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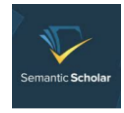


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The Hope of Positive Behavior Interventions and the School Climate

Xiaoqiao Cheng

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"Good behavior is the last refuge of mediocrity."
–Henry S. Haskins

NUMEROUS factors influence educational success. Students' learning performance and overall development are greatly influenced by their school environment. The term "school climate" refers to how instructors and students perceive the general atmosphere of the school based on their long-term interactions with it. It is directly tied to staff and student morale as well as their satisfaction with the school. As per the study by Pan et al. (2001), the psychological climate of the classroom is crucial in fostering students' intellectual and physical development as well as personality development. The level of students' mental health increases with an improved school climate. According to Zhou et al. (2021), the school environment can considerably increase students' motivation to learn and their level of self-awareness and self-control. High expectations for behavior and a well-organized classroom can give children a safe place to learn in which they can cultivate good study habits and self-control, which will have a long-term effect on their overall development.

Since the 1960s, the majority of studies in this field have focused on the impact of school climate on school operational efficiency, or the relationship between school climate and teacher and student satisfaction, teaching effectiveness, and staff turnover. In recent years, numerous studies have

demonstrated the correlation between school structure and student mental health. Academics have developed an agreement regarding the relationship between school climate and student conduct. Additional research (Zheng, 2009) has proven the impact of the school environment on the psychological and mental states of teenagers.

There are a variety of ways to improve the school environment, including social and emotional skill training, bullying prevention, and risk prevention, among others. SWPBIS (school-wide interventions and support for good behavior) is one of them. Existing research has demonstrated that the SWPBIS program promotes the development of effective, reassuring, and positive school environments and climates. *Cultural Fit and Effects of School-Wide Positive Behavior Interventions and Supports in High Needs Schools: A Quasi-Experimental Study* (Deltour et al. 2022) in this issue investigated hundreds of children from four schools in Belgium and concluded that SWPBIS is effective at improving the school environment and reducing bullying by fostering better peer and student-teacher relationships. We hope that this report will stimulate more discussion on the topics of school climate and treatments for student behavior.

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COMMENTARY

Learning Environment Perception and Achievement Goals

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"I don't believe a mistake-free learning environment exists."
–Astro Teller

THE interpersonal relationships in the classroom are a crucial part of the learning environment for students. Through positive teacher-student and student-student contact, students can experience a more supportive learning environment during the instructional process, which supports their learning motivation and helps them develop decision-making skills and a sense of responsibility.

Evaluation of instruction, including instructor feedback, is a vital component of such interaction. School evaluation is a valuable instrument for assessing the efficacy of classroom instruction and teaching practices that are intimately connected with student learning processes. The majority of academics agree that instructional evaluation is multidimensional. It might be a teacher's appraisal of students, a student's evaluation of instructors, or an evaluation between students. The evaluation of students by instructors permits teachers to examine what students have learned in previous lessons, identify their learning issues, and compensate for their inadequacies in subsequent instruction. Thus, the evaluation data can be employed in full to modify instructional tactics (Wang, 2020). Students get the opportunity to analyze classroom instruction and identify its merits and downsides during teacher evaluations. This is the most straightforward and efficient method for

teachers to collect suggestions for future development, and it exemplifies the concept of teaching and learning promoting each other. Interactive activities among classmates, such as group discussion in class and group assignments after class, have increased significantly as the popularity of student-centered instruction has grown; students now have more opportunities to communicate and share ideas with their peers, thereby enhancing their understanding of their peers (Wu, 2016). Consequently, the value of interaction-based peer evaluation increases.

The Relationship between Middle School Students' Learning Environment Perceptions and Achievement Goals in Science (Kahraman, 2022) is an empirical study based on a sample of 407 middle school students from two public schools in eastern Turkey. According to the study's findings, student progress in science is correlated with their perceptions of interpersonal relationships and instructor feedback. This paper makes a compelling case that the ability of students to construct their learning through contact with others is essential to their academic performance and long-term development. It is hoped that this study will inspire additional research on the impact of constructivist learning environments on student academic development.

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COMMENTARY

Which Matters More, Cognitive or Non-cognitive Ability?

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"Since we all have different cognitive profiles, educators should take those individual differences very seriously."

–Howard Gardner

FROM a psychological perspective, both cognitive and non-cognitive abilities are significant drivers of human growth. The ability to gather, choose, and comprehend information is referred to as cognitive ability. To be more specific, it consists of human abilities to comprehend the nature and characteristics of objects, as well as how they relate to one another, fundamental laws, and the future course of the world. Any skill that is not cognitive is considered non-cognitive. Examples include emotional maturity, empathy, and interpersonal skills, which are essential for people to deal with various contexts.

Academics have determined that cognitive capacity measuring methods can be classified into two categories: self-evaluation and operational tests (Dong, et al., 2016). Nevertheless, there are controversies over the definition and measurement of non-cognitive ability, which has impeded the growth of empirical research on non-cognitive skills. After looking at 12 frameworks for measuring non-cognitive skills in China and other countries, Zhou (2020) tries to put non-cognitive skills into three categories: goal achievement, interpersonal cooperation, and emotion regulation. These categories correspond to how to deal with school and career advancement, how to work with others, and how to accept oneself, respectively.

The exam results of students' academic disciplines are the most widely utilized indicator for gauging their cognitive aptitude. The most prominent example is the PISA (Program of International Student Assessment) test, which is sponsored by the Organization for Economic Co-operation and Development (OECD). Initiated by the OECD in 2000, it is a cross-national (regional) and cross-cultural program that assesses students' academic proficiency in reading, mathematics, and science as well as their capacity to apply knowledge to real-world issues and predicts how competitive they will be in the future. However, there has not been a lot of research on students' non-cognitive abilities; it wasn't until the 2010s that the OECD started formally organizing global research on the topic. To conduct an organized analysis of student social and emotional skills, the OECD collected samples from eleven cities in 10 different nations. The results of the research show that students' social and emotional abilities have a major impact on their academic performance, expectations for their education and careers, psychological well-being, and levels of creativity and curiosity. According to research results based on a sample from China, Chinese students perform exceptionally well in reading and mathematics, but there is great potential for development in their sense of belonging to and happiness with the school, as well as in their self-efficacy and self-regulation (Zhao et al., 2021).

Chinese scholars started studying students' non-cognitive talents in 2013 and have since concentrated on theorizing about their importance for academic advancement. A Narrative Review on Studies of Non-cognitive Ability in China in this issue provides a summary of research on this topic in China and draws the conclusion from the body of literature that non-cognitive skills significantly and favorably affect students' academic quality improvement and general student development (Zhou, 2022).

Every student must possess both cognitive and non-cognitive skills. Nevertheless, China's school education plays a limited role in developing student non-cognitive ability because examination-oriented instruction overemphasizes so-called "intellectual education" while ignoring the cultivation of student social and emotional skills; the student is treated as an exercise- and test-obsessed machine as opposed to a whole person with independent thought. Therefore, the incorporation of non-cognitive ability into pedagogical research and the school evaluation system has significant practical consequences. It is anticipated that this study will stimulate additional conversations on student non-cognitive capability within the educational community and contribute to the growth of student non-cognitive skills.

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ORIGINAL ARTICLE

Cultural Fit and the Effects of School-wide Positive Behavior Interventions and Supports in High-Need Schools: A Quasi-Experimental Study

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***Abstract**: School-Wide Positive Behavior Interventions and Supports is a framework that aims to improve school culture and climate, students' behavior and attendance. As the program is largely spreading, comparative studies showing its efficacy on students' outside the United States are needed. In addition, there is a need for studies examining SWPBIS effects on school climate from all the stakeholders' point of view, especially students and parents. Moreover, few researches used comprehensive questionnaires including the three main components of school climate: engagement, safety and environment. The purpose of this study is twofold: investigate the SWPBIS implementation feasibility in a French speaking European country and measure implementation effects on school climate and absenteeism. Using a quasi-experimental design, the current study investigates the impact of SWPBIS implementation in elementary and secondary high-need schools (n intervention schools = 4, n control schools = 5). Findings show positive effects for all stakeholders on different components of school climate. Effects on absenteeism are mixed. Implications and limitations are discussed.*

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***Keywords**: SWPBIS, Quasi-Experiment, School Climate, Absenteeism, High-Need Schools*

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Introduction

SCHOOL-WIDE Positive Behavior Interventions and Supports (SWPBIS) have existed for over 20 years in the United States (Sugai & Horner, 2002). Now, the program is being disseminated in many other countries, including in Europe. To date, no deleterious effects have been published (Author). Instead, various positive effects have been reported, mostly on student suspensions and other disciplinary measures (Bradshaw et al., 2010, 2012, 2015; Caldarella et al., 2011; Flannery et al., 2014; Gage, Rose et al., 2019; Gage, Grasley-Boy et al.,2019; Lee et al., 2021; Pass et al., 2019; Ward & Gersten, 2013) but also on increased student attendance at school (Caldarella et al., 2011; Freeman et al., 2016; Pas et al., 2019), perceived school safety (Horner et al., 2009), increased instructional time (Lassen et al., 2006), and decreased problem behaviors (Gage, Rose et al., 2019; Sørlie & Ogden, 2007, 2014, 2015) and bullying (Waasdorp et al., 2012; Gage, Rose et al., 2019; Ward & Gersten, 2013).

The Netherlands' successful implementation of SWPBIS for more than 10 years (Nelen, Blonk et al., 2019; Nelen, Willemse et al., 2019), its potential for cultural adaptation, and the encouraging effects observed in various contexts have inspired the idea to adapt SWPBIS for the French-speaking Belgian context. Indeed, as part of a reform of the education system, it was decided to foster evidence-based education (Author) and to offer underperforming schools incentives to use proven intervention programs (Fédération Wallonie-Bruxelles, 2017). Some of these schools had been experiencing a deteriorating school climate and numerous behavioral problems. In such cases, restoring the school climate is a prerequisite for providing all students with good learning opportunities. It is in this context that SWPBIS was implemented on a small scale. This evaluation of its effects using a quasi-experimental design aims to verify the value of continuing this project to address the challenges of schools facing difficulties and is a prerequisite to scaling up (Slavin, 2017).

SWPBIS is a school-wide program based on the Response to Intervention (RTI) model in which universal prevention is the primary focus (Fuchs et al., 2003). Universal prevention reorganizes the rules of a school around shared values that are translated into expected student behaviors in different areas of the school. The educational team teaches these expected behaviors actively and explicitly (via modelling, guided practice, autonomous practice). Positive reinforcement of the expected behaviors and the application of logical and appropriate consequences for inappropriate behaviors increase the likelihood that the expected behaviors will appear.

The management of inappropriate behavior is reviewed considering the consistency and fairness of treatment that students expect from the educational team. It is especially important to consider the unequal treatment and unfairness felt by some students because of its direct link to dropping out (Monseur & Baye, 2017).

Another key aspect of SWPBIS is the decision-making process, which is driven by regular data collection. Data-driven choices are intended to make decisions more objective and easier to understand for all stakeholders (Schildkamp et al., 2013). This approach is relatively complex to implement in schools, where decisions made about

students are sometimes based on feelings and on "labels" applied at a particular time that students may find difficult to shed (Schildkamp et al., 2014).

School Climate

School climate refers to shared beliefs, values, and attitudes that shape interactions between students, teachers, and administrators. Together, these elements determine the parameters of acceptable behavior in the school setting (Kuperminc et al., 1997). For Haynes et al. (1997), school climate represents the quality and consistency of interpersonal relationships. The relational aspect that involves how people feel connected to each other at school is one of the fundamental dimensions of school climate (Bradshaw et al., 2014). For other authors, school climate refers to the quality and characteristics of school life (Cohen et al., 2009; Gage et al., 2016). More recently, the notion of school climate was expanded to include safety and the physical environment (Wilson, 2004; Zullig et al., 2010). Another definition builds on the idea that school climate is the "atmosphere for learning" (Suldo et al., 2013). This atmosphere arises from the feelings that people develop about their school and whether the school provides the conditions for learning to occur.

While all the factors determining school climate have not yet been clearly established, one important aspect seems to be the functioning of the school. This includes a focus on academic achievement, friendly and collegial relationships among staff members, respect for all members of the school community, leadership and support from the principal, a consistent disciplinary policy, attention to safety issues, and engagement with families and the community (Hoy & Tarter, 1997, as cited in Bradshaw, Koth et al., 2008).

There is a consensus in the literature regarding the need to develop a healthy school climate (Berkowitz, 2017) since positive school climate is linked to several positive outcomes in behaviors, social skills, as well as attendance and academic achievement (Berkowitz, 2017; Booren et al., 2011; Gage et al., 2016; Gubbels et al., 2019). Students with a sense of belonging to their school community demonstrate greater regulation of classroom behaviors, whereas feeling insecure and outside of the school community represent elements that have been associated with deleterious outcomes (Gase, 2017; Goldweber et al., 2013; Wilson, 2004).

The quality and characteristics of school life (Cohen et al., 2009; Gage et al., 2016) therefore influence students' behaviors and social skills (Gottfredson et al., 2005; McIntosh et al., 2006; Gage et al., 2016). On the contrary, disorganized schools with high rates of conflict can specifically exacerbate the manifestation of problem behaviors and can contribute to academic failure and absenteeism (Goldweber et al., 2013; Hawkins et al., 1992).

According to Bradshaw et al. (2014), school climate is a significant predictor of dropping out, absenteeism, school exclusion, and aggressive and violent behavior. A positive school climate is associated with lower rates of absenteeism (Gubbels et al., 2019; Hendron & Kearney, 2016). Research on bullying has also highlighted that stu-

dents who perceive their schools as unsafe and unsupportive are more likely to engage in bullying (Bradshaw, O'Brennan et al., 2008, Goldweber et al., 2013).

Effect of SWBIS on School Climate

Successful support for students' positive behaviors has been linked to school environments and school climates that are effective, reassuring, preventive, and positive (Bradshaw, Koth et al., 2008; 2009; Gage et al., 2016; Horner et al., 2010).

In a recent meta-analysis on the effects of school-wide intervention programs on school climate, Charlton et al. (2020) concluded that SWPBIS is among the two types of interventions with the highest effect sizes.

In SWPBIS, improving school climate is a key element. By reducing inappropriate behaviors, the school becomes a more pleasant place to live (Caldarella et al., 2011). The data collected in numerous studies have shown a decrease in discipline problems in schools following the introduction of SWPBIS. Everyone in the school feels safer and relationships are more positive.

Horner et al. (2009) conducted a randomized, wait-list control trial in the United States on the effects of SWPBIS in 60 elementary schools. After implementation, the authors measured the various dimensions of school climate with the School Safety Survey (Sprague et al., 1996) including design of space, crowding, perceived caring, perceived sensitivity to cultural differences, students' bonding with school, quality of student-adult interactions, perceived fairness of school rules, and level of adult supervision. The effect size observed for staff members on the entire questionnaire was +0.32.

Bradshaw and colleagues (2008, 2009) also investigated the improvement in school climate through the implementation of SWPBIS as experienced by staff members in 37 Maryland elementary schools. This experimental study used the Organizational Health Inventory for Elementary Schools (Hoy & Fedman, 1987). The results show an overall positive effect of SWPBIS implementation on the overall OHI (ES = +0.29) and on the sub-dimensions measured (ES = +0.24 for staff affiliation, ES = +0.22 for academic emphasis, ES = +0.21 for resource influence, ES = +0.20 for collegial leadership, and ES = +0.16 for institutional integrity).

The quasi-experimental study conducted by Caldarella et al. (2011) to measure the effects of SWPBIS implementation on more than 3,000 teachers and more than 10,000 middle secondary students showed substantial improvement in school climate following the implementation of the program, throughout the sub-dimensions included in the Indicators of School Quality (Taylor et al, 2006): educational assistance: ES = + 0.72; school communication: ES = + 1.24 and student prosocial behavior: ES = + 2.73. According to the authors, this improvement had a positive impact on overall school quality and student achievement.

Ward & Gersten (2013) conducted an experimental wait-list study to evaluate the effects of implementing the Safe and Civil Schools model for PBIS in 22 elementary schools in the United States. They administered both the student and staff versions of the California Healthy Kids Survey (WestEd, 2013). First, the two authors noted that

teachers reported improvement in several elements of school climate, namely a decrease in bullying (ES = -0.24), a decrease in classroom disorder (ES = -0.67) as well as a decrease in mistrust of adults (ES = -0.15). Second, more students reported never being hit or pushed at school (ES = +0.12). These results indicated a decrease in peer violence and an improvement in perceived safety at school. Smolkowski et al. (2016) repeated the investigation three years later and confirmed the initial results.

In Norway, Sørlie and Ogden (2015) investigated the effect of the Norwegian version of the SWPBIS in their quasi-experiment. Teachers from 48 elementary schools were asked to complete the Classroom Climate Scale (Sørlie and Nordahl, 1998). A student version was used to measure students' perceptions of prosocial learning in the classroom. Sørlie and Ogden found a low effect size at baseline on the teacher questionnaires (ES = + 0.17). In contrast, no effect was found in the data from the student questionnaires.

Most of the comparative studies were conducted in the United States and were primarily focused on only one category of individuals (school staff or students). None of the studies included school staff, parents, and students. In addition, the studies addressed only one or two dimensions of school climate (safety, engagement, and environment) but never all three. However, Gase et al. (2017) explained that when schools seek to "measure and implement interventions aimed at improving school climate, consideration should be given to grounding these efforts in a multidimensional conceptualization of climate that values student perspectives and includes elements of both engagement and safety" (p. 320). The authors demonstrated that school staff and administrative measures of school climate showed limited association with student outcomes, while student reports of engagement and safety showed strong associations with student outcomes.

Effects of SWPBIS on Absenteeism

Since absenteeism is one of the observable and predictive symptoms of dropping out (Balfanz et al., 2007; Rumberger & Lim, 2008), it is important to test whether the implementation of SWPBIS increases student attendance in school, as research in other school systems has shown (Caldarella et al., 2011; Freeman et al., 2015, 2016; Molina et al., 2020; Pas et al., 2019; Smolkowski et al., 2016; Ward & Gersten, 2013).

Purpose

In some schools, especially high-needs schools, addressing the school climate issue is a prerequisite for learning to take place. SWPBIS is a framework that has demonstrated effects in the USA, but only a limited number of studies have demonstrated the effects outside the USA.

In a European context, and especially in our particular context, positive feedback is rare, while negative feedback and sanctions are the norm (OECD, 2019). Furthermore, the behaviorist aspects of such a project typically meet resistance. Finally,

data collection and analysis at the school level are not common practice (Soetewey & Crepin, 2014). We posit that the habits of negative feedbacks and the defiance related to behaviorism are part of our school cultural context, school culture being defined as "the beliefs, values, habits and assumed ways of doing things among communities of teachers who have had to deal with similar demands and constraints over many years" (Hargreaves, 1992, p. 217).

The first aim of this study was to test the feasibility of implementing SWPBIS in a Western European French-speaking educational system. This issue of feasibility and cultural fit was a prerequisite to collecting and analyzing data on the effectiveness of SWPBIS in our educational context. Indeed, context matters and any attempt to implement prefabricated solutions, without taking into account the conditions of reception in different contexts, including the school environment and culture, is likely to fail (Bressoux, 2017; McIntosh et al., 2010). The barriers and enablers of the implementation of SWPBIS in a French-speaking context will be discussed elsewhere (Author). In this study, we will address this first issue through an analysis of the fidelity of the program's implementation, which will give an indication of the feasibility of implementing SWPBIS in our context. In our opinion, if the program can be implemented with fidelity without any extraordinary and not reproducible means to achieve it, it will mean that the intervention features correspond to the school environment and needs, thus representing cultural fit. The cultural fit will then be measured via validated international tools of SWPBIS fidelity of implementation.

The second purpose of this study is to measure the effects of the implementation of SWPBIS in four experimental schools (three elementary schools and one middle school) compared to control schools. The effects will encompass all the dimensions of school climate and all the stakeholders. Our study adds to the existing body of knowledge as it includes all the stakeholders (i.e., students, educational team, and parents), in both elementary and middle schools, and addresses all three dimensions of school climate (safety, engagement, and environment).

Research Questions

Research Question 1: To what extent is it feasible to implement SWPBIS with fidelity in a Western French-speaking country?
Research Question 2: Do the students, school staff, and parents in the SWPBIS experimental schools feel that their school climate is improving to a larger extent than those in the control schools?
Research Question 3: Is student absenteeism lower in SWPBIS experimental schools?

Materials and Methods

Participants

Table 1. Characteristics of Participating Schools.

School	Education Level[a]	No. of Students	School Particularity	School SES[b]	Geographical Characteristic	School Type[c]
Exp.1	Elementary	84		4	Suburban	Public (state level)
Ctrl. 1	Elementary	149		7	Suburban	Public (state level)
Exp. 2	Elementary	127	Bilingual (French-German)	5	Suburban	Public (state level)
Ctrl.2	Elementary	204	Bilingual (French-English)	4	Suburban	Public (state level)
Exp. 3	Elementary	208	Bilingual	19	Rural	Public (municipality)
Ctrl.3	Elementary	149	Bilingual	18	Rural	Public (municipality)
Exp.4	Middle school	160	Grades 7 & 8 only	2	Urban	Private (but mainly state-funded)
Ctrl.4	Middle school	180	Grades 7 & 8 only	3a	Urban	Private (but mainly state-funded)
Ctrl.4'	Middle school	115	Grades 7 & 8 only	1	Urban	Private (but mainly state-funded)

Note:

a. *Education level: Elementary schools go from kindergarten to grade 6.*
b. *School SES is defined each year by the Ministry of Education according to the socio-economic status of the students in each school. The rating ranges from 1 to 20, with 1 designating the most disadvantaged schools.*
c. *School type: Schools relate on three main networks: public at the state level, public at the local level, and private (mainly catholic schools funded at the state level; private schools may therefore welcome very poor students, like in experimental and control 4 schools).*

In 2017–2018, four schools (three elementary schools and one middle school) began the implementation project. School officials helped the research team find comparable control schools based on school size, geographical situation, particular features (such as bilingual schools), school type, and socio-economic status. **Table 1** describes the characteristics of the experimental and control schools. In a small education system, it is a challenge to find comparable schools on all the defined criteria. The selected experimental and control schools are fairly comparable, even if control school 1 is somewhat more advantaged and larger in size than the corresponding experimental school.

By Ministry decision, the project was proposed exclusively to "high-need schools." This status is given by the Ministry of education to schools facing specific difficulties and therefore in need of specific support. The schools that receive this status and support are the furthest from the average according to a composite indicator combining information on students' retention and dropout rates, students' achievement, staff turnover, and school climate. The participating schools are mostly situated in quite poor neighborhoods and enroll students from disadvantaged to very disadvantaged backgrounds, as shown in **Table 1**, except for school 3 where underperformance was due to staff turnover.

SWPBIS was first introduced at an assembly of school directors. For those who showed interest, a further on-site presentation for all the staff was organized. This de-

tailed presentation was followed by a question and answer session. At the end, the entire school staff voted anonymously on the project. We were expecting an 80% buy-in (Slavin, 2004) to start the project in a particular school.

As soon as staff buy-in was obtained, a training schedule was proposed. A small SWPBIS team was created on a voluntary basis. The advice was to build a diverse team to be representative of the entire school staff. This SWPBIS team was responsible for preparing, implementing, and monitoring the project. For the first four participating schools, we followed the implementation method used in the Netherlands: preparation and implementation "area by area." Thus, the university coaches and the SWPBIS team prepared the implementation of SWPBIS for the playground, then the project was implemented in this location, and then a new area, e.g., the cafeteria, was added, and so on.

Measures

School Climate

The Georgia School Climate Survey Suite (La Salle et al., 2021) was chosen because it covers all the categories of people we wanted to survey and includes all the important constructs of school climate described in the school climate literature, both in English (Booren et al., 2011; Bradshaw et al., 2009, 2014; Cohen et al., 2009; Koth et al., 2008; Kuperminc et al., 1997; Modin & Ostberg, 2009; Suldo et al., 2013; Thapa et al., 2013; Van Houtte, 2005) and in French (Debarbieux, 2013, 2015; Janosz et al., 1998; Poulin et al., 2015).

The survey was validated cross-culturally with middle and high school students within the eight dimensions of school connectedness, character, physical environment, adult support, peer support, cultural acceptance, order and discipline, and safety (La Salle et al., 2021). The scale includes a higher-order school climate factor that explains the variance, in part, among eight lower-order factors that assess the aforementioned dimensions of school climate. The elementary questionnaire was validated in the US. The confirmatory factor analysis results indicated a good model fit and an internal consistency of the scale of .80 (La Salle et al., 2016).

We translated and adapted the Suite using double translation followed by reconciliation and validation by an expert (Grisay, 2003; Harkness, 2003). After a trial of the different versions of the questionnaire with approximately 20 participants per questionnaire (volunteer teachers, students, and parents), four people were contacted again to carry out a cognitive lab to ensure the quality of the translation. The research team wanted to ensure that the different concepts in French were understood in the same way as in the original version of the measurement tool. Participants answered using a Likert scale with response options ranging from 1 (strongly disagree) to 4 (strongly agree), with higher scores representing more positive perceptions of school climate. Below, Cronbach' alphas at pre-test are presented after each dimension.

Each questionnaire covers several school climate constructs:

- Georgia School Personnel Survey (31 items): staff connectedness (0.80), structure for learning (0.84), physical environment (0.74), peer and adult relations (0.88), parent involvement (0.83), school safety (removed because of a lack of internal consistency)
- Georgia School Student Elementary Survey (15 items): school climate (0.71), peer victimization (0.79)
- Georgia School Student Secondary Survey (67 items): school connectedness (0.68), physical environment (0.68), adult support (0.85), peer support (0.67), cultural acceptance (0.71), order and discipline (0.64), school safety (0.46), parent involvement (removed because of a lack of internal consistency), peer victimization (0.83), character (0.80)
- Georgia Parent School Climate Survey (24 items): Teaching and learning (0.70), school safety (0.80), interpersonal relationships (0.85), institutional environment (0.65), parent involvement (0.47)

Two sub-scales were added from the PISA 2015 student questionnaire.

- Disciplinary climate (0.77): five items (4-point Likert scale) measuring disciplinary climate in the classroom.
- Teacher unfairness (0.82): six items (4-point Likert scale) concerning the perception of fair treatment from teachers were added to the questionnaire.

Absenteeism

Given the difficulty in obtaining administrative data on the topic due to the general data protection regulation (GDPR, 2016), self-reported PISA items on falling behind in school and absenteeism were used. Only middle school students responded to these items. We included three items from PISA 2015 on absenteeism. These self-reported measures asked the students whether they had "skipped a whole school day," "skipped some classes," or "arrived late for school" during the last two full weeks of school. Students answered on a four-point Likert scale ("never," "one or two times," "three or four times," "five or more times").

Implementation Fidelity

Implementation fidelity, also called treatment integrity, is defined according to Blakely et al (1987, cited by Mowbray et al., 2003) as the proportion of a program's components that are implemented and the way they are implemented with respect to the original protocol (Orwin, 2000, cited by Mowbray et al., 2003).

According to Carroll et al. (2007), implementation fidelity partly determines the effectiveness of the intervention. According to Keller-Margulis (2012), this is especially true for measures based on the Response to Intervention model (Fuchs et al., 2003), as in the case of SWPBIS. The objective of assessing fidelity is to understand whether the SWPBIS is implemented in a way that maintains its quality and achieves its intended goals (Dusenbry et al., 2003).

Table 2. Data Collection.

Instruments	Time of Year
School climate questionnaire, in student, staff, and parent versions, including items on attendance and school absenteeism	Autumn, before implementation preparation (pre-test)
	Autumn, after 6 months of implementation (post-test 1)
	Autumn, after 18 months of implementation (post-test 2)
Internal and external assessment of implementation fidelity[1]	Winter and spring, beginning of implementation
	Winter and spring, after 1 year of implementation
	Winter and spring, after 2 years of implementation[2]

Note: 1. Only in the experimental group. 2. Due to COVID-19, the external assessment of implementation fidelity planned for June 2020 was cancelled.

We used two instruments to assess implementation fidelity: one external (the School-wide Evaluation Tool, SET) and one internal (the Tiered Fidelity Inventory, TFI). The SET (Horner et al., 2004) is a 28-item direct observation and survey instrument that assesses the extent to which schools are implementing the SWPBIS universal prevention practices. It takes approximately two hours per school for an external trained evaluator to collect the data, review the permanent products, and interview students, administrators, teachers, and other staff members. SET generates a "total" score ranging from 0 to 100%. A school is considered to have achieved fidelity when its total score reaches or exceeds 80%. The internal consistency of the SET has been documented with an alpha of .96, while test-retest reliability is .97 and inter-rater agreement is .99 (Horner et al., 2004). The SET uses a mixed method of fidelity assessment and helps create an overview of the school by combining different types of interviews, observations, and a review of materials (Mowbray et al., 2003). This evaluation tool has been recognized as the most objective and direct fidelity assessment (Bruhn et al., 2015).

The Tiered Fidelity Inventory (TFI) (Algozzine et al., 2014) assesses the fidelity of each of the three tiers of PBIS in a single instrument through a scale of scores for each tier listed separately or through an overall score. This is a self-reporting measurement tool, intended to be completed by the SWPBIS team members with the coach as facilitator. Tier 1 consists of 15 items. The internal consistency of the Tier 1 measure is documented by an alpha of .87. Several studies have demonstrated evidence of its content validity, factor structure, as well as reliability: with a Cronbach's alpha of .96, and of .87 for Tier 1; inter-rater and 2-week test-retest intra-class correlations of .99 (Massar et al., 2017; McIntosh et al., 2017). Schools achieving a TFI score of 70% or higher are considered to be implementing Tier 1 adequately.

Data Collection

Baseline data were collected before any component of the intervention was discussed with the educational team. Thereafter, data collection occurred at the same time of the school year each year (**Table 2**).

Interventions

Tier 1 Interventions

Tier 1 intervention involves defining, teaching, monitoring, and positively reinforcing a small number of values expressed through expected behaviors. It concerns all students, both inside and outside the classroom. In addition to the positive reinforcement that forms the core of the program, Tier 1 also requires careful consideration of the school's policy for managing problem behaviors, to harmonize the consequences that follow students' inappropriate behaviors.

For this first level of intervention, it is important to clearly, explicitly, and consistently define both the expected behaviors in each area of the school and the associated reward system, as well as the consequences for inappropriate behavior. The school must also become accustomed to collecting and using data to make decisions.

The goals of this first phase of the program are to establish a school culture that allows students to know what behaviors are expected and valued, to create a sense of predictability and safety, and to maximize the time spent learning. Students need to be able to see that school expectations are predictable, consistent, safe, and positive. As in other examples of the Response to Intervention model (Fuchs & Fuchs, 2006), SWPBIS anticipates that an active investment in the prevention of inappropriate behaviors partially prevents problems from occurring through the ongoing assessment system, and prevents the escalation of problems through consistent, logical, and immediate interventions.

Tier 2 Interventions: More intensive interventions for small, targeted groups of students

Once Tier 1 is implemented with fidelity, schools can move on to implement tiers 2 and 3. At these levels, moderate or intensive monitoring for students who do not "respond sufficiently to Tier 1 intervention" is arranged. Tier 2 interventions are designed for students whose behavior problems do not pose a serious risk to others or to themselves (Anderson & Borgmeier, 2010; Hawken et al., 2009). The goals of this level of intervention are to reduce the frequency of student behavior problems and prevent their escalation (Peshak-George et al., 2009).

There are different types of Tier 2 interventions. Check-In/Check-Out is, however, the most frequently used program at this level and rigorous scientific evaluations have demonstrated its effectiveness (McIntosh et al., 2009; Simonsen et al., 2010). These encouraging results prompted us to make it a priority. In concrete terms, more attentive support is offered to groups of students who are having difficulty adopting the expected behaviors, most often in the classroom.

Tier 3 Interventions: Higher-intensity individual interventions for fewer students

Table 3. Questionnaires and Response Rates.

	Pre-Test		Post-Test 1		Post-Test 2	
	Exp. G	Ctrl. G	Exp. G	Ctrl. G	Exp. G	Ctrl. G
Q Distributed	T[a] = 110 EP[b] = 120 SS[c] = 168 P[d] = 545	T = 148 EP = 122 SS = 281 P = 694	T = 119 EP = 116 SS = 167 P = 585	T = 156 EP = 153 SS = 288 P = 770	T = 119 EP = v.a[e]. 71%/ v.b[f]. 71% SS = 145 P = 564	T = 149 EP = v.a. 85%/ v.b. 86% SS = 307 P = 809
Q Received	T = 72 EP = 106 SS = 130 P = 327	T = 63 EP = 94 SS = 205 P = 320	T = 69 EP = 107 SS = 130 P = 365	T = 85 EP = 131 SS = 192 P = 340	T = 58 EP = v.a. 57%/ v.b. 64% SS = 126 P = 338	T = 51 EP = v.a. 59%/ v.b. 66% SS = 246 P = 414
Response Rate	T = 65.5% EP = 88% SS =77% P = 60%	T = 42.4% EP = 77% SS = 73% P = 46%	T = 58% EP = 92% SS = 78% P = 62%	T = 55.5% EP = 85.5% SS = 67% P = 44%	T = 49% EP = v.a. 80%/ v.b. 90% SS = 87% P = 60 %	T = 34% EP = v.a. 69%/ v.b. 76% SS = 80% P = 51%

Note: a/ T = teachers; b/ EP = elementary pupils from grades 4 to 6; c/ SS = secondary students; d/ P = parents; e/ v.a. = original version of the elementary questionnaire; f/ v.b. = second version of the elementary questionnaire: reversed Likert scale

Tier 3 interventions are highly individualized and based on a functional behavior assessment. A specially trained individual follows a process to understand the underlying needs spurring the student's recurrent problem behavior. Assessing the purpose fulfilled by the repetitive problem (according to the student), makes it possible to create a behavioral intervention plan, which can last between three and eight months. The plan guides the student towards preferable replacement behaviors when faced with the same kind of situations.

Some members of the SWPBIS teams were trained in this process.

Data and Analysis

Response Rate

Table 3 presents the number of questionnaires administered and returned, as well as the response rates for the teacher and student samples. The response rates for elementary and middle school students were satisfactory, although there was a differential in favor of the experimental group. The participation rate of parents exceeded the expected rate, which indicates the benefit of asking them about this dimension. Here again, the response rate was higher in the experimental schools. The teachers' response rate was lower than expected in both groups. The relatively low response rate is likely because the questionnaires were distributed to all the school staff members, including the maintenance staff, cooks, etc. However, some of these staff members and some teachers only come to the schools for a few hours and so did not participate in the study. Survey-

ing only the regular teachers would have improved the response rate, but we wanted to consider all adults who interact with students as part of the staff.

Missing Data

Data collected via Likert scales were scaled using the one-parameter item response logistic model generalized to polytomous items, specifically the so-called partial credit model. Analyses were performed with Conquest (Wu et al., 1997) software and estimates for individuals were made using the Weighted Likelihood Estimate (Warm, 1985). Among the clear advantages of these IRT models is their ability to scale data from an incomplete evaluation design to a single scale. With this property, respondents with missing data can be given a score that is perfectly comparable to the scores of respondents without missing data.

Effect Size

The effect sizes were calculated using Morris's formula (2003). Using this formula is valuable because it takes into account the difference between the sample sizes and also uses a polarized standard deviation. Finally, the process capability index (Cpk) allowed us to avoid the bias of overestimating the effect sizes (Morris, 2008).

There is no universal guideline for interpreting the significance of a standardized effect size estimate for an intervention (Hill et al., 2008). The rules of thumb suggested by Cohen (1988) have been used extensively. According to those guidelines, effect size of about .20 is considered "small," about .50 is considered "medium," and about .80 is considered "large."

However, Hill et al (2008) showed that the gain in effect size varies substantially depending on the nature of the intervention, the population, and the outcome measures. The authors therefore recommend that effect sizes be interpreted by comparing them to effects observed for similar interventions in similar settings. This means that for a school-wide program, an effect size of around .20 is still quite significant (Borman et al., 2003; Lipsey, 1998).

Results

Baseline Equivalence

Table 4 presents the comparison between the experimental and control groups on all dimensions measured at pre-test. Using a criterion of no more than .25 SD difference at pre-test (Baye et al., 2019), the experimental and control groups were comparable on all but three of the constructs measured. Taking a looser criterion of .50 SD difference at pre-test (Slavin, 2008), the groups were comparable on all dimensions.

Cultural Fit of the Intervention

Table 4. Baseline Equivalence between Experimental and Control Group.

Questionnaire Version	Sub-Scale	Experimental Group		Control Group		Effect Size
		μ	σ	μ	σ	(Cohen δ)
Elementary	Order and discipline	3.81	1.23	4.13	1.44	0.24
Elementary	School safety	4.47	1.63	4.71	1.64	0.15
Elementary	School connectedness	10.89	2.14	11.01	2.10	0.06
Elementary	Peer victimization	7.74	3.44	6.84	3.15	-0.27
Secondary	School connectedness	13.45	3.22	13.62	3.09	0.05
Secondary	Peer support	15.62	2.97	15.84	3.04	0.07
Secondary	Adult support	12.07	2.99	12.21	2.81	0.04
Secondary	Cultural acceptance	11.42	3.35	12.68	5.24	-0.27
Secondary	Character	24.94	4.97	25.14	4.13	-0.08
Secondary	Physical environment	11.37	2.71	11.44	2.20	-0.10
Secondary	School safety	17.87	3.94	16.85	3.68	-0.26
Secondary	Order and discipline	19.87	3.96	20.36	3.82	0.12
Secondary	Peer victimization	10.28	4.48	9.38	3.63	0.22
Secondary	Disciplinary climate	14.90	3.79	14.46	3.33	-0.12
Secondary	Teacher unfairness	9.38	4.31	9.04	4.26	-0.08
Personnel	Staff connectedness	19.78	2.44	20.11	2.54	0.13
Personnel	Structure for learning	17.71	2.77	18.89	3.51	0.38
Personnel	Physical environment	11.75	1.96	11.77	2.30	0.02
Personnel	Peer and adult relations	17.42	3.02	19.27	4.41	0.50
Personnel	Parent involvement	6.98	2.10	7.85	1.81	0.44
Parent	Teaching and learning	12.53	1.67	12.22	2.12	-0.16
Parent	School safety	15.81	2.53	15.68	2.73	-0.05
Parent	Interpersonal relationship	26.15	3.33	25.42	4.35	-0.19
Parent	Institutional environment	9.62	1.41	9.51	1.45	0.08
Parent	Parent involvement	11.26	2.27	10.98	2.37	0.12

Table 5 shows the overall results of the implementation fidelity tests conducted each year, both internally (TFI) and by an external evaluator (SET).

The TFI results for Year 3 show that all four intervention group schools were implementing Tier 1 universal prevention with sufficient fidelity to achieve the expected results of SWPBIS implementation. Three experimental schools were already meeting implementation fidelity in Year 2.

The difference in fidelity test scores for Experimental School 3 at the end of the second year of implementation is explained, in this case, by the absence of the principal during Year 2 of implementation. Since the SET results are calculated based on the correspondence between the answers given by staff members and those given by the principal, they were strongly influenced by the principal's absence in Year 2. The TFI administered by the coach with the SWPBIS team shows that fidelity was met in Year 2.

Table 5. Fidelity Scores.

	SET Year 1	TFI Year 1	SET Year 2	TFI Year 2	SET Year 3	TFI Year 3
Experimental School 1	a	a	54.8%	53.3%	b	70%
Experimental School 2	a	a	73%	83%	b	73%
Experimental School 3	77.4%	56.6%	59.88%	80%	b	70%
Experimental School 4	72.5%	53.5%	77%	70%	b	73.5%

Note: a = not administered (too early since the beginning of the implementation), b = not administered (COVID)

Table 6. Effect Sizes after Two Years of Implementation - Elementary Pupils (Grades 4 To 6).

		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
School Connectedness (Engagement)	μ	-0.20	0.01	0.03	0.11		0.10	-0.16	
	σ	1.04	1.02	0.91	0.92	+0.13	1.07	1.18	+0.45
	n	108	94	108	131		56	59	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Order and Discipline (Environment)	μ	0.31	0.29	0.19	0.34		0.56	0.72	
	σ	0.73	0.72	0.71	0.76	-0.23	0.75	0.74	-0.25
	n	108	94	108	131		56	59	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
School Safety (Safety)	μ	0.28	0.09	-0.02	0.14		0.46	0.35	
	σ	0.87	0.96	0.80	0.79	-0.38	1.11	0.83	-0.09
	n	108	94	108	131		56	59	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Peer Victimization -Reversed Scale (Safety)	μ	0.18	-0.21	0.06	0.20		0.40	0.31	
	σ	1.27	1.28	1.24	1.31	-0.41	1.43	1.30	-0.23
	n	108	94	108	131		56	59	

Not all the implementation fidelity assessments scheduled for the 2019–2020 school year could be administered due to the COVID crisis and the extended school closure in FWB.

In conclusion, it appears that when the implementation fidelity results are examined as a whole, it can be inferred that the adaptation of the SWPBIS to the educational context of French-speaking Belgium was successful and working well, according to both internal and external fidelity indices.

Effects of Intervention

School Climate

Table 6 presents the effect sizes after two years of SWPBIS implementation for pupils in the last three grades of elementary education since pupils in grades 1 to 3 are too young to be surveyed this way.

The effect for school connectedness was +0.45. This dimension comprises five items that cover various aspects: whether the child likes going to school and has the impression that he/she is performing well, whether the behavior of other pupils allows the teacher to carry out lessons, the quality of relations between pupils, and the possibility of finding help at school if the child needs it.

The effect size of the SWPBIS implementation on peer victimization was also higher in the experimental group as the scale was reversed (ES = -0.23). This points to the value of active supervision during recess, another component of the SWPBIS. The adults pay greater attention to the children and their experiences during recess supervision, and this logically prevents certain problematic situations from developing or escalating.

Unexpectedly, the results obtained on order and discipline show an effect size that was unfavorable to the experimental schools (ES = -0.25). The last dimension, school safety, comprising four items, shows a negative effect size close to zero (ES = -0.09). An examination of the averages demonstrated that the intervention did not have any detrimental effects, but it did not allow the experimental schools to progress more than the control schools.

Eleven dimensions of school life were surveyed among middle school students (**Table 7**) before the program implementation, and during two consecutive years of the program.

For each of the dimensions considered, effect sizes in favor of students in the experimental groups were observed, albeit with variations. Effect sizes of about half a standard deviation were observed for the dimensions adult support (ES = +0.54), school connectedness (ES = +0.51) and order and discipline (ES = +0.48). We also observe positive results for peer support (ES = +0.37), cultural acceptance (ES = +0.37), discipline (ES = +0.37), school safety (ES = +0.34), but also peer victimization (ES = +0.27), as well as all the dimensions measured by our survey, except for the physical environment. Also of note is the ES in favor of the experimental group regarding the feeling of being treated fairly by teachers (ES = +0.34), a construct added because of its link to dropping out.

Students' parents were not particularly involved in the project during the first years of implementation. They were still surveyed. The results can be found in **Table 8**. The effect sizes were small but all positive. This is quite logical since there were relatively few actions targeting parents during the first two years of the project. These results mean that the more remote players, not directly involved in the project, noted improvements in the dimension relating to the quality of relations between all the stake

Table 7. Effect Sizes after Two Years of Implementation - Secondary Students.

		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
School Connectedness (Engagement)	μ	-0.09	-0.07	-0.09	0.06		0.40	-0.13	
	σ	1.08	1.06	1.68	0.86	-0.12	0.91	0.85	+0.51
	n	130	205	131	192		123	245	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
Peer Support (Engagement)	μ	-0.24	0.01	-0.16	0.02		0.26	0.07	
	σ	1.09	1.22	1.20	1.19	+0.06	1.25	1.20	+0.37
	n	130	205	130	192		123	245	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
Adult Support (Engagement)	μ	-0.12	-0.10	-0.03	-0.01		0.55	-0.64	
	σ	2.28	2.20	2.45	2.19	0.00	1.85	2.21	+0.54
	n	129	205	128	192		123	245	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
Cultural Acceptance (Engagement)	μ	-0.53	-0.09	-0.01	0.10		0.26	0.16	
	σ	1.50	1.48	1.66	1.49	+0.22	1.47	1.69	+0.37
	n	129	205	128	192		123	244	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
Character (Engagement)	μ	-0.06	-0.01	-0.05	0.18		0.14	-0.13	
	σ	1.39	1.16	1.33	1.24	-0.14	1.02	1.18	+0.25
	n	127	205	130	192		123	244	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
Physical Environment (Environment)	μ	-0.09	0.01	-0.17	0.24		-0.04	-0.05	+0.09
	σ	1.29	1.14	1.26	1.13	-0.26	1.09	1.18	
	n	127	205	129	192		123	244	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
School Safety-Reversed Scale (Safety)	μ	0.11	-0.02	-0.03	-0.08		0.01	0.03	
	σ	0.47	0.44	0.63	0.63	-0.18	0.59	0.61	-0.34
	n	126	205	129	192		123	244	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
Peer Victimization-Reversed Scale (Safety)	μ	0.86	0.65	0.62	0.39		0.45	0.59	
	σ	1.37	1.28	1.44	1.23	+0.02	1.23	1.32	-0.27
	n	124	205	128	190		123	244	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
Order and Discipline (Environment)	μ	-0.06	0.07	0.04	0.01		0.18	-0.08	
	σ	0.80	0.83	1.02	0.76	+0.20	0.79	0.86	+0.48
	n	123	204	128	192		123	242	
Disciplinary		T0		T1		ES	T2		ES

Climate-Reversed Scale (Environment)						(Morris δ)			(Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
	μ	0.18	0.10	0.08	-0.15		-0.39	0.06	
	σ	1.53	1.33	1.67	1.37	+0.11	1.55	1.47	-0.37
	n	122	204	128	192		123	242	
Teacher Unfairness-Reversed Scale (Safety)		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Ctrl.	SCP	Ctrl.		SCP	Ctrl.	
	μ	0.60	0.48	0.56	0.40		0.33	0.58	-0.34
	σ	1.07	1.07	1.14	0.92	+0.04	0.91	1.00	
	n	121	202	124	187		120	236	

For each of the dimensions considered, effect sizes in favor of students in the experimental groups were observed, albeit with variations. Effect sizes of about half a standard deviation were observed for the dimensions adult support (ES = +0.54), school connectedness (ES = +0.51) and order and discipline (ES = +0.48). We also observe positive results for peer support (ES = +0.37), cultural acceptance (ES = +0.37), discipline (ES = +0.37), school safety (ES = +0.34), but also peer victimization (ES = +0.27), as well as all the dimensions measured by our survey, except for the physical environment. Also of note is the ES in favor of the experimental group regarding the feeling of being treated fairly by teachers (ES = +0.34), a construct added because of its link to dropping out.
Students' parents were not particularly involved in the project during the first years of implementation; They were still surveyed. The results can be found in Table 8.

holders in the school (students, teachers, but also parents) and in the dimension relating to the environment the students experience at school.

For school staff (**Table 9**), there was a significant effect of the intervention on school climate dimensions on structure for learning (ES = +0.60), parent involvement (ES = +0.58), and peer and adult relations (ES = +0.38). There was no detectable impact on physical environment (ES = -0.01) and a negative effect on staff connectedness. The strongest effects were observed on the dimensions that showed the largest differences at pre-test, with the experimental group starting out from lower levels at pre-test on these dimensions.

It needs to be noted that the experimental schools all experienced a change in leadership. During these "downs," the coaches observed that the most convinced teachers continued their efforts, while the others slackened off in the absence of a leader at the school, which could have weakened team cohesion and led to the result observed on this dimension.

Absenteeism

The implementation of SWPBIS did not have a visible impact on student-reported absenteeism from class (**Table 10**). It did, however, have an effect on students arriving late for class.

Being on time for school and classes is an expected behavior emphasized in SWPBIS and is explicitly and actively taught in the program. In the study, punctuality

Table 8. Effect Sizes after Two Years of Implementation – Parents.

		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Teaching and Learning (Engagement)	μ	-0.12	-0.32	0.09	-0.27		0.35	-0.13	
	σ	1.72	2.01	1.68	1.70	+0.09	1.80	1.76	+0.15
	n	322	315	361	337		300	410	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
School Safety (Safety)	μ	-0.24	-0.35	0.19	-0.12		0.11	-0.11	
	σ	1.98	2.01	1.84	1.91	+0.10	1.87	1.87	+0.06
	n	322	320	361	340		299	412	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Interpersonal Relationship (Engagement)	μ	0.01	-0.23	0.23	-0.12		0.26	-0.31	
	σ	1.70	1.94	1.84	1.79	+0.06	1.82	1.70	+0.18
	n	321	319	361	338		300	414	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Institutional Environment (Environment)	μ	0.01	-0.15	-0.22	-0.33		-0.17	-0.63	
	σ	2.25	2.28	2.38	2.24	-0.02	2.47	2.39	+0.13
	n	316	317	360	337		298	413	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Parent Involvement (Engagement)	μ	0.03	-0.11	0.01	0.13		0.11	-0.13	
	σ	1.43	1.45	1.46	1.50	-0.18	1.56	1.41	+0.07
	n	319	316	361	335		297	409	

was reinforced, while tardiness led to consequences (most often the recovery of lost time).

Discussion

School climate may be a challenge in high-need schools. SWPBIS, as a complete framework, has existed for over 20 years in the United States (Sugai & Horner, 2002) as a program to improve student and teacher relationships and students' behavior through positive support. In the US context, a few positive results have been found concerning the effect of SWPBIS on school climate among teachers (Bradshaw, Koth et al., 2008, 2009; Caldarella et al., 2011; Horner et al., 2009; Smolkowski et al., 2016; Ward & Gersten, 2013) and students' attendance at school (Caldarella et al., 2011; Freeman et al., 2015, 2016; Molina et al., 2020; Pas et al., 2019; Smolkowski et al., 2016; Ward & Gersten, 2013). Unfortunately, no study has taken a comprehensive measurement of climate from students themselves. The purpose of this study was to measure the effects

Table 9. Effect Sizes after Two Years of Implementation – School Staff Members.

		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Staff Connectedness (Engagement)	μ	0.13	0.37	-0.29	0.18		-0.81	-0.10	
	σ	2.05	2.11	2.54	2.04	-0.11	2.51	2.27	-0.23
	n	74	65	69	84		56	52	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Structure for Learning (Environment)	μ	-0.64	0.40	0.15	-0.06		0.15	-0.09	
	σ	1.84	2.42	1.89	1.92	+0.58	2.17	1.99	+0.60
	n	74	65	69	84		56	52	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Physical Environment (Environment)	μ	0.32	0.31	0.03	-0.44		-0.14	-0.14	
	σ	1.76	1.86	1.31	1.45	+0.25	1.37	1.33	-0.01
	n	74	65	69	84		56	52	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Peer and Adult Relations (Engagement)	μ	-1.19	0.12	0.44	-0.23		0.32	0.59	
	σ	2.23	3.20	2.02	2.48	+0.72	2.14	2.24	+0.38
	n	73	65	69	84		56	52	
		T0		T1		ES (Morris δ)	T2		ES (Morris δ)
		SCP	Control	SCP	Control		SCP	Control	
Parent Involvement (Engagement)	μ	-0.66	0.62	0.50	-0.71		0.36	0.11	
	σ	2.77	2.43	2.42	2.37	+0.95	2.25	2.19	+0.58
	n	73	62	65	80		56	49	

Table 10. Effect Sizes after Two Years of Implementation on Truancy and Tardiness Declared by Middle School Students.

Middle school students (n = 361 – 3 schools)	ES
I skipped a whole school day	+ 0.50
I skipped some classes	+ 0.04
I arrived late for school	- 0.65

of SWPBIS in high-need schools on all stakeholders, including those primarily concerned—the students, using a comprehensive measure of school climate. In addition, this study wanted to test the feasibility of the project in a cultural context outside the

United States. A small-scale feasibility study was a prerequisite for the wider extension of the project in an evidence-based education perspective (Slavin, 2017).

The feasibility of its implementation in the context of a French-speaking Western European country was not easy, due to a negative opinion about the behaviorist paradigm and a school culture massively oriented towards assessment-sanction and negative feedback, where students perceive little support from their teachers (OECD, 2019). Furthermore, the intervention was only offered to high-need schools where the school climate was particularly deteriorated.

Fidelity measures, which show if a practice and all its features correspond to a school culture, environment, and needs (McIntosh et al., 2010), were used to determine whether SWPBIS implementation culturally and contextually fit our school system. An examination of the internal implementation fidelity measures showed that three of the four pilot schools were able to reach the expected internal fidelity threshold of 70% in Year 2 of implementation and all four schools had reached fidelity after three years of implementation. This result could be expected in relation to the average time needed to implement universal prevention with fidelity (Nese et al., 2019), but it was not obvious to achieve it in a French-speaking context (Author). Regarding the external fidelity measure (SET), after two years, the fidelity threshold of 80% (Horner et al., 2004) had not yet been reached. In particular, the schools were not meeting the SET criterion on data-based decision making. Data-based decision making in education (Schildkamp, et al., 2013, 2014) is not very present in our educational system, at least at the time the SETs were given. Yet, as McIntosh et al. (2018) have shown, the data use dimension is a significant predictor of program sustainability over time.

The second purpose of the study was to measure the effects of the program on the three dimensions of school climate (engagement, safety, and environment) and on absenteeism using a quasi-experimental design.

In this quasi-experimental study, we evaluated school climate outcomes for four schools implementing SWPBIS compared with five control schools that had not been trained in SWPBIS. Across the 25 school climate outcomes, the results indicated that 15 outcomes (60%) showed a $d > 0.25$ in favor of the experimental group.

We simultaneously surveyed students, parents, and educational teams. The results indicated that all stakeholders perceived benefits of the project. To date, we have found no other studies on the effects of SWPBIS on school climate dimensions conducted with middle school students or parents. Our project contributes to the body of scientific knowledge because it provides results for both populations.

According to previous research on school climate (e.g., Cohen et al., 2009; O'Brennan & Bradshaw, 2013; Thapa et al., 2013), there are different ways of improving school climate such as implementing programs targeting social and emotional learning, bullying prevention, risk prevention, (mental) health promotion, or supporting positive behavior. SWPBIS is thus one of these approaches. Indeed, working on the quality of the relationships which are the "glue that binds together an effective school climate" (Payne, 2018, p.8) plays a role in the effort to enhance school climate. Therefore, it is

not surprising to find positive impacts of SWPBIS implementation on the three dimensions of school climate.

Regarding middle school students, the overall results obtained for the different sub-dimensions of climate were positive. As far as we know, this is the first comparative study showing positive outcomes on a comprehensive measure of school climate for middle school students. With the exception of the physical environment subscale, the effect sizes (d Morris) were systematically greater than .25.

Regarding parents, we observed positive effects on the three main dimensions of school climate. Admittedly, the effects on school safety and institutional environment were weak. The effects on interpersonal relations and teaching and learning were more interesting. These kinds of results could not be found elsewhere and thus cannot be compared to others.

Very little work to date has measured the effects of the program on elementary school students in terms of school climate, and the majority has focused on bullying. Ward and Gersten (2013) observed an effect of -0.24 on bullying, while Gage, Rose et al. (2019) found none. We observed nearly the same effect as Ward and Gersten (2013) on bullying. Nelson et al. (2002) found an effect on the feeling of safety, which we did not observe. We also noted a negative effect on the subscale order and discipline, a dimension that has not been evaluated by other research. That said, the effect is not detrimental (both groups progressed), but it should be noted that the control group has probably implemented more effective practices on this dimension. Unfortunately, we did not carry out more detailed observations of the control groups to better understand this type of phenomenon. For elementary students, the subscale school connectedness (ES = +0.45) saw the greatest increase. We find no such result in the scientific literature, with the only other "engagement" measures taken by Sørlie & Ogden in Norway (2007, 2014, 2015) being slightly negative or zero. To date, our study is the first to document positive effects simultaneously on two of the three major dimensions of school climate.

Regarding teachers, we found particularly positive effects on the subscales of structure for learning (ES = +0.60), peer and adult relations (ES = +0.38), and parent involvement (ES = +0.58). These results echo those of Bradshaw, Koth et al. (2008), who also found positive results on two of the three main components of school climate, namely engagement (everything related to the relational quality between people) and environment (quality of resources and disciplinary policy).

In our opinion, the most notable result was the improvement on dimensions related to interpersonal relationships, which is convergent with Payne's work (2018) and the importance of relationships in creating an effective school climate. The dimensions linked to relations are found in various forms in each version of the questionnaire. In the personnel questionnaire, the subscales are peer and adult relations and structure for learning. The effects on these dimensions were respectively +0.38 and +0.60. In the questionnaire for primary school students, peer relationships are included in school connectedness, for which an effect of +0.45 was observed, and in peer victimization (ES = +0.23). For secondary school students, relationships with adults in the school and with peers are included in adult support (ES = +0.54: this is the largest increase of all

the subscales in the questionnaire), peer support (ES = +0.37), cultural acceptance (ES = +0.37), teacher unfairness (ES = +0.34) and peer victimization (ES = +0.27).

We believe that the profound paradigm shift of rewarding students in a cultural context where such reinforcement is rarely used explains the positive results obtained in terms of improved student-teacher relations. Moreover, rewarding students, in parallel with maintaining consistent rules and sanctions, explains, in our opinion, the increase in the feeling of justice and the calmer relations between students.

Another explanation to such positive results can be found in Borman and colleagues' meta-analysis on comprehensive school reforms (2003), also known as whole-school reforms. To implement changes on a whole-school basis, specific ingredients need to be present: staff buy-in, professional development and training, quality external support and assistance. The same ingredients are also cited in Durlak and DuPre's review of the literature regarding the influence of implementation on program outcomes (2008). In the case of SWPBIS implementation in our educational context, staff buy-in was a prerequisite to joining the project, professional development and support were frequently provided, and assistance was ongoing.

Regarding absenteeism, we hypothesized a decrease in absenteeism reported by students attending SWPBIS schools. This dimension was measured only at the middle school level, where the problem is most prominent. Five studies have measured the effect of SWPBIS on full-day absenteeism among middle and high school students using administrative data (Caldarella et al., 2011; Freeman et al., 2015, 2016; Molina et al., 2020; Pas et al., 2019). Unlike these studies, we used a self-reported measure. Four of the previous studies found positive effects. Like Molina, our study, on the other hand, showed a negative effect on full-day absenteeism. However, we obtained a positive effect of 0.65 on the self-reported measure of tardiness. This finding is consistent with the expected behavior articulated in all SWPBIS schools that all students must arrive on time to all classes.

Limitations and Directions for Future Research

At the conclusion of this study, it is important to mention three essential limitations in order to avoid overgeneralizations.

First, school climate is a major component of school culture and has multiple implications. It is generally measured through questionnaires and therefore reflects the feelings of the respondents. However, these self-reported measures must be interpreted with some caution.

Second, the sample size and the "pilot" nature of the project were undoubtedly a limitation of this study. For example, while the results for elementary education were based on three experimental schools, the results for middle school education were based on only one experimental school. Thus, there was a risk of confounding the effect of the program with the middle school implementing it. In addition, the absence of random components in the construction of the sample and its small size made it impossible to use inferential statistical tools. Furthermore, the experimental design adopted did not

allow for guaranteed causality of the intervention on the observed effects. Thus, investigating the organizational health of the schools in the control group would add value to any future research, to ensure that the implementation of SWPBIS is indeed the cause of the improvement in school climate and not of the particular events experienced in the control schools, which would explain a decrease in the feeling of school climate.

Finally, the schools in the experimental group enroll students from mostly disadvantaged to very disadvantaged backgrounds. Future research could implement SWPBIS in schools with students from different socio-economic backgrounds to compare the effects of these demographic characteristics on implementation and to verify that school climate can improve through SWPBIS regardless of the setting. Indeed, school climate quality does not depend solely on the social and academic characteristics of the students.

Implications

In a school, a visitor can perceive a positive climate "within minutes" (DeWitt, 2016). In contrast, a deteriorated climate can take months or years to restore. In the high-need schools we worked with, improving climate and regaining control over student behavior management were significant challenges. To meet these challenges, the teams chose to set up a school-wide project, which also implied a "cultural revolution," as positive feedback is not very common in our educational system.

The pilot experience showed that the significant investment made by the educational teams paid off and contributed to improving school climate and decreasing bullying, by enhancing the quality of peer relations as well as student-teacher relations. However, the project did not improve all aspects of absenteeism in secondary school. Overall, these results are likely to support the educational teams in their choices and help them overcome certain difficulties related to the implementation of the systems. The next challenge for SWPBIS coaches and teams is to achieve sustainability and for researchers to analyze what will contribute to maintaining the effects over time.

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ORIGINAL ARTICLE

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

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

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Introduction

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

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

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

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

The Relation between Learning Environment and Achievement Goals

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

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

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

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

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

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

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

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

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

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

Method

Sample

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

Instruments

Students' Perceptions of Learning Environment in Science

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

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

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

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

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

Motivational Variables

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

Results

Descriptive Results

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

Inferential Statistics

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

Table 1. Descriptive Statistics and Reliabilities.

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

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

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

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

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

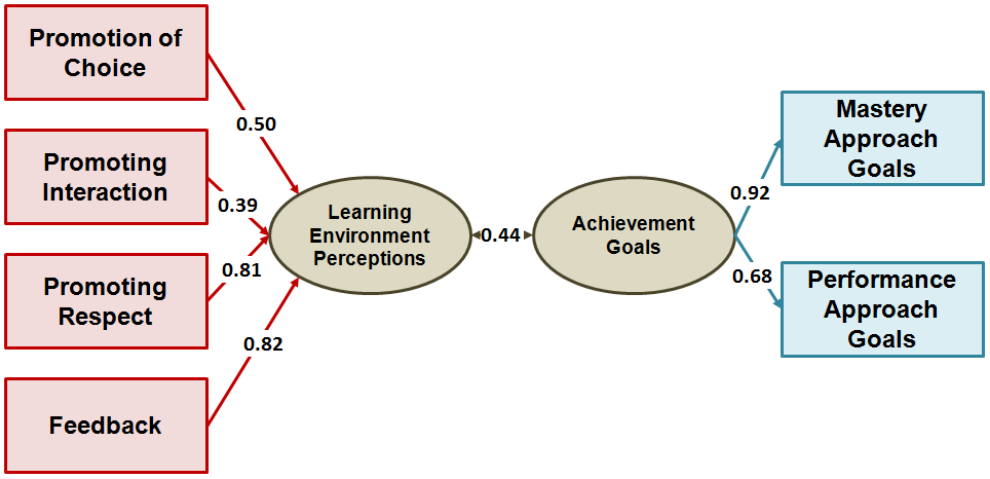

Figure 1. The Relation between the Set of Students' Achievement Goals and Students' Perceptions of Classroom Learning Environment.

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

Discussion

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

The Relationship between Perceived Learning Environment Variables and Achievement Goals

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

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

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

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

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

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

Conclusion

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

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

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REVIEW

Juvenile Delinquency in China: Causes and Prevention

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***Abstract**: Juvenile delinquency is one of the most complex social issues confronting both developing and developed nations in today's rapidly changing world. In China, adolescent criminality is likewise increasing at an alarming rate. In this study, we examined the status quo of juvenile delinquency in China, elucidated the reasons for adolescent crime from the perspectives of the individual, family, school, and society, and proposed preventive methods to provide insight into the reduction of juvenile delinquency in China.*

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JUVENILE delinquency has become a worldwide phenomenon that threatens social order and stability. Due to a surge in delinquency, a decrease in the average age of offenders, a proliferation of offense types, and the employment of sophisticated tactics, the issue of juvenile crime has raised significant public concern in China. As China has around 250 million school-aged children, the juvenile delinquency rate is approximately 6 per 10,000 and as high as 20.6 per 10,000 in major cities (Lu & Guo, 2014). Experts and academics have paid a great deal of attention to the escalation of adolescent criminality, which has prompted significant conversations and investigations. This study examines the current state and causes of juvenile delinquency and proposes solutions to this problem in an effort to contribute to the reduction of youth crime in China.

The Status Quo of Juvenile Delinquency in China

The incidence of juvenile delinquency in China has decreased for a number of years since 2010, but has risen again from 2020, according to statistics on juvenile offences released by relevant judiciaries. It is characterized by a wide range of crimes and sophisticated criminal methods. In addition, the average age of criminals is decreasing, and the majority of unlawful activities are committed by gangs.

The Lowered Age of Adolescent Offenders

Recent trends in juvenile criminality indicate that the average age of delinquent adolescents is falling. In 2013, Li, a girl from Chongqing Province, seized a baby and hurled it to the elevator floor when she was only 10 years old; and Cai, a 13-year-old boy, brutally murdered a 10-year-old girl in Dalian in 2019 (Sun, 2020). In all cases of juvenile delinquency, the proportion of juvenile offenders younger than 14 years old is increasing fast. The trend of younger adolescents committing juvenile offenses is increasing, resulting in irreparable consequences for the juveniles, their families, and the entire community.

The Use of Intelligent Technology in Juvenile Offenses

The Internet and information technology are widely used in adolescent delinquency as a result of the increased popularity of smart phones. Presently, youthful criminals are able to utilize intelligent technology in their crime planning; they can commit a crime and get away with it using intelligent means. Simultaneously, the universalization of online communication enhances the possibility that young people will meet other pro-delinquent juveniles over the internet; the convenience and effectiveness of communication facilitate the formation of criminal gangs among adolescents who are socially deviant.

Adult-like Mentality in Juvenile Crime

In recent cases of adolescent violence, several perpetrators displayed adult-like composure and deliberation. They plotted well prior to committing crimes, remained composed after the occurrences, and had formidable counter detection abilities. After the murder, the 13-year-old Dalian boy did not panic or provide any hints. Instead, he watched the police investigating the case from his window as if nothing had happened, and he arrived at the location only after the girl's body was discovered. A 12-year-old child in Hunan stabbed his mother to death due to his hatred of her discipline. After his mother's passing, he used her cell phone to send a text message to his teacher requesting time off. They displayed a mentality comparable to that of adult criminals despite their adolescence, and the entire illegal operation was well planned. Their calculated maturity has surprised the entire community (Shi, 2014).

Causes of Juvenile Delinquency

External (Non-individual) Factors Related to Families, Schools, and Society

Hirschi (2004) claimed that every person is a potential criminal, whereas a person's relationship with society can cultivate their knowledge of ethical behavior and dissuade them from engaging in deviant and criminal activity that breaches societal norms. This implies that juvenile delinquency is the result of weakened or broken relationships with society. Consequently, family, school, and social issues cannot be separated from the investigation of the causes of adolescent misbehavior.

Family-Related Factors

Numerous researchers have published their findings on the impact of family on juvenile misbehavior over the course of several decades. Most of them examined the relationship between family function and adolescent criminality from the perspective of family interactions (Zou, Zhang, & Wang, 2005). According to the prevailing viewpoint, it is not the dissolution of the family itself that causes juvenile delinquency, but rather the rifts between family members that undermine family functioning and instigate juvenile criminality. Palmer and Hollin (1998) found that the problematic behaviors of children from single-parent or remarried families are mostly linked to their conflicting surroundings, and that if these adolescents move from a conflict-ridden milieu to a harmonious one, their problematic acts decrease. Bank and Burraston (2001) discovered through interviews, surveys, and observations that the majority of juvenile offenders came from inharmonious families filled with parent-child, inter-parent, and inter-sibling conflicts. The proportion of juvenile criminals with loveless parents and strained relationships with their parents is significantly greater than the proportion of juvenile offenders with divorced parents. A tense family environment tends to erode family cohesion, which is adverse to the efforts of parents to educate their children and solve difficulties. In this work, we attempt to separate family factors into two categories: the family environment

and the family structure, and we examine the impact of family factors on juvenile delinquency in these two dimensions.

The Effect of Family Environment on Juvenile Delinquency

The family environment contains both a physical and a soft component. The soft home environment includes characteristics such as intimacy, affection, cultural atmosphere, recreation, and conflict; the physical home environment is represented by parents' age, level of education, occupation, and socioeconomic status. Li and Zhou (2004) found that the majority of home conflicts occur prior to parents' divorce or in families with short-tempered parents with low levels of education; in both cases, family life is characterized by quarrels, accusations, and denunciations, and children are plagued and tormented by fear and anxiety throughout the day. Children are likely to develop traits such as introversion, aggression, and animosity throughout life. In order to escape the sad familial environment, kids may choose to run away and wind up living on the streets. As a result, people may be forced to commit illegal crimes in order to survive. In addition to family problems, parental moral apathy has a negative impact on children's behavioral development. Parents who are arbitrary, greedy, cruel, and crafty are more likely to create children who are selfish, narrow-minded, and aimless. The influence of parental behavior on children's personalities increases with age.

According to Chen's empirical research from 2004, 35% of delinquent teenagers in a city in Heilongjiang Province lived in households where their parents constantly argued, while 65% of teenagers who were sentenced in Wuhan lived in families where there was no love. Nearly 60% of the 186 surveyed juvenile delinquents in Jilin Province had parents who had no idea how to raise their children, and some of these parents even encouraged their kids to steal, gamble, and consume alcohol before the legal drinking age. In Shandong Province, 9% of juvenile offenders from one-child families had divorced parents, but 46.8% of them claimed that they had long lived in the shadow of arguing parents. As a result, conflicts between parents or a parent's corrupt lifestyle are strongly and favorably connected with the emergence of deviant behavior in children.

The Impact of Family Structure on Juvenile Delinquency

Contemporary Chinese family structures are less influenced by conventional marriage ethics and morals, and individuals are more likely to accept core families, which are independent and relatively small, as opposed to the old large family model. The single-parent family, migrant worker family, stepfamily, separated family, and DINK family are examples of so-called "alternative families" that are also allowed. This change denotes the declining stability of China's family system and the consequent rise in family issues that are either directly or indirectly linked to juvenile delinquency (Jiang, He, & Zou, 2006).

The Single-Parent Family and Juvenile Delinquency

Even though parents may have been ready for a divorce in a broken marriage, because children are more psychologically vulnerable and lack sufficient self-control, it is more like a "sudden calamity" to them. Children suffer more severely from divorce than parents do. Children who experience parental estrangement from either one or both parents develop a sense of inadequacy that can make them irritated and even violent (Wang, 2021). Another effect of divorce is that parents who feel bad for their kids may become very critical of themselves and try to make up for it by overindulging in worldly possessions. Because of this, they end up indulging their kids, who may turn to stealing or robbery if their family's financial needs cannot be met. On the other hand, some divorcing parents pin their future hopes on their kids. They become excessively severe with their children and place unreasonable demands on them. The kids may flee home and commit delinquent behavior in an effort to escape the crushing responsibility.

The Stepfamily and Juvenile Delinquency

Children of remarried couples tend to be sensitive to stepparents and find it difficult to quickly establish a compatible parent-child bond with them, which lowers their level of satisfaction with the new family. Children of stepfamilies might occasionally experience abuse and abandonment at the hands of their stepparents, developing distant, violent personalities and mental health issues. There are worse situations where parents disregard their own children's desires for parental company and see them as a barrier to remarriage. These children are more prone to engaging in illegal behavior as adults because they lack parental direction and are uninformed of moral and social conventions (Qu & Zou, 2009).

Families with Implicit Handicaps and Juvenile Delinquency

Juvenile delinquents can also result from seemingly stable households with underlying issues like extramarital affairs and illegal cohabitation. Children's psychological well-being suffers greatly when one parent leaves the house, and this causes them to become resentful of their parents. They may grow to have antisocial personalities and pro-delinquent views over time.

Internet-Related Factors

Undoubtedly, the internet has two sides. While it greatly improves the effectiveness of human endeavors, it has numerous detrimental repercussions on contemporary society. Internet access has now become one of the key variables affecting the physical and mental development of teenagers, since internet browsing is currently the No. 1 leisure activity for Chinese youngsters. The internet is flooded with information on violence

and pornography because internet regulation has lagged significantly behind its development. Young people are prone to developing a socially abnormal mindset if they are exposed to such damaging material over an extended period of time.

Online Pornography and Juvenile Delinquency

The internet is currently flooded with all types of sexual content. According to pertinent data, pornography is mentioned in relation to around 47% of non-academic information on the internet. The majority of the approximately one million pornographic computer files on the internet are novels, video clips, and graphics; 85% of convicted juvenile offenders in China have been tempted by obscene information; 48.28% of them have been exposed to pornographic websites; and 43.39% have received pornographic and violent emails or e-cards (Liu, 2012).

Adolescence is a high-risk stage of life in which teens experience fast physiological growth, giving rise to mature sexual organs and evident secondary sexual indicators. At the same time, they also develop a sexual awareness of and interest in the opposite sex. Youths in China receive minimal sex education in school, and open discussion of sex is not proper. Teenagers are therefore vulnerable to the harmful effects of various types of pornographic information because they lack appropriate instruction on sexual issues. After being exposed to online pornography, some young people are more likely to develop pathological impulses that lead them to engage in illegal or criminal behaviors such as prostitution, whoring, and rape.

Cyber Violence Games and Juvenile Delinquency

The internet may offer individuals interactive activities and entertainment that let them fully immerse themselves in them, in addition to traditional mass media like news, film and television, and other entertainment programs. The growth of online gaming has been aided by advances in information technology and the internet. Among these industries, the cyber violent games sector is the most successful due to its ability to draw in young people. The most exciting aspect of online violent games is that they allow players to simulate actions and experience improbable outcomes through realistic scenarios. Teenagers' intense curiosity in the outside world is satisfied by this function. The cost of violence in the game is low. When using violence, players do not need to expend a lot of mental or physical effort or bear any responsibility. In addition, players do not feel bad about using violence, even when it is directed at innocent people. Teenagers who play cyberviolence games are reinforced in their understanding of violence and have their morals misguided, leading them to believe that using violence to solve problems is appropriate. As a result, when they run across conflicts in real life, they turn to violence as a first resort, which leads to many instances of starting fights and causing difficulties (Mei, 2005).

Addiction to Cyber Games and Juvenile Delinquency

According to research, once young people become addicted to online games, they tend to spend the majority of their time and money on them. Due to their extensive workload as students, they will inevitably violate school policies in order to do this. Obsessed with online games, kids don't think twice about engaging in risky conduct like skipping class, staying up late, and spending a lot of time at cybercafés and other locations where they can access cyber games (Liu, 2017). Liu, Hu, and Guo (2014) found that teens hooked on online games tend to go to great lengths to raise money in order to buy props or expensive equipment required in the game. They made this discovery through interviews with cybercafe management and parents of internet-dependent children. If it doesn't work, stealing and robbery are the fallback options. For instance, Shi, a 17-year-old addicted to internet games, received a one-year prison term for robbing a store using a knife. Sun, a 14-year-old who was addicted to online games, began by borrowing money from his parents, family, and friends before moving on to stealing money with his online pals. Because he was under 16, the public security agency instructed him before releasing him.

School-Related Factors

Outdated Educational Methods and Juvenile Delinquency

Some schools continue to apply the traditional, antiquated educational approaches that have been around for a while but are no longer in line with the needs of modern teenagers, despite the ongoing development of innovative pedagogical ideas. These antiquated teaching techniques are frequently regimented and dictatorial in nature, disregarding student diversity and interactions with teachers. Due to these conditions, students have strained relationships with their professors, experience emotional suppression, and, over time, develop abnormal personalities (Mo & Ye, 2006).

School Punishment and Juvenile Delinquency

Teachers in China are frequently too focused on their students' exam results and will go to any lengths to encourage them to raise their grades. They might turn to physical punishment if verbal reprimand is ineffective. Students who observe physical punishment in the classroom may come to believe that violence is the answer to all of their issues; potential targets for their violence may include teachers, parents, and other students. Some professors prefer to verbally or physically criticize low-achieving students in addition to using corporal punishment to motivate them to improve. These discriminated-against students may seek out outside delinquent teenagers for psychological assistance because these "soft violence" practices can undermine students' self-esteem and cause them to forsake themselves.

Individual Factors

Psychological aberrations in people also have a role in juvenile delinquency, in addition to variables relating to families, schools, and the internet. Adolescent criminal behavior is caused by the interplay of various causative elements.

Inferiority Complex and Compensation

The founder of Individual Psychology, Adler (1959), talked about how "inferiority complex" and "compensation" relate to crime and offer theoretical justification for insights into criminal psychology. An inferiority complex is a sensation that you are not as important or as good as other people. A person who feels inferior frequently has a low opinion of themselves and a bad attitude toward themselves. People with physiological flaws, such as deficiencies in body organs, weakness, clumsiness, slowed growth, and deformities, are frequently prone to inferiority complexes, according to Adler (1959). According to Adler's thesis, "compensation" refers to the process of replacing one activity with another to offset psychological distress when an individual is disappointed by their inability to complete a task owing to a flaw in themselves. Numerous instances of juvenile delinquency demonstrate that almost all young people involved in gang activity have flaws in one or more areas that affect their survival and development, such as a dysfunctional or loveless family, academic failure and the subsequent stigma from teachers and peers, or a poor upbringing. These inadequacies lead to a chronic inferiority complex that has never been adequately healed. Personality disorders are the outcome of long-term mental suffering and turn young people against their peers and society. In an attempt to make up for their inferiority, they decide to join an adult criminal gang or form a group with other kids who have had a similar experience. They then engage in crimes that violate other people's rights and upend societal order.

Adler's concept of inferiority complex and compensation was validated by Ma and Xu's (2011) study of a gang crime involving 67 male juvenile offenders in eastern Hebei Province. Most of the members of this criminal gang were low-achieving kids who were shunned by instructors and alienated by peers due to family divisions at home, which prevented them from having regular parent-child interactions. As a result, they resorted to the gang, which was made up of kids who were also experiencing emotional voids, scholastic disappointments, and family calamities, for emotional fulfillment. They are faithfully and firmly committed to the gang where they have a sense of self-worth and belonging, which helps to offset their sense of inferiority brought on by the lack of care. The results of Ma and Xu's study also reveal that the 67 juvenile offenders had only 8.2 years of schooling on average, with 36 of them having dropped out of junior high school. Their inferiority complexes are exacerbated by the fact that, after dropping out of school, they were unable to support themselves without the required educational background and job skills.

Frustration and Aggression

According to Miller (1941), the nature of individual frustration is the suppression of the desire for pleasure and the inability to get rid of the feelings brought on by unpleasant stimuli. When the human drive to seek pleasure is restricted from releasing energy due to frustration, pressure will result. When blocked energy is directed outward, it causes intentional harm to other people; when directed inward, it leads to self-torture, self-destruction, or even suicide. According to a field investigation of female murderers housed in Jiangxi Province's Women's Prison, the main motivator behind their crimes was an intense sense of frustration brought on by their poor socioeconomic and occupational standing, inadequate educational preparation, and emotional setbacks like divorce (Jiang, 2007). Teenagers are more susceptible to setbacks and challenges than adults are. They face significant challenges from things like academic success, jobs, romantic relationships, and interpersonal interactions. Adolescents are more inclined than adults to externalize psychological failures and disagreements into aggressive actions throughout the challenging teenage years. The Shangqiu City Juvenile Court's statistics showed that between 1999 and 2001, the court tried a total of 14 defendants who were then enrolled in school. Six examples featured arguments or acts of retaliation between students; another six were motivated by hatred; one involved the defendant's younger brother; and two were about standing up for friends. Therefore, frustration has a very harmful effect on juveniles, both directly and indirectly (Chen, 2021).

How to Prevent Juvenile Delinquency

Home-Related Measures

Set Up Parent Schools

A supportive family structure and a peaceful home environment are crucial for a child's healthy physical and mental development, and a quality home education can make up for some shortcomings in school education. Despite the widely acknowledged value of home education, most parents really lack systematic knowledge of family education due to their own educational background or line of work. They require the expertise and support of professionals and academics in the fields of education, psychology, sociology, etc. In order to provide classes on resolving domestic disputes, emotional control, scientific parenting, and problem child correction, communities must develop parent schools. Parents who attend parent schools can share parenting advice and knowledge with one another as well as receive new information about home schooling from teachers (Zhang, 2021).

Establish Family Support and Welfare Systems

As per Mwangangi's study, youngsters are frequently pushed to the brink of crime by their family's failure to pay for basic requirements like food and clothing. Because of this, the majority of young criminals are from the most impoverished slums in major

cities. Although several nations have implemented pertinent welfare policies to guarantee the poor's fundamental standard of living, China has, in comparison, not given the family support tax system and home welfare system adequate attention. Without social help, poor parents must focus all of their efforts on generating income to maintain their family, neglecting their responsibility to look for and educate their children. Parents can only devote the time necessary to their children's physical and mental health and to creating a peaceful home environment when they are not burdened by financial obligations. This will stop children from committing crimes.

To Provide Legal Support through Social Workers

Individuals' ignorance of the law prevents them from receiving legal education at home. To lower the risk of juvenile delinquency, social workers with training in law might give families lectures or quick videos focused on legal problems that kids could overlook. In order to prevent emotional harm to juvenile offenders from family members, they should also offer legal services to families who already have juvenile offenders and mandate interventions in their rehabilitation based on the principles of equality, respect, and acceptance. Plans for the follow-up education of youth with a history of delinquency can be developed based on social workers' scientific assessments (Yao, 2021).

School-Related Measures

Educate Teachers on Professional Standards and to Regulate their Educational Behavior

Teachers serve as crucial role models for students and have a lasting impact on their development. The best way to keep students on the correct track is with a group of excellent professors. Lack of oversight and control by the educational system considerably increases the likelihood of students' criminality. Students who do not have positive school experiences are more likely to take drastic measures, such as dropping out and truancy, to avoid receiving a regular education (Ghosh, 2021). Schools should implement a more thorough teacher assessment system to control their instructional behavior in addition to evaluating teachers based only on the academic success of their students. Teachers who utilize severe sanctions for corporal punishment on students should be fired from the school. Additionally, the school administration must understand that developing students' moral character and outlook on life is just as important as their academic progress rate (or test scores), and that teachers should be especially patient with students who exhibit poor behavior and learning difficulties (Gao & Pang, 2003).

Provide Students with a Psychological Counseling Service

Impulsive adolescents are prone to acting aggressively due to negative attitudes brought on by feelings of inferiority and frustration. The likelihood of them committing criminal activities rises as angry feelings mount. It is imperative to universalize school psychological therapy so that kids can receive support from a reputable source anytime they encounter emotional disturbance. Additionally, including psychological health education in the curriculum might benefit students by enhancing their psychological knowledge and self-acceptance in order to support teenagers' healthy personality development (Deng, 2012). According to pertinent research, those who have experienced domestic violence, physical or mental abuse, or long-term neglect are less likely to seek out psychiatric counseling services. In order to prevent catastrophes, schools should routinely conduct interviews or home visits with children to better understand their family backgrounds. They should also give particular attention to students who have experienced psychological trauma (van Duin et al., 2019).

Offer Extra Help to Academically Disadvantaged Students

In their analysis, Mishra and Biswal (2018) found that the majority of juvenile offenders considered quitting school as early as the compulsory education stage. They lose interest in learning and school as a result of their academic shortcomings. They spend the entire day doing nothing and wind up becoming friends with other juvenile offenders. According to a national study on juvenile delinquency in China, of the more than 2,000 juvenile offenders detained, 74.2% were inactive before committing the crime, failing to graduate from junior secondary schools or even primary schools. They didn't try to hide their dislike of studying when they were being interviewed (Zhou, 2008). Some dropouts stop going to school because they can't keep up with the curriculum; others are dismissed from schools because of their troublesome behavior, which is not only irresponsible toward the students they've expelled but also against the law. To maintain all children of school age in schools, schools should increase their understanding that every child is educable and offer low-achieving students additional tutoring to assist them improve their academic performance.

Community-Related Measures

To Strengthen the Regulation of the Internet

Although there are many different types of material available on the internet, some of them are harmful to young people's physical and mental health. To lessen the negative effects of unwholesome information on adolescents, the government should implement effective measures to regulate online information communication and modernize the network environment. To stop minors from developing criminal attitudes, it is important to perform extremely thorough inspections of websites that offer cybergames and to limit their exposure to online portrayals of illegal and criminal activity. Internet addic-

tion can impair academic performance, cause vision loss, and cause a drop in physical fitness. Therefore, the government must create a grading system for online gaming software and set time limits for youth playing online games in order to confine their attention to the virtual world and focus their energy on real-world activities (Liu, 2014).

To Provide Shelters to Adolescents in Predicaments

The government should provide juveniles who are truant (including but not limited to homeless children) with shelters where they have access to food and other necessities of life, as well as support their prompt return to school. Communities should provide young aimless idlers with the fundamental advice they require in terms of education, work, lifestyle, and social contact, based on their actual circumstances, so that they can integrate into the community and discover the direction for their future lives (Yang, 2015).

To Give Full Play to the Corrective Role of Juvenile Delinquency Punishment

The recommendations for youth criminal punishment should call for individualizing sentences and minimizing jail time. Most adolescents are physically and mentally fragile as they make the transition between childhood and maturity. Their incarceration has probably not resulted in education or reform but rather an extreme attitude, an inferiority complex, and a lifelong burden of criminal records, all of which enhance the likelihood of recidivism. Therefore, the juvenile court should examine criminal punishment's function in social reform and correction more when imposing sentences on young offenders (Teng, 2005).

Conclusion

Adolescents have greater demands during the challenging teenage years in regards to academic success, peer acceptance, interpersonal connections with parents and teachers, etc. Individuals' emotional instability, parental neglect, irrational teaching strategies, and the negative effects of the internet can all be factors in the prevalence of adolescent delinquency. To effectively prevent and protect young people from engaging in illegal activities, a teen-friendly atmosphere must be created via the combined efforts of the family, school, and community. Children who have a history of delinquency should be embraced without prejudice and encouraged to reintegrate into society and the classroom.

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REVIEW

A Narrative Review on Studies of Non-cognitive Ability in China

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***Abstract**: Non-cognitive ability has recently gained popularity as a hot topic in education and has appeared as a novel idea in contemporary study. Numerous studies on the definition, measurement, influencing factors, impact, and other aspects of non-cognitive talents have been conducted. With the intention of igniting additional conversation on this topic and encouraging student holistic development, this study attempts to present an overview of research on non-cognitive ability in China and outline the limits of existing studies.*

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STUDENT competency is conventionally equated with cognitive ability, although non-cognitive aptitude is frequently undervalued. However, in a society that is always evolving, non-cognitive ability has become a vital component of student core competency. Numerous studies demonstrate that non-cognitive qualities, such as learning resilience, emotional balance, self-confidence, and educational self-expectations, have a higher impact than IQ on student academic achievement and long-term development. This study draws on the relevant CNKI literature on the influence of non-cognitive abilities on student development and analyzes the research findings of current studies to demonstrate the importance of increasing inputs for enhancing student non-cognitive abilities.

Non-Cognitive Ability Definitions

The majority of scholars describe non-cognitive ability from a psychological standpoint. Non-cognitive ability, according to Sheng and Hu (2019), is a type of capacity to place oneself in the position of the other, referring to personality attributes such as cooperative, adaptive, communicative, and gregarious that cannot be fully quantified by educational standards. According to Lei (2021), non-cognitive ability is not a one-dimensional talent, but rather a composite of numerous personality traits; unlike cognitive capacity, non-cognitive ability cannot be measured by intelligence tests or academic performance, but rather by personality traits. Non-cognitive ability in psychology is typically characterized by non-intellectual qualities such as emotional intelligence or a balance of thought, emotion, and behavior.

From a sociological standpoint, Xie (2020) viewed non-cognitive ability as cultural capital, exemplified by habitual behaviors and personality traits; in educational research, it encompasses more specific elements such as learning styles, self-efficacy, peer communication skills, etc.

Nonetheless, some scholars have stated that the dichotomy of cognitive and non-cognitive ability is not a precise approach, as the majority of personality traits that are viewed as non-cognitive skills involve cognition; that is, intelligence-based cognitive and non-cognitive ability are not completely distinct. Given this, Huang (2018) suggested that non-cognitive ability is a multidimensional concept, correlated with but distinct from cognitive ability, encompassing a variety of social attitudes and behavioral habits such as leadership capacity, perseverance, self-esteem, self-control, and educational expectations, which are inextricably linked to the academic and future career success of individuals.

In addition, several nations, including China, and international organizations, encourage non-cognitive ability as one of the basic competences of teenagers and strive to define it precisely. For instance, the *Core Competence Development of Chinese Students*, promoted the cultivation of curiosity and inquiry, among other skills in basic knowledge learning, and encourages the autonomous development of self-confidence, self-love, tenacity, optimism, self-control, emotional regulation, and resistance to frus-

tration. All of these concepts are intimately associated with non-cognitive abilities (Jiang & Jiang, 2021).

The Measurement of Non-Cognitive Ability

Methodologies and indices are the main topics of research in non-cognitive ability measurement. The personality test, questionnaire survey, and behavioral experiment are the most frequently utilized methodologies in the empirical research on this topic now available. The questionnaire survey is the one that is used the most commonly. The *Big Five Personality Inventory* personality qualities, as well as self-efficacy and integration into the group, are among the commonly used indexes for measuring non-cognitive abilities from practice that have been developed by an increasing number of scientists.

As per Jiang and Jiang (2021), the *Big Five Personality Inventory* had gained widespread acceptance and use among researchers in China and other nations for the measuring of non-cognitive ability as a result of its many benefits. Openness, conscientiousness, extraversion, agreeableness, and neuroticism are among the five groups of qualities that it comprises. In contrast to conformists and rigid people, those who are open to new experiences are more creative, curious, and willing to try new things. In contrast to ineffective and unreliable people with a low sense of responsibility and poor organizational skills, highly conscientious people have outstanding organization and planning skills and tend to consciously increase work efficiency; In contrast to withdrawn, aloof, unsociable, and depressed people, extroverts are typically vivacious, energetic, enthusiastic, and socially adept. People with high agreeableness tend to be amiable, gentle, modest, and compassionate, while those with low agreeableness are frequently selfish, indifferent, and mean; Individuals with high levels of neuroticism exhibit poor self-control, anger, and depression in contrast to those with low levels, who are often calm, assured, and secure (Jiang & Jiang, 2021). The *Big Five Personality Inventory* was used in studies like Huang's (2020) "*Factors Influencing Non-Cognitive Skills of Secondary Vocational Students*" and Miao's (2020) "*The Impact of Non-cognitive Skills on Job Promotion*" to evaluate and measure samples, and they came to logical conclusions.

According to Chen (2013), self-efficacy—the degree of assurance in one's own ability to carry out a particular behavior—is a crucial element of non-cognitive ability. The more self-efficacy a person has, the more confident, motivated, and determined they are to overcome obstacles and challenges. Because of this, self-efficacy is a regularly used index when assessing non-cognitive abilities. Li and Wu (2021) used the self-efficacy of the kid to determine the relationship between maternal educational level and non-cognitive abilities.

Some researchers measure non-cognitive abilities by taking into account the locus of control and self-esteem. Rotter (1966) introduced the psychological concept of locus of control, which describes how firmly people feel they have control over the events and experiences that have an impact on their lives. The locus of control in education often relates to how students interpret what led to their success or failure in the

classroom. While students with an "external locus of control" typically attribute their success or failure to outside forces they have no control over, such as luck, opportunities, or circumstances, those with an "internal locus of control" typically attribute their success or failure to the effort they put into their studies. In Liu's (2018) study, locus of control and self-esteem were closely explored as two important aspects affecting non-cognitive abilities.

Lei (2011) asserted that one of the indexes for assessing non-cognitive ability should also be taken into account: integration into the collective, which can be reflected by more specific factors like the number of friends, engagement in group activities, and psychological intimacy. These items can be used to assess the research subject's potential for pro-social conduct.

The Significance of Non-Cognitive Ability

The social evaluation of an individual's competence has historically focused on cognitive capacity, and occasionally the degree of competence is closely correlated with educational attainment. Despite this, there are differences in employment earnings and possibilities for advancement among people with the same levels of education, showing that non-cognitive ability is an essential component of human capital and that knowledge and skill are only one aspect of an individual's capabilities. The current study aims to investigate the significance of non-cognitive ability in academic achievement and employment; its distinctive benefits over cognitive ability in the contemporary labor market are underlined.

The Influence of Non-Cognitive Ability on Student Personal Development

The Effect of Non-Cognitive Ability on Student Academic Performance

The majority of current empirical investigations into the connection between non-cognitive ability and student academic performance support the idea that non-cognitive ability has a favorable impact on academic results.

Li and Zhao (2017) discovered that non-cognitive skills have a significant positive impact on student academic achievement based on the baseline data of the China Education Panel Survey (CEPS) 2013-2014.The likelihood of low-achieving students receiving moderate and good grades increases by approximately 87% and 3%, respectively, for every unit of gain in non-cognitive ability.

Through his analysis of data from the Survey on Compulsory Education Development in Beijing, Li (2018) presented that parental involvement, including parent-child reading, parent-child communication, and home-school interaction, promotes the

development of student non-cognitive skills, which further improves child academic performance.

In their empirical studies, some researchers go into greater detail on the non-cognitive skill components and others go into great detail about the heterogeneous effect of non-cognitive abilities on student academic advancement. According to Liu (2018), non-cognitive abilities had an impact on student academic performance in two ways: internal locus of control and self-esteem may mediate an individual's assessment of their own capacity, which determines the amount of effort they will expand to achieve higher academic results; people with these traits typically invest more time and effort into learning. After adjusting for the sampled students' cognitive abilities, locus of control and self-esteem will have an impact on academic success through altered student learning effort. In addition, there are disparities in how gender, urban vs. rural, and family background affect non-cognitive talents. Teenage girls are more motivated by self-esteem than by locus of control. This is in contrast to boys, who are more affected by locus of control because society generally considers that men tend to dominate the labor market and women are relatively disadvantaged. Compared with urban students from economically advantaged families, rural adolescents have relatively fewer educational opportunities. As a result, self-esteem has a greater influence on them than locus of control.

In order to conduct the empirical research, Lei and Li (2021) divided non-cognitive ability into four categories: learning persistence, emotional balance, self-confidence, and educational expectations. 438 classes from 112 schools in 28 county-level regions throughout China were randomly chosen for the study. The results demonstrate that non-cognitive ability has a significant favorable impact on the academic performance of junior secondary students after controlling for the fixed effects of class, past academic achievement, cognitive ability, individual characteristics, and family factors. They also talk about how non-cognitive talents fluctuate depending on the group, pointing out that at the junior secondary level, non-cognitive skills have less of an impact on boys' academic success than they do on girls'. With the exception of emotional balance, boys' non-cognitive skills are significantly lower than girls'. Junior secondary school students from rural and low-income families have stronger learning perseverance and are more likely to develop perseverance than their peers from urban middle-and high-income families. However, there is little correlation between academic aspirations, self-confidence, and academic success for adolescents from rural low-income families.

Several studies on the influence of non-cognitive skills on students' tolerance to frustration were conducted by other scholars. In order to determine the academic standing of students in compulsory education, Qian et al. (2020) used random sampling and elaborated on the meanings of non-cognitive ability in five dimensions: extroversion, tenacity, optimism, rigorousness, and self-expectation. It has been discovered that non-cognitive skills can predict academic success for students. At the primary level, extroversion, tenacity, optimism, and rigorousness as well as self-expectation can improve students' capacity to deal with ongoing pressure in the classroom and their awareness of overcoming adversity; at the junior secondary level, extroversion, opti-

mism, rigorousness, and self-expectation can significantly predict the likelihood of student academic advancement, among which self-expectation is essential to academic success.

The Influence of Non-Cognitive Ability on Individuals' Employment

In China, empirical study on the impact of non-cognitive aptitude on people's jobs and wages started in the 2010s. Based on their examination of data from the *Chinese Enterprise-Employee Survey* (CEES), Cheng and Li (2017) drew the conclusion that openness and conscientiousness on the *Big Five Personality Inventory* have a significant beneficial impact on workers' ability to earn more money. Le and Hu (2017) conducted their research using data from the 2012 and 2014 *China Family Panel Surveys* (CFPS) and the Big Five Personality Inventory. The findings demonstrate that non-cognitive abilities are essential for people to survive in the workforce and that these skills' influence on employment is unrelated to educational attainment. According to Xu's (2017) analysis of employment data from 2,000 graduates of 54 public universities in Beijing, differences in employment of college graduates were primarily caused by implicit personality traits, and non-cognitive ability was a more important factor in determining graduates' competitiveness and earnings in the labor market than family background. Therefore, non-cognitive talents can aid disadvantaged students in overcoming the disadvantages of their family origins, thereby closing the gap in their personal capabilities and career outcomes with their peers from affluent family backgrounds and enabling social mobility. Using data on national college students from the "*Higher Science Education Reform*" project of the Graduate School of Education at Peking University, Liu (2016) made an effort to analyze the effects of cognitive and non-cognitive factors (such as professional values and interpersonal communication skills) on graduates' employment outcomes. His research demonstrates that while non-cognitive talents have a significant influence on job search outcomes, cognitive ability cannot entirely explain income inequalities across graduates. Wang (2021) drew the conclusion from earlier research that job candidates with superior non-cognitive skills are better at emotional regulation, displaying a pleasant and reasonable demeanor, and effectively interacting with others in a variety of social contexts.

The heterogeneous effects of non-cognitive ability on employment outcomes among other groups have also garnered the interest of a large number of academics. According to Le and Hu (2017), agreeableness and neuroticism in the *Big Five Personality Inventory* have a stronger impact on female job seekers, but conscientiousness has a greater impact on male workers' earnings. Wang and Zhang (2019) discovered that non-cognitive ability has a greater effect on female income growth than on male income growth, which is mediated by the social capital effect, occupational screening effect, and marginal effect of schooling. Therefore, boosting female non-cognitive ability can somewhat reduce the wage difference between men and women.

Zhu and Zhang (2018) noted that although non-cognitive ability may play a positive role in increasing the monthly salaries of university graduates, its effect on junior college students is different; cognitive ability development has a greater impact on the monthly salaries of junior college graduates, while the effect of non-cognitive ability is not significant, indicating that there are job differences in the influence on incomes between cognitive and non-cognitive ability. As a result, cognitive ability has a primarily short-term effect on their earnings, whereas non-cognitive ability may influence their long-term professional development. In addition, Zhou (2015) found the more general conclusion that the effect of non-cognitive ability varies based on the complexity of different sectors and vocations. Non-cognitive abilities are of similar value in employment that is only partially or not at all tied to technology, whereas superior cognitive ability provides a substantial advantage in technology-oriented jobs.

The Impact of Non-Cognitive Skills on the Labor Market

Non-Cognitive Abilities and Excessive Education

Nowadays, unemployment among highly educated individuals, depreciation of certificates, and excessive education are extremely widespread, and doctoral or master's degrees are no longer assurances of excellent employment opportunities. The proportion of people whose educational level is excessively higher than that required for specific employment demonstrates inefficient use of human resources and results in a variety of undesirable outcomes, such as lower earnings, reduced job satisfaction, deteriorating health, etc. Zhang (2021) used CFPS 2018 data to determine the relationship between non-cognitive ability and excessive education, as well as whether non-cognitive skills can mitigate the detrimental effects of excessive education. The results indicate that workers with high non-cognitive ability are less affected by the negative effects of excessive education than those with low non-cognitive ability; rigor and extraversion are advantageous for mitigating the negative effect of excessive education on income; and aggression, conscientiousness, and interpersonal communication skills can alleviate over-educated individuals' income penalties.

Non-Cognitive Skills and Service Industries

Because low-skilled labor for non-programmable and interaction-based tasks cannot be easily replaced by machinery and equipment, Sheng and Hu's (2019) empirical analysis based on micro data from CFPS 2010-2016 demonstrated that the demand for labor in the low-end service sector has been increasing in recent years. This increases the boosting effect of non-cognitive skills on the incomes of low-end industry workers. Low-end service sectors in China's economy, including transportation, lodging and catering, wholesale, and retail, saw a growth of 10.2% in 2010 to 15.8% in 2016. According to the *Routine-biased Technological Change* (RBTC) theory, jobs in service sectors that

demand a high level of interaction, quick decision-making, and empathy will survive as information and automation technology gradually replaces labor in procedural and task-intensive occupations, such as office clerks, machine operators, and assembly line operators (as cited in Sheng & Hu, 2019). The growth of the low-end service industry attests to the rising demand for workers in contemporary economies who have strong non-cognitive skills.

Factors Influencing Non-Cognitive Ability Development

In China, research on the factors influencing the development of non-cognitive abilities concentrates on micro-elements such as family background, family cultural capital, parenting techniques, and schooling, with few discussions on macro-level factors such as social environment. This study attempts to integrate the most often mentioned literature on CNKI into three dimensions: parenting style, family capital (including family economic position and cultural capital like parents' educational level), and school environment.

Parenting Styles and Child Non-Cognitive Ability

According to research findings, parenting and the family environment are critical to the development of non-cognitive skills in students. Parents with a high level of expertise and involvement in child development are better able to aid their children in developing their abilities. Involvement of these parents in their children's early development and their continual influence on their children's learning motivation have positive effects on the development of their children's non-cognitive skills and subsequent academic achievement.

Huang (2019) used CEPS 2014-2015 data to examine the current distribution and class differences of parenting styles, as well as their influence on the development of adolescent non-cognitive skills, and found a correlation between high-quality parent-child interaction and child non-cognitive ability development. Among numerous parenting styles, authoritative parenting is most conducive to the development of children's non-cognitive talents, whereas authoritarian parenting is detrimental.

In their empirical research, Yang and Dai (2021) explored two dimensions of parental participation: emotional and behavioral, both of which had considerable positive effects on the mental health, life satisfaction, and self-esteem of children. The troubling mental state of left-behind children (children separated from their migrant worker parents) is frequently attributable to the dearth of empathy and camaraderie resulting from parental absence. The absence of one or both parents will raise the likelihood that their children will develop depression and greatly diminish their perceptions of happiness, self-confidence, and willingness to engage in interpersonal connection.

Wu et al. (2019) analyzed the impact of working hours of native urbanites and migrant workers on the cognitive and non-cognitive ability of children using CFPS data.

Their study concluded that parental encouragement and involvement with their children can considerably enhance the cognitive and non-cognitive abilities of their children.
Huang (2020) applied the *Big Five Personality Inventory* to a random sample of secondary vocational school students in Hunan Province and conducted a questionnaire survey on the factors affecting the non-cognitive ability of secondary vocational school students. He found that at home, the second classroom of students, parents' encouragement, patience, concern, and communication with children are extremely beneficial to the development of students' non-cognitive skills. Students in secondary vocational education between the ages of 15 and 19 are in a crucial phase of life. However, the majority of their parents believe that they are merely studying for a living and disregard quality communication with them, exposing them to negative views.

Family Capital and Child Non-Cognitive Ability

Numerous studies have shown that socioeconomically privileged families may easily transmit household resources between generations. Family contexts affect a child's ability acquisition through two separate processes. First, parents use the family's advantage in financial resources to buy high-quality educational tools directly to train their children's abilities, or they provide possibilities for skill development through connecting them with internships or jobs through social connections. Second, a child's acquisition of cognitive and non-cognitive skills that are essential to their academic and future career success can be affected implicitly and over time by the family's advantage in cultural capital, including language proficiency, social skills, professional competence, and broader perspectives.

Ye and Yao (2018) found a substantial positive link between family economic and cultural capital and children's non-cognitive and cognitive abilities using CEPS data. The more educated the parents, the better the family's financial situation. Advantaged families are able to provide their children with the educational resources they require while simultaneously allowing them access to superior family cultural environments.

Fang (2018) examined the relationship between student non-cognitive ability and family background using data from the CEPS 2014 and the propensity score matching method and mediation model. She came to the conclusion that children from high-income families typically have higher non-cognitive skills, and that this relationship between family income and a child's non-cognitive ability development becomes stronger as the child gets older. Due to varying family resources, there are notable differences in non-cognitive abilities among kindergarten students. These differences tend to grow over the six years from kindergarten to fifth grade, typically by a factor of two to three.

According to Tang (2019), who examined the intergenerational mobility of thousands of Chinese families using data from the CFPS in 2014 and 2016, parents had three different ways of influencing their children's non-cognitive abilities. First, parents' incomes have a direct impact on the educational attainment of their kids because

wealthy parents are frequently more willing to invest generously in their kids' education. Second, because highly educated parents are more likely to apply scientific methods in their child's education, parental education will have an impact on the development of non-cognitive abilities in children. Third, parents will also utilize their registered address and social connections to enroll their kids in prominent schools so they can benefit from the advanced training program there and enhance their non-cognitive talents.
Therefore, the majority of Chinese experts agree that family circumstances and parenting practices are essential for children's development of non-cognitive skills as well as for people's overall well-being. The development of children benefits from parents' high competence and total engagement. Class gaps in children's non-cognitive talents already exist in childhood and will progressively get worse as they get older. Additionally, the quality of the education students receive in schools has a big impact on their acquisition of non-cognitive skills; overly utilitarian instructional methods harm students' physical and mental health and inhibit their overall development.

School Environments and Students' Non-Cognitive Ability

The majority of student education occurs in schools, where teachers and peers have a significant impact on educational attainment. As important parts of a child's outside environment, high-quality educational resources, scientific teaching methods, competent teachers, and high-competence peers will all help a child develop cognitive and non-cognitive skills.

Using random class placement data from the CEPS, Gao and Zhu (2021) revealed that the impact of releasing student rankings (as an incentive mechanism) on student non-cognitive ability growth varies by academic level. Students with relatively strong academic standings can be further encouraged by this strategy. However, students with average or below-average academic standings may experience frustration, impeding their academic growth and mental health development.

Using multi-level modeling, Tao et al. (2015) analyzed the data of 12,023 students in grades 4-6 from 423 schools in 100 districts and counties across the country and discovered that a positive school psychological environment has a significant effect on the improvement of students' non-cognitive abilities. The school should provide kids with an environment that is equitable and fair. Discrimination based on test scores will degrade student self-efficacy, compromise student school identity, and produce negative school adaptation, consequently hindering the development of students' non-cognitive abilities.

Some researchers explored the influence of boarding and day schools on the mental and emotional development of students. Zhou and Xu (2021) utilized OLS regression and PSM approaches to evaluate the impacts of boarding and day education on students' non-cognitive abilities. They obtained Chinese and math exam scores from the CEPS database for 19,784 junior secondary school students in 28 districts (counties) in China. Their findings show that boarding schools have a negative impact on students'

psychological and emotional development. Although boarding school provides an environment conducive to academic and learning advancement, it is detrimental to the social and emotional development of students.

Additionally, Dong and Zhu (2020) concentrated on talking about the effect of curriculum design on the growth of students' non-cognitive abilities. They came to the conclusion that competitive sports play a crucial role in helping students develop non-cognitive skills like self-efficacy and environmental adaptability after analyzing data about respondents' daily participation in additional sports from Monday through Friday from the CEPS 2013–2014 questionnaires. Teenagers' non-cognitive abilities can be boosted by an appropriate increase in after-school sports. Zhao (2020) used semi-structured interviews with 85 urban and rural students from four junior secondary schools in a county in central China to investigate the effects of extracurricular activity engagement on the acquisition of non-cognitive skills. According to the research, participating in extracurricular activities that are focused on their interests helps kids develop their self-efficacy by increasing their self-assurance and their openness to new experiences. Additionally, through extracurricular activities, teachers who are highly knowledgeable in a particular sector can assist students in expanding their horizons and igniting their interest in potential occupations. Therefore, extracurricular activities help children gain valuable non-cognitive abilities and a deeper understanding of who they are.

How to Develop Non-Cognitive Skills in Students

Chinese scholars have suggested changes to the home-school relationship, class numbers, educational quality, evaluation system, social supervision, and early childhood education in order to enhance students' non-cognitive abilities.

Since parenting styles have a substantial impact on the development of a child's non-cognitive skills, the question of how to improve parents' educational perspectives has become an urgent one. Zhang et al. (2022) recommended that through school-parent partnership programs, schools should educate parents to abandon harmful parenting styles such as authoritarian, indulgent, and neglectful approaches and to comprehend the actual situation and requirements of children. At the same time, under the guidance of teachers, parents are taught specific techniques for fostering the development of their children's non-cognitive talents. Tang (2019) noted that despite the fact that most schools plan parents' meetings and open days, they have not contributed to the improvement of parents' home education techniques; parents' meetings and other school-parent cooperation events are only formalities. Teachers, as the organizers of home-school activities, should therefore understand the parenting style of each family in advance and then customize improvement methods to meet their actual needs.

Some researchers believe that lowering class size can facilitate the development of students' non-cognitive skills. Zheng (2020) suggested that, if educational resources permit, schools should limit class sizes so that teachers may spend more time interacting with students. Additionally, he emphasized that students' interactions with teachers and peers, as well as class environments with reasonable competitiveness, have

positive effects on the promotion of students' perseverance, creative thinking, and other non-cognitive skills; and that schools should place a premium on teachers' ability in creating a healthy competitive environment and in promoting positive teacher-student interaction and inter-student communication; and that training and seminars should be provided to teachers.

Some scholars contend that enhancing students' non-cognitive skills necessitates rethinking educational objectives and revising the educational evaluation system. The current educational evaluation system concentrates solely on student knowledge rather than covers all educational objectives, such as the development of students' non-cognitive talents. After reviewing international research findings, Zhao (2021) advocated for a competency-based evaluation norm. *The Mastery Transcript Consortium* (MTC) in the United States has developed a more scientific evaluation paradigm, utilizing electronic media to evaluate student comprehensive abilities, such as self-management, interpersonal communication, evaluation of information, application of knowledge, etc.; MTC collects students' experiences and works to certify the level of their abilities; and observes students' development paths over a long period of time, including but not limited to liaising with teachers, parents, and students. In a similar vein, Li and Xin (2021) recommended that the Department of Education develop a CIPO (Context-Input-Process-Outcome) survey architecture that includes two primary components. One is the educational output survey. Standardized exams are used to measure students' cognitive ability; the other is to explore the key factors affecting students' growth, with an emphasis on the development of students' attitudes, emotions, and values. However, Zhu and Ye (2013) argued that incorporating non-cognitive skills into the educational evaluation system is a difficult task because factors such as communication capability and moral strength are complex concepts that are constrained and influenced by a variety of variables, making it nearly impossible to formulate unified standards.

Dong (2020) presented that social evaluation of students' capabilities is still based on students' test scores, i.e., the results of student cognitive ability. This is despite the fact that non-cognitive ability, hailed as essential social and emotional skills in the 21st century, has been accorded increasing importance in the new human capital theories, and its influence on individuals' social behavior even exceeds that of cognitive ability. Prior to the complete transformation of the current evaluation mechanism, the relevant educational authorities must supervise the application of non-cognitive ability instruction in schools. In addition, the media should be encouraged to examine and oversee issues connected to the education of non-cognitive skills in adolescents.

Non-cognitive skills are more malleable in childhood, according to Zhou and Xu's investigation into the best time for non-cognitive ability education in 2021. Heckman and Rozelle (2019) showed that early non-cognitive ability interventions have a greater positive impact on adult economic and social success than later interventions, and that most nations have invested more money in early childhood development programs and vulnerable community child development than they have in other areas. The majority of adult education programs (including vocational training, adult literacy instruction, and offender rehabilitation programs) produce few results, whereas early

childhood intervention programs are more equitable, more cost-effective, and have a history of producing better long-term outcomes. Therefore, it is recommended that non-cognitive ability education be incorporated into the preschool curriculum and be adjusted to the age and ability of the students.

Conclusions

In the past, the majority of studies on student cognition in China and other nations have focused on cognitive capacity, as more reliable and precise measures have been developed to evaluate it at an earlier stage of research. Non-cognitive ability is significantly more difficult to assess than cognitive ability. Although the significance of non-cognitive skills is widely accepted, insufficient study has been conducted on the effects of each specific skill and their training techniques. Due to the complexity of data gathering, non-cognitive ability study remains inadequate. There are still restrictions on data accessibility and coverage (Jiang & Jiang, 2021).

Numerous empirical researches on non-cognitive ability schooling have been undertaken, with varying results. The following are some proposals for future research on this topic: First, investigate family-related aspects that can enhance the development of a child's non-cognitive abilities in order to create new opportunities for the growth of persons. Second, acquire high-quality data and increase the representativeness of samples for a more thorough investigation based on evidence. Third, incorporate global measuring frameworks into China's empirical research to broaden the breadth of non-cognitive skill theories.

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REVIEW

Let Students Engage in Real Learning: An Evaluation of Protocol-guided Learning

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***Abstract**: Both a student-centered instruction approach and a classroom management technique based on the learning protocol are known as protocol-guided learning. This paper describes the protocol-guided learning model's implications for classroom practice and its impacts on classroom reconstruction with the aim of ensuring that learning actually occurs on students. Its definition, advantages, and practical roles are described.*

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THE protocol-guided learning model is derived from critical reviews of the two prevalent classroom instruction modalities in China: one is teacher-dominated, which is typical of traditional classroom teaching, and the other is laissez-faire, which permits an unstructured learning process. The former is opposed to the notion that education should be student-centered, while the latter disregards the guiding function of instructors. Both are estranged from the core of classroom learning (Xia & Zhou, 2021). Student-centered and teacher-led classroom learning can be realized with the assistance of protocol-based instruction.

Protocol-guided learning transitions from teacher control in the classroom to teacher-student collaboration; from a focus on student learning outcomes to an emphasis on the learning process; and from teachers' unilateral knowledge transmission to teacher-student bidirectional communication (Zhang, 2006). In the framework of curriculum reform, implementing student-centered classroom instruction and providing students with the opportunity to develop practical approaches through experiential learning are sensible steps to popularize scientific educational principles and improve the overall quality of education.

The Definition of Protocol-Guided Learning

The protocol-guided learning model was created in response to curricular reform. Traditional classroom education emphasizes teachers' lecturing, disregards the internalization of student information, and fails to account for student-specific learning conditions in lesson planning, resulting in a vague teaching design and a gap between teaching and learning. In contrast, protocol-guided learning requires teachers to investigate student learning status in advance and address the difficulty of the lesson with a step-by-step approach to ensure that students can keep up with class progress and have a complete understanding of the key points highlighted by the learning protocols; teachers reserve sufficient time for free discussion to facilitate student interaction. Huang (2009) contended that protocol-guided learning necessitates a rigorous design of class activities, which may encourage students to arrange each step of the learning process independently and foster students' capacity for self-directed learning and independent thought. Therefore, protocol-guided learning refers to a teaching paradigm in which teachers construct student learning protocols that comprise learning objectives, materials, methods, and procedures prior to the session and utilize them to guide students to engage in more autonomous learning. In this form of instruction, teachers do not explicitly impart knowledge to students but rather direct them to investigate and practice independently; the goal of instruction is to build students' abilities and skills, not to impart knowledge.

The Benefits of Protocol-Guided Learning

In protocol-guided learning, teachers create overall lesson plans based on student learning conditions, which can enhance classroom outcomes, optimize student learning effi-

ciency, and increase student learning interest as well as teacher and student classroom satisfaction.

Enhancing Student Classroom Engagement

Students become more proactive in their learning as a result of the transition in the classroom from a teaching-oriented to a learning-oriented environment. When designing a learning protocol, teachers take into account the academic position and interests of their pupils. The classroom process is permeated with flexible, problem-based activities that enable students to discuss, visualize, and evaluate. As a result of the shift from passive to active learning, students become more interested and motivated to participate in the lesson through independent research and learning (Zhou & Xia, 2020).

Improving Teacher-Student Relationships

In contrast to their traditional function as knowledge transmitters, teachers in protocol-guided learning more often act as learning facilitators, providing assistance and guidance to students as needed. With the help of well-crafted learning protocols, teachers can help students prepare for class, talk in groups during class, conduct independent research, and form their own thoughts and opinions. Teachers and students can work harmoniously together in this environment.

Increasing Classroom Learning Efficiency

The three main components of protocol-guided learning are pre-class preparation, enhanced in-class learning, and post-class extension. Self-directed learning by students based on the procedure can help them become well-prepared for class and fully aware of the challenges they must face there; teachers can increase classroom productivity by responding to students' queries discriminately in accordance with their level of difficulty. Additionally, group discussions in class give teachers a chance to learn more about the level of student learning. Teachers can further elaborate on those frequent issues and skepticisms in response to the outcomes of the group discussion, take appropriate steps during the preparation of upcoming lessons, and modify the teaching process (Dong, 2017).

The Roles of Protocol-Guided Learning in Instructional Practice

Currently, the conventional picture of Chinese classroom instruction is of a teacher lecturing with a textbook. In such a monotonous environment, student thought is inert and inactive, which is adverse to the development of their academic competence. In this context, the protocol-guided learning model, which was designed to promote student autonomy, pro-active participation, and cooperative exploration, has reorganized the curriculum on the premise of "learning before teaching" and has become an impressive

paradigm for classroom quality and efficiency improvement, garnering widespread attention from peers.

The Role of Protocol-guided Learning in Before-Class Preparation

Protocol-guided learning is the practice of encouraging students to develop effective thinking through the use of questions, activities, and tasks. The pre-class learning protocol might include a range of pre-class learning activities for students. It facilitates student integration into learning contexts by introducing familiar concepts and allowing the progression of pertinent knowledge. Teachers might arrange students to study in groups for cooperative learning so that students can learn from each other through exchange and presentation, once they have completed their independent studies. This not only heightens students' awareness of self-reflection but also boosts their self-confidence and enables them to sense the pleasure of teamwork. Pre-class preparation establishes the groundwork for the successful application of protocol-guided learning in the classroom. Teachers should employ a heuristic approach while constructing learning protocols to enable students to think actively and acquire a deep understanding of content through individual investigation (Li, 2014).

The Role of Protocol-Guided Learning in Classroom Activities

Activity-based learning can encourage classroom involvement and foster analytical and problem-solving skills in students. Discussion and group study are the two most popular forms of interactive classroom activities. Nonetheless, group activities in the classroom can be disorderly and ineffective; students are not always well-informed about the topic of discussion and often converse about irrelevant topics. Such group activities waste class time and prevent students from achieving the goal of cooperative learning. In the protocol-guided learning paradigm, comprehensive plans for class activities are created to address the issue of classroom order. Topics for classroom inquiry are included in the protocol, and teachers and students use dialogues and discussions to conduct cooperative exploration according to the "question chain." Students can also learn problem-solving strategies through communication, reflection, and teachers' guidance, thereby enhancing their skills in autonomous study and independent thought. In addition, students are asked to write down the findings of their group discussions, which will be reviewed by professors. Therefore, protocol-guided learning can considerably enhance the efficacy of classroom inquiry and support teachers in attaining the objectives of class activities in accordance with their plans (Gao, 2006).

The Role of Protocol-guided Learning in After-Class Extension

A review of course material after class is essential for student knowledge retention. As a means of reinforcing what has been taught in class, the vast majority of Chinese professors assign pupils a substantial amount of repeated homework. This technique drastically diminishes students' enthusiasm for learning and hinders their knowledge breadth and depth of thought. To reduce student academic burden and achieve effective after-class extension, the protocol-guided learning model replaces endless exercises with innovative after-class activities that integrate theoretical knowledge with life experience of students to improve the transferability of course content and promote students' all-around development (Xia & Zhou, 2020).

The Role of Protocol-guided Learning in Instructional Evaluation

The instructional evaluation is a crucial educational instrument that guides, regulates, and motivates student learning. In protocol-guided learning, instructional evaluation is interwoven into every aspect of student learning, including evaluations of pre-class independent student learning, problem-solving, mastery of learning skills and procedures, and consolidation of information after class. Effective instructional assessment can offer teachers with feedback on their work and reflect students' learning status, so encouraging teachers to enhance their teaching level and motivating students to make up for learning inadequacies. The major indicators utilized by the protocol-guided learning model to evaluate the efficacy of student learning activities are the following: identification of learning objectives, attention and participation, time for self-directed study and reflection, comprehension of the knowledge acquisition process, and application methods. Through these evaluations, the development of students' academic competency is included into every learning process, and students are encouraged to go beyond the textbooks.

Conclusion

Protocol-guided learning can produce optimal instructional outcomes. Utilizing this model in learning activities is not only advantageous for student self-directed learning, but also for classroom efficiency and effectiveness. Notably, the design and authoring of learning protocols necessitate considerable work, and they must be continuously analyzed and modified in order to be utilized as effective tools throughout student learning processes.

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