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SAFE schools: Feasibility and impact of a universal comprehensive approach to managing adolescent aggressive behavior in schools

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ABSTRACT

We investigated the feasibility and outcomes of 'SAFE schools', a comprehensive and universal intervention approach to school-based adolescent aggression, applied to students and/or teachers. Though a minority of schools were receptive to the intervention, those who were considered the interventions socially valid. Quantitative data taken from 145 students and 53 teachers allocated to one of four conditions (i.e., teacher-only, student-only, combined intervention, no-intervention) show increased relational and reputational aggression for all conditions and increased overt aggression for the combined intervention, from pre- to post-intervention. Alternatively, students reported increased awareness of their difficulties and perceived relevant changes following the intervention. An increased use of an authoritarian teaching style was observed in the teachers-only condition. Qualitative data suggests increased knowledge on aggressive behavior and the adoption of alternative behaviors by both students and teachers. These findings highlight the importance of distinguishing between awareness and behavioral practice, as well as considering the characteristics of school contexts and the target population when implementing interventions and accessing outcomes.

1. Introduction

The current work presents feasibility and efficacy outcomes of the 'SAFE Schools' intervention, which was designed based on the social information processing model and applied as an universal approach to changing the practice of aggression by adolescents in school settings. Aggressive acts are practiced and received by more than 30 % of adolescents, being particularly high during early adolescence (González-Cabrera et al., 2022), and gravely impact students, teachers, and schools (Polanin et al., 2021).

Adolescent aggressive behavior may be practiced in response to perceived provocations (i.e., reactive aggression) or as a rational option to achieve one's goals (i.e., proactive aggression) Also, it may be assume a physical/overt (i.e., use or threat to use physical force) or relational form (i.e., damage or threat to damage the victims' relationships; Fite et al., 2023). Besides the aggressor who intentionally inflicts harm to others, aggression involves the victim who perceives to having received harm from another, and the bystander(s) who are present when the aggressive act occurs and whose actions may serve either to aid the aggressor or the victim. So,

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adolescent aggression may be seen as a group process that usually takes place in schools (Salmivalli, 2010).

The impact of aggression in schools includes impaired learning environment (Bru, 2009), compromised academic performance (Vuoksimaa et al., 2021), proneness to teachers' experiences of burnout (McCarthy et al., 2009), and overall hostile school climates (Goldstein et al., 2008). A recent meta-analysis further showed that school-violence has a longitudinal effect on students' mental health, academic achievement and involvement in criminal or delinquent acts (Polanin et al., 2021). Alternatively, schools may be contexts for successful interventions (Waschbusch et al., 2019) and serve as optimal contexts to encourage developmentally adaptive learning and well-being (García Bacete et al., 2014).

1.1. The Social Information Processing Model applied to school-based adolescent aggression

The Social Information Processing (SIP) Model was developed as a conceptual framework for understanding and changing aggressive behavior. It assumes that SIP plays a mediating role between a social event and the behavioral response given to it (Crick & Dodge, 1996). Specifically, the individual begins by encoding and assigning meaning to social cues present in any given social event. The individual then defines intended goals for that event, accesses and assesses possible response options, and finally chooses and engages in one of them (Crick & Dodge, 1994; Martel, 2019). Aggression has been consistently associated with biased SIP, particularly in relation to an hostile attribution bias, meaning that aggressive individuals (including children and adolescents; Martinelli et al., 2018) tend to assume others have hostile intentions towards them (Smeijers, 2023). This attribution style may, also, be influenced by the emotional state the individual is experiencing (Lemerise, 2010). Previous reviews sustain the applicability of the SIP model for explaining victimization (van Reemst et al., 2016) and aggression (Smeijers et al., 2020), as well as socially competent behavior (Gifford-Smith & Rabiner, 2004) and the intention to act against aggression by bystanders (Gundlach et al., 2003).

The SIP model has also been applied to the design of interventions to promote social competence and prevent aggressive behavior (Li et al., 2013) SIP-based intervention applications include reassigning meaning to ambiguous social situations, diversifying one's behavioral repertoire, promoting the practice of adjusted social behaviors, and promoting emotion regulation strategies, particularly in relation to anger (Boxer & Dubow, 2001). A recent review of SIP-based interventions suggests meaningful changes in hostile attribution bias, goal formulation, response decision, and aggressive and disruptive behavior when applied to children and adolescents (Peng et al., 2024). Out of 42 works included in that review, only three considered interventions implemented in schools towards adolescent aggression. Outcomes from these works were non-consensual. Williamson et al. (2013) implemented the 'Positive Life Changes' to adolescents at-risk for aggression who volunteered to participate and found pre to post-intervention reduction in the practice of physical and verbal aggression. Instead, Fung (2012) had social workers intervene with adolescents who were reactive aggressors and found no change from pre to post-intervention; participants reported diminished reactive aggression (but not proactive aggression) starting at three-months follow-up that seemed to be sustained at one and two-years follow-ups. Likewise, Sharma et al. (2020), who worked with students within classes, found that physical and nonphysical aggression and victimization decreased only at the 6-months follow-up but not at post-intervention. The 'Responding in Peaceful and Positive Ways' is also based on the SIP model. Although not statistically significant, its results showed that, at post-intervention, participants in the intervention group had fewer disciplinary violations for violent offenses, fewer in-school suspensions, and reported resorting more to mediating strategies, compared to the control group (Farrell et al., 2001, Farrell et al., 2002). Only one of these works considered aggression as a group process within classes (i.e., Sharma et al., 2020); none considered intervening with other school personnel, namely teachers, independently or in combination with interventions targeting students.

Within an ecological and universal approach to changing school aggression (Espelage, 2014), teachers may be an important resource. Interventions with teachers are based on the assumption that teachers (as well as same-aged peers) might influence students' aggressive behavior, both positively and negatively (Kuhn et al., 2015), and hold a fundamental role in managing that behavior (Ahtola et al., 2012). Teachers often assume an observer role towards an aggressive interaction (Skaalvik & Skaalvik, 2010). Alternatively, they may consciously adopt the role of social models that students can imitate when interacting with peers (e.g., observing a teacher who praises their students can lead adolescents to use less aggressive strategies; Weyns et al., 2017). Fostering teacher's knowledge and awareness of all types of aggressive behaviors while engaging them in managing students' behavior may contribute to decreasing the intensity/frequency of disruptive behaviors and enhance the potential of interventions (Kuhn et al., 2015).

1.2. The 'SAFE schools' intervention

SIP-based interventions to mitigate aggression in schools have shown modest and variable results. Moreover, previous works have seldomly presented thorough information on the intervention feasibility, though it has been found to impact intervention outcomes (Waschbusch et al., 2019). None of these works reported on the multitude of the forms (i.e., overt, relational or reputational aggression) and functions (i.e., proactive or reactive) of aggression as they are usually practiced in schools by adolescents (Fite et al., 2023), considered change as reported by both teachers and adolescents, or explored diverse intervention effects based on who receives the intervention (i.e., students, teachers, or both). Also, they did not consider the relevant roles of aggressors, victims, and observers (either peers or teachers) in sustaining aggressive interpersonal cycles, unlike what has been done within college settings (Bell et al., 2019).

The 'SAFE Schools' intends to address these issues that have not been considered in previous literature: the 'SAFE Schools' intervention protocols are based on the SIP model and developed to target whole classes where adolescent aggression may unfold, including students and/or their teachers, who reported on the multiple forms and functions of aggression. The current work presents three studies that combine evidence on the feasibility and impact of the 'SAFE schools' intervention.

Study 1 considers the following research question: Is the 'SAFE Schools' intervention protocol feasible to be transferred/applied to real-world contexts, such as schools and classrooms? We will consider aspects related to the preparation (i.e., design procedures and practicability) and to the implementation (recruitment capability, data collection procedures, social validity, and fidelity; Gadke et al., 2021) of the 'SAFE Schools' intervention. This data will allow better interpretation of outcomes taken from Studies 2 and 3 and will inform future attempts to apply school-based interventions targeting adolescent aggression.

Study 2 addresses the following research question: Is the 'SAFE Schools' intervention effective in producing changes in outcomes related to aggression in schools? This study relied on a non-randomized cluster trial methodology and gathered quantitative data across three assessment moments (i.e., from pre-intervention to post-intervention and to a one-month follow-up) and between four conditions: intervention with teachers only, intervention with students only, intervention with teachers and their students (i.e., combined intervention), and no-intervention. Primary outcomes are aggression perpetration and victimization; secondary outcomes are assertive and prosocial behavior reported by students as well as teacher-student relationship quality and teaching styles reported by teachers. We expect aggression perpetration and victimization to decrease (Williamson et al., 2013) and practice of prosocial and assertive behavior to increase (Sharma et al., 2020) across time, especially for the intervention with students only and the combined intervention conditions. We also expect better teacher-student quality across time (Duong et al., 2018; Mikami et al., 2011), which may reflect in increased practice of authoritarian teaching styles, particularly for the intervention with teachers only and the combined intervention conditions.

Study 3 focuses on the following research question: Do participants in the 'SAFE Schools' intervention perceive change following that intervention? Qualitative data was gathered, and we expect that data to mirror quantitative data collected in Study 2. Results from studies 2 and 3 will contribute to the sparce literature on the efficacy of SIP and school-based universal interventions, specifically adding data on changes on the forms and function of aggression and based on who received the intervention.

2. Study 1 – feasibility of the 'SAFE schools' intervention

Study 1 explores the feasibility of the 'SAFE schools' project, namely its preparation (i.e., Design procedures and Practicality) and implementation processes (i.e., Recruitment capability, Data collection procedures, Fidelity of implementation, and Social validity) as defined by Gadke et al. (2021).

2.1. Preparation of the 'SAFE schools' project

2.1.1. Design procedures

This work was initially designed to be controlled trial randomized at the school level. However, schools' availability was conditional on choosing their allocated condition, and so we adopted a non-randomized cluster trial (NCT) methodology comparing before-and-after changes across groups (Schmidt, 2017). Written informed consent was obtained from adult participants (i.e., teachers) and from students' guardians before any procedure was implemented; adolescents themselves agreed to participate voluntarily in the study. All participants, regardless of condition, were assessed using the same set of self-report questionnaires, at three times (i.e., T0, T1 and T2) with a 14-week interval between T0 and T1 and a 4-week interval between T1 and T2. The interventions conditions took place between T0 and T1.

This design reflected the theory of change considered in this work, namely that aggression is a self-sustained interaction cycle (e.g., Hornby, 2016) and so changes were explored based on targeting one (i.e., student only or teacher only) or more participants (i.e., students and teachers) in that cycle. The inclusion of a control group allowed more confident attribution of changes to the intervention conditions. Based on *a priori* sample size calculation for 3 (time) * 4 (conditions), for an effect size estimated at 0.25 and power placed at .95, we expected a minimum of 15 students and 15 teachers in each condition; analyses are to be conducted separately for students and teachers.

As for our independent variable (i.e., our intervention conditions), two intervention manuals, one aimed at students and another aimed at teachers, were developed. Interventions were designed to be delivered in a group format and were based on the cognitive and emotional processes defined by the SIP model. The 'SAFE schools' intervention for students comprises 14 weekly sessions of approximately 60 min each (see Table A the Supplementary Material). The 'SAFE schools' intervention for teachers comprises 25 hours distributed over the course of 14 weeks (see Table B in the Supplementary Material).

2.1.2. Practicality

The interventions required only physical resources usually available in classrooms (e.g., chairs, computers). Students' intervention sessions used the time allocated to a regular class and schools scheduled the weekly sessions according to their availability. The teachers' intervention was scheduled according to the teachers' availability during a 14-week period. No additional resources were requested from schools. The management team has vast experience in intervening in school-contexts (though mainly with internalizing difficulties), and with adolescents presenting aggressive behavior (though mainly in forensic contexts). The facilitators were two masters in psychology with previous clinical experience working individually with adolescents and had specific training and assiduous supervision when conducting the interventions.

2.2. Implementation of the 'SAFE schools' project

2.2.1. Recruitment capability

Schools were purposefully selected within those placed in educational territories of priority intervention (i.e., TEIP schools; http://www.dge.mec.pt/teip) that have higher manifestations of violence and indiscipline, among other vulnerabilities. This criterium was applied based on previous works showing more evident change in aggressive behavior for students who reported more practice of that behavior at the onset of the intervention (e.g., Farrell et al., 2001, 2022 when targeting students or Nixon & Werner, 2010; Simon et al., 2008 when targeting students and teachers). Based on geographical convenience and on targeting the age group with higher prevalence of aggression (i.e., early adolescence; González-Cabrera et al., 2022), we sought TEIP schools that taught the 7th through 9th grades (i.e., students aged 12 to 15 years old) in the northern region of Portugal (n = 49).

Schools were contacted only after research procedures were approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra and the General Directorate of Education. Twenty-seven schools were contacted, of which four accepted to participate (see Figure 1; retainment rate of 14.81 %); as schools closer to the urban center refused, the research team gradually contacted schools located further. Schools were contacted and accepted throughout the school year and were receptive only to receiving the condition of their choice. The combined intervention started in November 2022, the student only intervention commenced in January 2023, and the teacher only intervention initiated in March 2023. Another school was allocated to the control group (CG), and pre-intervention data was collected in February 2023. Schools were asked to refer classes attending the 7th to 9th grades and presenting peer-to-peer and/or peer-to-teacher aggressive behaviors. All schools signaled one class from each school grade (i.e., one 7th, one 8th, and one 9th school grade), except for the teacher only condition who signaled one 7th grade and two 8th grade classes because there was no 9th grade class fulfilling the inclusion criteria.

All participants were properly informed about the goals of the current work, the confidentiality and anonymity of the data they would provide, and the voluntary nature of their participation. Then, written informed consent was requested from parents/ legal guardians of students, in addition to students' verbal informed assent. Written informed consent was also requested from all adult participants themselves. No incentives were provided for students; teachers had the opportunity to receive credits for training if participating in the complete intervention.

2.2.2. Data collection procedures

Outcome data collection procedures include self-report questionnaires (for collecting quantitative data) and focus groups (for collecting qualitative data).

The self-report questionnaires were selected based on their psychometric quality as applied to Portuguese adolescents and to Portuguese teachers. All instruments were used in their Portuguese version. The research protocol took approximately 30/45 min to complete and was answered in paper format. Descriptive scores for our primary outcome measures (i.e., practice of aggressive behavior reported by students) show that scores are similar across intervention conditions (see Pre-intervention scores for the Practice of Aggressive Behavior in Table C in Supplementary Material), with all $ps > .11$. Those scores also show an evident deviation to the left, meaning a tendency for reporting lower levels of aggression (see Table C in Supplementary Materials) that were, on average, like those reported previously using school-based adolescent samples.

Focus groups were based on class groups for students and on intervention groups for teachers, considering that their shared experience might facilitate a more comfortable, sincere, lively, and fluid discussion. The intervention leaders served as moderators for the focus groups, to facilitate a non-threatening environment (Hennink, 2013). Focus groups took place in the schools, after the post-intervention or the follow-up assessment, based on the availability of participants. The agenda for these focus groups included: a) welcoming and providing a brief overview of the goals of the discussion, b) acknowledging participants as experts on their own experiences and asking them to share that experience under the principles of non-judgment, anonymity, and confidentiality, and c) flexibly going through the script of the focus group. That script addressed two main contents, namely how participants characterized their behavior and interactions before the intervention began, and if they perceived changes during and/or after the intervention had ended and why. Focus groups lasted between 15 to 20 min each and were audio recorded and fully transcript shortly after.

2.2.3. Social validity

Both students and teachers spoke about the reasonableness and appropriateness of the interventions in the focus groups conducted after the intervention had ended.

Students spoke about the intervention being relevant to their needs (e.g., "*I thought the sessions were necessary*" or "*I would like to continue with the sessions*"); having enjoyed the dynamics of the intervention (e.g., "*(…) the program was very interesting [and the dynamics] were fun and interesting.*" or "*I really enjoyed the sessions, as each one was more creative than the other.*"); and perceiving the intervention as useful in improving the classroom climate (e.g., "*I think that the class, with the sessions, started to get closer and to relate better*" or "*(…) the sessions were very good for the class in general, and our behavior improved a lot.*"). Students also suggested more role-play activities as an opportunity to improve the intervention (e.g., "*I think we should have done more role-play dynamics*").

Teachers considered the intervention appropriate to their needs (e.g., "*(…) this type of intervention should happen more often in schools*"). They also spoke about the intervention being useful to promote changes, particularly referring to the usefulness of role-play dynamics [e.g., "*I think that the role-plays, (…) which is learning by doing; if we do it, it is registered in a more intrinsic way, (…) so it's easier to act that way afterwards*"]. Finally, they suggested the intervention should also target families [e.g., "*(…) this intervention should be with students and parents, and with us too*"].

2.2.4. Fidelity of implementation

Fidelity of implementation considered adherence and participant responsiveness, for each intervention condition. Information was taken from the Goal Attainment forms facilitators completed after each session and from supervision meetings.

2.2.4.1. Combined intervention. Sessions with students and their teachers were applied during the same period (i.e., between November 2022 and March 23) and separately. Students sessions were applied weekly whereas teachers received 12 sessions with a weekly or fortnightly frequency; both interventions were interrupted during school breaks. About the intervention with students, different implementation trajectories occurred. In the 7th grade, 8 of the 14 sessions (57.14 %) were applied as planned; the goals of three sessions were hindered by students aggressive behavior and another three sessions had to be adapted *a priori* because facilitators anticipated and/or were informed by students to expect low participant responsiveness. In the 8th grade 11 of the 14 sessions (78.57 %) were applied as planned; two sessions were *a priori* adapted and one sessions' goals were not accomplished due to students' behavior. In the 9th grade, all 14 sessions (100 %) were implemented as planned. Regarding the intervention with teachers, 5 of the 7 themes were addressed as planned (71.43 %). It was necessary to adapt the intervention in relation to two themes, in one case due to group destabilization and in the other to encourage participant responsiveness.

2.2.4.2. Students only intervention. Thirteen of 14 sessions (95.86 %) were implemented between December 2022 and May 2023 on a weekly basis and stopping for school breaks. One session was not applied for the 7th and 9th grades because teachers were on strike and so did not make their class available; as a contingency plan, two sessions were combined into one so that students had access to all intervention contents. For the 8th grade, the last session could not be implemented because the teacher opted to use the time allocated to the session for other purposes.

2.2.4.3. Teachers only intervention. The intervention was applied during 11 sessions occurring between March and June 2023, with a weekly or fortnightly periodicity and interrupted in periods of school breaks. Six of seven themes (85.71 %) were implemented as planned. The objectives associated with one of the themes were not fulfilled (i.e., alternative behaviors/ forms of supporting the victim) due to low participant responsiveness, who considered this theme as irrelevant compared to their concerns focused on the aggressor.

3. Study 2 – quantitative outcomes following 'SAFE schools'

Study 2 presents quantitative results based on a before-after-follow-up non-randomized cluster trial. The recruitment procedures are described above (see '1.2.1. Recruitment capability' section in Study 1) as are the Intervention Plans and Goals (see '1.1.1. Design procedures' section in Study 1 and Tables A and B in Supplementary Material). Here, we detail the methods used for collecting quantitative data via self-report, the participants' flow and sample characterization, the data analyses plan, and the results, firstly for students and then for teachers.

3.1. Students' self-reported quantitative change

3.1.1. Adolescent self-report assessment protocol

Students reported on their practice of aggressive behavior using the Peer Conflict Scale – Brief (Brief PCS, Scott et al., 2014; Portuguese version by Vagos et al., 2023) and the Revised Peer Experience Questionnaire (RPEQ, Prinstein et al., 2001; Portuguese version by Queirós & Vagos, 2016). They also reported on their victimization experiences based on the RPEQ. Finally, they informed on their practice of prosocial behavior using the RPEQ and assertive behavior using the Short form of the Scale for Interpersonal Behavior – Short SIB-S, Arrindell et al., 2002; Portuguese version by Vagos et al., 2014). Students in the combined and the students only conditions also filled in the Subjective Perception of Change Scale (SPCS), which was developed for the current work.

The **Brief PCS** uses 20 items to assess four combinations of the forms and functions of aggression: proactive relational (e.g., "*I enjoy making fun of others*"), proactive overt (e.g., "*I start fights to get what I want*"), reactive relational ("*Sometimes I gossip about others when I'm angry at them*"), and reactive overt aggression (e.g., "*I threaten others when they do something wrong to me*"). Items are rated on a 4-point *Likert* scale (1 = '*it has nothing to do with me*' to 4 = '*it has everything to do with me*'). The Portuguese 20-item version for adolescents revealed factorial validity for a four-factor solution, at least acceptable consistency values (i.e., $\alpha \geq .67$ for proactive relational), and sex-based invariance (Vagos et al., 2023). Analyses into internal consistency values using the current sample (see '2.1.2. Participants' flow below') showed that items 1 and 2 notably lowered the Cronbach alphas of the proactive relational and reactive relational measures respectively and were thus excluded. Internal consistency values were: $\alpha \geq .65$ at pre-intervention, $\alpha \geq .81$ at post-intervention, and $\alpha \geq .85$ at follow-up.

The **RPEQ** uses 14 items answered using a 5-point *Likert* scale (1 = '*never*' to 5 = '*a few times a week*') to assess overt, relational, and reputational forms of perpetrating aggression (e.g., "*I hit, kicked, or pushed another teen in a mean way*") and of victimization (e.g., "*A teen hit, kicked, or pushed me in a mean way*"). It also assesses practicing and receiving prosocial behavior. The Portuguese version has shown factorial validity and sex-based invariance of two four-factor models, one on practicing and the other on receiving those behaviors. It also showed construct validity in relation to another measure of aggressive behavior, to attachment to parents and peers, and to psychopathic traits. Acceptable indicators of internal consistency (i.e., $\alpha \geq .75$ for the aggressor version and $\alpha \geq .76$ for the victim version) were also found (Neto-Queirós & Vagos, 2016). Using the current sample (see '2.1.2. Participants' flow below'),

internal consistency values were: α ≥ .64 for the aggression measures, α ≥ .74 for the victimization measures, and α ≥ .81 for the prosocial behavior measures at pre-intervention; α ≥ .72 for the aggression measures, α ≥ .74 for the victimization measures, and α ≥ .85 for the prosocial behavior measures at post-intervention, and α ≥ .82 for the aggression measures, α ≥ .80 for the victimization measures, and α ≥ .89 for the prosocial behavior measure at follow-up.

The **SIB-S** uses 25 items to measure the discomfort felt when practicing assertive behaviors and the frequency with which one acts assertively; only the latter was used. It uses a 5-point *Likert* scale (1 = '*never*' to 5 = "always") to address four forms of assertive behavior: expressing negative feelings (e.g., "*Discussing with someone your impression that they are trying to avoid you*"), expressing and managing personal limitations (e.g., "*Telling someone who has justly criticized you that he/she is right*"), taking initiative (e.g., "*Telling a group of people about something you have experienced*"), and expressing positive feelings. (e.g., "*Acknowledging a compliment on something you have done*"). In its original version, the SIB-S revealed factorial validity and at least acceptable internal consistency values (i.e., α ≥ .67; Arrindell et al., 2002). The Portuguese adolescent version revealed factorial validity of the four-factor model, at least internal consistency values (i.e., α ≥ .68) for its measures, and construct validity in relation to another measure of assertive behavior (Vagos, et al., 2014). Using the current sample, item 23 and items 5 and 16 considerably lowered the Cronbach alpha values of the expressing negative feelings and the expressing positive feelings measures, respectively and were thus excluded. Thus constituted, at least acceptable internal consistency values were found: α ≥ .60 at pre-intervention; α ≥ .75 at post-intervention, and α ≥ .74 for the at follow-up.

The **SPCS** assess respondents' awareness of the need to change and perception of change. About awareness, students were asked to report both recalled awareness (i.e., as it was before de intervention; 3 items, e.g., "*I had some difficulties in establishing relationships with others and thought it would be nice to try to solve them*"; α = .74), awareness at post-intervention (3 items, e.g., "*I still have some difficulties in establishing relationships with others and think it would be nice to try to solve them*"; α = .75), and awareness at follow-up (α = .70). The perception of change considers change in the way students' think, act, and relate to others as it happened during the intervention (7 items, e.g., "*Throughout the intervention I gradually felt more able to manage my difficulties in establishing relationships with others*"). Perception of change was reported at post-intervention (α = .89) and at follow-up (α = 90).

3.1.2. Adolescent participants' flow

See Fig. 1 for a detailed account of students' flow within the 'SAFE schools' project. A total of 145 adolescents were enrolled, aged between 12 to 18 years old and attending the 7th through 9th grades. Most had never been retained in the same school year, lived with their nuclear family, came from a low socioeconomic status family, and were not receiving psychological counselling at the time of enrolment (Table 1). Adolescents were allocated as follows: 39 attended the combined intervention (26.9 %) with a dropout rate of 30.77 % at follow-up; 48 attended the students only intervention (33.1 %) with a dropout rate of 10.42 % at follow-up; 36 were allocated to the teachers only intervention (24.8 %) with a 100 % dropout rate at follow-up[1]; and 22 were part of the control group (15.2 %) with a dropout rate of 36.36 % at follow-up.

Adolescents in the diverse conditions were evenly distributed by sex [$\chi^2_{(3)} = 1.10$, $p = .78$], household [$\chi^2_{(3)} = 3.37$, $p = .34$], and receiving psychological counselling at enrolment [$\chi^2_{(3)} = 7.51$, $p = .06$]. Concerning school grade, there were more 8th graders in the teachers only intervention group [$\chi^2_{(6)} = 18.73$, $p = .005$], as expected based on school referral (see '1.2.1. Recruitment capability' section in Study 1); this also resulted in significant mean age differences across conditions [$H_{(3)} = 25.02$, $p < .001$], with participants in that condition being significantly younger. Adolescents were not evenly distributed by history of school retentions [$\chi^2_{(3)} = 19.58$, $p < .001$]: there was a higher prevalence of students who had been previously retained in the combined intervention condition.

3.1.3. Data analyses and results

Analyses concerning aggressive, prosocial, and assertive behavior, as well as victimization, awareness and perception of change, were conducted based on intention-to-treat. Linear mixed-effect models were used to investigate change across time and condition (i.e., fixed effects); participant-specific random intercepts were incorporated to account for the nested data structure. Significant fixed effects were further explored via planned multiple comparisons using the Bonferroni correction. Non-parametric tests were used to explore the effects of time (paired-samples via the Friedman or the Wilcoxon Signed Rank test, as appropriate) and/or the effects of condition (independent-samples via the Kruskall-Wallis or the Mann-Whitney U test, as appropriate). Linear mixed-effects models were subsequently conducted to explore the impact of sociodemographic variables that diverged between conditions (i.e., school year, history of school holdbacks, and age). All time and condition effects were unchanged when considering the effects of these variables and so these results are not reported. Only significant effects are detailed; other results will be made available by the corresponding author without undue reservation. Analyses were performed via the statistical programming environment R (R Core Team, 2017) using the lme4 and the asbio add-on packages.

3.1.3.1. Change in aggressive behavior. No significant fixed effects for time, condition or interaction of time and condition were found for any of the four combinations of the forms and functions of aggression, nor for any form of victimization.

Time had a significant effect on forms aggression; for overt aggression, the interaction effect was also statistically significant (Table 2). About time, there was a significant increase from pre- to post-intervention for relational aggression ($M = 4.52$, $SD = 1.91$ to

[1] Students were on summer vacation at that moment and the school was not available to contact them. Dropout rates at post-intervention were 20.51% for the combined intervention, 6.25% for the student only intervention, 2.77% for the teachers only condition, and 0% for the control group.

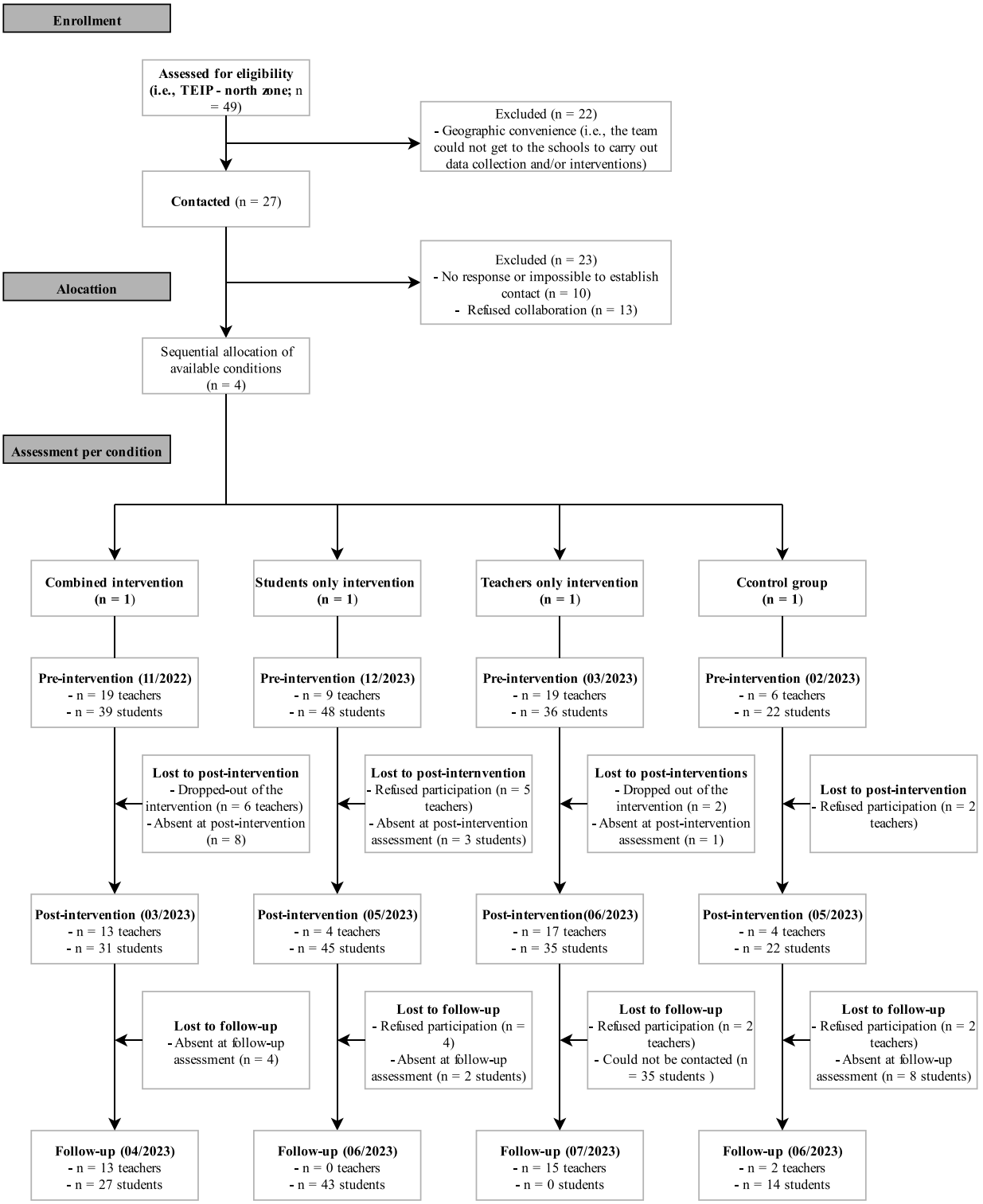

Fig. 1. Participants' flow for the 'SAFE schools' project.

$M = 5.14$, $SD = 2.32$; $z = -2.87$, $p = .004$); there was also a significant increase from pre- to post-intervention ($M = 3.68$, $SD = 1.62$ to $M = 4.22$, $SD = 1.87$; $z = -3.41$, $p = .001$) and from pre-intervention to follow-up ($M = 3.68$, $SD = 1.62$ to $M = 4.38$, $SD = 2.34$; $z = -3.46$, $p = .001$) for reputational aggression. About overt aggression, differences were only significant for the combined intervention [$\chi^2_{(2)} = 11.04$, p = .004]: for that condition, overt aggression increased from pre- to post-intervention ($z = -3.19$, $p = .001$; see Table 3).

Table 1
Student sample description, for the complete sample and by condition.

	Complete sample (n = 145)	Combined (n = 39)	Students (n = 48)	Teachers (n =36)	Control (n = 22)
Age [M(SD)]	13.63 (1.13)	14.08 (1.24)	13.82 (1.17)	12.85 (0.66)	13.64 (0.85)
Sex [n(%)]					
Male	70 (48.3)	18 (46.2)	21 (43.8)	19 (52.9)	12 (54.5)
Female	75 (51.7)	21 (53.8)	27 (56.3)	17 (47.2)	10 (45.5)
School year [n(%)]					
7th grade	47 (32.4)	10 (25.6)	14 (29.2)	18 (50.0)	5 (22.7)
8th grade	66 (45.5)	17 (43.6)	18 (37.5)	18 (50.0)	13 (59.1)
9th grade	32 (22.1)	12 (30.8)	16 (33.3)	–	4 (18.2)
History of school retentions [n(%)]					
Yes	117 (80.7)	25 (64.1)	42 (87.5)	35 (97.2)	15 (68.2)
No[a]	23 (15.9)	12 (30.8)	4 (8.3)	–	7 (31.8)
Household[b] [n(%)]					
Nuclear family	137 (94.5)	36 (92.3)	46 (95.8)	35 (97.2)	20 (90.9)
Other household	7 (4.8)	3 (7.7)	2 (4.2)	–	2 (9.1)
Socioeconomic status [n(%)]					
Low	98 (67.6)	24 (61.5)	32 (66.7)	27 (75.0)	15 (68.2)
Medium	30 (20.7)	6 (15.4)	12 (25)	7 (19.4)	5 (22.7)
High	1 (0.7)	–	1 (2.1)	–	20 (90.9)
Current psychological support [n(%)]					
Yes	21 (14.5)	4 (10.3)	4 (8.3)	6 (16.7)	7 (31.8)
No	124 (85.5)	35 (89.7)	44 (91.7)	30 (83.3)	15 (68.2)

Note: Information is based on enrollment. Due to missing values, not all counts account for the total n of the sample and subsamples. Combined = Combined intervention condition. Student = Student only intervention condition. Teacher = Teacher only intervention condition. Control = No-intervention control condition.

[a] Students reported between 1 and 2 previous retentions.

[b] 'Nuclear family' included living with mothers/fathers/siblings. 'Other households' included extended family (e.g., grandparents or uncles/ants, foster families, or residential homes).

When comparing conditions at each assessment moment for the practice of overt aggression, there were only statistically significant differences at post-intervention [$H_{(3)} = 14.96$, $p = .002$]: scores from the combined condition were significantly higher (see Table 3) than those from the students only condition ($z = -3.17$, $p = .002$), from the teachers only condition ($z = -2.64$, $p = .008$), and from the control group ($z = -3.27$, $p = .001$).

3.1.3.2. Change in alternative behaviors. No significant fixed effects for time, condition or interaction of time and condition were found for prosocial behavior, nor for assertive behavior.

3.1.3.3. Change in subjective perception of awareness and change. Significant effects for time[2], condition, and the interaction between time and condition were found for awareness (see Table 2). Pos-hoc comparisons show a significant difference across conditions only for recalled awareness ($z = -3.21$, $p = .001$), with students in the combined condition reporting significantly less awareness than those in the student only intervention condition. Furthermore, a significant difference between recalled awareness and awareness at follow-up was found specifically for the combined intervention condition ($z = -2.63$, $p = .008$).

For change, a significant effect was found for condition only (see Table 2). Post-hoc comparisons show significant differences across conditions both at post-intervention ($z = 2.84$, $p = .005$) and at follow-up ($z = -2.52$, $p = .001$): students in the students only intervention condition reported higher perceived change than students in the combined intervention condition.

3.2. Teachers' self-reported quantitative change

3.2.1. Teachers self-report assessment protocol

Teachers reported on the quality of their relationship with their students using the Student-Teacher Relationship Scale – Short Form (STRS-SF, Pianta & Steinberg, 1992; Portuguese version by Patrício et al., 2015) and on their teaching styles using the Teaching Styles Questionnaire (TSQ; Carlos et al., 2020).

The **STRS-SF** uses 15 items rated using a 5-point Likert scale (1 = '*Definitely does not apply*' to 5 = '*Definitely applies*') to assess teachers' perception of the quality of their relationship with their students based on closeness (e.g., "*I share an affectionate, warm relationship with this child*") and conflict (e.g., "*This child and I always seem to be struggling with each other*"). Teachers were asked to rate the items in relation to students in the referred classes. Factorial validity for the two-factor model as well as good internal consistency values ($\alpha \geq .86$) and sensitivity to sex-based differences were found for its Portuguese version (Patrício et al., 2015). Using the current sample, internal consistency values were $\alpha \geq .84$ at pre-intervention, $\alpha \geq .80$ at post-intervention, and $\alpha \geq .85$ at follow-up.

[2] Pre-intervention is based on students retrospectively recalling their awareness before the intervention started.

Table 2
Generalized linear mixed-effects models for student self-reported practice of the forms of aggression and for teacher self-reported authoritative teaching style.

	Student self-reported practice of the forms of aggression									Student subjective perception						Teacher self-reported authoritarian teaching style		
	Overt aggression			Relational aggression			Reputational aggression			Awareness			Change					
Predictors	Estimate	*95 % CI*	*p*	Estimate	*95 % CI*	*p*	Estimate	*95 % CI*	*p*	Estimate	*95 % CI*	*p*	Estimate	*95 % CI*	*p*	Estimate	*95 % CI*	*p*
(Intercept)	3.47	2.30–4.65	< .001*	3.82	2.59–5.05	<.001*	3.16	2.06–4.27	< .001*	4.40	1.54–7.26	.003*	14.78	6.68–22.70	< .001*	50.21	44.33–56.10	<.001*
Time	0.84	0.34–1.34	0.001*	0.65	0.09–1.20	.02*	0.62	0.12–1.13	0.02*	1.71	0.48–2.94	.007*	2.60	-2.12–7.31	0.28	-3.14	-5.45- -0.83	0.008*
Condition	0.16	-0.32–0.65	0.49	0.30	-0.21–0.80	0.25	0.07	-0.38–0.53	0.75	3.18	1.45–4.90	< .001*	4.98	0.24–9.72	0.04*	0.04	-2.28- 2.36	0.97
Time*Condition	-0.24	-0.45- -0.02	0.03*	-0.21	-0.45–0.02	0.08	-0.10	-0.32–0.12	0.36	-0.98	-1.72- -0.24	.010*	-1.10	-3.89–1.70	0.44	1.39	0.47–2.31	0.003*
Random Effects																		
σ2	2.29			2.90			2.44			4.63			15.33			14.70		
τ00	$2.34_{Participant}$			$1.74_{Participant}$			$1.20_{Participant}$			$2.14_{Participant}$			$15.98_{Participant}$			$29.94_{Participant}$		
ICC	0.51			0.37			0.33			.032			0.51			0.67		
N	$142_{Participants}$			$143_{Participants}$			$142_{Participants}$			$73_{Participants}$			$74_{Participants}$			$49_{Participants}$		
Observations	352			354			352			207			137			109		
Marginal R2 / Conditional R2	0.04/0.53			0.01/0.38			0.03/0.35			0.08/0.37			.09/.55			0.18/0.73		

Abbreviations: CI. confidence interval; ICC. intraclass correlation coefficient; σ2. residual variance; τ. random effect standard deviation.
Note: Significant results within those effects are signaled with '*'.

Table 3
Descriptive values by condition and assessment moment, for measures significantly affected by time, condition or the interaction of time with condition.

	Pre-intervention				Post-intervention				Follow-up			
	Combined	Students	Teachers	Control	Combined	Students	Teachers	Control	Combined	Students	Teachers	Control
Student-reported practice of aggressive behavior												
Overt aggression	4.13 (1.68)	3.74 (1.62)	4.69 (2.59)	3.67 (1.32)	5.81 (2.37)	4.25 (2.05)	4.46 (2.32)	3.77 (1.15)	5.72 (2.99)	4.19 (2.34)	–	4.23 (2.04)
Relational aggression	4.03 (1.29)	4.54 (2.07)	5.22 (2.25)	4.18 (1.68)	6.13 (2.78)	4.82 (2.21)	4.97 (2.09)	4.61 (1.86)	5.48 (2.66)	4.29 (1.85)	–	4.77 (2.28)
Reputational aggression	3.79 (1.42)	3.30 (1.00)	4.23 (2.54)	3.37 (0.68)	4.45 (1.69)	4.16 (1.88)	4.64 (2.29)	3.36 (0.95)	5.16 (3.10)	3.85 (1.56)	–	4.54 (2.43)
Subjective perception												
Awareness	8.20 (2.77)	10.49 (2.53)	n/a	n/a	9.32 (3.07)	10.37 (2.42)	n/a	n/a	9.74 (1.75)	9.97 (2.84)	n/a	n/a
Change	n/a	n/a	n/a	n/a	21.34 (5.96)	25.12 (5.61)	n/a	n/a	22.56 (3.59)	25.50 (6.35)	n/a	n/a
Teacher reported teaching style												
Authoritative	49.29 (4.98)	49.44 (5.55)	50.33 (8.46)	55.83 (5.23)	49.09 (8.10)	54.25 (2.22)	50.38 (7.37)	59.00 (3.92)	45.23 (6.33)	–	52.80 (6.98)	60.00 (7.07)

Note: Values presented for each condition at each assessment moment are presented as M (SD). Combined = Combined intervention condition. Student = Student only intervention condition. Teacher = Teacher only intervention condition. Control = No-intervention control condition. n/a = students in these conditions did not receive intervention and so could not report on their subjective perception of awareness; perception of change was based only on post-intervention and follow-up.

The **TSQ** results from adapting the Parenting Styles and Dimensions Questionnaire (PSDQ, Robinson et al., 2001) to a school context. It includes 21 items rated on a 5-point Likert scale (1 = '*Never*' to 5 = '*Always*') to address three teaching styles: the authoritarian (e.g., "*I physically punish my students to discipline them*"), the permissive (e.g., "*I tell my students that I punish them and then I don't comply*"), and the authoritative styles (e.g., "*I am sensitive to the needs and feelings of my students*"). Previous work provided evidence on the internal structure, reliability and construct validity of the TSQ factors (Carlos et al., 2020). In the present study, the TSQ presented acceptable internal consistency values for the authoritative measure only. For the authoritarian measure, it was not possible to calculate the internal consistency at post-intervention and at follow-up due to some items presenting zero variance (e.g., all participants replied 'never' to an item about physically punishing their students). For the permissive measure, internal consistency values were acceptable only at post-intervention and follow-up. Nevertheless, bearing transparency of data presentation, all three measures were considered in the current work.

3.2.2. *Teacher participants' flow*

See Fig. 1 for a detailed account of teachers' flow within the 'SAFE schools' project. Participants at enrolment were 53 adults aged 31 to 65 years old who had mostly taught the referred classes for one year or less. Most were female and married or in a *de facto* relationship (Table 4). They were allocated to the conditions as follows: 19 teachers to the combined intervention that had a dropout rate of 31.58 % at follow-up; 9 teachers to the students only intervention that had a dropout rate of 100 % at follow-up; 19 teachers to the teachers only intervention that had a 21.05 % dropout rate at follow-up, and 6 teachers to the control condition that had a 77.78 % dropout rate at follow-up.

Participants in these conditions were evenly distributed by years teaching the referred classes [$\chi^2_{(6)} = 7.64, p = .27$], sex [$\chi^2_{(3)} = 2.64$, $p = .45$], and marital status [$\chi^2_{(3)} = 3.16$, $p = .37$]. They had, however, significantly different mean ages [$H_{(3)} = 10.78$, $p = .01$]; specifically, participants in the teachers only condition were significantly younger than participants in the control condition ($z = -2.71$, $p = .004$).

3.2.3. *Data analyses and results*

The same data analyses plan described above (see section '2.1.3. Data analyses and results') was applied. In this case, we further explored the effect of age on our linear mixed-effects model, as teachers in different conditions had significantly different mean ages. All significant and non-significant time and condition effects were unchanged when considering age and so these results are not reported further. Only significant effects are detailed; other results will be made available without undue reservation.

3.2.3.1. Quality of teacher-student relationship. No significant effects were found concerning perceived conflict or closeness in the student-teacher relationship.

3.2.3.2. Teaching styles. There was a significant effect of time and of the interaction of time and condition for the authoritative teaching style (Table 2). Specifically, conditions differed significantly at follow-up [$H_{(3)} = 9.36$, $p = .009$], with participants in the teachers only intervention reporting significantly higher scores than those in the combined intervention ($z = -2.52, p = 0.011$; Table 3). No significant effects were found for the authoritarian or permissive teaching styles.

4. Study 3 – qualitative outcomes following 'SAFE schools'

Study 3 presents qualitative information on the perception of change based on focus groups conducted after interventions ended. This section details the study's samples, the focus groups' script, the thematic data analysis, and the ensuing results, which are presented firstly for students and then for teachers.

Table 4
Teacher sample description, for the complete sample and by condition.

	Complete sample (n = 53)	Combined (n = 19)	Students (n = 9)	Teachers (n =19)	Control (n = 6)
Age [M(SD)]	50.31 (6.66)	50.22 (7.57)	52.75 (3.96)	47.58 (549)	56.00 (6.39)
Sex [n(%)]					
Male	44 (83.0)	16 (84.2)	8 (88.9)	14 (73.7)	6 (100)
Female	9 (17.0)	3 (15.8)	1 (11.1)	5 (26.3)	–
Time with targeted class [n(%)]					
One year or less	36 (66.0)	14 (73.7)	4 (44.4)	14 (73.7)	3 (50.0)
2 years	9 (17.0)	2 (10.5)	2 (22.2)	3 (15.8)	2 (33.3)
3 years or more	6 (11.3)	1 (5.3)	3 (33.3)	1 (5.3)	1 (16.7)
Marital status [n(%)]					
Married/ in a *de facto* relationship	30 (56.6)	8 (42.1)	5 (55.6)	12 (63.2)	5 (83.3)
Single or divorced	22 (41.5)	10 (52.6)	4 (44.4)	7 (36.8)	1 (16.7)

Note: Information is based on enrollment. Due to missing values, not all counts account for the total n of the sample and subsamples. Combined = Combined intervention condition. Student = Student only intervention condition. Teacher = Teacher only intervention condition. Control = No-intervention control condition.

4.1. Qualitative change perceived by students

4.1.1. Student participants

Three focus group with between 7 to 22 participants were conducted with students from the students only intervention (i.e., one for each class). The focus groups took place at follow-up and all students retained at that stage participated (n = 43). The school where the combined intervention was implemented was not available.

4.1.2. Script for student focus groups

The script used for guiding the focus group discussion considered how participants characterized their behavior and interactions before the intervention begun (e.g., "*Before our sessions/training, what difficulties or problems do you identify that existed in your class?*") and if they perceived changes during and/or after the intervention had ended (e.g., "*Do you consider that there was any changes in the class or in its functioning as our sessions/training was happening?*") and why (e.g., "*If so, please describe what you think has changed over this period*"/ "*Please describe what you think allowed or facilitated the occurrence of these changes*"). The script was used in a flexible manner, prioritizing comprehensibility and fluidity of the interactions.

4.1.3. Data analysis and results

Thematic analysis was employed to verbatim transcriptions of participants' contributions and followed the six stages proposed by Braun and Clarke (2024). Two senior members of the research team familiarized themselves with the data and generated initial codes. The next step involved merging the codes to identify overarching themes. Lastly, the identified themes and codes were cross-referenced with the data, leading to their definition and naming within a coding book; for a detailed description of themes, subthemes and their definition see Table D in the Supplementary Material. Then, two junior members of the research team used the coding book to code participants' verbalizations independently; coding disagreements were resolved via consensus. Results were written based on the data coded by these junior researchers using the coding book created by the senior members of the team. Results will be presented by themes and illustrated by representative verbalizations (Table 5); a complete account on all verbalizations included in each theme and subtheme will be made available without undue reservation. The proportion of coded words was calculated based on the total word count said by participants and is presented as a percentage associated with each theme and subtheme.

4.1.3.1. Students' perception of difficulties at pre-intervention. This theme had 9.88 %-word proportion. Students referred to problematic behavior/indiscipline noticed by their teachers and by themselves (1.67 %), and to problems within relationships, both between peers and with teachers (8.21 %).

4.1.3.2. Students' perception of change based on acquiring new knowledge. This theme had 15.93 %-word proportion. Students recognized the observer role they may have within aggressive interactions (5.89 %), identified diverse types of overt aggression (2.72 %), considered the emotional (e.g., anger), intrapersonal (e.g., self-benefit) and interpersonal (e.g., reaction to another person behavior) determinants of aggression (6.08 %), and described the consequences of aggression, for the classroom for the individual (1.23 %).

4.1.3.3. Students' perception of change based on applying new knowledge. This theme had 26.15 %-word proportion. Students reported change in how they thought about their interactions, focusing on a "think-before-act" attitude (6.15 %). Students also said they noticed changes in their between-peer interactions, namely fewer aggressive interactions (3.99 %) and increased interactions based on alternative behaviors (9.10 %). Finally, students referred to using strategies based on emotional and behavioral regulation and on practicing alternative behaviors when feeling provoked by peers and by teachers (6.90 %).

4.2. Qualitative change perceived by teachers

4.2.1. Teacher participants

One focus group took place at post-intervention with 16 teachers from the teachers only intervention condition; one teacher was unavailable. The school where the combined intervention was implemented was not available.

4.2.2. Script for teacher focus group and stages of thematic analyses

The same script described above (see section '3.1.2. Script for student focus group') was used for the teachers focus group, though adaptations were made (e.g., more formal wording of questions out loud). Again, leaders used the script flexibly and prioritized comprehension and quality of interactions.

4.2.3. Data analysis and results

Thematic analysis was again employed to verbatim transcriptions of participants' contributions. The same two teams were involved in developing the coding book, and then in coding the teachers' verbalizations. Emerging themes were very similar to those uncovered for the students' verbalizations and so the same coding book was applied to teachers' verbalizations. Results will be presented by themes and their respective word proportion, as well as illustrated by representative verbalizations (Table 5); a complete account on all verbalizations included in each theme and subtheme will be made available without undue reservation.

Table 5
Results of thematic analysis applied to students' verbalizations.

Theme	Subtheme	Students' quotes	Teachers' quotes
1: Difficulties perceived to exist at pre-intervention	1.1: Problematic Behavior/ indiscipline	*"There were many teachers that said that our class had the capacity to achieve more and more and that sometimes it was because of the effort and also our behavior, because we were very exalted [that we didn't]".*	*"The most complicated situations (is where you see) the lack of (respect for) authority appears; they straight on mistreat the person in front".*
		"Our teachers also complained about the noise".	*"Low grades".*
		"We made hasty decisions".	*"They miss (classes) because they have no support at home"*
	1.2: Problems within relationships	*"When we had different opinions, everyone started to argue"*	Not applicable
		"(…) even in the school breaks there was that little group that had one opinion, then the other and then the other. Then everyone was just looking [at each other] and that was it."	
		"(…) then the teacher started to be more rigid, just matter now, and we started like "so this was the teacher what would let us do all the things and now what…?".	
2: Change based on acquiring new knowledge	2.1: Identification of diverse roles in aggressive interactions	*"Sometimes we can interfere in the wrong way if you are an active observer".*	*"Yes, sometimes I could be associated with an aggressor towards [the students], depending on the situation".*
		"(…) sometimes I [would look and] laugh because it's funny, and I think this fits our class a lot because there were several types of observers in the discussion. And I did not know. I thought the discussion was like just [between] those two, but we are all included because after all we are all watching."	*"(…) it was not so clear [o me] that, in fact, when we act in front of a student in a more complicated situation we have a whole audience, (…) that we are, in fact, transmitting and modeling behaviors."*
		"Active and passive observer. I think he also fits in very well with our class."	*"You weren't aware that there were these two things; the aggressor and the one being aggressed or attacked."*
	2.2: Identification of diverse ways of acting aggressively	*"I think colleague A is more physical aggression and colleague A is more verbal, like she starts talking but colleague A is like 'Look, I'm going to punch you'."*	Not applicable
		"I think there are many people in our class who, when they don't agree, even start calling names or even attack in a more verbal way."	
	2.3: Identification of the determinants of aggressive behavior	*"Because in the moment we are getting nervous and that's what comes out. It's an explosion that comes out and we don't have a lot of control over it sometimes."*	*"(…) an assertive observer student can actually make a difference in a situation in the course of a more complicated situation."*
		"(…) sometimes the observers' laughing can be an act of provocation for the one who is arguing".	*"(…) because he might be feeling really bad".*
		"(…) when someone laughs [about what the bully is doing], they may think 'it's cool and I'm going to continue making fun [of others], to be cool and so that everyone thinks I'm the coolest "	*"(…) now I think more often about what the student might be thinking or feeling when he is taking a certain attitude towards something in class. I think "well, maybe he is feeling uncomfortable" or [I consider] what he could be thinking at this point to say this. And only then to I act in relation to that attitude."*
	2.4: Identification of the consequences of aggressive behavior	*"Then there was a very tense atmosphere in the class".*	*"'I'm more aware of the consequences of what I'm going to do; maybe I wasn't [as aware] before".*
		"In the classroom I wanted to scream at them to shut up and I can't, because [if I do I'll have] a disciplinary measures; I think about the consequences".	
3: Change based on applying new knowledge	3.1: Way of thinking about interactions	*"When we recreated several scenes but each one with different attitudes, we would be able to see which one is right, so I think it was important because then we thought 'We do this but, in reality, what is right is that attitude and we shouldn't do what was wrong'."*	*"I saw two or three kids, three kids going after another one, they wanted to do something to him. And I did what I always do, I called their attention 'You don't have to…', and then I remembered, and I became aware that I broke a cycle."*
		"We learn what non-constructive activities will give rise to others [of the same kind and so we should] think before we say things."	*"We already have a more methodical notion of what works and what doesn't."*
		"I learned to better control my emotions and learned to relate to other people"	*"Maybe I wasn't very aware of the impact I could have on students"*
		"I learned to moderate my behaviors and reactions to different situations."	*"I think before I act. I think if I should do it differently"*
	3.2: (Less) practice of aggressive behavior	*"It helped us to behave moderately, and to resolve things based on conversation, without aggression".*	Not applicable
		"(…) before the sessions, a simple word would cause confusion".	
		"Conflicts from before have eased".	
	3.3: (More) practice of alternative behaviors	*"(…) several situations were handled with assertive behaviors, and I was happy about that"*	*"Perhaps we have a more assertive notion of dialoguing with them."*

(*continued on next page*)

Table 5 (*continued*)

Theme	Subtheme	Students' quotes	Teachers' quotes
		"The class is now much more assertive, and we are [get along much better] with each other"	*"You start listening to the other person more."*
		"We feel a lot of difference in behavior, we are calmer and breathe before acting".	*"We can more easily put ourselves 'in their shoes."*
	3.4: Other applied knowledge	*"We started not being impulsive, even speaking one at a time, which I think was something that the sessions helped us with and giving our opinion correctly".*	*"Maybe more positive reinforcement, maybe (…) I verbalized it more, [unlike the tendency] to think that students notice when we are happy with them."*
		"I was assertive with teacher of discipline 3, I told her what I felt, paying attention to the tone of voice. But I was very angry".	*"Act differently in a situation that students had already taken for granted that they would be punished."*
		"I learned a lot of new things about assertiveness and used it to ignore others who try to lower my self-esteem but fail".	*"Sometimes I [would] react impulsively in any situation. [Now] I calmly remember, let's see the lens. See things better, see more clearly."*

4.2.3.1. Teachers' perception of difficulties at pre-intervention. This theme had 2.56 %-word proportion. Teachers considered students' problematic behavior manifested in missing classes, having poor academic achievement, and disrespecting teachers' authority.

4.2.3.2. Teachers' perception of change based on acquiring new knowledge. This theme had 14.21 %-word proportion. Teachers acquired knowledge on the diverse roles that both students and teachers may play in aggressive interactions (6.82 %), on the determinants of students' aggressive behaviors, particularly the students' emotional arousal (13.14 %), and on the consequences of their own actions towards their students' aggressive behavior (1.64 %).

4.2.3.3. Teachers' perception of change based on applying new knowledge. This theme had 24.46 %-word proportion. Teachers understood their role in the face of aggressive behavior based on a more thoughtful and methodical attitude (15.06 %). They also mentioned an increased practice of alternative assertive behaviors (2.04 %) and the use of more diverse ways of handling aggressive behavior enacted by their students, particularly based on positive reinforcement for appropriate behavior (7.45 %).

5. Discussion

The current work analyzed the feasibility and quantitative and qualitative changes associated with the 'SAFE schools' intervention, a comprehensive universal approach to school-based adolescent aggression based on the SIP model. We intended to examine the relevance and utility of the 'SAFE schools' project from a holistic perspective and so findings will be discussed complementarily. Overall, current findings add to existing literature on the following key points: (1) SIP-based and universal interventions are feasible in schools, though resistance should be an integral part of assessment and efforts to promote change; (2) interventions may be more apt to change awareness rather than behavior, especially when applied to more resistant school contexts; and (3) working jointly with schools and using multi-method assessments is necessary to uncover the impact of SIP-based and universal interventions.

5.1. Feasibility of SIP-based and universal interventions in schools

The 'SAFE schools' project was designed based on rigorous procedures that might substantiate a RCT while also minimizing demands placed upon schools (e.g., resources requested by schools). Schools were purposefully selected based on their vulnerability (OECD, 2018) and were, thus, expected to be available and interested in taking part of a research project aimed at their identified difficulties. That was not the case. Most schools were resistant and refused any intervention, whereas a minority was resistant to randomly receiving a condition and were open only to receiving the intervention of their choice. This meant we had to change our design to a non-randomized cluster trial (Schmidt, 2017).

Resistance to change is not uncommon in schools and may be linked to several aspects. Of those, the perception of limited resources to exert change or of change signifying threats to power or influence (Yılmaz & Kılıçoğlu, 2013) may have been particularly present in our targeted schools. These schools may have learned, through previous experiences, that they lack or will not be given the necessary resources to cope with the characteristics of their students. TEIP school status is seldomly updated (OECD, 2018), and so teachers in these schools, which often admit students with behavioral or emotional problems, will more likely report continuous classroom behavioral problems that they are not able to cope with (LeBlanc et al., 2007). Referring to change as threatening to the established power dynamics, this project considers a theory of change based on the mutual responsibility of both teachers and students, rather than focusing on the aggressor alone (e.g., Hornby, 2016; Salmivalli, 2010). This perspective may be difficult to grasp within systems where power struggles are crystalized. As with any other system, school systems strive to keep their stability and so will likely be resistant to interventions that are offered within a top-down approach (Klooset al., 2012). The 'SAFE schools' project may have been perceived as misaligned with the schools' culture and past experiences, and that may have hindered schools' acceptability.

Relatedly, ours is a non-treatment seeking sample that may be more resistant and less ready for change. Based on the way teachers and students characterized the classroom interpersonal dynamics before the intervention, we may have been dealing with individuals still in a precontemplation stage of motivation for change (Prochaska & Velicer, 1997) – teachers and students do not acknowledge a

problem within themselves. This also concurs with previous evidence that teachers are unaware or lack knowledge on how to appropriately identify disruptive behavior (Shamsi et al., 2019), and do not always adopt the most effective interventions to manage those behaviors (Wachs et al., 2019). This pre-contemplation stage of motivation to change may have manifested in several aspects, namely difficulties in the fidelity of the implementation due to aggressive behaviors and/or low participant responsiveness within sessions, high dropout rates (particularly for teachers), and self-reports (particularly for students) that were inconsistent with school referrals, facilitators' experience and data from the focus groups about initial difficulties.

Facilitators perceived difficulties in implementing the intervention as intended. These difficulties were particularly evident for the combined intervention condition, and, in this case, are likely related to both school and facilitator related aspects. About the school, it is included in a specific high-risk urban context, whereas the other schools are located further from the urban center. Teachers in urban, low performing schools – as is the case with this school - have reported less positive school climate, overall poorer quality relationships and school safety, as well as less appropriate student behavior (Jain et al., 2015) and more classroom behavioral problems (LeBlanc et al., 2007). So, the school that welcomed the combined intervention may have been trapped in a cycle that normalized ongoing aggressive behaviors manifested towards diverse interlocutors, including the facilitators. Accordingly, students in this school recalled being significantly less aware of their difficulties and need to change at pre-intervention, in comparison with students who received intervention in another school. Instead, when schools foster positive interactions between students and between students and teacher, favor norms opposing aggression, and have a strong policy of noticing and reporting school violence, there is less reported students' aggression (Behrhorst et al., 2020; Henry et al., 2011). This consistently validates the need to tailor intervention goals and strategies to both individual and school-based characteristics.

The facilitators' (lack of) experience with the intervention may also have impacted on the poorer outcomes found for the combined intervention, which was the first to take place. Experienced therapists adhere less to specific theory-driven intervention techniques (Tschuschke et al., 2015), and therapists' adherence to manualized interventions seems to be associated with improved outcomes (Collyer et al., 2020). Within an especially challenging context, facilitators may have had more difficulty in applying the manualized theory-driven intervention techniques. Instead, quality of implementation is associated with improved outcomes of school-based interventions targeting aggression and defiance (Waschbusch et al., 2019).

About the intervention dropout rates, previous meta-analytic work shows that studies conducted in naturalistic settings have higher dropout rates (i.e., as high as 54.5 % for aggressive child and adolescents) than those conducted in controlled settings (de Haan et al., 2013). So, dropout rates found for students in the current work are encouraging and may be framed within the positive appraisal and social validity reported for the 'SAFE schools' interventions. Teachers' dropout rates, though still within what was found by previous literature (Roos & Werbart, 2013), varied across conditions. For those conditions that did not target teachers directly, dropout seemed to be continuous throughout the three assessment moments. It was likely that these teachers felt disconnected and not compensated for their participation and so dropped out. Alternatively, for those conditions targeting teachers directly, dropouts happened from pre- to post-intervention. Facilitators were able to engage most participants during the interventions and that led to higher retention rates, which aligns with dropping out rates diminishing as more sessions are attended (Fernandez et al., 2015).

Concerning the self-report measures, students reported very low mean levels of aggression at pre-intervention, similarly to what was reported by Nixon and Werner (2010). In fact, their self-reported practice of aggression was like that reported previously by generalized community adolescents. Adolescents targeted by 'SAFE Schools' may be more prone to base their answers on social desirability and/or biased perception of how normative/ frequent their practice of aggression is. Previous findings have indicated that adolescents intentionally underestimate their risk behaviors due to beliefs of social desirability (Brener et al., 2003), and that invalid estimation of one's behavior is more likely for adolescents who present with risky behavior and more negative perceptions of their schools (Cornell et al., 2014). Likewise, previous findings show that self-reports on aggressive behavior or victimization do not necessarily coincide with other-report or observer ratings (Pellegrini & Bartini, 2000).

5.2. Efficacy of the 'SAFE schools' intervention for changing quantitative and qualitative indicators of aggression-related outcomes

Though likely somewhat biased, our quantitative results indicate an increase in self-reported practice of relational, reputational and overt aggression. This is at odds with previous SIP-based interventions that focused on the aggressor (e.g., Williamson et al., 2013) but replicates previous works that considered both teachers and students as intervention targets (Nixon & Werner, 2010; Simon et al., 2008). Alike those works, we propose these results represent an increased awareness and accurate labeling of one's actions brought about by the intervention (Nixon & Werner, 2010; Simon et al., 2008) that may confound or mask the effects of interventions (Smith et al., 2004). Concordantly, students in the combined intervention condition reported becoming significantly more aware of their difficulties at follow-up, when compared to what they recalled from pre-intervention. Also, students in the student intervention only condition verbalized that they were more able to label their own behaviors.

Students in the student intervention only condition also perceived changes in their way of thinking, acting, and relating to others, more so than students in the combined intervention condition. Their verbalizations specify that, by the end of the intervention, they experienced more interactions based on alternative behaviors and more attempts to self-regulate emotions and behaviors. Specific examples of alternative behaviors refer mostly to "not-(re)acting" (i.e., ignoring/ not reacting to a perceive provocation or stopping one's reactive aggressive response), which were not assessed by the self-report protocol we used and may explain why no quantitative changes were found. Though more adaptive ways of conflict management are warranted, as they have proved to be associated with better psychosocial outcomes (e.g., Dost-Gözkan, 2019), this avoidance of retaliation may be a relevant first step in changing one's behavior and in stopping the violence escalation cycle (Anderson & Carnagey, 2004).

Concerning teachers, those in the teachers only intervention condition reported practicing more authoritative interactions with

their students, in contrast to those from the combined intervention at follow-up; again, a more enabling context and increased facilitator's experience/adherence, in addition to the intervention itself, may explain this finding. Given that authoritative interactions have been found to be associated with students' lower engagement in aggression and victimization (Kloo et al., 2023), this finding is encouraging. In turn, unlike previous studies working with teachers to improve the quality of student-teacher relationship (Duong et al., 2018; Mikami et al., 2011), we found no evidence of improved student-teacher relationship. This may be explained by the fact that the intervention did not focus on this relationship and so it did not become apparent in the outcomes. Concordantly, teachers did not verbalize on the closeness or conflict with their students. Rather, they verbalized on being able to recognize their students' emotional arousal and to understand and take responsibility of purposefully acting towards a more effective classroom management, which aligns with the definition of an authoritative teaching style (Walker, 2009). These combined verbalizations also align with previous findings on the association between cognitive empathy and greater teacher competence when handling problematic behaviors – though in children (Wink et al., 2021), and accredit the attainment of some specific goals proposed by this intervention.

5.3. Limitations

There are limitations to this work that should be cautiously considered in future studies. One refers to the impossibility of randomizing schools to the conditions and to schools being from diverse backgrounds. This was a methodological necessity to make the project viable and to respond to the schools' needs but nevertheless questions the comparability of the conditions (Schmidt, 2017). Likewise, schools were responsible for signaling classes to the intervention, which may not have been representative of that schools' overall demographics and may have introduced potential selection bias. Still about the schools, we did not gather information on contextual variables that might help explain the results (e.g., schools' implicit norms and responsiveness towards aggression) and so should be taken into consideration in futures studies. We relied only on self-reported data, whereas previous works found self-report and observer ratings to diverge (Mikami et al., 2011; Pellegrini & Bartini, 2000). Moreover, the self-report instruments used in this work, though carefully chosen based on their established reliability and validity in community adolescent samples, may not adequality reflect the biased response pattern of our target-population, nor be able to distinguish between increased knowledge/ awareness Vs increased practice (Pellegrini & Bartini, 2000). Finally, the alignment of those instruments with the contents worked through in the interventions should be revised. Other objective and descriptive measures (e.g., the number of disciplinary occurrences) may also be relevant outcomes to consider in future studies. Triangulating self-reported data with disciplinary data taken from students individual records may be particularly useful to uncover an interventions' impact; previous findings show coherent change in those diverse outcomes (Farrell et al., 2001, 2002).

Relatedly, we did not access the mutual perspectives of students' and teachers' change or how change in ones associated with change in the others (i.e., dyadic analyses). We also did not consider other stakeholders within the school system (e.g., directory boards, families), which would be necessary to add evidence to an interpersonal (Salmivalli, 2010) and ecological (Hornby, 2016) perspective on aggression and likely promote overall change in school climate and adolescent aggression. Families in particular were mentioned by teachers as relevant targets for intervention; including them may have an additional impact on changing at-risk students' perspectives on aggression (Simon et al., 2008). Lastly, our intervention with students was longer (Fung, 2012; Sharma et al., 2020) or similar (Williamson et al., 2013) to previous SIP-base interventions, whereas our intervention with teachers was initially longer but was not kept throughout the school year, unlike previous works (e.g., the Establish-Maintain-Restore intervention; Duong et al., 2018). Though longer interventions did not necessarily associate with more noticeable change (e.g., Simon et al., 2008), considering the optimal length of future interventions may be relevant.

6. Conclusions and implications

The 'SAFE schools' project was met with (some) resistance on the part of the schools, possibly because it adopted a top-down approach in which a team outside the school prescribed a way of change (Kloos et al., 2012). This resistance may have been a underlying limitation to all studies and have impacted on the projects' feasibility, implementation quality and, consequently, its quantitative outcomes that relate to a pre-intervention moment when schools were particularly not invested. If follows the practical implications that interventions delivered in schools should follow a bottom-up (Kloos et al., 2012) and action-research approach (Oosthuizen, 2002), where schools are, from earlier stages, taken as partners in defining the problem and proposing ways of understanding and managing it. Within this approach, schools would be identified based on diverse stages of the motivation to change, and interventions should, then, be tailored to these stages (e.g., raising awareness if systems are in a pre-contemplation stage Vs prompting alternative behaviors if in a preparation stage; Prochaska & Velicer, 1997). The 'SAFE schools' might be useful in diverse stages of change. For example, in the intervention for students, module 1 might be appropriate to the pre-contemplation/ contemplation stages, whereas modules 2 and 3, focusing on applied and behavioral modification strategies, may fit the action stage.

Taken together, efficacy outcomes taken from the 'SAFE Schools' interventions point to an increased awareness of the interpersonal nature of aggression and of alternative ways of acting when faced with conflicts, concurring with the interpretation of similar findings by previous works (Nixon & Werner, 2010; Simon et al., 2008). About these alternative behaviors, though mentioned as more frequent, they are not reflected on assertive or prosocial behaviors nor in higher quality of teacher-student relationship. Although the intervention did not directly reduce aggressive behavior, the increased awareness among adolescents of their actions and respective consequences represents an important foundation for long-term change. Implications for educational policies may be taken from these findings, namely that they should encourage school-wide programs that prioritize awareness-building as a foundation for long-term behavioral change and create conditions for those long-term changes to be carefully guided and assessed by trained facilitators.

Policies can also play a role in reducing school resistance by providing adequate resources, training, and support for teachers, thereby creating the conditions for successful and sustainable implementation.

Finally, current findings contribute to the literature by highlighting increased awareness of aggressive behavior as a meaningful intermediate outcome, which may precede actual reductions in aggression. They also draw attention to the role of school resistance, suggesting that implementation barriers should be more systematically investigated. Such has implications for future research namely understanding under what conditions does awareness leads to long-term reductions in aggression, tracking the evolution from awareness to behavior change, or exploring mediating (e.g. teacher support, school climate) and moderating (e.g. dose, fidelity, setting) factors that may be essential to intervention effectiveness. Future research is encouraged to carefully and continuously assess and reflect upon change options proposed to schools, so that interventions and schools develop and jointly contribute to the end goal of coping with aggressive behavior and build more healthy and safe schools.

Ethical statement

Informed consent was obtained from all individual participants included in the study and, for underage participants, from their parents and/or legal guardians. All procedures performed in this study that involved human participants were in accordance with the ethical standards of the University of Coimbra and with the Code of Ethics of the World Medical Association or comparable ethical standards.

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CRediT authorship contribution statement

Paula Vagos: Writing – original draft, Project administration, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Francisca Alves:** Writing – review & editing, Validation, Resources, Data curation. **Catarina Monteiro:** Writing – review & editing, Validation, Resources, Data curation. **Ana Xavier:** Writing – review & editing, Visualization, Validation, Supervision. **Daniel Rijo:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. The funding institution had no part in the design of this study, nor on the analyses of the results and writing of the current work.

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Supplementary materials

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