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교육학박사학위논문

Relations of Classroom Goal Structure and
Social Relationships to Error Perception in
Collaborative Learning

협력학습 상황에서 교실목표구조, 사회적 관계 및
실수에 대한 인식 간의 관계

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Abstract

Relations of Classroom Goal Structure and Social Relationships to Error Perception in Collaborative Learning

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Despite the ubiquitous adage that “mistakes breed success” errors tend to be avoided at all costs in education settings. However, researchers have recently started to pay attention to the potential role of errors in stimulating students’ improvements in learning. To extend the potential benefits of errors, the current study examined factors that affect students’ error perception, which may subsequently impact student achievement. Research has shown that students’ perception of errors reflect their constructive attitude toward errors and is easily affected by classroom climate. Especially, under the greater threatening that may cause in social contexts, the current study examined the potential benefits of errors that occur during collaborative learning in the elementary school classroom. An experimental design was used to measure the relations of classroom goal structure and social relationships on students’ error perception in the collaborative learning context. In the current study, errors are defined as an avoidable or unavoidable deviation from one’s expectations (Reason, 1990).

A total of 160 fourth, fifth, and sixth graders attending two elementary schools in a large Korean city participated as part of their regular class curriculum. Self-reported questionnaires were administered to measure students’ general perception of errors in learning and perceived social relationships with teacher and peers in the same class. Prior to the survey, participants were put into groups of 3 and asked to learn 12

traditional Korean proverbs within 12 minutes. Each student then had 10 minutes to take 20 problems of quiz. During the study session and the quiz, teachers manipulated the classroom goal structure to be either mastery-oriented or performance-oriented. After the students completed the quiz, they once again reported their perception of errors.

Results from the current study suggest that students' perception of errors, which may subsequently impact student achievement, is greatly affected by classroom goal structure and social relationships. This study adds to the existing body of literature by examining whether constructive error perception matters in students' achievement and factors affecting on their perception of errors. A mastery classroom goal structure and warm relationships with teacher and peers were more likely to encourage students to have positive perception of errors. Furthermore, students with more constructive perception of errors were more likely to perform better.

Students' perception in consideration for improving errors and preferences for risk taking increased under the mastery-oriented classroom goal structure and within the perceived secure and warm relationships with teacher and peers. However, students' perception for strain on errors was not affected by either goal structure or by social relationships in the classroom. These results imply how the collaborative learning classroom climate should be structured to improve perception of errors, which can in turn impact student achievement.

Keywords: perception of errors, classroom goal structure, social relationships, collaborative learning, task achievement

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CHAPTER I: INTRODUCTION

Statement of Problem

Encouraging students to focus on mastering what they learn rather than on outperforming peers is a critical challenge for teachers. Research has shown that students who prioritize mastery over outperforming tend to show higher motivation and achievement (Ames & Archer, 1988; Urdan & Midgley, 2003). Many students, however, show more negative reactions to hypothetical consequences of receiving lower grades than hypothetical consequences of missing what they have learned. There is reason to suspect that the typical classroom does not allow students the freedom to make mistakes, but instead forces them to outperform others. Theories in child development posit that a child's environment influences his developmental outcomes (Bronfenbrenner, 1977). Student motivation and achievement can differ based on how environments are constructed. Shin, Yeon, Lee, Chung, and Kim (2011) found that students with a sense of belonging are more likely to demonstrate greater satisfaction and positive learning behaviors. How students experience the emotional warmth and support in relationships with peers, teachers, and parents influences academic performance. Kim (2012) also suggested that student-teacher relationships may help to create educational space protecting students' psychological well-being.

Despite the strong associations between performance-oriented environments and diverse maladaptive learning outcomes, many of studies to date have explored how environmental pressures of being perfect without errors operate in academic settings (Jia et al., 2009; Koth, Bradshaw, & Leaf, 2008; Liu & Lu, 2011). There is reason to suspect that errors are one of the most important standards for assessing the individual performance.

A history of penalizing error-making behaviors from behaviorist perspectives have considered errors only as an assessment tool to evaluate students' abilities or understanding in learning (Fiori & Zuccheri, 2005; Lannin, Barker, & Townsend, 2007;

Maxwell, Masters, & Weedon, 2001). Teachers often tend to evaluate student performance based on the quantity of errors, instead of monitoring where students make the errors and how to modify them for improving and learning. Therefore, students have attached negative connotations to such setbacks, depriving students of the chance to consider mistakes as learning opportunities.

Recent evidence suggests that errors have potential in learning situations (Santagata, 2005; Yerushalmi & Polingher, 2006) such as providing information about the teaching-learning process and about students' motivation. Yerushalmi and Polingher (2006) demonstrated the instructional benefits that teachers can obtain through observing students' error-making behaviors during high school physics class. Specifically, students gained understanding of the material when they were asked to identify the incorrect part of a statement, formulate a correct statement, and to explain why the original statement was wrong.

Research underscores not only the inherent benefits of errors but also the potential role of a constructive perception and attitude toward error-making and environments as an important predictor of effective learning (Frese & Altmann, 1989; Keith & Frese, 2008). Webb, Farivar, and Mastergeorge (2002) suggested that any help from other resources cannot be beneficial and would have negative consequences without considering students' personal needs. They argued that students' errors can lead to opportunities to explore and acquire more flexible knowledge only when students are willing to modify their errors. From this perspective, it is critical that students are willing to reflect on their perception toward errors. Because one's perception reflects his or her belief, students' perception of errors may further influence their strategies to dealing with errors.

The literature, however, has yet to offer concrete answers to questions such as how errors relate to academic outcomes and which environmental conditions can help students to perceive environments as allowing errors. The few studies that do exist have involved students in Europe and North America (Heinze & Reiss, 2007; Santagata, 2005; Yerushalmi & Polingher, 2006) and have been limited to individual learning settings, which further limit the ability to generalize the results to adolescents in other cultures or in collaborative settings.

Before such findings can be generalized, the greater threatening power of errors in social contexts is another reason to consider collaborative academic settings. Because collaborative learning normally requires two or more persons to work together in a particular place at the same time, it can often be ineffective without warmth between group members. Research has shown that the warmth of learning environments plays a critical role in collaborative learning (Roseth, Johnson, & Johnson, 2008). For instance, students tend to show more engagement in group activities (Illing, Tasca, Balfour, & Bissada, 2011; Lee & Kim, 2009) and higher achievement levels (Koth et al., 2008; Shin & Park, 2013) when they feel accepted by and connected with group members. Thus, it would be beneficial to explore which classroom climate can best help students to have a constructive perception toward learning from errors in social contexts.

To address the issues discussed above, I investigated the relations of classroom climate and perception of errors in a group of adolescents. Specifically, I was interested in the classroom climate that could help students resist perceiving errors as a threat in collaborative learning. To explore the nature of error perception in academic contexts, I begin by reviewing the literature on the underlying relationships between perception of errors and task achievement. I then tested the conditions of classroom climate as potential facilitators of these associations through the empirical part of this study that addresses instructional developments.

Purpose of Study

The purpose of this study was to investigate antecedents and consequences of error perception in a classroom setting. With regard to the predictive relations of error perception and task achievement, particular emphasis was placed on examining the relations of potential individual and contextual predictors of classroom climate and students' perception of errors in collaborative learning. It was assumed that students were likely to have difficulties in perceiving errors as learning opportunities when their classroom climate only recognized higher achievers, and when they perceived lack of warmth in classroom. An experimental design involving random assignments to

treatments and self-reported surveys was used to examine the relations of classroom goal structure and social relationships with teacher and peers to students' perception of errors.

Theoretical Framework

This study is grounded in two major theoretical frameworks: the importance of *error management training* (EMT), and *social interdependence theory*.

EMT makes the assumption that people should learn how to deal with errors rather than to avoid them (Frese & Altmann, 1989; Keith & Frese, 2008). It argues that the individual should redefine errors as another learning opportunity. They also suggest that well aware of having errors which can exist as a natural part of learning may reduce frustration when errors are committed.

Employing the *theory of constructive failure*, Clifford (1984) pointed out that failure is a learning experience, not an end result as is so often taught in schools. Failure can even be beneficial under certain circumstances where students have high self-initiated value and where goals are unambiguous and concrete. She argued that constructive failure can foster students' intrinsic motivation such as increasing task persistence, task interest, and achievement under the suggested predictive circumstances. Despite the firmly demonstrated association of failure and adaptive learning behaviors, students may not always value or be self-initiated to certain learning materials. In addition, her argument against an error prevention perspective has limits due to difficulty of complete elimination of errors (Reason, 1990).

However, error management training, which targets attitudes and strategies after experiencing errors, has demonstrated even greater enhancement of intrinsic motivation and task performances than prevention perspectives. Intrinsic motivation may decrease if errors are seen as punishment, which is a form of extrinsic constraint, but it may increase when errors are framed positively (Keith & Frese, 2008).

Even though previous studies mainly address cognitive and motivational issues in organizational settings, the central notion of error management training can also be

applied in education settings, particularly in settings where students have opportunities to learn new materials like workers do when learning new operational skills.

The second theory underlying the current study is social interdependence theory, which exists when the outcomes of individuals are affected by others' actions (Johnson & Johnson, 1989). There are two types of social interdependence theory: (1) positive interdependence, in which the actions of individuals promote achievement, and (2) negative interdependence, in which the actions of individuals obstruct achievement. The types of social interdependences determine how an individual must interact: positive interdependence results in constructive interaction whereas negative interdependence results in constraint interaction (Jia et al., 2009; Liu & Lu, 2011). In sum, social interdependence theory notes that how participants perceive goals and their individual goals determine how they interact which may subsequently impact the outcomes of the performance.

Many motivational strategies such as providing mastery, social, and collaborative goals to students have been developed and they have been shown to facilitate students' quality of interaction and achievement (Johnson, Johnson, & Stanne, 1994). The current study, which examines the relations of classroom climate and students perception of errors in collaborative learning, focuses on how a classroom that emphasizes either mastery or performance and students' perceived social relationships with teacher and peers affect the way students interact with others and their perception of errors in collaborative learning.

Organization of Chapters

Chapter I introduces an overview of the theoretical and practical issues in regard to perception of errors in collaborative learning and its relationships with task achievement. Chapter II provides a critical review of the literature on characteristics of errors and theories addressing the potential of errors. Chapter III describes the research methods of the current study. Chapter IV presents the results for each of this study's research questions. Finally, Chapter V includes a general discussion of the study with

theoretical and practical implications. It also addresses limitations and suggestions for the future research.

Research Questions

Based on the extent research on error management training and social interdependence theory, the current study generated research questions to examine the relations of classroom goal structure and social relationships to error perception in collaborative learning. Specifically, the study tried to examine how classroom goal structure and relationships with teacher and peers affect students' error-handling attitudes.

To serve the purpose, this study primarily examined whether perceptions of errors are related to task achievement. To answer the question, the analysis first focuses on the relationship between three components of error perception (consideration for improving errors, preferences for risk taking, and strain on errors) and task achievement. This question is particularly important because it helps to determine whether fostering perception of errors matters in school learning. Research shows that a tolerant view of errors improves students' performance (Cannon & Edmondson, 2005; Santagata, 2005). Therefore, it was assumed that students' perception of errors would show relations to task achievement. The specific research questions are as followed:

Question 1: What are the relations of classroom goal structure and social relationships to students' perception in consideration for improving errors?

Question 2: What are the relations of classroom goal structure and social relationships to students' perception in preferences for risk taking?

Question 3: What are the relations of classroom goal structure and social relationships to students' perception for strain on errors?

Based on the literature on error management training and social interdependence theory, it was hypothesized that students in the experiment conditions of mastery

classroom goal structure and students who perceive greater ties to teacher and peers would show more consideration on improving errors and preferences of risk taking, but less strain from errors.

Definition of Terminology

Perception of Errors

Errors are defined in the current study as a deviation from desired results (Reason, 1990) and one's perception of errors reflects the orientation toward this deviation (Lazarus & Folkman, 1984). Perception of errors not only constitutes cognitive mental representations, but also involves degree of behavior and emotion in the face of errors (Rybowiak, Garst, Frese, & Batinic, 1999). Therefore, perception of errors in this study would be defined as one's reflective orientation toward errors, which can encourage or discourage a future-oriented action in learning. The perception of errors in this study has three major components: cognitive, behavioral, and emotional.

Collaborative Learning

Collaborative learning is an organized feature, where peers help each other to solve problems as a small unit (Johnson, Johnson, & Holubec, 1988). Collaborative learning has been widely used in classrooms alongside traditional lecture techniques to maximize learning (Johnson & Johnson, 2009; Johnson, Johnson, & Smith, 2007). With regard to positive interdependence, asking students working together to complete a task that represents the shared goals that do not demanding ignorance of own academic achievement in order to make sure that other members understand the material. Therefore, in this study, collaborative learning is defined by the extent to a shared activities, "learning proverbs," as a group.

Classroom Climate

Classroom climate is interconnected with classroom conditions (Ames, 1992; Patrick, Kaplan, & Ryan, 2011) which associated with their values (Ames & Archer, 1988; Meece, Anderman, & Anderman, 2006) and its warmth (Patrick et al., 2011) to play an important role in students' motivation, engagement, and achievement at school. For instance, classroom climate is a powerful determinant of teacher and student outcomes such as well-being and achievement (N., Kim & Kim, 2011; MacNeil, Prater, & Busch, 2009).

The climate is determined by the conditions that take place in teaching and learning and the quality of relationships between individuals in a classroom (Anderman, 1999; Patrick, Anderman, Ryan, Edelin, & Midgley, 2001). *Classroom goal structure* is defined as the purpose for engaging in academic tasks and the parameters of what constitutes success (Ames, 1992; Ames & Archer, 1988). The concept of classroom goal structure has two major components: mastery and performance. *Mastery classroom goal structure* emphasizes how much an individual has improved in terms of understanding the material. *Performance classroom goal structure* emphasizes performance relative to one's classmates. And, social relationships embrace a student's perceptions of the quality of social interactions between teacher and peers in the classroom, which can enhance a students' positive emotions and is expected to influence learning outcomes (N., Kim & Kim, 2011; Ryan & Patrick, 2001).

Task Achievement

Academic achievement is one of the most important educational goals, as it is an indicator of students' actual understanding of learning materials. Task achievement, in this study, is operationally defined as the total points scored by individual students on the quiz.

CHAPTER II: LITERATURE REVIEW

Literature on errors can be divided into two categories depending on its focus. First, there is a body of research on errors itself that focuses predominantly on the potential of errors. Another body of research on errors is mostly concerned with classroom climate to foster the perception of errors to task errors as an opportunity. Research has developed in these aspects focusing on classroom goal structure and social relationships that can enhance motivation after the errors.

Despite the development of research in both categories, the uses of the term “error” are not consistent, thus causing discrepancies in terms of the potential benefits of errors. Therefore, the literature review in the current study starts by describing what constitutes errors and what types of errors appear to hold particular potential in facilitating learning.

Characteristics and Types of Errors

Norman (1993) distinguished between two categories of errors: slips and knowledge-based errors (i.e., mistakes). He defined a slip as a failure of execution which occurs from unintentional memory and behaviors that are often caused by distractions such as a lack of attention, misperception of task, or automaticity. According to Norman and Shallice (1986), a routine of action may take attention away to organize several schemas that are not routine. They, thereby, distributed slips as an unintended performance of observable behaviors or memory failure that occurs when the intended target is not achieved.

In contrast, knowledge-based errors refer to mistakes that concerning the results of an inappropriate strategy to attain the goal (Sternberg, 1996). Knowledge-based errors and mistakes, therefore, typically involve the misinterpretation of a situation or the wrong application of an appropriate rule and can thus be seen as systematic errors (Norman, 1988, 1993; Reason, 1990; Richburg, Harward, & Steinkamp, 2000). In fact,

such knowledge-based errors and mistakes are considered more important in educational settings due to their emphasis on knowledge-based learning.

As errors involve a deviation from a desired goal, they always occur in the context of a goal-directed action (Hacker, 1998). That is, errors refer in respect of implicit desired goal (Renkl, 1997) and this line of research has shown that knowledge-based errors bear particular potential for learning because they imply an inappropriate strategy for attaining the goal (Bauer & Mulder, 2007, 2013; Keith & Frese, 2005). Cognitive and action-oriented approaches to human errors provide a basis for explaining what constitutes errors, what types of errors can be distinguished, and what kinds of errors provide particular chances for learning (Frese & Zapf, 1994; Reason, 1990; Senders & Moray, 1991).

Potential of Errors in Learning

Research has been focused on understanding of the negative consequences of errors more than its' positive potential. This is particularly true within the field of cognitive psychology where most studies have conceptualized errors as primarily negative events (Norman, 1993; Reason, 1990). This line of research has supported the concept of error prevention. However, because the elimination of human errors is impossible and errors provide information about wrong understandings, research should explore the potential positive role of errors. Although an error prevention approach can reduce the potential threat of errors in learning, at the same time, it also reduced opportunities to benefit and learn from errors.

Große and Renkl (2007) considered the potential of incorrect solutions as a tool for enhancing learning outcomes. They tested effects of a combination of correct and incorrect solutions on student outcomes in a series of two experiments and found that student outcomes increased when they received both correct and incorrect solutions rather than when they only received the correct solutions. That is, students engaged in deeper understanding and obtained higher achievement when given the opportunity to communicate and monitor errors rather than merely evaluating successful processes.

The most popular theory that addresses the potential benefits of errors on both cognitive and motivational aspects is impasses-driven learning. Impasses-driven learning (Jones & VanLehn, 1994; VanLehn, 1988) posits that learning can be largely facilitated through the resolution of impasses encountered during problem solving. An impasse refers to the lack of knowledge or skills required to solve a given problem. However, when missing knowledge or skills are accessed and appropriately applied the impasses are successfully resolved and achievement also get increased (VanLehn, 1988). For instance, in a study by VanLehn, Siler, Murray, Yamauchi, and Baggett (2003), college students who studied alone by having struggles of constructing knowledge displayed higher achievement than students who were assisted by 125 hours of tutorial dialogs. Kapur and Kinzer (2009) also found that group of students who experienced ill-structured problems outperformed than those of students who worked well-structured problems as a group. Although students with ill-structured problems had more struggled to solve problems as a group, these difficulties may turn out students to have more problem spaces for solving problems in later.

VanLehn et al. (2003), however, further discussed how motivational impasses such as interests and values can be navigated to increase student achievement. In their work, *interest* refers to the enjoyments which can enhance engagement for continuing an activity. For example, computer games are designed to sustain players' interest by presenting increasingly challenging obstacles to overcome.

Research has also shown that only the novel and appropriately impasseschallengeable obstacles induce achievement in impasses. Große and Renkl (2007) showed that students who received both correct and incorrect examples with highlighting on the specific errors were much more able to transfer learning than a group of students who received only the correctly worked examples. They argued that a series of incorrect examples with errors highlighted can foster learning outcomes. However, they also noted that the degree to which these impasses foster learning depends on whether students have appropriate prior knowledge to productively react to their errors. In sum, students' impasses can only be beneficial within the bounds of the existing knowledge which would be challengeable to enhance interests.

Value, as described by VanLehn et al. (2003), addresses the importance of doing

activities and also guarantee of the activity even under the consecutive of errors. As *expectancy x value theory* posits, the effort that students are willing to put forth depends on how much they value a given activity. If the value is sufficient, students have been shown to invest the effort needed to overcome impasses (Eccles & Wigfield, 2002).

Corrective motivation (Reeve, 2009) also posits that students have motivation to achieve a desired goal and are willing to invest effort when they perceive a discrepancy between the desired goal and the current status. Reeve (2009) showed that the discrepancies between the current status and the goal may lead to increased effort. He further elaborated that the dynamic processes of feedback, especially when given after errors are committed, play a critical role because the nature of feedback on errors can be a significant indicator of students' effort. Much other prior research also found that students are engaged more in tasks that they value intrinsically (Eccles & Wigfield, 2002; Reeve, 2009; Wigfield & Eccles, 1992). In summary, impasses-driven learning theory contends that impasses do not always guarantee learning and that much depends on the students' interests and value of the activities.

Error Perception of Error Management

Errors are inherent in human nature and can never be fully prevented. Therefore, it is more important to address what should be done after an error has occurred than to merely consider how to prevent errors (Frese, 1991; Nordstrom, Wendland, & Williams, 1998). In other words, failure is important in learning, and that one should not to focus exclusively on success.

Error management training (Frese & Altmann, 1989) posits that students are better equipped to handle errors if they redefine errors as learning opportunities. An error management approach, which is cognitively associated with pursuing goals of self-control and learning, allows individuals to leverage errors (Bauer & Mulder, 2013; Edmondson, 1996; Keith & Frese, 2005; Nordstrom et al., 1998). Error encourages learning when people use a metacognition to consider their errors and when perceive less negative emotional impact from errors (Cannon & Edmondson, 2001; Keith &

Frese, 2005; Mathan & Koedinger, 2005).

Van Dyck, Frese, Baer, and Sonnentag also highlighted that error management training can promote positive consequences of errors and can also help to redefine errors as learning opportunities. They argue that the principle notion of error management training is to help trainees distinguish and dissociate errors from their consequences (Cannon & Edmondson, 2005; Edmondson, 1996). In contrast to error prevention approaches that aim to avoid the negative consequences of errors, error management training helps people focus on enhancing the potential positive consequences. These effects are similar to the *priming effects* (Meyer & Schvaneveldt, 1971) that demonstrated affective differences depending on people's perceptions of the same information.

Research has shown that students who perceive more emotional support of teachers are more likely to use errors as learning opportunities and attain higher achievement (Goodenow, 1993a; Kim, 2012; D., Kim & Kim, 2011; N., Kim & Kim, 2011, 2011; Shin et al., 2011). In contrast, poor handling of errors can lead to hostile environments in which trust and interpersonal relationships break down. Under these conditions, fear of being blamed may discourage individuals from discussing their errors (Lannin et al., 2007).

However, even though the current research consistently supports error management approaches, schools rarely use error management approaches exclusively due to an attempt to prevent critical errors. Schools usually use both error prevention and error management approaches to effectively handle the consequences of students' errors. For instance, some studies (Bauer & Mulder, 2013; Heinze, Ufer, Rach, & Reiss, 2011) emphasize the importance of using error management approaches whereas others describe the uses of error prevention approaches (Ohlsson, 1996) in learning, particularly at school.

Despite potential crisis that error management training posits in learning, the current study has deemed the function of students' perception of errors on achievement and conditions for improving perception of errors. Error management perspective that posits redefining errors are deemed an appropriate for this research.

Orientations of Error Perception

An individual's orientation reflects their perception and attitude toward errors (Cannon & Edmondson, 2005; Hetzner, Gartmeier, Heid, & Gruber, 2011), and this belief can influence the ability to respond constructively to errors. Rybowski et al. (1999) provide a theoretical framework with eight proposed scales of error orientation: error competence, learning from errors, error risk taking, error strain, error anticipation, covering up errors, error communication, and thinking about errors. These scales are measured with a 32 question survey derived on a completed conceptual model. Error orientation (Rybowski et al., 1999) posits that the way an organization deals with errors determines the amount of organizational learning. Specifically, how to using errors to enhance learning leads to better performance. Although Rybowski et al.'s (1999) paper primarily addressed organizational settings, the principle notion of the paper can be applied in education settings as well.

Table 1

The eight scales of error orientation questionnaire (EOQ) (Rybowiak et al., 1999, p. 542-547)

Scales (in English)	Contents	α
Error competence	A capability for immediate recovery from errors	.56
Learning from errors	An ability to prevent errors in the long term by learning from them, planning, and changing processes	.89
Error risk taking	A general flexibility and openness towards errors	.74
Error strain	A hypothetically consequences of being strained by making errors	.79
Error anticipation	A stable negative expectancy and attitude toward a result of errors	.73
Covering up errors	(1) A strategy of anxious people who consider errors as a threat and, therefore, prevent accusations often associated with errors in a social context (2) A general reaction to certain organizational conditions	.78
Error communication	A general ability to anticipate and communicate errors for quick error detection and efficient error handling	.67
Thinking about errors	A future-oriented tendency of thinking about errors to be improved	.83

The original 32 items (eight scales) of error orientation which were constructed by Rybowiak et al. (1999) comprise a combination of cognitive, behavioral, and emotional components due to attempting to include all aspects of the phenomenon. Therefore, the composition of the error orientation that relates how to perceive errors is discussed here before elaborating on the reduced concepts used in the context of the current paper.

Despite some issues such as construct validity and lack of use in empirical studies, it was appropriate to use for the current study because items from the Error Orientation Questionnaire (EOQ) scale are formulated in a general manner that may evokes the

impression of trait perspectives regardless of the type and context of errors. At the same time, the current study only considered the scales that can be arbitrarily affected by learning contexts. This is because the current study was focused on features of classroom climate, which can contribute to changes in the general manners of errors. In particular, it is appropriate because it involves beliefs and attitudes about errors (Tjosvold, Yu, & Hui, 2004) which can be relevant predictors for the engagement in learning after errors are committed.

In order to discern how individual interpretation of errors relates to engagement in learning after the errors, the following three components of error perception from the EOQ scale (Rybowiak et al., 1999) were investigated. They are noticed as less stable traits among eight scales which may vary easily on situations.

Cognitive Orientation of Error Perception

Individuals' attitude toward errors and engagement in learning after errors may depend on two of Rybowiak et al.'s (1999) eight scales: 'learning from errors' and 'thinking about errors' lead to differences in one's error perception. How an individual perceives errors as opportunities for learning and how much metacognitive effort an individual invests into covering up errors may require individuals to adopt a constructive interpretation of errors as relevant learning opportunities in order to increase understanding importance of errors as well as engagement in learning activities (Cannon & Edmondson, 2001; Edmondson, 1996, 1999, 2004; Zhao & Olivera, 2006). Rybowiak et al. (1999) argue that individual cognitive efforts in learning from errors and thinking about errors as another opportunity for learning positively relate to the initial action orientation and the action orientation even after errors.

Behavioral Orientation of Error Perception

Learning and applying new knowledge in problem solving requires taking a risk of making errors which may involve the potential for negative consequences (Hirst, van Knippenberg, & Zhou, 2009; Tierney & Farmer, 2004). Individuals with a greater preference for challenges may be expected to be more motivated to seek uncertain risks that possess high potential of errors (VandeWalle, 1997).

Risk taking is an attitude that implies flexibility and openness towards errors. Like cognitive efforts in perception of errors, individuals who take errors as chances to be improved report being more actively engaged in learning (Cannon & Edmondson, 2001; Dweck & Legget, 1998; Rybowskiak et al., 1999; VandeWalle, 1997). Individuals who have an avoidance orientation, a tendency to avoid potential risks of errors, may tend to shy away from learning and may have lower chances of success. Together, one's preference for taking errors as another challenge in learning may enhance innovative problem solutions.

Emotional Orientation of Error Perception

In contrast to cognitive and behavioral interpretations of error orientation that have only positive effects on learning from errors, scholars have claimed that negative emotional interpretation on learning from errors can produce both fostering and inhibiting effects (Cannon & Edmondson, 2001; Keith & Frese, 2005). For instance, Dickhauser, Bush, and Dickhauser (2011) proposed that learning goals and performance-oriented goals lead to students' adaptive behaviors after a failure. They argue that focusing on attaining success, even after failure, seems to be associated with a positive self-regulation process.

Despite positive cases where negative emotional interpretation appears to foster learning from errors, Rybowskiak et al. (1999) report the negative correlations of perception for strain on errors to action orientation. Moreover, Keith and Frese (2005) found that negative emotional pressures distract attention resources away from the task. To summarize, scholars agree that errors are associated with negative emotions, but they disagree about the effects of errors on learning.

These three variables cover cognitive, behavioral, and emotional components of the interpretation of errors. These reduced component and derived assumptions are investigated in the current study in order to answer questions about the relationships between perception of errors and learning. On the whole, there is a stronger assumption of the effects of negative cognitive and behavioral interpretation and learning, but uncertain effects of negative emotion, strain, and learning. However, individuals with strong negative emotions who report high strain levels on the EOQ scale from

Rybowiak et al. (1999) may show greater fear to have risks at the engagement in learning in social context (Edmondson, 1999; Zhao & Olivera, 2006). In the following section, the relationships between perception of errors and learning and the conditions of classroom climate that affect perception of errors in learning are elaborated.

Classroom Climate to Foster Error Perception of Error Management

Student engagement is vital to academic achievement. More engaged students show higher achievement, because they are actively participating in class discussion and are highly motivated. On the other hand, disengaged students who report being bored in the classroom are more likely to become disruptive, are less likely to pursue educational goals, and tend to have lower grades (Kaplan, Peck, & Kaplan, 1997). Thus, effective learning is contingent upon students being engaged in the classroom (Furrer & Skinner, 2003; Osterman, 2000; Reeve & Lee, 2014). Research has also shown that students with higher engagement are more likely to have better grades than students with lower engagement (Reyes, Brackett, Rivers, White, & Salovey, 2012).

Previous research on student engagement has generally focused on individual traits rather than on how teachers structure their teaching (Urdu & Schoenfelder, 2006). Studying individual differences such as demographics as predictors of engagement has reached the limits of what can be predicted. Therefore, researchers are currently shifting their focus to classroom processes and teacher-student interactions that promote student outcomes (Brophy, 1986; Patrick, Ryan, & Kaplan, 2007).

Although the conceptualization and measurement of classroom climate has varied widely across researchers (Anderson, 1982; Cohen, McCabe, Michelli, & Pickeral, 2009), a number of studies have shown classroom climate, which depends upon the instructor, to be associated with important student and school outcomes. For instance, school climate has been linked to students' academic achievement (Brand, Felner, Shim, Seitsinger, & Dumas, 2003) and motivation (Marsh, Martin, & Cheng, 2008) affected by teacher's instructional performance (Yerushalmi & Polingher, 2006) and interaction

between and among teacher and peers.

The instructional aspects of the classroom climate include not only the teacher's ability to integrate prior knowledge into instruction to invoke higher order thinking (Ames & Archer, 1988; Urdan & Schoenfelder, 2006) and to strictures for classroom behavior (Emmer & Stough, 2001), also for the ability to promote a positive and supportive relationships between peers (Jia et al., 2009).

A theoretical integration of the two perspectives can enhance understanding of the nature of the positive classroom climate, advance research in this area, and contribute to educational practice. I begin by reviewing the construct of classroom goal structure. We then review the social climate literature on the role of students' perceptions of social relationships within the classroom.

Classroom Goal Structure and Error Perception

Goal theory assumes that students' motivation and learning patterns are influenced not only by their individual personal beliefs but also by the environment (Ames, 1992; Nicholls, 1989). Classroom goal structure consists of students' perceptions of the reason for engaging in tasks and what constitute success (Ames, 1992) and it is influenced by teachers' practices and classroom routines. Researchers have identified two types of classroom goal structure: mastery goal structure (i.e., the development of competence) and performance goal structure (i.e., the demonstration of competence) (Kaplan, Middleton, Urdan, & Midgley, 2002).

Depending on how teachers create goal structures in the classrooms through their use of various instructional and evaluation strategies, students may perceive the classroom goals differently (Kaplan et al., 2002). For example, teachers who focus on skill improvements may lead students to adopt a mastery goal, whereas teachers who focus on competitive grades may lead students to adopt a performance goal. Numerous empirical studies have clearly highlighted the integral role of classroom goal structure by predicting differential outcomes in achievement-relevant motivation (Dweck, 1999; Harackiewicz, Barron, & Elliot, 1998; Kaplan & Maehr, 1999, 2007).

A mastery goal structure involves a perception that students' mastery of materials is more valued, and success is associated by how much individual has improved (Kaplan & Maehr, 2007; Meece et al., 2006; Patrick et al., 2011). In a mastery goal structure, teachers share responsibility for decisions with students and place more acknowledgement on how much effort students invest rather than on comparing performance. In addition, teachers evaluate students with individual criterion-referenced standards, which are typically not made public, and interpret grades in terms of improvement.

A performance classroom goal structure involves a perception that student competence, especially normative competence, is more valued, and success is associated with how well an individual has performed (Dweck, 1986; Maehr & Nicholls, 1980). In a performance classroom goal structure, teachers are more likely to reward students for outperforming others, evaluate in public, and interpret students' performance in terms of their performance relative to the class or some other normative group. Overall, all determinates of classroom attribute to students' ability (Ames, 1992; Kaplan & Maehr, 1999; Meece et al., 2006).

It is also possible for students within the same classroom to perceive the goal structure of the class differently (Kaplan et al., 2002; Wolters, 2004). Because a classroom goal structure involves students' cognitive interpretations (Ames, 1992), students in the same class do not necessarily perceive teacher practices in the same way (Ames & Archer, 1988; Turner et al., 2002; Urdan & Midgley, 2003; Urdan, Midgley, & Anderman, 1998) and there is no absolute classroom goal structure (Ames, 1992). To briefly sum up, teachers who focus on skill improvements may lead students to adopt a mastery orientation, whereas teachers who focus on competitive grades may lead students to adopt a performance orientation.

Research on the relationships between perception of errors and classroom goal structures have been reviewed under the error management culture (Van Dyck et al., 2005) or an error-tolerant classroom culture. In addition, studies also reviewed the interventional error-handling strategies for learning from errors (Rach, Ufer, & Heinze, 2013) which may promote students' constructive attitudes towards errors.

Error management culture, which is hard to differentiate from environmental

climate, implies shared values and practices related to communicating about errors and handling errors (Reichers & Schneider, 1990). A number of studies (Baumard & Starbuck, 2005; Cannon & Edmondson, 2005; Rach et al., 2013) suggest that high error management culture translates into outstanding performance. Allowing people to communicate freely about their errors and receive support from others in the same group may lead to a mutual understanding of potential risks and effective strategies for handling errors.

In addition, open communication can facilitate the acceptance of errors as a natural part of work and a quick detection through the communications may reduce negative consequences that would be associated with errors (Cannon & Edmondson, 2005; Santagata, 2005). That is, a mastery classroom goal structure, where teachers allow students to have responsibilities and recognize improvement of competence, is more likely to create a culture that reduces negative error consequences and promotes positive error consequences.

Empirical studies also report similar tendencies that how teachers deal with errors affecting students' outcomes. Heinze et al. (2011) showed that cognitive and emotional supports of teachers correlate with students' intensity of errors as learning opportunities and lower anxiety. Shin, Choi, and Yeon (2014) also found that students reported less strain due to errors and had a more constructive attitude towards dealing with errors when they perceived teachers focused on their improvements rather than performance in elementary school.

Classroom goal structures become even more critical when students work in groups (Ames, 1992; Ames & Archer, 1988). For instance, when students see a group activity as ambiguous or not valued, they will be less committed and motivated in their approach to the learning task. In addition, when students have to compete with others as a group, they are more likely to blame group members for their unsuccessful performances (Tjosvold et al., 2004).

People tend to view their own unsuccessful performance different than that of others (Kim, 2014; Peterson & Schreiber, 2012). Performance goals, which require students to demonstrate outstanding performances, may increase group dissension instead of having synergetic effects of working together if they result in unsuccessful

outcomes. However, a culture that allows focusing on group development and communicating about errors can help encourage students' motivation and performance as well as reducing the blaming of other group members. Edmondson (1996) reported that teams who allowed talking about errors showed better performance with greater error detection and error correction.

Social Relationships and Error Perception

Human motives are the desire to form and maintain social bonds (Bandura, 1986; Baumeister & Leary, 1995). Social interactions have long been recognized as one of the critical factors for facilitating the learning process. Social interdependence theory (Johnson & Johnson, 2009) further supports this concept, noting that social interaction leads to higher levels of cognition than does individual learning through collaborative learning. The theory posits that people are internally motivated and achieve better when they work with others rather than working alone. It is hypothesized that interaction with others may be positively related to both academic performance and motivation. Thus, students' sense of social relatedness at school may serve as a key construct in learning (Eccles & Wigfield, 2002; Patrick et al., 2011; Wigfield & Eccles, 1992).

Research on this topic notes that when students experience a sense of connectedness and supportive interaction between teachers and peers, they are more likely to engage in classroom activities and experience satisfaction within the classroom (Anderman, 1999; Birch & Ladd, 1997; D., Kim & Kim, 2011; N., Kim & Kim, 2011; Shin et al., 2011). On the contrary, when students' sense of social connectedness is threatened, they have trouble maintaining learning behaviors and their performance drops (Baumeister & Mulder, 2013). Given the importance of social relationships for human functioning and wellbeing, an important question involves how social relationships affect students' personal interests and motivated behavior.

Although the vast majority of the existence research on social relationships and engagement has been conducted in secondary schools, recent research suggests that supportive social relatedness in the primary grades may display even greater positive

behavioral and academic adjustments (Ladd, Birch, & Buhs, 1999; O'Connor & McCartney, 2007). For example, O'Connor and McCartney (2007) found that the relationships between students and teachers in preschool predicted students' academic achievement in third grade, even after controlling for relevant classroom variables.

In summary, the many aspects of interpersonal relationships and social interdependence theory may affect students' perception of errors. Martin, Marsh, McInerney, and Green (2009) suggest that students' interpersonal relationships with teacher and peers may be differentially associated with academic and non-academic outcomes. Therefore, social relationships in this study included two separate classroom factors: perceived relationship with teacher and perceived relationships with peers.

Social Relationships with Teacher and Error Perception

It is well established that the quality of students' relationships with their teachers has particularly important implications for their academic and behavioral adjustment in the lower grades (Hamre & Pianta, 2001; Pianta, 2001; Wentzel, 1994, 1997, 1998). Because young students largely depend on authority from adults who have power, teachers play a substantial role in their lives. Thus, significant relations of students' perceptions of support from teachers motivate students much more than peers during the elementary school years (Hamre & Pianta, 2001; Patrick et al., 2011; Pianta, 2001; Wentzel, 1994). Students who perceive supportive relationships with a teacher are more likely to engage in classroom activities and attend more to the teacher (Furrer & Skinner, 2003; Hamre & Pianta, 2001). Goodenow (1993a) also found that students displayed higher achievement in English when they perceived their teachers are warm and supportive.

The majority of research on teacher-student relations has been conducted on academic efficiency rather than on safety as an issue of the relevance of interactions between teacher and students. However, psychological and emotional threats from teachers may have a negative impact on student motivation. In particular, teachers who are highly critical may create classrooms in which students display low levels of social and academic engagement (Wentzel, 1997, 1998). Similarly, little is known about the social contexts where the teacher creates a safe environment.

One critical role of a teacher is evaluating student performance in the classroom (Dicke et al., 2014). Even though researchers suggest that providing corrective information to improve performance can foster motivation, there is the possibility that students may perceive feedback from teachers as aggression or threats. In a study by Birch and Ladd (1997), students' problematic behaviors differed considerably depending on their relationships with their teachers. Specifically, students perceived teachers' feedback more aggressively when they did not report having a solid relationship with the teachers. Students who feel their teachers are caring and supporting pay more attention during class and are more motivated (Flook, Repetti, & Ullman, 2005; Kim, 2012; N., Kim & Kim, 2011; Wentzel, 1994, 1997). Moreover, such students are less likely to hesitate to make mistakes in problem solving (Chillarge & Nordstrom, 2003; Santagata, 2005). However, the opposite is true when students do not perceive a solid relationship with their teacher.

Given the higher social status and greater respect for teachers in Asian countries such as Korea, China, and Japan than in the U.S., there are greater possibilities that students who do not perceive the teacher as supportive would view negative feedback from teachers as more threatening in Asian cultures (Heine, 2001). Jia et al. (2009) reported that Chinese students are expected to treat teachers as they to parents with obedience and respect. Overall, it is reasonable to assume that students' perception of errors may be affected by their relationships with teachers.

Social Relationships with Peers and Error Perception

Perceived emotional supports from peers have been associated with students' motivational outcomes (Goodenow, 1993b; Quiroga, Janosz, Bisset, & Morin, 2013; Wentzel, 1994). Specifically, a sense of connectedness with close friends may increase the adoption of social valued goals as well as individual goals. In contrast, failure to avoid harm from peers or experiences of being isolated by peers can have a significant negative impact on a student's academic and social outcomes (Choi & Kim, 2012; Goodenow, 1993a, 1993b; Shin et al., 2011). Therefore, safety among peers has been studied extensively, and many studies (Goodenow, 1993a, 1993b; Lee & Robbins, 1995) indicate that large numbers of students take active measures to avoid being harmed

physically as well as psychologically by peers. For instance, students who are frequently victimized tend to report higher levels of distress, depression, and dropout from schools than those who are not routinely victimized (Quiroga et al., 2013; Quiroga, Janosz, Lyons, & Morin, 2012).

Such maladaptive learning behaviors can affect social, cognitive, and academic developments and functioning in adolescents (Shin et al., 2011; Shin & Yim, 2009) and increase the most when adolescents experience a break in relationships with peers (Goodenow, 1993a). This is one reason educators are urged to pay attention to students' relationships with peers at school. However, the research examining the educational outcomes of student learning has shown inconsistent findings, thus leaving many unanswered questions about the effects of relationships with peers. In particular, poor peer relationships may affect students' perception of errors in collaborative learning.

Students must interact with a variety of peers and the quality of these interactions may accelerate their cognitive growth (Johnson & Johnson, 1999). Thus, research has begun to examine the facilitative role of relationship with peers on the development of both cognitive and social skills and on the quality of students' relationships with peers in collaborative learning. It is generally believed that the quality of relationships with peers can provide not only extensive support for students' development, but also can relieve pressure to perform well. It follows that the role of peer relationships in the context of perceiving errors may be significant. Consequently, the potential of deep relationships with peers should be evident in the constructive perception of errors.

Error Perception in Collaborative Learning

To date, only a few studies have explored the potential of errors and the importance of error perception in the field of education, and even fewer have investigated the role of social context. Recent case-based research on expertise has indicated that errors can be valuable sources of professional learning and has expanded to the organizational perspective through focusing on how organizations can use errors as learning potential for organizational development (Billett, 2004; Tjosvold et al.,

2004). However, there is still a lack of empirical research on this subject in social contexts.

There are a few empirical studies which deserve a close look. For instance, Bauer and Mulder (2013) addressed how nurses' engagement in social learning after committing errors at work was affected by a safe team climate and common team values and goals. Their work suggests that the positive relation between social interdependence among teammates and their engagement after errors may be related to error perception in social learning.

Barron (2003) also found that collaborative learning cannot display its positive effects when group members are not attached to each other. In addition to achievement, students' error tolerance behaviors are affected by how relationships are established in social contexts (Chillarege, Nordstrom, Williams, 2003; Santagata, 2005; Shin & Park, 2013). Just as infants become attached to and feel safety from caregivers who provide emotional support, adolescents also display more engagement and less anxiety when they perceive connectedness with others (Goodenow, 1993a, 1993b). A feeling of safety encourages students to focus on developing their own competency rather than on how others evaluate their performances.

The process of learning from errors can be framed in many ways, ranging from identifying potential causes of errors to developing strategies for avoiding future errors (Bauer & Mulder, 2007) and each of these strategies can be executed individually or with others. However, identification and discussion of potential causes of errors through peer interaction may afford the basis for advance in development. Edmondson's (2004) study on errors in social contexts focused on the development of strategies to avoid potential causes of errors with peers. Even though individual detection of errors may also reduce potential causes of errors (Crump & Logan, 2013; Duval & Sylvia, 2002), identifying problems and constructing knowledge from diverse perspectives would be more helpful according to the constructivist perspectives. The role of social exchange (Billet, 2004) also supports the view that communication can foster the development of strategies for handling errors.

To summarize, engagement in social learning activities after errors are committed bears the potential of extending the learning process to the group level (Cannon &

Edmondson, 2001; Van Dyck et al., 2005), and both individuals and groups can ultimately have benefits from the occurrence of errors.

CHAPTER III: METHODS

The current study was designed to investigate the relations of classroom goal structure and social relationships with teacher and peers to the error perception in collaborative learning. Duties of students include studying Korean proverbs and taking quizzes on learning materials.

A class of 20 to 25 students was randomly assigned to one of the classroom goal conditions, (1) mastery classroom goal structure and (2) performance classroom goal structure, in order to confirm its relations to students' error perception. Self-reported perceived relationships with teacher and peers were measured to investigate the relations of social relationships on the error perception.

Participants

All participants were enrolled in 4th, 5th and 6th grade during February of 2014 at a public elementary school in a metropolitan city near Seoul and a private elementary school in Seoul. Both schools are relatively large, having four to five classes in each grade, and they serve middle-income families and their sizes. Ages of the participants was ranging from 10 years and 1 month to 13 years and 4 months at the time of the experiment.

Since the nationwide standardized competency test does not exist anymore in elementary school, students' perceived threats on their grades are increasing overtimes. This is because, especially for the upper classmen, school grading is the only factor that evaluates one's advance in academic-track to middle schools. Rybowski et al. (1999) showed that perception of errors can be influenced by perceived evaluative threats. Because this study had interests in the function of perceiving errors under regular academic circumstances, upper classmen of elementary school, particularly 4th to 6th graders, who have possibility to experience evaluative stress were deemed an appropriate target for this research.

Participants were recruited by asking local teachers to spread information about this study (e.g., by handing out fliers). Before entering the computer lab for the experiment, participants were required to return the parental consent forms that were handed out few days prior to the experiment. Since all participants were minors, under the age of 18, this study was conducted under the participants' parental consents.

Among the 183 students, the total number of students who participated in the study, students were excluded due to insincere responses (6 students, 3%), unmanipulated treatments (3 students, 2%), and technical problems during the computer program and unwanted participation (14 students, 8%), so the final sample size was 160. Specifically, students were excluded if their parents did not allow their child to participate on the study. In addition, no monetary reward was given to participants. Table 2 and 3 include the demographic information about participants. In terms of the grade level, even though distributed samples of grades were different in each condition, no group differences were reported.

Table 2
Participants' gender by conditions

	Mastery Goal Structure		Performance Goal Structure		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Male	42	51.9	45	57.0	87	54.4
Female	39	48.1	34	43.0	73	45.6
Total	81	100.0	79	100.0	160	100.0

Table 3
Participants' grade by conditions

	Mastery		Performance		Total	
	Goal Structure		Goal Structure			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
4 th grade	25	30.9	28	35.4	53	33.1
5 th grade	38	46.9	11	13.9	49	30.6
6 th grade	18	22.2	40	50.6	58	36.3
Total	81	100.0	79	100.0	160	100.0

Study Context

This study was conducted during regular classroom hours several days before the semester ended in February. In Korea, a teacher is responsible for a class of 20 to 25 students for a yearlong in an elementary school curriculum, and a school year begins in March and ends in February year after. Since my focus of interest lies on the function of social relationships with teacher and peers on perceiving errors, a few days before the end of semester was deemed an appropriate time frame for this research. All study was offered through online computer program which is developed and designed by experts and tested by three students attending at elementary school.

The program deals with the nature contexts of learning that occurs throughout the elementary school curriculum. During the program, students learn about Korean proverbs and its applications to learning contexts. In shorts, it is a computer administered program developed on the Korean curriculum which is currently used in the elementary school.

The content of program is carefully designed to promote students' engagement in learning Korean proverbs in collaborative learning. First of all, all learning materials include vivid illustrations to help students engage more in learning and build rich understandings. This vivid format of materials helps students to consider this study as a part of the real classroom curriculum. Also, it not only introduces proverbs itself but

also taps into its' applications in real-life settings. In addition, all learning materials were provided in 3 segmented versions to each participant in order to prevent every student from studying alone for all 12 proverbs. Students must exchange all versions with other group members to master all 12 proverbs.

Procedure

In the beginning, participants were randomly assigned to one of the two classroom goal structure conditions and given an overview of the procedure by an instructor and their classroom teachers. Then, students completed a questionnaire that contained items assessing their general perception of errors in learning (Rybowiak et al., 1999), perceived value (Berndt & Miller, 1990) and self-efficacy (Pintrich & De Groot, 1990) of the task, and their perceived relations with a teacher (Hamre & Pianta, 2001; Lee & Robbins, 1995) and peers (Lee & Robbins, 1995) who are in the same class. All the self-report items were on 5-point Likert scale. Demographic information was also collected.

After participants completed the questionnaires, they were introduced that they should learn 12 proverbs as a part of activities in the Korean class and were strongly articulated on the importance of learning the proverbs. In detail, participants were introduced to learn 12 traditional Korean proverbs during 12 minutes and take a 20 problems quiz on 10 minutes. Once 12 minutes of study time begins, first, each student has responsibility for reviewing 4 proverbs individually and, then, explaining them to others in the same group. After the 12 minutes of study time, participants individually took 20 problems of quiz on what they had learned as a group. Finally, participants were asked to complete the questionnaires about own error perception on during the task.

In order to motivate the participants to do their best on the task, classroom teachers stayed in the computer lab to encourage students until the program ends. Every task and survey was conducted on desktop computers with 18 to 20-inch monitor. Once all the participants from one school completed the survey and the task, an experimenter debriefed them. The specific procedure of experiment is displayed in Figure 1.

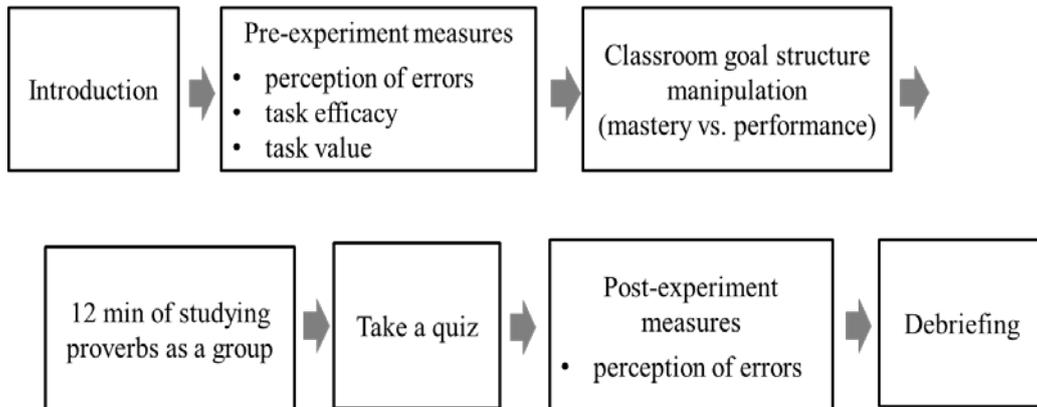


Figure 1. Experimental procedure

Treatment

20 to 25 participants as a class were randomly assigned to one of the two classroom goal structure conditions: (1) a mastery classroom goal structure and (2) a performance classroom goal structure. In details, the classroom goal structure treatment was embedded in the introduction of study. Research (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001; Chartrand & Bargh, 1996) constantly reports that unconsciously primed goal can also encourage activating as a set of personal goal through an act of conscious will. Since the classroom goal structure manipulated as classroom, students who were not able to make a group of 3 due to the class size, participated in the individual program under the same classroom goal structure treatment. And, they were excluded from the total samples due to the consistency of the current study.

In the mastery classroom goal structure condition, participants were introduced to master and to have fun with what was given to learn through a new style of learning and quizzes. In the performance classroom goal structure condition, however, participants were introduced to score higher than any other groups in the same class. Through the experiments, the classroom goal structure primed total three times; the beginning of the experiment and before each study and quiz.

The instruction of the mastery classroom goal structure condition followed as:

You are going to study 12 proverbs for 12 minutes and then have to take a quiz. These proverbs are selected by professors from Department of Education at Seoul National University. Since you are with 2 other friends, you can only take 4 proverbs to study yourself but have responsibility to teach your group members what you have studied and have to learn 8 other proverbs from other members for 12 minutes. You can find three color ring (red, yellow, blue) files in front of you, and each of the file has 4 proverbs and its explanations.

Once the time bar, which is displayed on the computer screen, goes off after the 12 minutes, the computer program will automatically direct you to the quiz. Thus, your job is **to master the 12 proverbs for 12 minutes with group members** and to do your best on the quiz. One thing you have to remember the most is that your team score would be calculated as the sum of all three of your members.

Don't forget! **Your job is to master the proverbs.** Hope you have fun with enjoying a new style of learning.

The instruction of the performance classroom goal structure condition followed as:

You are going to study 12 proverbs for 12 minutes and then have to take a quiz. These proverbs are selected by professors from Department of Education at Seoul National University. Since you are with 2 other friends, you can only take 4 proverbs to study yourself but have responsibility to teach your group members what you have studied and have to learn 8 other proverbs from other members for 12 minutes. You can find three color ring (red, yellow, blue) files in front of you, and each of the file has 4 proverbs and its explanations.

Once the time bar, which is displayed on the computer screen, goes off after the 12 minutes, the computer program will automatically direct you to the quiz. Thus, your job is **to achieve the highest score on the quiz as a group** and to

do your best on the quiz. One thing you have to remember the most is that your team score would be calculated as the sum of all three of your members.

Don't forget! **Your job is to achieve a higher score on the quiz than other groups.** Hope you have fun with enjoying a new style of learning.

Condition Checks

To ensure that participants in the two experimental conditions (i.e., mastery classroom goal structure and performance classroom goal structure) understood the rationales that they were supposed to be aware of, students who do not report the same condition where they belonged were excluded from the final sample. According to a manipulation check report, 98% of participants have accessed the same condition.

Materials

Task

The task used in this research consists of 12 Korean proverbs that were carefully selected and edited by a professor, two elementary school teachers, and two secondary Korean teachers. To investigate the appropriate number of proverbs and the right amount of time for the experiments, I interviewed two teachers and tested 20 students two months before the experiments. Each of the 12 proverbs was provided with related pictures, and its explanations include where they were rooted and how they can use in our lives (see Appendix H).



Figure 2. The example of study materials on proverbs

Three participants in a group were asked to study 12 Korean proverbs for 12 minutes. They were informed that each of group members has a responsibility to master 4 proverbs each and explain them to the rest of the group members. Once participants click the “Start” button, a 12 minute time bar gradually decreased. When time is up, the screen automatically turned to the quiz.



Figure 3. Time bar for the group work

Quiz

After the 12 minute proverb-learning, all participants individually took a quiz about the proverbs they have studied as a group. The quiz consists of 20 multiple choices with 4 examples to assess students’ understanding of the learned task materials. In details, a few problems were asked for participants to select the right answer for the blank, but a few other problems were asked for participants to select the most appropriate answer for the given picture or explanation. Three experts including two elementary school teachers developed and carefully edited all the questions. Following examples are a few representative problems of the quiz (see Appendix I).

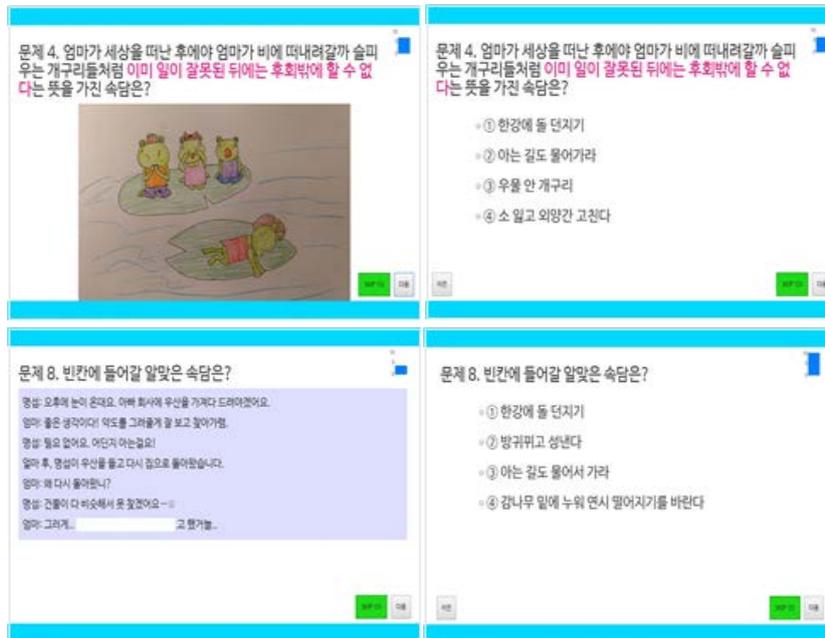


Figure 4. The example problems of the quiz

Measures

Students responded to items on a 5-point Likert scales with 1 indicating strongly disagree and 5 strongly agree for all. All scales, except the error orientation questionnaire scale, had been translated and validated in Korean in previous researches.

Pre-experiment Measures

In advance to the experiments, students completed a questionnaire that contained items assessing general perception of errors in learning, perceived value and self-efficacy of the Korean proverbs which will be used as the task for this experiment, and their perceived relationships with a class teacher and peers.

Perception of errors. Perceived errors in learning were assessed using Error Orientation Questionnaire (EOQ: Rybowskiak et al., 1999). EOQ was originally developed to measure one's perception of errors at work and compromised with 8

subscales.

The current study, however, only included four subscales from EOQ: 'Learning from Errors,' 'Error Risk Taking,' 'Error Strain,' and 'Thinking about Errors'. 'Learning from Errors (e.g., "Mistakes provide useful information for me to carry out my study," $\alpha = .89$ in the original scale),' 'Error Risk Taking (e.g., "The people around me expect me to succeed at everything I do," $\alpha = .74$ in the original scale),' 'Error Strain (e.g., "I feel embarrassed when I make an error," $\alpha = .79$ in the original scale),' and 'Thinking about Errors (e.g., "After I have made a mistake, I think about how it came about," $\alpha = .83$ in the original scale)' were assessed with each 4 and 5 items respectively. Rest of 4 subscales from EOQ, 'Error Competence (e.g., "I don't let go of the goal, although I may make mistakes," $\alpha = .56$ in original scale),' 'Error Anticipation (e.g., "I expect that something will go wrong from time to time," $\alpha = .73$ in original scale),' 'Covering up Errors (e.g., "It can be useful to cover up mistakes," $\alpha = .78$ in original scale),' and 'Error Communication (e.g., "When I have done something wrong, I ask others, how I should do it better," $\alpha = .67$ in original scale)' were excluded in this study due to irrelevancy.

In addition, four subscales from EOQ were reorganized into three subscales with perception in consideration for improving errors (learning from errors and thinking about errors), preferences for risk taking (error risk taking), and strain on errors (error strain) for optimal scales that would be more appropriate for the current research (see Appendix C). Rybowski et al. (1999) also categorized as above depending on cognitive, behavioral, and emotional orientations.

For this study, English version of EOQ was translated in Korean by a student who had a bachelor degree in the United States and validated by professor who is an expert in Educational Psychology. A few studies have demonstrated that the translated versions have functioned well with the constant reliability of the selected scales from elementary school to high school (Shin et al., 2011; Shin et al., 2014).

Relationships with teacher. Relationships with teacher were assessed both using Student-Teacher Relationship Scale (Pianta, 2001) and Social Connectedness Scale (Lee & Robbins, 1995) which has been often used in studies with young adolescents to

investigate teacher-child relationships (see Appendix D). Although the original scale of asked students to rated their relationship with a 3-point Likert scale, in the current study, however, we used with a 5-point Likert scale. Teachers reliability of extended to 5-point Likert scale displayed as .90 and students' reliability of 3-point Likert scale displayed as .92 in the study of Valiente, Lemery-Chalfant, Swanson, and Reiser (2008).

Among 28 items of structured with perceived feeling from teachers including affection, admiration, conflict, warmth, reliable alliance, only 6 items that seems most related to the current research were selected and organized as age-appropriately for due to time limitation to focus on perceived perception of relationships with teacher.

Although this scale often used for teachers to report their perception of relationships with students, the internal consistency of the items displayed .94 in the current study. Evidence that the measure correlates in the expected direction with other variables in the current study also supports the convergent validity of the Student-Teacher Relationship Scale (Hamre & Pianta, 2001).

Relationships with peers. Relationships with peers was also assessed using Social Connectedness Scale (Lee & Robbins, 1995, see Appendix E) which has been developed to measure emotional distance between self and peers within factors of connectedness (4 items), affiliation (3 items), and companionship (1 item). Although original scale specifically pointed peers as subject in each items, the current study changed items as age and content-appropriately for the research purpose.

The internal consistency of the items displayed .91 in the current study and the measure also correlates in the expected direction with others variables in the current study.

Task efficacy. The five items in the task efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ: Pintrich & De Groot, 1990, see Appendix F) assessed participants' prior knowledge and ability on given task materials with proverb (elementary school) (e.g., "I know that I will be able to learn the material for this class"). Participants were asked to rank how much confidence she has on the scales from (1) strongly disagree to (5) strongly agree.

The internal consistency of the items displayed .93 in the current study. The translated version had demonstrated above .88 in various samples of Korean elementary and middle school students and correlated significantly with academic achievement (Bong, Hwang, Noh, & Kim, 2014; Shin et al., 2014).

Task value. The three items in the task value (e.g., “I think what I learn in today’s class is important”) were used to assess how participant take given task material seriously (Berndt & Miller, 1990, see Appendix G). Each items assessed utility value, intrinsic value, and importance value and participants were asked to rank how important, how useful, and how interest to learn proverb was, and Cronbach’s α for this study was .91.

Post-experiment Measures

To assess students’ perception of errors during the task, the same questionnaire that had been used for the pre-experiment was re-administered at the end of the experiment. In addition, task achievement was collected through the total points that students accumulated throughout the quiz and their maximum possible point was 100.

Perception of errors. Perceptions of errors during the quiz which were taken after the 12 minutes of studying proverbs were assessed to investigate the changes of perceptions after the experiments by using EOQ (Error Orientation Questionnaire; Rybowski et al., 1999).

The items used in measuring individual differences were repeatedly used only with changes in subjects of items. The sample items of EOQ after the study are “Mistakes provide useful information for me to carry out the task,” and “I feel embarrassed when I make an error on the quiz” (see Appendix J).

Task achievement. Task achievement was calculated by the total points that students accumulated throughout the quiz. To ensure that all students in collaborative conditions were participated without free-ride, a list of students who perform evidently low scores on quiz were checked. According to students’ performance, 98% of

participants have well participated and only one group of 3 participants were excluded due to insincerity.

Data Analysis

To examine the relations of classroom goal structure and social relationships to the error perception in collaborative learning, the current study used a two-step hierarchical multiple regressions. In this hierarchical regression, Model 1 began with mastery classroom goal structure and performance classroom goal structure. Students' perceived relationships with teacher and peers were added in Model 2 to investigate relations of social relationships and dimensions in error perception. The results are presented by each dependent variable.

CHAPTER IV: RESULTS

The results of the current study will be presented in regard to the relations of classroom goal structure and social relationships to the error perception in collaborative learning. Specifically, the current study pays particular attention on examining the relations of two classroom climate (i.e., classroom goal structure and social relationships) on students' perception of errors in collaborative learning.

Manipulation Check

In order to confirm the success of classroom goal structure manipulation, the participants in each mastery classroom goal structure and performance classroom goal structure condition were asked which their goal for the class was after they completed tasks.

The perceived goal structure was assessed by using one-item survey. The item was "Goal for this class was either to master materials given to study or to perform better than others." The participants responded to the item by selecting either 1 for the mastery goal and 2 for the performance goal. Participants who did not select for the right classroom goal structure condition where they belonged (3 students, .2%) were excluded from the final data analysis.

Descriptive Statistics

The responses to negatively worded items were reverse-coded so that high scores represent the greater possession of the construct under investigation. *Skewness* and *kurtosis* statistics indicated that the responses to all items were approximately normal distributed. Table 4 reports descriptive statistics of the scales.

Mean scores of most scales ranged between 3 and 4 on a 1–5 response scale with

no strong hint of floor or ceiling effects. Among perception of errors, strain on errors scale was an exception to this trend with $M = 2.67$ (a general perception for strain on errors in learning which was measured before the experiment) and 2.26 (a perception for strain on errors to task which was measured after the experiment). Yet given the less pressured nature of this variable in elementary school, it is not surprising that students provided low agreement ratings on these items. Furthermore, given the less valued nature of this instantaneous experiment, therefore, it was not unexpected to find that the students reported even lower strain on errors. The responses to all scales showed acceptable degrees of internal consistency as presented in Table 4.

Table 4
Descriptive statistics and reliability of scales

Variables	<i>M</i>	<i>SD</i>	α	Range	Scale			
					Min. observed	Max. observed	Kurtosis	
<i>Pre</i> -perception of errors	3.25	.75	.87	1-5	1.00	5.00	-.30	.55
consideration for improving errors	3.64	.85	.76	1-5	1.00	5.00	-.22	-.12
preferences for risk taking	2.67	.94	.83	1-5	1.00	4.80	.13	-.56
strain on errors	3.41	.88	.93	1-5	1.00	5.00	-.28	.27
Task efficacy	3.90	.89	.91	1-5	1.00	5.00	-.57	.26
Task value	3.63	.81	.87	1-5	1.22	5.00	-.37	.02
Perception of errors	4.07	.86	.82	1-5	1.00	5.00	-.81	.59
consideration for improving errors	2.26	1.08	.86	1-5	1.00	5.00	.66	-.32
preferences for risk taking	3.94	.90	.94	1-5	1.17	5.00	-.60	-.36
strain on errors	3.75	.79	.91	1-5	1.00	5.00	-.42	.24
Relationships with teacher	87.41	12.98		0-100	26.00	100	-1.66	3.98
Relationships with peers								
Task achievement								

Note. Min. = minimum, Max. = maximum. *N* = 160.

Relations of Error Perception and Task Achievement

In advance to investigate the relations of classroom goal structure and social relationships to error perception, this research first described the relationships between students' general perception of errors and achievement. According to previous studies (Bauer & Mulder, 2013; Chillarege et al., 2003; Heinze et al., 2011), it was assumed that students' general perception of errors would highly relate to their task achievement. For each three sub-contents of errors represent subjective descriptions (i.e., perception in consideration for improving errors, perception in preferences for risk taking, and perception for strain on errors), both bivariate correlations and multiple regressions were used to test the preliminary assumption. When there were a statistically significant results emerging from the regression test, one-way analysis of variance (ANOVA) was used to test wheatear there was any differences caused by classroom goal structure treatments.

Means, standard deviation and Pearson correlations are displayed in Table 5. The bivariate correlations yielded that all three sub-contents in pre-perception of errors significantly were related to task achievement. In detail, a significant correlation was shown between task achievement and perception in consideration for improving errors ($r = .28, p < .01$), preferences for risk taking ($r = .19, p < .01$) and strain on errors ($r = .19, p < .01$).

Also, there were significant positive correlations among pre-perception of errors. Especially, a significant correlation was shown between pre-perception of errors in consideration for improvements and preferences for risk taking ($r = .56, p < .01$), pre-perception of errors in consideration for improvements and strain on errors ($r = .19, p < .05$). However, there was no significant correlation between preferences for risk taking and strain on errors under the perception of errors.

Table 5

Means, standard deviation, intercorrelations of variables for predicting task achievement

	<i>M</i>	<i>SD</i>	Intercorrelations			
			1	2	3	4
1	87.41	12.98	1			
2	3.24	.75	.28**	1		
3	3.64	.85	.19**	.56**	1	
4	2.67	.94	.19**	.19*	-.07	1

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

Note. 1: task achievement, 2: perception in consideration for improving errors, 3: perception in preferences for risk taking, 4: perception for strain on errors. $N = 160$.

A multiple regression analysis was carried out to investigate the relations between students' perception of errors and task achievement. The standardized multiple regression coefficients were subsequently reviewed to assess the relative importance among three orientations (cognitive, behavioral, and emotional) of error perception in the prediction of task achievement.

Using a multiple regressions analysis, only cognitive and emotional orientation of error perceptions predicted task achievement. The possibility that there existed multicollinearity among the predictors was evaluated and rejected (Tolerance = .63-.92, Park, 2005). As presented in Table 6, results from the analysis indicated that perception of errors accounted for 11% of the variances in the task achievement, $F(3, 156) = 6.11$, $p < .01$. Among general perception of errors which was measured before the experiment, simple slopes tests showed students' perception in consideration for improving errors ($\beta = .20$, $p < .05$) and their strain on errors ($\beta = .16$, $p < .05$) as significant predictors of task achievement. That is, students who consider for improving errors and report higher strain on errors were more likely to perform better in the task. There were no significant effects of perception in preferences for risk taking on task achievement ($\beta = .09$, $p > .05$).

Table 6

Summary of multiple regression analysis for predicting task achievement

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	β	<i>F</i>	<i>R</i> ²
<i>Pre</i> -perception of Errors					6.11**	.11
consideration for improving errors	3.41	1.64	2.07*	.20		
preferences for risk taking	1.44	1.44	1.00	.09		
strain on errors	2.26	1.09	2.07*	.16		

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

In advance to the relations between perception of errors and task achievement, stepwise hierarchical multiple regressions analyses were carried out to investigate the relations of classroom goal structure and social relationships to error perception in collaborative learning. Classroom goal structure and social relationships with teacher and peers were added to the stepwise hierarchical multiple regressions. The classroom goal structure was coded as 1 for mastery goal structure and 2 for performance goal structure. Other measures were used in the same way as other analyses. Means, standard deviation and Pearson correlations are displayed in Table 7.

As seen in Table 7, there were significant positive correlations among perception of errors. Especially, a significant correlation was shown between perception in consideration for improving errors and perception in preferences for risk taking ($r = .57$, $p < .01$) and perception for strain on errors ($r = .24$, $p < .05$). Again, there was no significant correlation between preferences of risk taking and strain under the perception of errors. In addition, all three, cognitive, behavioral, and emotional orientation of error perception were showed significant correlations with students' relationships with teacher and peers.

In particular, perception in consideration for improving errors and preferences for risk taking showed a significant correlation with students' perceived relationships with teacher ($r = .31$ and $.37$, $p < .01$). However, there was a negative correlation between perception for strain on errors and students' relationships with teacher ($r = -.25$, $p < .01$). A similar pattern was presented between all three perceptions of errors and the relationships with peers. Perception in consideration for improving errors and perception

in preferences for risk taking showed a significant correlation with students' relationships with peers ($r = .35$ and $.33$ $p < .01$). However, there was an insignificant and negative correlation between perception for strain on errors and students' relationships with peers.

Table 7

Means, standard deviation, intercorrelations of variables for research questions

	<i>M</i>	<i>SD</i>	Intercorrelations				
			1	2	3	4	5
1	3.63	.81	1				
2	4.07	.86	.57**	1			
3	2.26	1.08	.24*	.07	1		
4	3.94	.90	.31**	.37**	-.25**	1	
5	3.75	.79	.35**	.33**	-.05	.51**	1

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

Note. 1: perception in consideration for improving errors, 2: perception in preferences for risk taking, 3: perception for strain on errors, 4: social relationships with teacher, 5: social relationships with peers. $N=160$.

To examine the relations of classroom goal structure and social relationships to error perception, stepwise hierarchical multiple regressions analyses were carried out with the classroom goal structure and relationships with teacher and peers as independent variables and each cognitive, behavioral, and emotional perception of errors as a dependent variable: (1) perception in consideration for improving errors, (2) perception in preferences for risk taking, and (3) perception for strain on errors.

Perception in Consideration for Improving Errors

As presented in Table 8, the results from the analysis indicated that classroom goal structure accounted for 4% of the variances in perception in consideration for improving errors, $F(1, 158) = 6.29, p < .05$. A simple slope tests showed that classroom goal structure as significant predictor explains 4 % of perception in consideration for improving errors. That is, perception in consideration for improving errors was less likely to improve under the performance classroom goal structure, whereas their students' perceptions were more likely to improve under the mastery classroom goal structure.

In addition, the results from the second step of this analysis revealed that the regression equation containing all classroom climate predictors additionally including social relationships accounted for approximately 17% of observed variance in perception in consideration for improving errors, $F(3, 156) = 10.67, p < .01$, adjusted $R^2 = .15$. It indicated that social relationships increased the amount of variance explained by all of the predictors by 13%, $\Delta R^2 = .13, F(3, 156) = 12.41, p < .01$. However, when social relationships variables were added in the second step, classroom goal structure did not remain as a significant predictor of perception in consideration for improving errors. These results show that the importance role of social relationships on students' perception of errors rather than its' importance of classroom goal structure.

Regarding the corresponded to those for significant predictions in the model 2, the finding revealed that both relationships with teacher and peers displayed significant predictors. The beta weight of relationships with teacher was .18 ($p < .05$), while the beta weight of relationships with peers was .27 ($p < .01$). The results displayed that the more positive relationships with teacher and peers, the more positive perception in consideration for improving errors.

Table 8

Summary of hierarchical regression analysis for predicting perception in consideration for improving errors

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	β	<i>F</i>	R^2	ΔR^2	$\Delta R^2(F)$
<i>Step 1</i>					6.29*	.04		
Classroom goal structure	-.32	.13	-2.53*	-.20				
<i>Step 2</i>					10.67**	.17	.13	12.41**
Classroom goal structure	-.17	.12	-1.35	-.10				
Relationships with teacher	.17	.07	2.24*	.18				
Relationships with peers	.27	.08	3.35**	.27				

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

Perception in Preferences for Risk Taking

As presented in Table 9, the results from the analysis in step 1 indicated that classroom goal structure accounted for 7% of the variances in the perception in preferences for risk taking, $F(1, 158) = 11.17, p < .01$. A simple slope tests showed that classroom goal structure ($\beta = -.26, p < .05$) as a significant predictor of perception in preferences for risk taking. Similar to perception in consideration for improving errors, students' perception in preferences for risk taking was also less likely to positive under the performance goal structure, whereas their students' perception were more likely to positive under the mastery goal structure. The more teachers reflected on mastery classroom goal structure, the more students gained the constructive perception in preferences for risk taking.

The results from the model 2 revealed that the regression equation containing all classroom climate predictors additionally including social relationships accounted for approximately 20% of observed variance in the perception in preferences for risk taking,

$F(3, 156) = 13.08, p < .01, \text{adjusted } R^2 = .19$. A second model was calculated with classroom goal structures being set equal, then it indicated that social relationships increased the amount of variance explained by all of the predictors by 14%, $\Delta R^2 = .14, F(3, 156) = 13.18, p < .01$. In other words, students' relationships with teacher and peers may take additional 14% more on explaining students' perception in preferences for risk taking after the controlling its prediction of classroom goal structure. The higher quality relationships with teacher and peers students have during learning, the more they gained the belief that errors are constructed as another opportunity that worthwhile for risk taking rather than given by results to be evaluated.

In addition, classroom goal structure still remained as a significant predictor of perception in preferences for risk taking, $\beta = -.10, p < .05$. That is, although social relationships take variances for explaining perception in preference for risk taking, students' perception in preferences for risk taking still affected by classroom goal structure.

Regarding the corresponded to those for significant changes, the finding revealed that classroom goal structure and both relationships with teacher and peers displayed significant predictors. The beta weight of classroom goal structure was $-.10 (p < .05)$ and social relationships with teacher was $.18 (p < .01)$ while the beta weight of relationships with peers was $.27 (p < .01)$. Overall, students who perceived more positive relationships with teacher and peers as well as mastery classroom goal structure were more likely to improve perception in preferences for risk taking.

Table 9

Summary of hierarchical regression analysis for predicting perception in preferences for risk taking

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	β	<i>F</i>	<i>R</i> ²	ΔR^2	$\Delta R^2(F)$
<i>Step 1</i>					11.17**	.07		
Classroom goal structure	-.43	.13	-3.34*	-.26				
<i>Step 2</i>					13.08**	.20	.14	13.18**
Classroom goal structure	-.26	.13	-2.07*	-.10				
Relationships with teacher	.24	.08	3.16**	.18				
Relationships with peers	.22	.08	2.64**	.27				

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

Perception for Strain on Errors

As presented in Table 10, the results from the analysis indicated that classroom goal structure did account for any of the variances in the perception for strain on errors, $F(1, 158) = .05$, $p > .05$. The prior research has shown that students show anxiety regardless to classroom goal structures if it relates to the evaluating process (Ames, 1992; Elliot & Church, 1997). Therefore, it was a rather unexpected finding that students strain on errors were indifferent in neither mastery nor performance classroom goal structures.

Although the model 1 did not qualify statistical assumptions, social relationships variables were added in the second step to investigate its additional explanations for students' perception for strain on errors and the second model increased significantly. The results from the model 2 of this analysis revealed that the regression equation containing all classroom goal structures and social relationships accounted for approximately 7% of observed variance in the perception for strain on errors, $F(4, 155)$

= 3.95, $p < .01$. It indicated that social relationships increased the amount of variance explained by all of the predictors by 7%, $\Delta R^2 = .07$, $F(3, 156) = 5.90$, $p < .01$.

Regarding the corresponded to those for significant changes, the finding revealed that the relationships with teacher only displayed significant predictors and the beta weight of relationships with teacher was $\beta = -.29$ ($p < .05$). That is, the relationship with teachers positively influenced to reduce student's strain when they perceive errors.

Overall, results suggest that students' perception for strain did not differ by the classroom goal structure. In other words, students in neither mastery nor performance classroom goal structure conditions reported that their perception for strain on errors are changed depends on these instructions. However, it was affected by perceived relationships with teachers.

Table 10

Summary of hierarchical regression analysis for predicting perception for strain on errors

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	β	<i>F</i>	R^2	ΔR^2	$\Delta R^2(F)$
<i>Step 1</i>					.05	.00		
Classroom goal structure	-.04	.17	-.23	-.02				
<i>Step 2</i>					3.95**	.07	.07	5.90**
Classroom goal structure	-.19	.17	-1.10	-.09				
Relationships with teacher	-.35	.10	-3.38*	-.29				
Relationships with peers	.07	.12	.63	.06				

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

Discussion of Results

The regression analysis focused on exploring the relations of classroom goal structure and relationships with teacher and peers and perception of errors. In advance to

the relations between perception of errors and task achievement, the results supported two research questions.

First, it was found that both students' perception in consideration for improving errors and preferences for risk taking was improved under the mastery classroom goal structure. In other words, students in mastery classroom goal structure conditions reported that their perception of errors was improved. If students learn under the mastery classroom goal structure, they are more likely to take errors as other opportunities while they learn.

Second, it was found that students who have positive relationships with teacher and peers reported better perception in consideration for improving errors and preferences for risk taking even under the control of classroom goal structures. These findings were consistent with previous studies that showed the safety and warmth in climates positively influenced students' learning behaviors including perception of errors (Bauer & Mulder, 2013; Patrick et al., 2011). While consistent with the literature on positive environments for students' motivation, the results of this study suggest that social relationships in classroom may more affect students' learning behaviors and perception of errors rather than classroom goal structures in collaborative learning contexts.

Overall, the results of the current study suggest that relationships with teacher and peers were more likely to improve students' perception of errors rather than mastery classroom goal structure in collaborative learning. Theoretical and practical implications of the current study will be discussed in the next chapter.

CHAPTER V: GENERAL DISCUSSION

This study aimed to investigate the relations of classroom climate and students' perception of errors. Since errors would be helpful for learning (Fiori & Zuccheri, 2005; Mathan & Koedinger, 2005; Siegler, 2002), the perception of errors needed to be considered in learning (Cannon & Edmondson, 2005; Edmondson, 1996; Lannin et al., 2007). Results of the study imply how social relationships should be considered more importantly for the constructive perception of errors in collaborative learning. Specifically, this study extends the existing body of research by examining how classroom goal structure and social relationships are related to a constructive perception of errors in a natural collaborative learning context. The findings of the current study in regard to its research purposes and limitations will be discussed along with suggestions for the future research.

It was assumed that classroom climate which influenced by classroom goal structure and social relationships would be related to perception of errors in collaborative learning. These assumptions were partially supported by the results of the current study. In contrast with confirmatory research on collaborative learning, the current study included more exploratory characteristics to discover a greater range of social climate effects beyond the more heavily-studied learning climate. Because error perception was sub-divided into (1) consideration for improving errors, (2) preferences for risk taking on errors, and (3) strain for errors, these three strands are presented separately in this section. The overarching assumption for the current study was that students' perception of errors would be affected by perceived classroom goal structure and social relationships when students worked together.

Error perception was measured through scoring a self-reported questionnaire based on students' perceptions of errors during the task. Among classroom climate, classroom goal structure was manipulated while social relationships with teacher and peers were measured with a self-reported questionnaire.

Perception of Errors and Task Achievement

In order to investigate the relations of classroom goal structure and social relationships to error perception, the prerequisite hypothesis of this study was that whether students' general perception of errors be positively associated with task achievement or not. Results regarding students' perception of errors and task achievement partially supported the hypotheses.

Specifically, it was found that task achievement was higher among students who reported that they reflect on and correct to their errors (i.e., perception in consideration for improving errors) and among students who felt pressure to avoid committing errors (i.e., strain on errors). These findings were consistent with previous studies that showed metacognition, a cognitive processes which involved in monitoring one's cognition (Flavell, 1979), enhances high achievement, enhancing considerations of what students know about and how they learn from errors may foster task achievement and these effects also repeated in collaborative achievement. Van Dyck et al. (2005) found that constructive error management perspectives boosted corporate performance in two European countries. Shin et al. (2014) also presented a positive relation between students with more constructive perception of errors and academic achievement in both elementary I and middle school.

In addition, even though organizational culture that embraces communications about errors to reduce anxiety consistently results in personal and organizational benefits (Cannon & Edmondson, 2005; Edmondson, 2004), our results supported that certain level of anxiety can increase students' performance. As many previous studies on anxiety consistently found that moderate levels of anxiety may improve motivation on tasks that demand persistence to perform better (Brook, 2014; Mandler & Sarason, 1952) according to the U-shaped relationship between anxiety and performance described by the *Yerkes-Dodson Law* (Yerkes & Dodson, 1908). Scheepers (2009) also found that anxiety can increase effort on a task, thus potentially resulting in higher achievement.

Furthermore, not all positive components of perception of errors were related to task achievement. There was no significant relation between preferences for risk taking and task achievement. In the literature on achievement motivation (e.g., Atkinson, 1957),

high achievers consistently prefer intermediate levels of risk to very easy or very difficult tasks. Moreover, according to *attribution theory* (e.g., Heider, 1958), a form of social interdependence theory, achievement-related behaviors such as the preference for intermediate-level risks may be heightened when working with others. Yeon (2009) also found that students who are very conscious of how they look to others are less likely to take risks than students who focus more on self.

In a potentially hostile environment such as collaborative learning where social pressures can be magnified, students may prefer the safety of doing work to avoid social pressures such as fears of being blamed or ridiculed by disagreements from others (Tjosvold et al., 2004). Athletes in team sports report less enjoyment and more anxiety in striving for better achievement than do their counterparts in individual sports (Behzadi, Hamzei1, Nori, & Salehian, 2011). In other words, the more shared goals with others, such as within a sport team or within the classroom, may increase more anxiety in performance due to avoid being blamed from others within the same group. Therefore, it is reasonable to assume that failure in the environments where social evaluation and strong perceived expectancies explain why the prediction of students' preferences for risk taking on task achievement was not statistically significant in this study.

Perception in Consideration for Improving Errors

Classroom goal structure has been considered as the most effective factor in influencing students' academic behaviors and achievement (Ames, 1992; Ames & Archer, 1988). Goal structure has been shown to have significant effects even after controlling for the effects of individual differences in many previous studies (Ames, 1992; Ames & Archer, 1988; Elliot & Church, 1997). However, of greater interest to the current study is whether social relationships still exert a significant effect in collaborative learning after controlling for the effects of classroom goal structure.

Results showed that a mastery classroom goal structure played a positive role in how students perceived errors and on their efforts and persistence in improving errors. In contrast, performance classroom goal structure negatively influenced students'

perceived consideration for improving errors. These results were consistent with prior research that linked classroom goal structure and perception of errors (Nordstrom et al., 1998).

For instance, a mastery classroom goal structure leads to deeper learning strategies rather than just memorization scopes and increases to challengeable behaviors. Previous studies also suggest that classroom goal structure plays a crucial role in the depth of learning. Ames and Archer (1998) reported that learning goal orientation is associated with more adaptive patterns of learning. Similarly, Tickle (2001) found that students with mastery goals adopt deep-learning strategies to master a given task. In addition, Miki and Yamauchi (2005) found that a sample of 323 elementary school students were more likely to adopt deep-learning strategies under a mastery classroom goal structure than when they perceived the classroom as having a performance classroom goal structure.

In addition, students' perceived social relationships with their teacher and peers predicted students' perception in consideration for improving errors. Recent literature reviews on social climate consistently reported organizational climate as a predictor of organizational performance outcomes (Kozlowski & Ilgen, 2006; Zohar, 2000). Relationships with the teacher and between peers are a critical dimension of a classroom's social climate. These relationships may be even stronger in East Asian cultures which tend to embrace interdependent self-construal patterns (Heine, 2001; Markus & Kitayama, 1991; Oyserman, Coon, & Kimmelmeier, 2002; Oyserman & Lee, 2008). Since individuals in Korea work hard to maintain group harmony by striving to please group members, Korean students would be more considerate and behave better to improve on their errors especially in collaborative learning environments to avoid displeasing others.

In particular, relationships with peers were found to be a significant positive predictor of perceived consideration for improving errors. Because the current study was designed to examine peer learning, it is reasonable to expect that students' learning behaviors would be affected more by peers than by teachers, especially in the context of making errors. A study by Roseth et al. (2008) showed that students are more affected by positive peer relationships under cooperative learning than in competitive or

individualistic learning.

Perception in Preferences for Risk Taking

Another aspect of perceived errors in preferences for risk taking was also examined by measuring the hierarchical effects of the classroom climate. Similar to perception of errors in consideration for improving errors, classroom goal structure and social relationships with both teacher and peers significantly predicted risk taking preferences. The effects of classroom goal structure still remained significant after social climate factors were included in the model.

The role of classroom goal structure was controversial in previous studies on risk taking behavior because the effectiveness of classroom goal structure can vary depending on how learners interact with the situation and each other (Woodman et al., 2013; Yeon, 2009). In particular, recent literature on risk taking behaviors has mostly been reviewed dependent on either environmental pressures for achieving high scores (Dweck, 1999) or on previous success or failure (Shalley, Zhou, & Oldham 2004; VandeWalle, 1997).

For example, risk taking increases after consecutive successes and in environments where students are not pressured to deliver outstanding performances. In particular, research has identified that lower-pressure environments are correlated with increased willingness to accept challenges (Dweck, 1986; Steele-Johnson, Heintz, & Miller, 2008). In mastery classroom goal structure environments, where there is less pressure to perform, students display more innovative thoughts and accept more challenges in learning (Dweck, 1999; Elliot & McGregor, 2001; VandeWalle, Cron, & Slocum, 2001). Therefore, a mastery classroom goal structure tends to promote challenges, including high risks, more than a performance classroom goal structure. The findings of the current study are consistent with these research results.

In addition, students' perception in preferences for risk taking is largely predicted by social relationships (Parker & Asher, 1987). A *peer effect* (Albert & Steinberg, 2011) posits that adolescence is a period of heightened involvement in risky behavior, much of

which occurs in the presence of peers rather than alone or in the presence of older individuals. Adolescents more easily involved in high-risk behaviors when they are with friends (Choi & Kim, 2012; O'Brien, Albert, Chein, & Steinberg, 2011; Smith, Chein, & Steinberg, 2014) who provide warmth and safety, and these effects are greater when friends identify with them as being of the same sex or age (Goodenow, 1993a, 1993b).

In order to advance the importance of relationships with peers, having a positive relationship with their teacher was a significant predictor of students' preferences for risk taking behaviors. This finding was unexpected, because it suggests that students perceive not only their peers but also their teacher in collaborative learning. One possible explanation is that, despite the wording used in the study, students still considered the teacher to be an authoritative evaluator of their performance. If so, it would be reasonable that the relationship with the teacher was a highly significant predictor of risk taking preferences, which were directly related to task achievement.

Perception for Strain on Errors

Despite the statistical significance of both perceptions in consideration for improving errors and preferences for risk taking on errors by classroom climate in the hierarchical model, the final component of perceived strain on errors was not significant. This result implies that emotional arousal is not influenced by both classroom goal structure and social relationships.

Classroom contexts have been linked to students' motivation, well-being, engagement, and achievement (Ames & Archer, 1988; Kaplan & Midgley, 1999; Patrick et al., 2011). In this way, classroom goal structure may be directly related to changes in students' academic outcomes. However, in contrast to consistent prior research on classroom goal structure (Ames & Archers, 1988), students' anxiety was not affected by classroom goal structure in the model for predicting perception for strain on errors. Although the final model that included both classroom goal structure and social relationships was significant, and although students' relationships with the teacher were a particularly strong predictor of perceived strain on errors, the final result cannot be

interpreted as significant.

This inconsistency may be due to the following reasons. In the current study, students were introduced to content that they should have mastered during their previous curriculum. It was also suggested that they participate actively in a new style of learning, in a computer lab, within the designed programs. Many of the active participants, despite the instruction, asked whether or not this activity was required by the class advisor. Upon finding that it was not, they stopped participating and disturbed group members. Therefore, low-motivated students who lack task value and interest for doing tasks might interfere with the effects of perceptions in strain for error during tasks. The role of classroom goal structure was controversial in previous studies in terms of strain because the effectiveness depended largely on how much students valued the materials (Berndt & Miller, 1990; Pintrich & De Groot, 1990). Thus, students' anxiety may not be as affected by manipulations in an experimental situation as in an authentic setting due to the irrelevancy and undervaluation of the materials.

Implications of Findings

Theoretical studies support that the existence of errors is meaningful for students to accept as a natural part of learning rather than merely as an undesirable result. Despite the potential benefits of errors, the competitive nature of Korean culture makes it hard for students to accept mistakes as a natural part of the learning process (Reason, 1990; Shin & Yim, 2009). However, errors are unavoidable in the learning process (Norman, 1988, 1993), and students can obtain effective benefits of learning based on a corrective framework. Thus, it is worthwhile to further explore conditions for accepting errors as a natural part of learning rather than attempting to avoid them completely. Constructive error handling can be considered an important factor for learning processes.

Research on perception of errors has mostly developed in the context of the workplace rather than in educational settings. Despite the importance of a constructive perception of errors, errors still remain as things to be avoided and unfortunately, only a few empirical studies have examined the nature of attitude toward error-making in

classroom. However, researchers have recently started to pay attention to the potential role of errors that stimulate students' improvements in learning. Because there is little empirical research about the relationships between perceived errors and achievement and the conditions for exploring a constructive perception of errors, the current study contributes to a gap in the research literature. The current study suggests that perception of errors affects task achievement. This study found that students with a constructive perception of errors showed higher task achievement.

In addition, results of the current study suggest that mastery classroom goal structure and social relationships with teacher and peers influence on students' perception of errors in collaborative learning. These results indicate that it is important to build a warm classroom climate, because it can encourage constructive perception of errors that, in turn, increases achievement. Specifically, its results suggest that it is necessary to encourage students to have solid and positive relationships with their teacher and peers.

For example, students who have a good relationship with teacher and peers would have constructive perception of errors regardless of which goal structure was introduced in collaborative learning. This implies that educators need to focus more on students' development of social relationships than developing effective strategies to enhance achievement and intrinsic motivation. Results of the current study suggest that those students' achievement and intrinsic motivation is more affected by social relationships they have with teacher and peers in collaborative learning.

The present study shows that the significant factors affecting students' error perception were varied by the classroom goal structure and social relationships with teacher and peers. These results provide insights about the factors affecting students' perception of error which further influence on the task achievement, specifically, by emphasizing social relationships in collaborative learning. With these results, we can provide students with concert

The present study shows that the significant factors affecting students' error perception were varied by the classroom goal structure and social relationships with teacher and peers. These results provide new insights about the factors affecting error perception which in turn to task achievement, specifically, by emphasizing social

relationships in collaborative learning. With these results, not only we need to encourage students to build concrete relationships with teacher and peers, we also need to invest effort into developing a learning-oriented culture through informing students how much have they have achieved already rather than how much they have yet to achieve.

Limitations and Future Research

The results of the current study should be interpreted and applied to other contexts with caution due to the potential for overgeneralizing beyond the context of this study. Because participants in the current study attended one of only two schools, educators should be cautious when applying these findings to secondary education in general.

In addition, educators should carefully note that this study was only conducted in the context of elementary-level Korean (i.e., Korean proverbs) when applying the findings to other contexts. Since middle school classrooms tend to operate under more competitive goals even in collaborative learning, educators should carefully consider the learning environment in order to replicate the effects from the current study. Future research should explore how students' perception of errors is affected by classroom climate in middle school where even collaborative learning becomes competitive and learning materials require techniques based on more than common sense.

Furthermore, because there is little research about the perception of errors in collaborative learning and its relationship with classroom climate in the education setting, this study performed exploratory research on perception of errors in schools. Studies conducted in organizations on the perception of errors have been limited to self-report surveys or observational studies (Bauer & Mulder, 2007; Van Dyck et al., 2005) making it difficult to identify how learning and social climates affect perception of errors. Although the current study was not able to manipulate social relationships due to the nature of relationships with peers and the teacher, it did focus on which social classroom climate was associated with greater perception of errors in learning.

Given the importance of perception of errors on students' achievement, future

studies related to perception of errors are highly encouraged. The present research comprised two empirical studies that facilitate broader understanding of perception of errors in learning through investigating the relationships between perception of errors and task achievement and the classroom climate for perception of errors in learning. Future research is recommended to investigate conditions for the effects of perceived errors on intrinsic motivation and subjective wellbeing.

The present study suggests the value of an experimental study in which social relationships could be manipulated. Although classroom goal structure was manipulated in the current study, the manipulation of social relationships would improve the validity of the results. Results from the current study indicate that students are more likely to view errors positively when provided with the emotional support, advice, and safety from teacher and peers than when placed in an effective learning climate. However, the question remains whether this is a causal effect or merely an association. It is possible that the students with better peer and teacher relationships also shared other factors beyond the social climate which may have led to their constructive perception of errors.

Finally, it would be helpful to investigate the perception of errors in specific domains. Although this study considered the possibility of generalizing the specific domain classroom results into a more general setting by using a domain general scale for the perception of errors, it would be meaningful to validate these results in several other classrooms with domain specific scales for the perception of errors. This would allow for a more accurate assessment of the perception of errors in learning.

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APPENDIXES

Appendix A. 참여 학생 모집 문건

실험 참여자 모집 안내

연구 책임자 : 연은모 (서울대학교 교육학과 박사과정)

실험 목적 : 학습자의 실수에 대한 긍정적인 인식에 영향을 미치는 교실 맥락 및 사회적 관계 탐색 연구

실험 대상 : 현재 초등학교에 재학 중인 학생 300~350명

실험 일시 : 2013년 2월 첫째 주부터 실시

실험 장소 : 근처 컴퓨터실

실험 내용 : 주어지는 지시문에 따라 제한시간 내에 3인의 전문가가 선정한 『초등학생이 꼭 알아야 할 속담』에 대한 학습프로그램 참여 후 과제를 수행하고, 이와 관련된 설문조사에 응답함. 이때 컴퓨터를 통해 과제를 수행하게 됨.

※ 약 40분 소요 예정

※ 본 실험에서 수집되는 모든 정보는 통계법에 의거하여 비밀이 절대 보장됩니다.

※ 실험참여자가 본 연구에 참여하지 않아도 어떠한 불이익도 없습니다.

※ 연구에 참여하는데 있어서 직접적인 이득은 없습니다. 그러나 귀하가 제공하는 정보는 학습자가 실수를 긍정적으로 인식할 수 있도록 돕는 교실 환경 및 교수법에 대한 이해를 증진하는데 도움이 될 것입니다.

※ 실험 참여 의사가 있는 학생은 본 연구의 책임자인 연은모 연구원(rain4515@snu.ac.kr, 010-6392-XXXX)에게 문의하시기 바랍니다.

서울대학교 교육학과

Appendix B. 참여 학생 및 법정대리인 동의서

어린이용 설명서 및 동의서

연구 과제명 : 아동의 학습 흥미에 대한 탐색

연구 책임자명 : 연은모 (서울대학교, 박사과정)

이 설명서에는 이해되지 않는 말들이 포함되어 있을 수 있습니다. 이해가 분명하게 되지 않는 말이나 정보에 대해서는 연구를 담당하는 연구원 선생님 (연은모, 010-6392-XXXX)에게 문의하시기 바랍니다.

1. 이 연구를 왜 하나요?

이 연구는 서울대학교 연구원 선생님들이 실수에 대해서 초등학생 친구들이 어떠한 생각을 가지고 있는지에 대해 알기 위해 실시하고 있습니다. 우리는 여러분에게 이 연구에 대해 설명한 후 여러분이 이 연구에 참여할 지 물어볼 것입니다.

2. 왜 저에게 참여하라고 하시는 건가요?

전국에서 초등학교 2학년부터 5학년에 재학 중인 300-350 명의 어린이가 이 연구에 참여할 것입니다. 연구원 선생님은 여러분이 그 어린이들 중 하나가 될 수 있다고 생각하여 참여하고 싶은지를 묻는 것입니다.

3. 꼭 참여해야 하나요?

원하지 않으면 참여하지 않아도 되며 참여하지 않아도 여러분에게 해가 되는 일은 없습니다.

4. 연구 중에 어떤 일을 하나요?

맨 먼저 연구원 선생님이 여러분에게 설문지를 통해서 여러분이 평소에 실수에 대해서 가지고 있는 생각들과 선생님 그리고 친구들에 대해서 어떻게 생각하는지에 대한 질문(예를 들면 “실수는 내 공부를 향상시키는데 도움을 준다.”, “우리 담임선생님은 나를 믿어 주신다.” 등의 질문입니다)을 할 것입니다. 연구원 선생님들의 질문에 대답한 친구들은 3인의 전문가 선생님이 선정한 ‘초등학생이 꼭 알아야 할 속담’ 12개에 대한 내용을 컴퓨터 프로그램을 통해서 학습하게 됩니다. 여러분과 여러분의 보호자께서 허락하면 이 연구에서 얻은 정보들은 함께 서울대학교에서 연구하는 교수님들과 공유하게 될 것입니다. 이 때 여러분의 이름은 알려지지 않을 것입니다.

5. 연구 참여 기간은 얼마나 됩니까?

약 40분이 소요될 것입니다.

6. 이 연구에 참여할 경우 위험한 내용은 없나요?

연구에 참여할 경우 여러분에게 해가 되는 내용은 전혀 없습니다.

7 연구에 참여하지 않는다고 불이익이 있나요?

여러분이 연구에 참여하기 싫으면 참여하지 않을 수 있습니다. 연구에 참여하지 않아도 불이익을 당하지 않습니다.

8. 이 연구가 저에게 어떠한 도움이 되나요?

이 연구에 참여하는 것은 여러분에게 직접적인 도움이 되지 않을 수도 있습니다. 그러나 이 연구를 통해 여러분이 제공하는 정보는 나중에 여러분과 같은 친구들이 배움의 과정에서 실수에 대해 긍정적인 생각을 가질 수 있도록 하는데 도움이 될 수 있습니다.

9. 이 연구에 참여하면 선물이 있나요?

미안하지만 이 연구에 참가하는데 있어서 여러분에게는 선물을 주지 않습니다.

10. 궁금한 것이 있으면 어떻게 하나요?

본 연구에 대해 궁금한 것이 있거나 읽고 나서 이해가 안 가는 것은 무엇이든 연구원 선생님 (연은모, 010-6392-XXXX)이나 보호자에게 설명을 해 달라고 하십시오. 원한다면 “보호자용 설명서”를 읽어 볼 수도 있습니다.

연구참여자용 설명서 및 동의서

1. 이 실험은 초등학생들의 실수에 대한 긍정적인 태도를 함양하기 위해 학습상황에서 실수에 대한 인식에 미치는 다양한 변인들과 사회적 관계에 대해 탐색하기 위한 연구의 일환으로 실시됩니다. 이에 서울 및 경기도 소재한 초등학교와 중학교에 재학 중인 약 700명의 학생들이 참여할 예정입니다.
2. 본 실험은 사전 설문조사(10분)-속담 학습프로그램 참여(20분)-사후 설문조사(10분)순으로 진행되며, 총 40 여분이 소요될 예정입니다. 본 실험은 모두 컴퓨터실에서 이루어질 것입니다.
3. 보다 구체적으로, 귀하의 자녀는 약 40분 동안 3인의 전문가가 추천한 『초등학생이 꼭 알아야 할 속담』 12개에 대해서 컴퓨터 학습프로그램을 통해 개인적으로 혹은 반 친구들과 함께 학습하게 됩니다. 모든 연구 참여자들은 정해진 시간 동안 12개의 속담을 학습한 후 스피드 퀴즈를 풀며 이해를 심화하게 됩니다.
4. 귀하의 자녀는 본 연구에 참여하지 않을 자유가 있습니다. 또한, 귀하의 자녀가 본 연구에 참여하지 않아도 어떠한 불이익도 없습니다. 본 연구는 자발적으로 실험참여의사를 밝혀주시는 분들에 한해 진행되며, 어떠한 불이익 없이 언제든지 참여 도중에 그만둘 수 있습니다. 만일 귀하의 자녀가 연구에 참여하는 것을 허락하지 않고 싶으시다면 첨부해드리는 동의서에 불참 의사를 표명해 주십시오.
5. 이 연구에 참여하는 데 있어서 연구참여자에게 금전적 보상이나 직접적인 이득은 없습니다. 그러나 학생이 제공하는 정보는 실수에 대한 긍정적 인식 함양을 위한 교실 환경 조성 및 교수법에 대한 이해를 증진하는 데 도움이 될 것입니다.

6. 연구 책임자는 연구에서 얻은 모든 개인 정보의 비밀 보장을 위해 최선을 다할 것입니다. 그러나 만일 법이 요구하면 학생의 개인정보는 제공될 수도 있습니다. 또한, 모니터 요원, 점검 요원, 생명윤리심의위원회는 연구참여자의 개인 정보에 대한 비밀 보장을 침해하지 않고 관련규정이 정하는 범위 안에서 본 연구의 실시 절차와 자료의 신뢰성을 검증하기 위해 연구 결과를 직접 열람할 수 있습니다. 연구참여자의 법적 보호자께서 본 동의서에 서명하는 것은, 이러한 사항에 대하여 사전에 알고 있었으며 이를 허용한다는 동의로 간주될 것입니다.

7. 본 연구에 대해 질문이 있으실 경우 다음 연구 담당자에게 연락하시면 됩니다.

이름: 연 은 모

연락처: 010-6392-XXXX (rain4515@snu.ac.kr)

8. 만일 어느 때라도 연구참여자로서의 학생의 권리에 대한 질문이 있다면 다음의 서울대학교 생명윤리심의위원회에 연락하십시오.

서울대학교 생명윤리심의위원회(SNUIRB)

전화번호: 02-880-5153

동 의 서

아래 사항을 확인한 후 연구에 참여하길 원한다면 이름을 써 주십시오.
여러분이 이 연구에 참여하기 위해서는 부모님이나 법정 대리인도 함께
동의서 양식에 서명해야 합니다.

1. 나는 이 설명서를 읽었습니다.
2. 나의 모든 궁금한 점은 완전히 이해할 수 있도록 연구원 선생님에게서
설명 받았습니다.
3. 나는 이 연구에 참여 할 것을 동의합니다.
4. 나의 서명은 동의서의 사본을 받았다는 것을 뜻하며 연구 참여가 끝날
때까지 사본을 보관하겠습니다.

연구 참여자 아동 명

서 명

날 짜 (년/월/일)

법정대리인 명(연구 참여자와의 관계)

서 명

날 짜 (년/월/일)

동의서 받은 연구원 명

서 명

날 짜 (년/월/일)

연구 책임자 명

서 명

날 짜 (년/월/일)

Appendix C. Questionnaires for Perception of Errors

This survey items below are adapted from Rybowskiak et al. (1999) and measured before the manipulation of classroom goal structure.

다음 문항들은 개인 특성에 대하여 기술해 놓은 것입니다.

주의 깊게 읽으시고, **자신과 얼마나 비슷한지** 표시해 주시면 됩니다. 자신과 비교하여 매우 그렇다고 생각하면 5에, 전혀 아니다라고 생각하면 1에 표시하시면 됩니다. 정답이 있거나 좋고 나쁜 답이 있는 것이 아니므로 평소의 자신을 가장 잘 나타내는 쪽으로 편안하게 표시하십시오.

1	2	3	4	5
전혀 아니다		보통이다		매우 그렇다

	문항	전혀 아니다				매우 그렇다
1	실수는 내 공부를 향상시키는데 도움을 준다	1	2	3	4	5
2	실수는 내가 공부를 계속 하는데 유용한 정보를 제공해 준다	1	2	3	4	5
3	나의 실수는 내 공부를 발전시키는데 도움을 준다	1	2	3	4	5
4	내 실수 덕분에 나는 공부에서 발전을 이룰 수 있었다	1	2	3	4	5
5	공부를 잘 하고 싶다면 실수하는 것을 두려워해서는 안 된다	1	2	3	4	5
6	가만히 있는 것보다는 위험을 감수하더라도 실수를 하는 것이 낫다	1	2	3	4	5
7	공부를 잘하기 위해서라면 나는 가까이 실수를 받아들일 것이다	1	2	3	4	5
8	나는 아무 것도 하지 않는 것보다는 실수하는 것을 더 선호한다	1	2	3	4	5
9	나는 실수를 할 때마다 스트레스를 받는다	1	2	3	4	5

10	나는 실수를 할까봐 자주 두려워한다	1	2	3	4	5
11	나는 실수를 하면 당혹스럽다	1	2	3	4	5
12	공부할 때 실수를 하면 나는 감정을 통제하지 못하고 화가 난다	1	2	3	4	5
13	공부를 하는 동안 나는 내가 무언가를 잘못하지는 않았는지 걱정한다	1	2	3	4	5
14	나는 실수를 한 후에 실수를 어떻게 하게 된 것인지에 대해 생각한다	1	2	3	4	5
15	나는 어떻게 하면 실수하는 것을 막을 수 있을지에 대해서 종종 생각한다	1	2	3	4	5
16	공부를 하는 동안 무언가 잘못되면 나는 그것을 매우 신중하게 생각한다	1	2	3	4	5
17	실수를 한 후, 나는 어떻게 실수를 고칠 수 있을지에 대해 오랫동안 신중히 고민한다	1	2	3	4	5
18	실수가 발생하면 나는 실수에 대해 철저히 분석한다	1	2	3	4	5

Appendix D. Questionnaires for Social Relationships with Teacher

This survey items below are adapted from both Hamre & Pianta (2001) and Lee & Robbins (1995).

문항	전혀 아니다	1	2	3	4	매우 그렇다
1 우리 담임 선생님께서는 나에게 따뜻하게 대해주신다	1	2	3	4	5	
2 우리 담임 선생님께서는 나를 존중해주신다	1	2	3	4	5	
3 우리 담임 선생님께서는 나에게 관심을 보여주신다	1	2	3	4	5	
4 우리 담임 선생님께서는 나를 믿어주신다	1	2	3	4	5	
5 우리 담임선생님께서는 나를 잘 도와주신다	1	2	3	4	5	
6 우리 담임선생님은 신뢰할 만한 분이시다	1	2	3	4	5	

Appendix E. Questionnaires for Social Relationships with Peers

This survey items below are adapted from Lee & Robbins (1995).

문항	전혀 아니다	1	2	3	4	매우 그렇다
1 나는 우리 반 친구들에게 이해 받고 있다고 느낀다	1	2	3	4	5	
2 나는 우리 반 친구들이 가족 같다고 느낀다	1	2	3	4	5	
3 나는 활발하게 우리 반 활동에 참여한다	1	2	3	4	5	
4 나는 친구들로부터 사랑과 관심을 받는다고 느낀다	1	2	3	4	5	
5 나는 우리 반 친구들과 잘 지낸다	1	2	3	4	5	
6 나는 우리 학교 친구들을 정말 좋아한다	1	2	3	4	5	
7 우리 반 친구들과 나는 평소에 서로 도움을 주고받는다	1	2	3	4	5	
8 우리 반 친구들은 평소에 나와 같은 감정을 공유할 때가 많다	1	2	3	4	5	

Appendix F. Questionnaires for Task Efficacy

This survey items below are adapted from Pintrich & De Groot (1990).

	문항	전혀 아니다			매우 그렇다	
1	나는 속담 학습프로그램에서 다루어지는 내용을 잘 이해할 자신이 있다	1	2	3	4	5
2	나는 속담 학습프로그램을 매우 잘 할 수 있다고 확신한다	1	2	3	4	5
3	나는 속담 학습프로그램에서 주어진 문제나 숙제를 성공적으로 해낼 수 있다고 확신한다	1	2	3	4	5
4	나는 속담 학습프로그램에서 좋은 성적을 받을 것이라고 생각한다	1	2	3	4	5

Appendix G. Questionnaires for Task Value

This survey items below are adapted from Berndt & Miller (1990).

	문항	전혀 아니다			매우 그렇다	
1	나는 속담 학습프로그램에서 다루지는 내용들이 중요하다고 생각한다	1	2	3	4	5
2	나는 속담 학습프로그램에서 배우는 내용들이 재미있다고 생각한다	1	2	3	4	5
3	나는 속담 학습프로그램에서 배우는 내용들이 유용하다고 생각한다	1	2	3	4	5

Appendix H. Study Materials

1. 낫 놓고 기억 자도 모른다

아직 한글을 아직 모르는 철수가 시골 할아버지 덕에 놀러 갔습니다. 마당에서 뛰어 놀던 철수에게 할아버지께서 말씀하셨습니다. "철수야, 창고에 가서 낫 좀 가지고 오거라. 날이 구부러져서 'ㄱ'자 같이 생겼단다." 고개를 가우뚱하던 철수가 할아버지께 되물었습니다. "할아버지, 'ㄱ'자는 어떻게 생긴 건데요?"



풀을 벨 때 쓰는 낫은 옛날부터 집집마다 흔하게 볼 수 있는 농기구로 'ㄱ'자를 닮았습니다. "낫 놓고 기억 자도 모른다"는 속담은 'ㄱ'자 모양으로 생긴 낫을 보면서도 'ㄱ'자를 모른다는 말로 아주 무식하다는 뜻입니다. 우리 친구들은 낫 놓고 기억 자도 모르는 사람이 되지 않도록 학교에서 선생님 말씀도 잘 듣고 열심히 공부하도록 해요. ☺

2. 우물 안 개구리

우물 안에 개구리 한 마리가 살고 있었습니다. 자기보다 작은 물고기 몇 마리뿐인 우물 안에서는 덩치 큰 개구리가 왕이었고 개구리는 세상에서 자기가 최고라고 생각했습니다. 우물 안에만 있으니까 세상은 개구리가 살고 있는 우물 안이 전부고 하늘은 그 우물 크기대로 보였겠조? 그러던 어느 날, 물을 길던 농부의 물동이에 실려 우물 밖으로 나오게 된 개구리는 이제껏 자신이 봐왔던 세상보다 훨씬 큰 세상에 깜짝 놀랐습니다.



"우물 안 개구리"란 세상을 너무 좁게 봐서 지식이 부족한 상태를 뜻하는 말로 보고 들은 게 없어서 세상을 잘 모르는 사람을 두고 하는 말입니다.



3. 방귀뀌고 성낸다

사람 많은 곳에서 방귀를 뀌어본 적 있나요?
그 때 기분이 어땠어요?
자기가 방귀를 뀌지 않은 척 하기 위해서 일부러 시치미를 뚝 떼고 더 크게 옆에 사람에게 "누가 방귀 뀌었나!!"며 화를 내 본 경험은 없나요?



"방귀뀌고 성낸다"는 속담은
자신이 잘못을 하고도 도리어
남에게 화를 낸다는 뜻입니다.



4. 돌다리도 두들겨보고 건너라

서울 창경궁에 가면 '옥천교'라는 돌다리가
있어요. 수백 년 전에 지어진 것임에도
불구하고 튼튼하게 자리를 지키고 있지요.
나무도 썩드 어닌 단단한 돌로 만들어진 다리는 수백 년이 지나
도 끄떡없이 자리를 지키고 있는데 돌로 만든 다리를 왜 두들겨
보고 건너라는 걸까요? 튼튼한 돌은 거센 바람이나 큰 비에도 쉽
게 깨지지 않는다는 사실을 여러분도 잘 알고 있을 겁니다.



"돌다리도 두들겨 보고 건너라"라는 속담은 튼튼한 돌다
리도 두들겨 보고 건널 만큼 모든 일에 주의를 기울이라는
뜻입니다. 잘 알고 있는 일이라 해도 쉽게 생각하거나 대충
하지 말고 신중하게 생각하고 행동하라는 교훈이 담겨있지
요.

5. 소 잃고 외양간 고친다

최근 과천 서울대공원에서 호랑이가 실내 우리 문을 열고 나오
는 사고가 발생했습니다. 호랑이는 먹이를 주러 갔던 사육사를
공격해 중태에 빠뜨리고 공원 근처를 돌아다니다가 경찰에 붙잡
혀 간신히 우리 안으로 되돌아갔습니다. 서울대공원 측은 이제서
야 부랴부랴 우리를 튼튼하게 고치고 있지만 서울대공원을 찾은
시민들도 불안한 기색을 감추지 못하고 있습니다. 서울대공원 측
은 때늦은 후회를 하고 있지만 소용이 없습니다.



혹시 여러분이 동물원 구경을 하던 중 호랑이가 우리에서
탈출했다면 생각만해도 동굴이 서늘하겠죠? 부서진 외양간 때문
에 소를 잃어버린 후 외양간을 고쳐봤자 아무 소용이 없다는 말
로 "소 잃고 외양간 고친다"는 속담은
이미 일이 잘못된 뒤에는 후회해도
소용없다는 뜻입니다. 중요한 일을
뒤로 미루다가 방지하지 말고 미리미리
하는 습관을 기르도록 합시다.



6. 구슬이 서 말이라도 꿰어야 보배

동글동글하고 매끄러운 진주나 보석으로 만든 장신구는 값비싸고 매우 귀한 것이었습니다. 그래서 옛날부터 부잣집 잔칫날이나 명절 때가 되면 부인이나 딸들이 예쁘게 치장하고자 반지나 목걸이를 만드는데 많이 사용했습니다.

그런데 어느 부잣집에 이저람 귀한 구슬이 서 말이나 있었다고 합니다. 서 말은 (곡식을 잘 때 쓰는) '되'라는 그릇으로 찧을 때 서른 그릇이나 되는 아주 많은 양입니다.



하지만, 아무리 귀한 구슬이라 해도 그냥 놔두면 무슨 소용이 있을까요? 구슬을 한 알 두 알 실에 꿰어야 예쁜 장신구가 되겠죠?

이저람 "구슬이 서 말이라도 꿰어야 보배다"라는 속담은 **아무리 귀하고 좋은 것이라도 알로 있게 만들어 놓아야 가치가 있다**는 뜻입니다.



7. 마파람에 계는 감추듯

여름방학을 맞아 시골 할아버지 덕에 놀러 간 동호는 하루 중일 사촌 형과 밖에서 뛰어 놀았더니 배가 너무 고했습니다. 마침, 집에 들어오니 거실에는 맛있는 저녁 밥상이 차려져 있었습니다. 동호는 자리에 앉자마자 손가락을 들고 금새 밥 한 공기를 똑딱 비워내고 "큰 어머니 저 밥 한 공기 더 주세요"라고 말했습니다. 이를 지켜보시던 할아버지께서 깔깔 웃으시며 "동호가 밥을 마 파람에 계는 감추듯 없애는구나!"라고 말씀하셨습니다.



계는 위험이 닥치면 겁을 먹고 재빨리 눈을 감추는 습성이 있어 바람이 불면 순식간에 눈을 감춰버립니다.

"마파람에 계는 감추듯"이라는 속담은 바람이 불면 계가 순식간에 눈을 감춰버리듯이 **음식이나 밥을 어느 틈에 먹었는지 모를 정도로 빨리 먹어버린 것**을 두고 이르는 말입니다. 흔히 눈 깜짝할 사이에 빨리 먹어버렸을 때 쓰는 속담입니다.

8. 부뚜막의 소금도 집어 넣어야 짜다

옛날에는 부엌의 부뚜막에 여러 가지 양념을 놓고 썼습니다. 손만 뻗으면 닿는 곳에 소금이 있어도 음식에 집어 넣지 않으면 맛이 나지 않겠지요. 이 속담은 **손쉽게 할 수 있는 일이나 기회가 있어도 이용하지 않으면 소용이 없다**는 말이에요.



9. 아는 길도 물어서 가라

조선 시대의 개성 상인은 수완 좋고 신용 있기로 유명해서 장사를 배우고자 하는 많은 사람들이 몰려들었습니다. 그 중 두 젊은이의 재질을 본 대상인은 두 사람에게 사할 모으는 법, 사기 당하지 않는 법 등의 기술을 가르쳤습니다. 삼 년 넘게 많은 것을 배운 두 사람은 각자 가게를 열었습니다. 가게를 열자마자 한 사람은 먼저 개업한 이웃 가게들을 돌아다니며 여러 가지를 물었지만 다른 한 사람은 개성 최고의 상인에게 배운 자신이 지방 상인들의 이야기를 듣는 것이 시간 낭비라고 생각했습니다.



그러나 얼마 가지 않아 이웃 가게들을 돌아다니며 이것 저것 질문한 친구를 비웃던 사람은 큰 사기에 휘말려 가게를 통째로 날려버리게 되었습니다.

이처럼 "아는 길도 물어서 가라"라는 속담은 **아무리 누구보다 잘 알고 자신만만한 쉬운 일이라도 실수하지 않기 위해서는 꼼꼼하고 철저하게 한번 더 살펴서 해야 한다**는 뜻입니다.

10. 한강에 돌 던지기

넓고 넓은 한강에 돌을 던져본 적 있나요?

넓은 한강에 돌 하나 던져봐야 아무런 흔적도 없이 사라지죠?

이처럼, **도저히 불가능한 일을 쓸데없이 하는 경우를 비유하는 뜻으로** 아무리 애를 써도 보람이 없는 일을 뜻합니다.



11. 감나무 밑에 누워 연시 떨어지기를 바란다

철수는 며칠 전부터 마당 같은 자리에 누워서 입을 벌리고 있습니다. 몇 날 며칠을 아무것도 하지 않고 같은 자리에 누워 입을 벌리고 있는 철수를 보며 엄마는 "철수야 도대체 뭐하고 있는 거니? 얼른 방안으로 들어오렴"하고 재촉했습니다.

그러자 철수는 "저 나무 위에 맛있어 보이는 감이 여기로 떨어지기를 기다리는 거예요"라며 꿈쩍도 하지 않았습니다.

저 감이 딱 떨어지면 좋겠다



잘 익은 감(연시)을 먹기 위해서 감이 스스로 떨어질 만한 위치를 생각해서 그 아래 입을 벌리고 누워있으면 감이 누워서 입 벌리고 있는 여러분 입으로 쓱~하고 떨어질까요? 혹시 운이 좋아서 감을 받아 먹게 되었다고 해도 너무 익어버려서 맛이 없을 것입니다. 탐스럽고 맛있는 감이 먹고 싶다면 직접 나무에 올라가 따 먹는 노력 정도는 해야 하지 않을까요?

이처럼 "감나무 밑에 누워 연시 떨어지기를 바란다"는 **아무런 노력도 하지 않고서 좋은 결과만 바램을 이르는 말**입니다.

12. 밀 빠진 독에 물 붓기

공쥐의 어머니가 일찍 세상을 떠나자 공쥐 아버지는 아내를 새로 맞았는데 새어머니에게는 팔쥐라는 말이 있었다. 공쥐를 미워한 새어머니는 남편 몰래 공쥐를 구박했다. 그러던 어느 날 마을 원님의 생일잔치가 벌어졌다. 새어머니는 팔쥐만 데리고 생일잔치에 참석하러 가며 잔치에 가고 싶다는 공쥐에게 밭을 다 갈고, 벼를 다 찧고, 독에 물을 가득 채워 놓은 후에 잔치에 오라 했다.



하지만 아무리 물을 길어다 넣어도 독이 채워지지 않자 여기저기 살펴보던 공쥐는 독의 아랫부분이 깨져있음을 알고 독 앞에 주저 앉아버렸다.

이처럼 밀 빠진 독에 물을 부어 봐야 독이 가득 찰 리가 없겠지요? **예서 한 일이 보람도 없이 헛수고가 되었을 때** 쓰는 말입니다.

Appendix I. Quiz

문제 1. 자신이 잘못을 하고도 도리어 남에게 화를 낸다는 뜻을 가진 속담은?

- ① 감나무 밑에 누워 연서 떨어지기를 바란다
- ② 마따람에 계는 감추듯
- ③ 방귀 쥐고 성낸다
- ④ 한강에 돌 던지기

정답: ②

문제 2. 빈칸에 들어갈 알맞은 속담은?



정답: ②

문제 2. 빈칸에 들어갈 알맞은 속담은?

- ① 구슬이 서 말이라도 꿰어야 보배
- ② 돌다리도 두드려보고 건너라
- ③ 소 잃고 외양간 고친다
- ④ 우물 안 개구리

정답: ②

문제 3. 아주 무식하다는 뜻을 가진 속담은?

- Ⓐ ① 소 잃고 외양간 고친다
- Ⓑ ② 밀 빠진 독에 물 붓기
- Ⓒ ③ 낫 놓고 기역자도 모른다
- Ⓓ ④ 우물 안 개구리

▶ 정답

문제 4. 엄마가 세상을 떠난 후에야 엄마가 비에 떠내려갈까 슬피우는 개구리들처럼 이미 일이 잘못된 뒤에는 후회밖에 할 수 없다는 뜻을 가진 속담은?



▶ 정답

문제 4. 엄마가 세상을 떠난 후에야 엄마가 비에 떠내려갈까 슬피우는 개구리들처럼 이미 일이 잘못된 뒤에는 후회밖에 할 수 없다는 뜻을 가진 속담은?

- Ⓐ ① 한강에 돌 던지기
- Ⓑ ② 아는 길도 물어가라
- Ⓒ ③ 우물 안 개구리
- Ⓓ ④ 소 잃고 외양간 고친다

▶ 정답

문제 5. 아래의 상황에 알맞은 속담은?

수원이가 기분 좋게 책을 읽고 있는데 갑자기 이상한 냄새가 방 안에 퍼졌습니다. 순간 수원은 할까 있던 오빠를 쳐다보며 "오빠, 지금 똥 똥지?" 하면서 코를 감쌌습니다. 수원의 옆에 기분이 상한 오빠는 "그라 내가 했다. 그래서 뭐?" 하고 버럭 화를 냈습니다. 갑작스런 오빠의 반응에 놀란 수원은 황당해 하며 코를 막고 방에서 나왔습니다.

▶ 정답

문제 5. 아래의 상황에 알맞은 속담은?

- Ⓐ ① 소 잃고 외양간 고친다
- Ⓑ ② 구슬이 서 말이라도 꿰어야 보배
- Ⓒ ③ 방귀 똥고 성낸다
- Ⓓ ④ 한강에 돌 던지기

▶ 정답

문제 6. 그림을 설명하는 알맞은 속담은?



정답: ①

문제 6. 그림을 설명하는 알맞은 속담은?

- ① 감나무 밑에 누워 연시 맺어지기를 바란다
- ② 낮 놓고 기억자도 모른다
- ③ 부뚜막의 소금도 짊어 넣어야 짜다
- ④ 아는 길도 물어서 가라

정답: ②

문제 7. 빈칸에 들어갈 알맞은 속담은?

어릴적 달궂힌 물죽은 그림을 _____ 후막 학어 치웠던 기억만 있다.

- ① 마파람에 계는 감추듯
- ② 방귀뀌고 성내는
- ③ 일 빠진 독에 물 붓기
- ④ 돌다리도 두드려보고 건너라

정답: ②

문제 8. 빈칸에 들어갈 알맞은 속담은?

경승: 오후에 눈이 온대요. 아박 회사에 우산을 가져다 드려야겠어요.
 영아: 좋은 생각이더! 억도를 그려줄게 잘 보고 찾아가렴.
 경승: 필요 없어요. 어딘지 아는걸요!
 영아: 후, 영승이 우산을 들고 다시 집으로 돌아왔습니다.
 영아: 왜 다시 돌아왔나?
 경승: 건물이 다 비수해서 못 찾았어요...
 영아: 그러게... _____ 고 했거늘...

정답: ②

문제 8. 빈칸에 들어갈 알맞은 속담은?

- ① 한강에 돌 던지기
- ② 방귀뀌고 성낸다
- ③ 아는 길도 물어서 가라
- ④ 감나무 밑에 누워 연시 맺어지기를 바란다

정답: ②

문제 9. 아무런 노력도 하지 않고서 좋은 결과만 바란다는 뜻을 가진 속담은?

- ① 구슬이 서 말이라도 꿰어야 보배
- ② 낮 놓고 기억 자도 모른다
- ③ 마파람에 계는 감추듯
- ④ 감나무 밑에 누워 연시 떨어지기를 바란다

[정답] [다음]

문제 10. 그림과 비슷한 뜻을 가진 속담은?



[정답] [다음]

문제 10. 그림과 비슷한 뜻을 가진 속담은?

- ① 돌다리도 두드려보고 건너라
- ② 부뚜막의 소금도 짠어 날어야 짜다
- ③ 우물 안 개구리
- ④ 마파람에 계는 감추듯

[정답] [다음]

문제 11. 빈칸에 들어갈 알맞은 단어는?

_____ 해를 안지거

- ① 한탄강
- ② 북한강
- ③ 한강
- ④ 인제강

[정답] [다음]

문제 12. "아는 길도 물어서 가라"와 뜻이 비슷한 속담을 고르시오

- ⦿ ① 돌다리도 두드려보고 건너라
- ⦿ ② 우물 안 개구리
- ⦿ ③ 소 잃고 외양간 고친다
- ⦿ ④ 감나무 밑에 누워 연시 떨어지기를 바란다

▶ ◀

문제 13. 그림을 설명하는 알맞은 속담은?



▶ ◀

문제 13. 그림을 설명하는 알맞은 속담은?

- ⦿ ① 마막람에 계는 감추듯
- ⦿ ② 방귀 편 놓이 성낸다
- ⦿ ③ 일 빠진 독에 물 붓기
- ⦿ ④ 부두막의 소금도 집어 놓어야 짜다

▶ ◀

문제 14. 보고 들은 게 없어서 세상을 잘 모르는 사람을 가리키는 속담은?

- ⦿ ① 감나무 밑에 누워 연시 떨어지기를 바란다
- ⦿ ② 마막람에 계는 감추듯
- ⦿ ③ 낮 놓고 기억 차도 모른다
- ⦿ ④ 우물 안 개구리

▶ ◀

문제 15. 그림을 설명하는 알맞은 속담은?

① 감나무 밑에 누워 연서 멀어지기를 바란다
 ② 우물 안 개구리
 ③ 한강에 돌 던지기
 ④ 아는 길도 물어서 가라

문제 15. 그림을 설명하는 알맞은 속담은?

- ⦿ ① 마파람에 계는 감추듯
- ⦿ ② 아는 길도 물어서 가라
- ⦿ ③ 방귀뽏고 성낸다
- ⦿ ④ 우물 안 개구리

문제 16. "밑 빠진 독에 물 붓기"와 뜻이 비슷한 속담을 고르시오

- ⦿ ① 감나무 밑에 누워 연서 멀어지기를 바란다
- ⦿ ② 우물 안 개구리
- ⦿ ③ 한강에 돌 던지기
- ⦿ ④ 아는 길도 물어서 가라

문제 17. 빈칸에 들어갈 알맞은 단어는?

_____에 계는 감추듯

- ⦿ ① 감나무
- ⦿ ② 파바람
- ⦿ ③ 마파람
- ⦿ ④ 마지람

문제 18. 그림을 설명하는 알맞은 속담은?



정답: 대

문제 18. 그림을 설명하는 알맞은 속담은?

- ① 우물 안 개구리
- ② 밑 빠진 독에 물 붓기
- ③ 낮 놓고 기억 차도 모른다
- ④ 구슬이 서 말이라도 꿰어야 보배

정답: 대

문제 19. 빈칸에 들어갈 알맞은 속담은?

도둑맞은 다음에 양피를 그려보지 무슨 소용이랴. _____ 죽이지.

- ① 소 잃고 외양간 고치는
- ② 우물 안 개구리 같은
- ③ 마파람에 겨는 김추는
- ④ 방귀똥고 성내는

정답: 대

문제 20. 그림을 설명하는 알맞은 속담은?



정답: 대

문제 20. 그림을 설명하는 알맞은 속담은?

- ① 아는 길도 물어서 가라
- ② 돌다리도 두드려보고 건너라
- ③ 밑 빠진 독에 물 붓기
- ④ 감나무 밑에 누워 면서 떨어지기를 바란다

정답: 대

Appendix J. Questionnaires for Perception of Errors

This survey items below are adapted from Rybowskiak et al. (1999) and measured after the manipulation for classroom goal structure.

주어진 10분이 모두 지났습니다.

문항을 주의 깊게 읽으시고 느낀 그대로 솔직하게 대답해주세요.

문항	전혀 아니다	1	2	3	4	매우 그렇다	5
1 실수는 주어진 속담에 대한 이해를 높이는데 도움을 주었다	1	2	3	4	5		
2 실수는 내가 주어진 속담을 이해하는데 유용한 정보를 제공해 주었다	1	2	3	4	5		
3 나의 실수는 주어진 속담에 대해 이해하는데 도움을 주었다	1	2	3	4	5		
4 내 실수 덕분에 주어진 속담에 대해 공부할 때보다 깊은 이해를 할 수 있었다	1	2	3	4	5		
5 높은 점수를 얻고 싶다면, 실수하는 것을 두려워해서는 안 되었다	1	2	3	4	5		
6 가만히 있는 것보다는 위험을 감수하더라도 실수를 하는 것이 낫다	1	2	3	4	5		
7 과제를 잘 수행하기 위해서라면 나는 가까이 실수를 받아들였다	1	2	3	4	5		
8 나는 아무 것도 하지 않는 것보다는 실수하는 것을 더 선호한다	1	2	3	4	5		
9 나는 과제를 하는 도중 실수를 할 때마다 스트레스를 받았다	1	2	3	4	5		
10 나는 과제를 하는 동안 실수를 할까봐 자주 두려웠다	1	2	3	4	5		
11 나는 과제를 하는 동안 실수를 한 경우 당혹스러웠다	1	2	3	4	5		
12 과제를 하는 동안 실수를 한 경우, 나는 평정심을 잃고 화가 났다	1	2	3	4	5		

국 문 요 약

I. 서론

실수(error)는 개인의 잘못된 이해에서 비롯되거나 이미 알고 있는 지식을 자동화하지 못해 발생하는 것으로 학습자 스스로에게 부족한 부분을 지각하게 한다(Siegler, 2002). 또한, 실수는 교수-학습 측면에서 학습자에게는 잘못된 이해를 재탐색할 수 있는 기회를 제공하는 동시에 교수자에게는 학습자의 현재 수준에 대한 객관적인 정보를 제공한다는 점에서 학습에 긍정적인 밑거름 역할을 할 수 있다(Fiori & Zuccheri, 2005; Mathan & Koedinger, 2005). 그러나 그 동안 실수의 긍정적인 역할은 간과되어 왔으며, 학습에 부정적인 영향을 미칠 수 있는 가급적 피해야 할 행동으로 여겨졌다.

행동주의 심리학자들은 실수가 부정적인 정서를 유발함으로써 반복적인 교정을 통해 그 원인이 되는 행동의 빈도를 감소시켜야 한다고 주장해왔다(Bauer, 2008; Cannon & Edmondson, 2005; Lannin, Barker, & Townsend, 2007; Reason, 1990). 이에 교육현장에서 실수는 학습자의 현 수준을 드러내는 평가의 관점에서 주로 활용되어 왔으며(Fiori & Zuccheri, 2005), 실수를 부정적으로만 바라보고 줄이기 위해 노력해왔다(Lannin, Barker, & Townsend, 2007; Maxwell, Masters, & Weedon, 2001).

동기적 관점에서 개인의 마음가짐은 학습양식과 정서, 그리고 동기에까지 영향을 미친다(Dweck, 2006; Keith & Frese, 2008). 특히, 주어진 과제를 성공적으로 수행하지 못하는 경우 학습자들은 개인의 마음가짐에 따라 이후 학습에 더 큰 차이를 보인다. 가령, 자신이 일련의 과정을 통해 성장할 수 있다고 믿는 학습자들의 경우에는 과제를 수행하는 동안 실수를 범하더라도 부정적인 정서를 느끼기보다는 열정적으로 자신의 실수를 수정해나가고자 한다. 이처럼 과제를 바라보고 이에 임하는 학습자의 태도는 과제 수행

과정에서 느끼는 정서 및 성취에 차별적인 영향을 미친다(Bauer & Mulder, 2013; Heinze, Gartmeier, Heid, & Gruber, 2011; Reyes, Brackett, Rivers, White, & Salovey, 2013).

최근, 실수-기반 학습(error-driven learning)에서는 학습 상황에서 실수가 피할 수 없는 과정이라면(Norman, 1988; Reason, 1990) 단순히 학습자의 수준을 드러내는 평가의 관점에서만 바라보고 줄여야 하는 것으로 인식하는 것보다 이를 학습에 발전적으로 활용하고자 하는 노력이 필요함을 제안한다(김종백, 2010). 자신의 실수를 어떻게 받아들이고 활용하느냐에 따라 실수 역시 교육적으로 긍정적인 측면을 가질 수 있기 때문이다. 실수를 긍정적으로 바라보게 함은 실수를 피하고자 하는 부정적인 정서보다는 자신의 수행을 모니터링 하는 과정을 통해 보다 능동적인 학습을 촉진함으로써 성취에도 긍정적인 영향을 미친다(신종호, 최효식, 연은모, 2014).

개인은 행동을 선택하고 결정함에 있어 자신을 둘러싼 환경에 많은 영향을 받는다(Bandura, 1986; Baumeister & Leary, 1995; Johnson & Johnson, 2009). 특히, 개인의 실수에 대한 인식은 사회적 요구와 책임이 따르는 타인과 함께하는 환경 안에서 주변의 영향을 더 크게 받을 수 있다(Cannon & Edmonson, 2005; Lannin, Barker, & Townsend, 2007). 또한, 우리 실생활의 대부분의 문제들은 혼자서 처리할 수 있는 것이기 보단 타인과 함께 해결해야 하거나, 혹은 함께 해결하는 것이 더 효과적이다. 많은 선행연구들(Johnson & Johnson, 2009; Johnson, Johnson, & Smith, 2007)은 협력학습은 개별학습보다 실생활의 문제해결 과정과 유사하며, 개별학습에 비해 학업성취와 사고력 등의 인지적인 측면뿐 아니라 사회성 발달 등의 정의적인 측면에도 긍정적인 영향을 가진다고 보고한다. 이는 우리 교육이 사회적 문제해결 능력을 촉진할 수 있는 협력학습을 중심으로 이루어져야 함을 시사하는 동시에(Johnson & Johnson, 1983; Roseth, Johnson, & Johnson, 2008), 학습자의 실수에 대한 인식 역시도 협력학습 안에서 보다 심층적으로 다뤄질 필요가 있음을 시사한다.

이에 본 연구는 개인의 실수에 대한 인식이 성취와 맺는 긍정적인

관련성을 보고한 선행연구들(Bauer & Mulder, 2013; Heinze, et al., 2011)을 바탕으로 협력학습 상황에서 실수를 보다 긍정적으로 활용할 수 있도록 돕는 교실 분위기에 대해 탐색하고자 하였다. 구체적으로, 교실 분위기 형성과 관련성이 높은 것으로 보고되고 있는 학습 환경 측면의 교실목표구조와 사회적 관계 측면에서 교실 내 교사 및 교우 간의 관계가 학습자의 실수에 대한 인식에 어떠한 영향을 미치는지 확인하고자 하였다.

성취지향적이고 수행을 강조하는 환경보다 자신의 생각과 이해 수준을 자유롭게 드러낼 수 있는 환경에서 학습자들은 과제 수행 과정에서 즐거움 등의 긍정적 정서를 더 많이 경험하고(Ames & Archer, 1998; Pekrun, Elliot, & Maier, 2006; Urdan & Midgley, 2003), 자유로운 타인과의 상호작용으로 지식을 재구조화할 기회를 통해 깊은 이해를 촉진시킨다(Dicke et al., 2014; Santagata, 2005). 즉, 학습자들은 자신의 실수가 능력을 절하시키는 평가의 대상이 되는 환경에서보다 부족한 이해 수준마저도 자유롭게 드러낼 수 있는 따뜻하고 숙달지향적인 학습 환경 속에서 자신의 실수에 대해 보다 긍정적으로 인식하게 됨을 미루어 짐작해볼 수 있다.

또한, 자신을 둘러싼 관계가 원만하며 이들로부터 지지를 받는다고 느낄 때 개인은 보다 적극적으로 학습에 임하는 것으로 확인된다(Lee & Robinson, 1995; Patrick, Anderman, & Ryan, 2012; Patrick, Kaplan, & Ryan, 2011). 학교에서 함께 생활하는 교사 및 친구들과 맺는 관계는 학습자가 긍정적인 정서를 가질 수 있도록 돕고 궁극적으로 성취에까지 영향을 미치는 것으로 나타난다(Furrer & Skinner, 2003; Walsh, Harel-Fisch, & Fogel-Grinvald, 2010). 가령, 자신이 의미를 두는 집단 내 관계가 원만하지 못한 경우 작은 실수나 실패를 범하더라도 이해 받지 못할 거라는 불안감에 더 높은 스트레스를 느끼며 학업성취 역시 떨어진다(Baumeister & Mulder, 2013; Patrick, Kaplan, & Ryan, 2011).

지금까지 대부분의 실수 및 실수에 대한 인식과 관련된 연구들은 실수를 피해야 할 것으로 규정하고 이를 예방하는 데 보다 많은 관심을 가져 왔으며,

주로 산업 현장에서 성과를 높이는데 영향을 미치는 환경적인 측면에 대한 탐색에 집중해왔다. 이에 본 연구에서는 교육현장의 협력학습 상황에서 실수에 대한 긍정적인 인식을 갖는 것이 학업성취에도 영향을 미칠 것이라는 가정하에 학습 상황에서 학습자의 실수에 대한 인식에 영향을 미칠 수 있는 환경에 대해 탐색하고자 하였다. 구체적으로, 실제 과제 수행을 통해 평소에 학습자가 가지고 있는 실수에 대한 인식과 성취와의 관련성을 살펴보고, 이러한 인식 수준에 학습 분위기를 형성하는 교실목표구조와 교실 내 교사 및 교우와의 관계가 갖는 관련성을 살펴보고자 하였다.

II. 연구문제

- 연구문제 1. 협력학습 상황에서 교실목표구조와 사회적 관계는 실수를 활용할 방안에 대해 고민하는가와 어떠한 관계가 있는가?
- 연구문제 2. 협력학습 상황에서 교실목표구조와 사회적 관계는 실수를 도전적으로 받아들이는가와 어떠한 관계가 있는가?
- 연구문제 3. 협력학습 상황에서 교실목표구조와 사회적 관계는 실수에 대한 긴장과 어떠한 관계가 있는가?

III. 연구방법

본 연구는 컴퓨터 실험을 통한 연구로 협력학습 자료를 제외하고는 모두 인터넷 홈페이지를 통해 구축되었다. 실험에는 서울 및 경기 소재의 초등학교 4학년부터 6학년 183명이 참여하였으며, 참여 학생들은 교실목표구조에 따라 숙달목표구조와 수행목표구조 집단에 무선 할당되었다(Ames & Archer, 1998). 주어진 40여 분의 시간 동안 참여 학생들은 연구자가 개발한 ‘숙달 학습프로그램’에 참여하였으며, 프로그램은 3명의

학생이 한 조가 되어 12분 동안 12개의 속담을 학습하고 주어진 20문제의 퀴즈를 10분 동안 각자 푸는 순서로 진행되었다. 두 집단 모두에게 퀴즈를 풀며 재미있게 학습하도록 안내하되, 속달목표구조 집단에게는 학습하는 내용에 대해서 완벽하게 학습하기 위해 노력하라고 강조한 반면에 수행목표구조 집단에게는 학습 후 퀴즈에서 다른 조보다 높은 점수를 받기 위해 노력하라고 안내하였다. 최종 실험 결과, 프로그램상의 문제 등으로 인하여 160명의 학생만이 최종 분석대상에 포함되었다.

실수에 대한 인식은 Rybowski, Garst, Frese와 Batinic(1999)이 개발한 도구를 사용하여 실험에 참여하기 전과 후로 나누어 측정되었다. 실험에 참여하기 전에 측정한 실수에 대한 인식은 연구에 참여하기 위해 무선 할당된 집단 간의 사전 인식 간의 차이와 학업성취와의 연관성을 살펴보기 위해 측정되었으며, 연구에 참여하고 난 후에 측정한 실수에 대한 인식은 교실 환경(학습 환경과 사회적 환경)에 따라 다르게 나타나는 실수에 대한 인식을 확인하기 위해 측정되었다. 연구에 참여하기 전 참여자들의 과제에 대한 효능감과 참여자들이 과제에 부여하는 가치를 측정하기 위해 Pintrich와 De Groot(1990), Berndt과 Miller(1990)가 개발한 척도를 활용하였으며, 과제 효능감과 과제가치 모두에서 집단 간 차이가 없는 것으로 나타났다. 교실 분위기 중 사회적 관계는 교실 내 교사와 친구 관계로 나누어 Hamre과 Pianta(2001), 그리고 Lee와 Robinson(1995)이 개발한 문항으로 측정되었다.

IV. 연구결과

먼저, 실수에 대한 인식과 과제 성취 간의 관련성을 확인하기 위해 중다회귀분석을 실시하였으며, 연구결과 실수를 활용하는 방안에 대해서 고민할수록, 또한 실수에 대한 부담이 높을수록 과제 성취를 높게 예측하는 것으로 나타났다.

이에 협력학습 상황에서 교실목표구조와 사회적 관계가 실수에 대한 인식에 미치는 영향을 살펴본 결과, 실수를 활용할 방안에 대한 고민과 실수를 도전적으로 받아들이는 데 있어 숙달목표구조와 교사 및 친구와의 사회적 관계가 긍정적인 관계를 맺는 것으로 나타났다. 특히, 교실목표구조를 통제하고 난 후에 확인된 사회적 관계의 예측력으로 미루어보아 숙달적인 교실목표구조를 형성하는 것도 중요하지만 교사 및 교우 간의 관계가 원만하고 이들로부터 지지를 받고 있다고 느낄수록 실수를 보다 긍정적으로 받아들이는 데 도움이 되는 것을 알 수 있다. 한편, 실수에 대한 부담에 있어서는 교실목표구조는 통계적으로 유의한 설명력이 없는 반면, 교사 및 교우 관계가 긍정적일수록 부담이 낮아지는 것으로 나타났다.

V. 논의 및 결론

본 연구의 목적은 협력학습 상황에서 실수를 보다 긍정적으로 활용할 수 있도록 돕는 교실 분위기에 대해 탐색하는 것이었다. 본 연구의 연구문제와 관련된 결과 및 시사점을 간략히 정리하면 다음과 같다.

사전검사로 개인이 평소에 가지고 있는 실수에 대한 인식과 과제 성취와의 관련성을 살펴본 결과 실수를 발전적으로 활용할 방안에 대한 고민과 실수에 대한 부담은 과제 성취에 긍정적인 관련성을 갖는 것으로 나타났다. 이는 실수에 대한 긍정적인 인식이 대체로 성취와 높은 관련성을 보인다는 선행연구들과 일치하는 결과(Heinze, et al., 2011; Rybowski et al., 1999)이다. 이를 바탕으로 이제껏 실수를 부정적으로 인식하고 실수를 예방하는 데 초점을 두었던 기존의 선행연구들과 달리, 실수의 긍정적인 측면에 초점을 두고 동일한 실수 상황에서도 이를 어떻게 인식하느냐에 따라 성취가 달라질 수 있음을 확인함으로써 실수에 대한 긍정적인 인식을 갖는데 영향을 미치는 환경 변인들에 대해 탐색할 수 있는 근거를 보충하였다.

실수에 대한 인식에 긍정적인 영향을 미치는 교실 환경에 대해 탐색한 결과 첫째, 기존의 선행연구(Ames & Archer, 1998; Kaplan et al., 2002)들과 유사하게 본 연구에서도 자신의 학습과 발전에 집중된 목표를 제공하는 것이 실수를 발전적으로 활용할 방안에 대한 고민을 더 많이 하게 하고, 실수를 도전적으로 받아들이게 하는 등 실수에 대한 인식에 긍정적인 영향을 미치는 것으로 확인되었다. 이는 학습자가 실수를 반성적 기회로 삼고 더 나은 성취를 위해 고민할 수 있도록 이끌어 주기 위해서는 개인의 성취와 발전을 중시하며 타인과의 비교로부터 자유로운 환경을 조성해 줄 필요가 있음을 시사한다.

더욱이, 타인과 공동의 목표를 추구하는 과정인 협력학습 상황에서는 자신이 실패할 때 타인에게 받을 비난 등에 대한 걱정으로 인해 수행에 대한 부담감이 더 강하게 나타날 수 있다(Bauer & Mulder, 2013; Tjosvold, Yu, & Hui, 2004). 따라서 타인과 비교하여 높은 성취를 강요하는 것보다 자신의 학습에만 집중할 수 있도록 숙달목표를 강조해주는 것이 매우 중요할 수 있다. 하지만 평가를 전제로 한 학습이 높은 불안을 야기한다는 기존의 결과들(Davis, DiStefano, & Schutz, 2008; Ganley & Vasilyeva, 2014)과 동일하게 숙달목표구조 역시 실수에 대한 부담을 낮추는 데는 영향을 미치지 못했다.

둘째, 본 연구를 통해 실수를 긍정적으로 인식하도록 함에 있어 학습자가 교실 내에서 교사 및 친구들과 맺고 있는 사회적 관계들이 학습을 적절하게 유도하기 위한 목표 설정과 수행에 대한 정보를 적절히 제공하는 것보다 중요한 요인으로 작용하고 있음을 확인하였다. 이는 자신이 속한 집단으로부터 인정받지 못하고 지지를 받지 못하는 경우 불안감이 높아지고 성취가 낮아진다는 기존의 연구들과 유사한 결과로(Baumeister & Leary, 1995; Osterman, 2000), 사회적 관계가 원만할 때 보다 긍정적인 학습 태도를 보일 수 있음을 시사한다.

특히, 협력학습 상황에서 실수에 대한 발전적인 방안에 대한 고민과 실수를 도전적으로 받아들이는 태도에 있어 교우관계가 미치는 영향은

‘동료효과(peer effect)’에 기초해서 설명될 수 있다(Albert & Steinberg, 2011). 공동으로 목표를 추구하는 상황에서 함께 일하는 동료의 행동과 사고방식에 더 쉽게 영향을 받음을 미루어 보아 동료와의 관계가 원만하지 못할 경우, 실수를 범했을 때 동료들의 비난이 두려워 학습자들이 오히려 문제해결에 소극적으로 행동할 수 있음을 시사한다. 최근 김명섭(2014)의 연구에서도 협동학습 상황에서 개인은 자신의 잘못보다 타인의 잘못에 의한 실패에 보다 쉽게 비난하는 경향성을 보이는 것으로 나타났으며, 이러한 경향성은 구성원 간의 문제해결적 접근을 저하시키는 것으로 확인되었다.

종합적으로, 본 연구는 학습 장면에서 실수를 긍정적으로 활용하기 위해서는 목표를 어떻게 제공해야 하는가 등의 교수-학습 기제뿐만 아니라 교사 및 교우 등의 지지적인 사회적 관계가 강조되어야 한다는 점을 밝힘으로써 실수 분야 연구에 대한 이론적 틀을 확장했다는 점에서 학문적 의의가 있다. 뿐만 아니라, 학습자가 실수에 대해 긍정적으로 인식할 수 있는 교실목표구조와 긍정적 교사 및 교우 관계를 가질 수 있도록 장려하는 것이 중요하다는 것을 확인함으로써 실수-기반 학습에 필요한 실제적인 교실 환경 조성 방안을 제시한다는 점에서 실용적 의의를 가진다.

국 문 초 록

협력학습 상황에서 교실목표구조, 사회적 관계 및
실수에 대한 인식 간의 관계

연은모

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학습 상황에서 불가피한 현상인 실수(error)는 학습자가 어떻게 수용하고 활용하느냐에 따라 학업성취 향상을 위해 발전적으로 활용될 수 있음에도 불구하고, 그 동안 교육현장에서 가급적 피해야 할 부정적인 행동으로 인식되어 왔다. 특히, 실수에 대한 개인의 인식은 사회적 요구가 수반되는 협력학습 상황에서 더 큰 영향을 받을 수 있다. 이에 본 연구에서는 협력학습 상황에서 실수가 가지는 긍정적인 가치를 탐색하고 이를 증진시킬 수 있는 방안을 모색하고자 하였다. 보다 구체적으로, 본 연구를 통해 협력학습 상황에서 실수에 대한 인식에 영향을 미치는 교실 분위기에 대해 탐색하고자 서울 및 경기 소재의 초등학교에 재학 중인 160명을 대상으로 컴퓨터 실험을 통해 확인하였다.

실수에 대한 인식과 과제 성취와의 관련성을 확인해본 결과, 실수를 어떻게 발전적으로 활용할까에 대한 고민과 실수에 대한 적절한 부담은 높은 과제 성취를 예언하는 것으로 나타났다. 이를 바탕으로 실수에 대한 인식과 교실목표구조 및 사회적 관계 간의 관계를 살펴본 결과, 숙달목표구조와 교사 및 교우와의 관계는 실수를 발전시키고자 하는 고민을 촉진시키고 실수를 보다 도전적으로 바라보는 데 있어 긍정적인 영향을 미치는 것으로 확인되었으나, 실수에 대한 부담에는 아무런 영향을 미치지 못하는 것으로 나타났다.

특히, 실수에 대한 인식 형성에 교실목표구조의 영향보다 사회적 관계가 높은 예측력을 갖는 것으로 나타났다. 이와 같은 결과는 실수를 학습 상황에 긍정적으로 활용함에 있어 그 동안 강조되어왔던 교실목표구조 외에 사회적 관계의 중요성이 부각되어야 함을 시사한다. 즉, 타인과 함께 학습하는 협력학습 상황에서는 실수에 대한 인식에 있어 무엇보다 사회적 관계가 큰 영향을 미치는 것으로 해석할 수 있으며, 이와 같은 결과는 그 동안 학습 현장에서 강조되어왔던 학습 목표를 어떻게 제시할 것인가에 대한 고민과 더불어 긍정적인 사회적 관계를 맺도록 지도하는 것이 필요함을 시사한다.

주요어: 실수에 대한 인식, 교실목표구조, 사회적 관계, 협력학습, 학업성취
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