

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

## **1. 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; Sørli & 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, Willemsse 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 students 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, Sørli 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* (Sørli and Nordahl, 1998). A student version was used to measure students' perceptions of prosocial learning in the classroom. Sørli 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 US, but only a limited number of studies have demonstrated the effects outside the US.

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?

## **2. Materials and Methods**

### **Participants**

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.

Table 1: Characteristics of participating schools

School	Education level <sup>a</sup>	No. students	School particularity	School SES <sup>b</sup>	Geographical characteristic	School type <sup>c</sup>
Experimental 1	Elementary	84		4	Suburban	Public (state level)
Control 1	Elementary	149		7	Suburban	Public (state level)
Experimental 2	Elementary	127	Bilingual (French-German)	5	Suburban	Public (state level)
Control 2	Elementary	204	Bilingual (French-English)	4	Suburban	Public (state level)
Experimental 3	Elementary	208	Bilingual	19	Rural	Public (municipality)
Control 3	Elementary	149	Bilingual	18	Rural	Public (municipality)
Experimental 4	Middle school	160	Grades 7 & 8 only	2	Urban	Private (but mainly state-funded)
Control 4	Middle school	180	Grades 7 & 8 only	3a	Urban	Private (but mainly state-funded)
Control 4'	Middle school	115	Grades 7 & 8 only	1	Urban	Private (but mainly state-funded)

Notes:

- 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).

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 detailed 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 (.80), structure for learning (.84), physical environment (.74), peer and adult relations (.88), parent involvement (.83), school safety (removed because of a lack of internal consistency)
- Georgia School Student Elementary Survey (15 items): school climate (.71), peer victimization (.79)
- Georgia School Student Secondary Survey (67 items): school connectedness (.68), physical environment (.68), adult support (.85), peer support (.67), cultural acceptance (.71), order and discipline (.64), school safety (.46), parent involvement (removed because of a lack of internal consistency), peer victimization (.83), character (.80)
- Georgia Parent School Climate Survey (24 items): Teaching and learning (.70), school safety (.80), interpersonal relationships (.85), institutional environment (.65), parent involvement (.47)

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

Disciplinary climate (.77): five items (4-point Likert scale) measuring disciplinary climate in the classroom.  
Teacher unfairness (.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).

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: 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 <sup>1</sup>	Winter and spring, beginning of implementation
	Winter and spring, after 1 year of implementation
	Winter and spring, after 2 years of implementation <sup>2</sup>

Notes: 1. Only in the experimental group.

2. Due to COVID-19, the external assessment of implementation fidelity planned for June 2020 was cancelled.

## 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**

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. Surveying 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.

Table 3: Questionnaires and response rates

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

Notes: 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

## **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).

### 3. 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.

Table 4: Baseline equivalence between experimental and control group

Questionnaire version	Sub-scale	Experimental group		Control group		Effect size (Cohen $\delta$ )
		$\mu$	$\sigma$	$\mu$	$\sigma$	
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

### Cultural fit of the intervention

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

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%

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

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.

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.



Table 6: Effect sizes after two years of implementation - Elementary pupils (grades 4 to 6)

School connectedness (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
	$\mu$	-0.20	0.01	0.03		0.11		
$\sigma$	1.04	1.02	0.91	0.92	+0.13	1.07	1.18	+0.45
n	108	94	108	131		56	59	
Order and discipline (environment)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
	$\mu$	0.31	0.29	0.19		0.34		
$\sigma$	0.73	0.72	0.71	0.76	-0.23	0.75	0.74	-0.25
n	108	94	108	131		56	59	
School safety (safety)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
	$\mu$	0.28	0.09	-0.02		0.14		
$\sigma$	0.87	0.96	0.80	0.79	-0.38	1.11	0.83	-0.09
n	108	94	108	131		56	59	

Peer victimization - reversed scale (safety)	SCP		Control		ES (Morris $\delta$ )		ES (Morris $\delta$ )	
	SCP	Control	SCP	Control	SCP	Control	SCP	Control
$\mu$	0.18	-0.21	0.06	0.20			0.40	0.31
$\sigma$	1.27	1.28	1.24	1.31	-0.41		1.43	1.30
$n$	108	94	108	131			56	59

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.

Tableau 7: Effect sizes after two years of implementation - Secondary students

School connectedness (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-0.09	-0.07	-0.09	0.06		0.40	-0.13	
$\sigma$	1.08	1.06	1.68	0.86	-0.12	0.91	0.85	+0.51
n	130	205	131	192		123	245	
Peer support (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Contrôle	SCP	Control		SCP	Contrôle	
$\mu$	-0.24	0.01	-0.16	0.02		0.26	0.07	
$\sigma$	1.09	1.22	1.20	1.19	+0.06	1.25	1.20	+0.37
n	130	205	130	192		123	245	
Adult support (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-0.12	-0.10	-0.03	-0.01		0.55	-0.64	
$\sigma$	2.28	2.20	2.45	2.19	0.00	1.85	2.21	+0.54
n	129	205	128	192		123	245	

Cultural acceptance (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
	$\mu$	-0.53	-0.09	-0.01	0.10		0.26	0.16
$\sigma$	1.50	1.48	1.66	1.49	+0.22	1.47	1.69	+0.37
n	129	205	128	192		123	244	

Character (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
	$\mu$	-0.06	-0.01	-0.05	0.18		0.14	-0.13
$\sigma$	1.39	1.16	1.33	1.24	-0.14	1.02	1.18	+0.25
n	127	205	130	192		123	244	

Physical environment (environment)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
	$\mu$	-0.09	0.01	-0.17	0.24		-0.04	-0.05
$\sigma$	1.29	1.14	1.26	1.13	-0.26	1.09	1.18	+0.09
n	127	205	129	192		123	244	

School safety - reversed scale (safety)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	0.11	-0.02	-0.03	-0.08		0.01	0.03	
$\sigma$	0.47	0.44	0.63	0.63	-0.18	0.59	0.61	-0.34
n	126	205	129	192		123	244	

Peer victimization - reversed scale (safety)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	0.86	0.65	0.62	0.39		0.45	0.59	
$\sigma$	1.37	1.28	1.44	1.23	+0.02	1.23	1.32	-0.27
n	124	205	128	190		123	244	

Order and discipline (environment)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-0.06	0.07	0.04	0.01		0.18	-0.08	
$\sigma$	0.80	0.83	1.02	0.76	+0.20	0.79	0.86	+0.48
n	123	204	128	192		123	242	

Disciplinary climate - reversed scale (environment)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
	$\mu$	0.18	0.10	0.08	-0.15		-0.39	0.06
$\sigma$	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 $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Contrôle	SCP	Control		SCP	Contrôle	
	$\mu$	0.60	0.48	0.56	0.40		0.33	0.58
$\sigma$	1.07	1.07	1.14	0.92	+0.04	0.91	1.00	-0.34
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.

Table 8: Effect sizes after two years of implementation - Parents

Teaching and learning (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-0.12	-0.32	0.09	-0.27		0.35	-0.13	
$\sigma$	1.72	2.01	1.68	1.70	+0.09	1.80	1.76	+0.15
n	322	315	361	337		300	410	

  

School safety (safety)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-0.24	-0.35	0.19	-0.12		0.11	-0.11	
$\sigma$	1.98	2.01	1.84	1.91	+0.10	1.87	1.87	+0.06
n	322	320	361	340		299	412	

  

Interpersonal relationship (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	0.01	-0.23	0.23	-0.12		0.26	-0.31	
$\sigma$	1.70	1.94	1.84	1.79	+0.06	1.82	1.70	+0.18
n	321	319	361	338		300	414	

Institutional environment (environment)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	0.01	-0.15	-0.22	-0.33		-0.17	-0.63	
$\sigma$	2.25	2.28	2.38	2.24	-0.02	2.47	2.39	+0.13
$n$	316	317	360	337		298	413	

  

Parent involvement (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	0.03	-0.11	0.01	0.13		0.11	-0.13	
$\sigma$	1.43	1.45	1.46	1.50	-0.18	1.56	1.41	+0.07
$n$	319	316	361	335		297	409	



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 stakeholders 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.

Table 9: Effect sizes after two years of implementation – School staff members

Staff connectedness (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	0.13	0.37	-0.29	0.18		-0.81	-0.10	
$\sigma$	2.05	2.11	2.54	2.04	-0.11	2.51	2.27	-0.23
n	74	65	69	84		56	52	
Structure for learning (environment)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-0.64	0.40	0.15	-0.06		0.15	-0.09	
$\sigma$	1.84	2.42	1.89	1.92	+0.58	2.17	1.99	+0.60
n	74	65	69	84		56	52	
Physical environment (environment)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	0.32	0.31	0.03	-0.44		-0.14	-0.14	
$\sigma$	1.76	1.86	1.31	1.45	+0.25	1.37	1.33	-0.01
n	74	65	69	84		56	52	

Peer and adult relations (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-1.19	0.12	0.44	-0.23		0.32	0.59	
$\sigma$	2.23	3.20	2.02	2.48	+0.72	2.14	2.24	+0.38
n	73	65	69	84		56	52	

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Parent involvement (engagement)	T0		T1		ES (Morris $\delta$ )	T2		ES (Morris $\delta$ )
	SCP	Control	SCP	Control		SCP	Control	
$\mu$	-0.66	0.62	0.50	-0.71		0.36	0.11	
$\sigma$	2.77	2.43	2.42	2.37	+0.95	2.25	2.19	+0.58
n	73	62	65	80		56	49	

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

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

#### 4. 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 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 Sørli & 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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