of achievement goals, but also how achievement goals are related to students' perceptions about their learning environment. The other reason for the positive associations between learning environment variables and performance-approach goals may be related to Turkish educational system. It is mostly examination oriented; in order to enroll in more prestigious high schools and colleges, students have to get high grades in countrywide examinations. Thus, education system in Turkey is highly competitive (Senler & Sungur, 2009; Tas & Tekkaya, 2010). The more emphasis on grades by teachers and parents in Turkey may lead students to adopt more performance goals (Kahraman & Sungur, 2013). Moreover, Turkish society reflects collectivist features (Hofstede, 1980). In collectivist cultures, other people's opinions are important for individuals so students tend to adopt more performance goals than individualistic cultures (Elliot, Chirkov, Kim, & Sheldon, 2001). The present study suggests that students' perceptions of science learning environment as promoting sharing control with their teachers, negotiating with their peers and mutual respect among classmates, and teacher's giving feedback were positively related to students' concerns with showing their ability to others and looking smart. I suggest future studies to focus on the associations between perceived learning environment variables and performance-approach goals and elaborate more on these relationships.

Conclusion

The present study aimed to investigate the relation between learning environment perceptions and achievement goals of middle school students. According to the results, students' approach goals and their perceptions about learning environment are related to each other reciprocally. These findings suggest teachers to create much constructivist learning environments. In the learning environments students should encourage to share responsibility with their teacher. Furthermore, it should be underlined that feedback was a significant contributor in the model. In the learning environments, students may be received reactions to their actions or work. On the other hand, the current study has some limitations that should be acknowledged. It focused on students' approach goals and their relations to perceived learning environment features. Hence, the study does not provide information about the reciprocal relation between avoidance goals and

learning environment perceptions. Future research can be designed by including all types of achievement goals. Additionally, the present study is cross-sectional; the data were collected at one point of time. It is suggested that in a longitudinal study the proposed relationships may be examined in more detail.

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