Reaching and teaching students: Using Nurture Groups to improve school functioning

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Abstract

In the 1960s, educational psychologist Marjorie Boxall developed Nurture Groups (NGs) in response to the growing number of children who were deprived of healthy nurturance in early life and who, as a result, were failing to cope with the demands of school. To date, research on this intervention model has consistently shown that students who attend a NG for at least one school year are much more likely to demonstrate improvements in school functioning than other at-risk students who do not. However, the conclusions that can be drawn about the beneficial effects of NGs are somewhat limited by the heterogeneity in practices among groups bearing the NG name and by the absence of data explicitly linking positive student outcomes to specific practices within NG classrooms. Both these limitations could be addressed by a more systematic effort to consider the question of implementation fidelity. Thus, the objective of the present study was to measure student progress in NGs for which detailed information about the intervention's implementation fidelity was available. In two NGs known to implement relatively high frequencies of nurture-based interventions (ie, attunement strategies and constructive behaviour support), results revealed statistically and clinically significant improvements in social, emotional and behavioural functioning following a nine-month period of intervention. More research relating NG efficacy to implementation procedures is needed in order to better understand the most effective ingredients of this intervention.

Data availability statement: The data that support the findings of this study are available on reasonable request from the corresponding author.

Reaching and teaching students: Using Nurture Groups to improve school functioning among Montreal children with developmental trauma

According to van der Kolk (2005, 2014), the term 'developmental trauma' distinguishes the experience of multiple and/or prolonged exposures to one or more developmentally adverse interpersonal events in early life (eg, abandonment, neglect, verbal/emotional abuse, physical or sexual abuse) from other forms of acute (eg, motor vehicle accident, a hurricane) or chronic stress (eg, receiving regular invasive medical treatment for an illness, growing up in a war-torn area). Among the many later problems associated with developmental trauma, such as reductions in brain integrity, autoimmune disorders, obesity, diabetes, alcoholism and depression (Afifi et al, 2014; Felitti et al, 1998; Gilbert et al, 2015; Kaffman, 2009), marked relational difficulties in childhood is one of the earliest signs (Bowlby, 1973). In the absence of protective factors, the effect of having been routinely mistreated or neglected by a primary attachment figure is associated with the development of an insecure or disorganised style of attachment (Bowlby, 1973; Geddes, 2017; Swarbrick, 2017) and, consequently, a host of social, emotional and mental health (SEMH) difficulties (van der Kolk, 2015).

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In the 1960s, educational psychologist, Marjorie Boxall, introduced Nurture Groups (NGs) in response to the growing number of children who were deprived of healthy nurturance in early life and who, as a result, were failing to cope with the demands of school (Bennathan & Boxall, 2000). Boxall's idea was to recreate the interpersonal experiences missing from infancy onwards in the school setting. By providing the safety, attunement and reliable structure required for children to feel contained and cared for, students can begin to form secure, trusting relationships with secondary attachment figures (ie, teachers and teaching assistants) (Bennathan & Boxall, 2000; Bowlby, 1969). The development of a secure style of attachment with school personnel gradually allows for a broadening of the child's rigid 'internal working model'; the cognitive framework comprising mental representations for understanding self and others (Bowlby, 1969). Importantly, the adaptive revision of negative internal working models of the self (eq, damaged, unworthy, unwanted) and of others (eq, dangerous, rejecting, unreliable) leads to improvements in school functioning via the child's increasing responsiveness to adult co-regulation and scaffolding and willingness to take academic risks (Cairns & Cairns, 2016).

Research on this model has shown that students who attend a NG for at least one school year are much more likely to demonstrate improvements in school functioning than other at-risk students who remain in a mainstream classroom (Cooper & Whitebread, 2007; Hughes & Schlösser, 2014). However, the conclusions that can be drawn about the beneficial effects of NGs are limited to a degree by the heterogeneity in practices among groups bearing the NG name (Cooper & Whitebread, 2007; Middleton, 2021) and by the absence of data explicitly linking positive student outcomes to specific practices within NG classrooms (Kearney & Nowek, 2019). Both these limitations could be addressed by a more systematic effort to address implementation fidelity which essentially asks the

question 'to what degree is the NG intervention being delivered as intended?' (Balisteri, 2016; Breitenstein et al, 2010; Fraser-Smith & Henry, 2016). Outcome studies on NGs with records of implementation would help to: (a) gain an understanding of how NGs in different regions are being operationalised, (b) identify the key ingredients responsible for positive student outcomes, (c) adjust NG practices to optimise success, and (d) provide an indication of implementation quality (Breitenstein et al, 2010). As an initial step toward addressing these issues, the present study sought to measure improvements in school functioning among students in two Montreal, Quebec-based NGs for which documented measures of NG implementation were available.

Research to date

Systematic reviews conducted by Bennett (2015) and Hughes and Schlösser (2014) have found that NGs are effective at reducing the social, emotional and behavioural difficulties of students. For example, in two investigations of classic NGs, significant improvements were reported on the 'peer problems, prosocial behaviour and hyperactivity' sub-scales of the Strength and Difficulties Questionnaire (SQD-t; Cooper et al, 2001; Seth-Smith et al, 2010). These same studies also revealed significant improvements among NG students on the 'developmental' strand (ie, measuring cognitive and social-emotional development) and 'diagnostic' strands (ie, measuring behaviours that interfere with social and academic performance) of the Boxall Profile[®]. Cooper and Whitebread (2007) reported similar findings in a national research study examining the combined effectiveness of the different models of NGs, including the classic model, the part-time model and 'NG variants' that deviate somewhat from the theoretical and/or practical underpinnings of classic NGs. A total of 359 students in 34 schools with NGs were compared to a representative sample of 187 students in mainstream classes. Results revealed significant improvements on the SQD-t and Boxall Profile® among NG participants relative to mainstream students. However, the heterogeneity in practices among the NGs considered by Cooper and Whitebread (2007) makes it difficult to isolate the components of the NG experience that were most responsible for the positive outcomes (Hughes & Schlösser, 2014).

Research objective and context of the study

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The objective of the present study was to measure student progress in NGs for which there exists detailed information about the NG's implementation practices. This was the case for two Montreal-based NG variants that underwent a comprehensive implementation assessment conducted by the authors of this study and whose results are summarised in Table 1. The following excerpt from Cloran et al (2022) highlights the ways in which these groups diverged from the classic NG model:

'Inspired by the widespread adoption of NGs in the UK, one Montreal-based school board independently set up two full-time NGs that have been in continuous operation for the last 12 years. These classes were developed based on the founding principles of classic NGs and adapted to the context of the province's education system and resources. The NG targets students in grades 1-3 (ie, six to nine years) with very significant SEMH difficulties, for whom school personnel strongly suspect a disturbed attachment between the child and their primary caregiver(s) and/or who have a documented history with child protective services. As the school board covers a large geographical area, students are assigned to the NG that is closest to the neighbourhood in which they reside (ie, a point-of-service model). As such, daily visits to students' homerooms were not an option.'

The observation and recording of teaching practices was conducted using the methodology devised by Cubeddu and MacKay (2017) and revealed significant differences between NGs and mainstream classrooms of corresponding grade levels. Consistent with the findings of Cubeddu and MacKay (2017), NG teachers employed attunement strategies, a key component of nurturance and secure attachment (Schore, 2001), significantly more frequently than mainstream teachers of corresponding grade levels. Specifically, NG teachers implemented the six strategies identified by Kennedy, Landor and Todd (2011) which have been found to promote attuned interactions by two meta-analyses (Bakermans-Kranenburg, Van Ijzendoorn, & Juffer, 2003; Fukkink, 2008). These included being attentive, encouraging initiatives, receiving initiatives, developing

attuned interactions, guiding and deepening discussions. In addition to the relatively high frequency of implementation of strategies aimed at developing attuned interactions, NG teachers also differed from mainstream teachers in terms of the frequency of 'constructive behaviour support' (ie, a strategy of co-regulation or scaffolding). Constructive behaviour support was often labelled by the Montreal NG staff as 'firmcaring' and described as involving proactive and intentional adult efforts to increase environmental predictability and security (eq, routines, rituals, frequent reminders of the classroom expectations and rules, explicit acknowledgment of pro-social behaviours) and manage student dysregulation in a very particular and consistent way (ie, nonjudgmental, affect neutral approach, neutral emotional tone, concerted attempt to look beneath the surface behaviour to try to understand the emotional trigger).

Ethics

The present study was carried out in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans of the Canadian Panel on Research Ethics, whose research ethics committee approved this study. Ethical approval was also granted by the Research Ethics Committee for Student Projects at the Université du Québec à Montréal, as well as by the Montreal school board's own internal ethics committee. Legal guardians were made aware of this study by means of an informational flyer shared with them by the school board's director of student services. Interested parents/guardians were invited to contact the lead author. Informed consent was obtained from all participants prior to the commencement of the observations. Consent forms outlined the: (a) general objectives of the study, (b) investigative procedures, (c) advantages and risks, (d) data confidentiality, and (e) the right to withdraw consent at any time without any prejudice. Additionally, the contact information of each author and of the ethics committee was made available in case of comments, questions, or complaints.

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Table 1Program description of two Montreal-based NGs (Cloran et al, 2022)

NG organisational supports			
Cost \$250,000 CAD	Technology iPads, computers		
 Equipment/physical space One traditional classroom space One domestic area One relaxation area 	 Materials Developmental curriculums (eg, socio-emotional) Academic curriculums and learning materials Classroom and home decor furnishings, food 		
 Class organisation Full-time classroom personnel: 1 teacher, 1 teaching assistant, 1 special education technician Part-time personnel: 1 NG director, 1 psychologist, 1 vice principal, 1 principal 8 students, ages 6-9 years 	 Transport and daycare Daily door-to-door specialised transportation (eg, minibus) for all NG students from their domicile to the NG host school, round-trip Before and after school daycare services provided by the school hosting the NGs 		
 Weekly supports 8x student psychotherapy sessions by NG psychologist 2x family psychotherapy sessions by NG psychologist 3x school progress meetings w/ guardians by NG classroom personnel 2x meetings with social services for students by NG classroom personnel and NG psychologist 	 Annual supports 6x NG classroom personnel act as liaison to health services for students 2x NG classroom personnel act as a liaison to health services for guardians 2x NG classroom personnel accompany student and guardian to medical appointment 		
 Intake support/student 1x intake meeting with school of origin 1x intake meeting with guardian(s) 1x observation in school of origin 1x case review by NG director with the NG team 2x meetings with social services for students by NG classroom personnel and NG psychologist 	 Discharge support/student 1x discharge meeting with guardian(s) 1x discharge evaluation/report 1x meeting with school of origin 5 days of reintegration support 3-5 days of post-reintegration support 		

Other supports

- 4 hours of bi-weekly supervision and training for classroom personnel
- 10 workshops offered to mainstream school board staff on nurturing and trauma-informed practices
- 6 case consultations with multidisciplinary professionals per class

Table 1 (continued)

Mean frequency of NG teacher interventions/60-minute interval as compared to mainstream teachers

	NG Teachers (N=2)	Mainstream teachers (N=6)
Being attentive	13	4
Encouraging initiatives	14	4
Receiving initiatives	14	6
Developing attuned interactions	9	2
Guiding	23	10
Deepening discussion	6	0
Constructive behaviour support	25	5
Total	104	31

Participants

Consent was obtained for five of the eight students in one NG and seven of the eight students in the other group. As no significant NG implementation discrepancies emerged between the two NGs (Cloran et al, in press), students were evaluated as a single group (N=12) for the pre- and postintervention comparisons. To better understand the characteristics of NG students and their families, legal guardians completed the Developmental History Checklist for Children (DHCC; Dougherty & Schinka, 1989) and the school-age Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2001). The DHCC provides information about a child's developmental, educational, medical, familial and socio-demographic history, while the CBCL evaluates students on eight empirically-based syndrome scales: (a) anxious/depressed, (b) withdrawn/depressed, (c) somatic complaints, (d) social problems, (e) thought problems, (f) attention problems, (g) rule-breaking behaviour, and (h) aggressive behaviours.

The CBCL also provides composites scores for internalising and externalising syndromes, as well as for total problems. The 'internalising grouping' (ie, problems arising within the self) is comprised of the 'anxious/depressed', 'withdrawn/depressed' and 'somatic complaint' syndrome scales, while the 'externalising grouping' (ie, problems arising within the interpersonal environment) is comprised of the 'rule-breaking' and 'aggressive behaviour' syndrome scales. The total problems score is an overall representation of a student's SEMH difficulties. Exposure to developmental trauma was assessed via the Adverse Childhood Events (ACE) questionnaire. To minimise family burden, NG teachers completed an adapted ACE questionnaire developed for school personnel which has been found to produce developmental trauma prevalence estimates consistent with those of caregiver reports (Blodgett & Lanigan, 2018).

Students in the NGs were, on average, aged seven years, five months at the time of admission (from a range of six years, six months to eight years, ten months). Legal guardians identified students as being primarily Caucasian, with one black student and one mixed-race student. Among nine boys and three girls, one student was in Grade 1, six students were in Grade 2 and five students were in Grade 3. On the CBCL, legal guardians rated students especially high on the 'attention problems', 'rule-breaking behaviour' and 'aggressive behaviour' scales, as well as on the 'externalising syndrome' and 'total problems' composites (Table 2).

Table 2

Average student percentile score on CBCL (pre-admission)

Syndrome Scales	Percentile
Anxious/depressed	88th
Withdrawn/depressed	90th
Somatic complaints	73rd
Social problems	92nd
Thought problems	88th
Attention problems	95th
Rule-breaking behaviour	95th
Aggressive behaviour	97th
Internalising syndromes	90th
Externalising syndromes	98th
Total problems score	97th

Table 3

Household and caregiver characteristics (Legal Guardian Report, pre-admissions)

Child custody	Both biological parents Single biological parent Adoptive parents	7 4 1
Economic status	Poverty level Lower class Middle class	3 6 3
Biological father education	Some high school High school diploma Trade school diploma Some college	5 3 2 1
Biological father occupation	Unskilled worker Skilled worker Other	2 7 3
Biological mother education	Some high school High school diploma Some college College diploma	5 1 3 3
Biological mother occupation	Unskilled worker Skilled worker Unemployed Other	2 4 4 2

The DHCC (Table 3) revealed that many biological fathers did not hold a high school diploma and were primarily employed in unskilled (eg, factory worker) or skilled jobs (eg, carpentry, clerical). Similar characteristics were noted for biological mothers. Of the 12 families in this study, three reported benefiting from the province's social assistance programme (ie, poverty-level), six families self-identified with 'lower class' socioeconomic status and three families with 'middle class' status.

On the adapted ACE questionnaire for school personnel (Table 4), NG teachers rated students on 10 questions at the time of discharge based on factual knowledge acquired over the course of students' participation in the NG (eg, guardian disclosure, direct staff knowledge of ACE exposure, etc.). Results revealed that students had experienced, on average, more than four different types of adverse childhood events. Inspection of each individual ACE item revealed that two thirds of the NG students (ie, 8 out of 12) were characterised by each of the following: (a) past or present involvement by child protective services, (b) divorced or separated parents and/ or (c) a caregiver with a substance abuse problem. Half of the NG students had unmet basic needs as observed at school (eg, nutrition, clothing, or hygiene) and the majority of students had at least one caregiver with mental health issues.

Table 4 Student exposure to adverse childhood events (N=12)

Adverse event	N=12
Has this child ever been homeless or highly mobile?	3
Has this child ever had a Youth Protection involvement or government placement?	8
Has this child ever had unmet basic needs that interfere with school adjustment?	6
Have this child's parents been divorced or separated?	8
Has this child experienced the death of a primary caregiver?	0
Has any member of this child's family ever been incarcerated?	2
Does this child have a caregiver with a mental health problem?	10
Does this child have a caregiver with a substance abuse problem?	8
Has this child ever witnessed or been the victim of domestic violence	5
Has this child ever witnessed or been the victim of community violence?	2
Average ACE score/student	4.33

Procedures and instruments

To measure student progress in response to specific practices within the NGs, five instruments were administered approximately two weeks after student admission and again within the last two weeks preceding their discharge from the NG. On average, the time between intake and discharge measures was just over nine months, the equivalent of one full school year in the Quebec education system.

The Behaviour Rating Inventory of Executive Functioning, Second Edition (BRIEF-2; Isquith et al, 2015), the Student-Teacher Relationship Scale (STRS; Pianta, 2001), Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2001) and direct observations of student behaviour were completed by the NG teacher, while the Piers-Harris 3 Scale of Self-Concept (Piers et al, 2018) was completed by students with the support of a teaching assistant.

The BRIEF-2 is a questionnaire rating executive functions (ie, the set of the mental processes that allow individuals to learn, work and manage daily life), a strong predictor of academic, social behavioural and emotional functioning (Isquith et al, 2015). The Behaviour Regulation Index (BRI), composed of the 'inhibit' and 'self-monitor' scales, measures the student's ability to regulate and monitor behaviour effectively. The Emotion Regulation Index (ERI), composed of the 'shift' and 'emotional control' scales, reflects the child's ability to regulate affective responses and shift thinking patterns to adjust to changes in environment, people, plans, or demands. The Cognitive Regulation Index (CRII), composed of the 'initiate', 'working memory', 'plan/organise', 'task-monitor' and 'organisation of materials' scales, measures the child's ability to control and manage cognitive processes in order to problem solve and complete tasks effectively (eg, school work). The Global Executive Composite is a composite summary score of all BRIFE-2 scales.

The STRS measures the overall quality of a teacher's relationship with a particular student based on perceived closeness, conflict and dependency (Pianta, 2001). This scale was developed with specific reference to 'attachment theory' (Settani et al, 2015) and is the most commonly used measure of teacher-student relationship (Toste et al, 2012). The 'closeness' subscale measures the degree to which a teacher experiences affection, warmth and open communication with a student. The 'conflict' and 'dependency' subscales measure the extent to which a teacher perceives a student to be hostile or over-reliant, respectively.

The Piers-Harris 3 is a brief, self-report measure of self-concept (ie, perception of one's own behaviour and attitudes) that can be used to assist in the diagnosis of externalising and internalising disorders (Piers et al, 2018). Test items are simple descriptive statements, written at a Grade 1 reading level (eg, 'I am an important member of my class', 'I sit alone at lunch', etc.). The Piers-Harris 3 is comprised of six scales: (a) behavioural adjustment, (b) freedom from anxiety, (c) happiness and satisfaction, (d) intellectual and school status, (e) physical appearance and attributes, and (f) social acceptance. When combined into a composite, the six scales provide a total score (ie, an overall measure of general self-concept). Higher scores indicate a higher or more positive self-concept (ie, self-esteem or selfregard), whereas lower scores are associated with a poorer self-concept.

Partial-interval recording is a method used to measure the occurrence or non-occurrence of a behaviour during a specified time interval (Cooper et al, 2019). In this study, partial interval recording was employed in 15-minute time samples by the NG teacher to measure the frequency of behaviours that interfere with school functioning. Challenging behaviours included externalising (eg, aggression, bullying, hyperactivity, difficulty managing emotional behavioural arousal) and/ or internalising behaviours (eg, withdrawn or shut down, prominent symptoms of anxiety).

Table 5 Mean t-scores on BRIEF-2 (N=12)

Like the CBCL completed by parents, the Teacher Report Form (TRF) was completed by NG teachers and provides six syndrome scales, composites scores for internalising and externalising grouping of syndromes, as well as a total problems score (Achenbach & Rescorla, 2001).

Results

Student scores were analysed using a series of two-tailed matched-paired t-tests to compare mean scores at NG intake and discharge. Each measure was analysed separately with an alpha of .05, of which .025 was used to detect improvement and .025 was used to detect decline.

As measured by the BRIEF-2, students experienced significant improvements on the Behavioural and Emotional Regulation Indices (p < .01, p < .001), as well as the Global Executive Composite (p < .001) (Table 5). In addition, the three scores which did not reach statistical significance, 'self-monitor' and 'initiate' scales and the Cognitive Regulation Index, all moved in a positive direction.

Scale	Intake	Discharge	Significance
Inhibit	67.83	57.50	*
Self-monitor	65.33	58.42	NS
Behavioural Regulation Index	68.92	58.92	**
Shift	68.42	57.58	**
Emotional control	74.17	60.25	**
Emotional Regulation Index	73.33	58.33	***
Initiate	56.58	51.17	NS
Working memory	60.17	48.58	**
Plan/organise	60.17	49.92	**
Task-monitor	60.17	49.50	**
Organisation of materials	54.58	45.00	*
Cognitive Regulation Index	56.25	49.33	NS
Global Executive composite	67.17	54.08	***

Note. Significance levels from matched-pairs t-tests (df = 11). ***p < .001; **p < .01; *p < .05; NS: not significant The results of the STRS revealed significant improvements on the 'conflict' subscale (p < .05) and in the overall quality (p < .05) of the NG teacher relationship to students (Table 6). Noteworthy improvements in the 'closeness' and 'dependency' subscales were also observed. Reduced conflict and dependency combined with higher closeness scores suggests that the teachers felt more connected and effective in their ability to support their students (Pianta, 2001). Changes in the self-perceptions of NG students over time were measured by the Piers-Harris 3 (Table 7). Following the NG intervention, students reported significant improvements in their 'overall self-concept' scale, as well as in the 'social acceptance' and 'intellectual & school status' scales. The scales that did not meet significance (ie, behavioural adjustment', 'freedom from anxiety', 'happiness & satisfaction' and 'physical appearance') moved in a positive direction.

Table 6

Mean percentile scores on the STRS (N=12)

Scale	Intake	Discharge	Significance
Closeness	44.83	54.17	NS
Conflict	78.67	53.83	*
Dependency	67.67	57.67	NS
Overall quality	26.67	46.42	*

Note. Significance levels from matched-pairs t-tests (df = 11). ***p < .001; **p < .01; *p < .05; NS: not significant

Table 7

Mean t-scores on the Piers-Harris 3 (N=12)

Scale	Intake	Discharge	Significance
Behavioural adjustment	40.33	42.50	NS
Freedom from anxiety	42.83	44.17	NS
Happiness & satisfaction	44.75	48.33	NS
Intellectual & school status	43.17	47.08	*
Physical appearance	49.33	53.50	NS
Social acceptance	41.67	49.67	*
Overall self-concept	41.25	48.17	*

Note. Significance levels from matched-pairs t-tests (df = 11). ***p < .001; **p < .01; *p < .05; NS: not significant On the syndrome scales of the TRF (Table 8), teachers reported significant improvements on the 'withdrawn/depressed' (p < .05), 'social problems' (p < .01), 'attention problems' (p < .01) and 'aggressive behaviour' scales (p < .001). Somatic complaints increased slightly, whereas scores on the remaining scales of 'anxious/ depressed', 'thought problems' and 'rule-breaking behaviour' all went down, despite not reaching statistical significance. Results also revealed significant improvements on the internalising syndrome (p < .05) and externalising syndrome (p < .001) scales as we all the total problems score (p < .001). Teacher-reported improvements in SEMH difficulties measured by the TRF were consistent with the results of direct observations of externalising and internalising challenging behaviours (p < .001). Upon NG entry, students engaged in behaviours that interfered with school functioning for approximately 60% of the day, on average (ie, roughly four hours in a 6.5-hour school day). By NG completion, the frequency of problematic behaviour decreased to 17% (ie, roughly one hour per school day).

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Mean T-Scores on the TRF (N=12)

Scale	Intake	Discharge	Significance
Anxious/depressed	62.67	56.92	NS
Withdrawn/depressed	60.17	55.83	*
Somatic complaints	51.33	52.58	NS
Social problems	66.08	59.50	**
Thought problems	65.17	59.42	NS
Attention problems	65.25	57.83	**
Rule-breaking behaviour	67.83	63.83	NS
Aggressive behaviour	69.25	61.00	***
Internalising syndromes	69.67	60.83	*
Externalising syndromes	63.42	53.17	***
Total problems score	70.42	60.92	***

Note. Significance levels from matched-pairs t-tests (df = 11). ***p < .001; **p < .01; *p < .05; NS: not significant

Discussion

An investigation of participant characteristics underscores the difficult and complex realities of many NG families. The majority of legal guardians in this study reported a low or poverty-level socioeconomic status and were employed primarily as manual labour workers. Nearly half of guardians did not complete their secondary education while most others did not complete a post-secondary education degree. Students in the NGs had already experienced, on average, more than four ACEs by their early elementary years. For example, most students in the Montreal NGs had a history of child-protective services involvement and a legal guardian with mental health and/ or substance abuse problem. In addition, half of the students were identified by NG personnel as routinely having unmet basic needs (eg, food, hygiene, clothing and sleep). These findings are particularly concerning given the dose-response relationship between ACEs and lifelong mental and physical health difficulties (Felitti et al, 1998). Unfortunately, guardian and teacher reports of school functioning provide strong indication that exposure to developmental trauma had already n

led to a clinical level of maladjustment by the time students were referred to the NG. Reflective of this possibility are indications that NG students were, on average, at the 97th percentile on the total problems score of the TRF; a very reliable measure of SEMH difficulties (Achenbach & Rescorla, 2001). While internalising syndromes were elevated relative to same-age peers, it was their self-regulation (eg, rule-breaking and aggressive behaviours) that was the most problematic area of functioning for NG students at intake.

By the end of a single school year in a NG, students were rated as being within the normal range on all scales of the TRF. This finding is striking given the severity of SEMH difficulties apparent at NG intake. Consistent with the findings of Seth-Smith et al (2010) and Cooper et al (2001), students demonstrated the greatest improvements in the areas of socialisation, attentional functioning and aggressive behaviour. Marked reductions in social difficulties is a particularly encouraging finding given that socio-emotional literacy and interpersonal skills are explicitly taught and reinforced in NGs. In addition to the didactic component of the NG, it is also possible that being part of a class of similarly challenged peers combined with NG personnel's welcoming, non-judgmental approach fostered feelings of safety and belonging among students that, in turn, encouraged them to take interpersonal risks and to begin to develop meaningful connections. Consistent with these possibilities, students reported significant increases on measures of perceived social acceptance and school status. NG participation also seemed to have robust effects on self-control with improvements observed in several related areas of emotional, behavioural and cognitive regulation. For example, teachers observed significant improvements in task monitoring and completion, sustained attention, working memory, planning, organisation, behavioural inhibition, tolerance to change and emotional control. Although of a lesser magnitude, students also showed signs of improvement in their ability to self-monitor (ie, awareness of the impact of one's behaviour on other people and outcomes) and independently initiate tasks.

As research investigating NG effectiveness has been criticised for failing to include direct measures of student comportment (Hughes & Schlösser, 2014), the present study complemented parent and teacher ratings of child functioning with classroom observations. Overall, the results of direct observation were consistent with the improvements in school functioning reflected by the TRF and BRIEF-2 scores. On average, the proportion of class time NG students were engaged in some form of social, emotional and/or behavioural difficulties (eq, withdrawal, teasing, arguing, etc.) decreased from approximately four hours to one hour per school day. This finding should be emphasised as it may help teachers set realistic expectations and establish a safe haven/secure base along with proactive supports (eg, preparing students for changes in routine or for the unexpected, rehearsing upcoming social circumstances that they will likely find challenging, etc) with NG students when they re-integrate into mainstream classrooms following graduation from their NG placement.

Statistically significant and clinically meaningful improvements in school functioning following nine months of intervention appear to be at least partially linked to the specific practices within these NGs. NGs in this study were known to implement six attunement strategies, a key component of nurturance and secure attachment (Schore, 2001), three times more frequently than mainstream teachers of corresponding grade levels (Cloran et al, in press). Given the relationship between attunement, secure attachment and self-regulation (Cairns & Cairns, 2016), it is reasonable to conclude that the NG teacher's awareness and responsiveness to student needs fostered improvements in school functioning (Geddes, 2017). Persistent efforts by the NG teachers to provide students with attuned interactions and thereby co-create connection may have also contributed to improvements in the overall quality of the student-teacher relationship (ie, from the 1st percentile to 34th percentile), as well as to student-rated improvements in overall self-esteem (ie, from the 18th to 42nd percentile, on average). Consistent with Bowlby's theory of attachment, these positive changes may be indicative of a shift in the child's underlying relational template wherein adults begin to be seen as trustworthy and dependable, and the self is experienced as progressively more capable and worthy of affection (ie, an adaptive revision of children's IWMs).

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NGs in this study also differed from mainstream classrooms in terms of the frequency of constructive behaviour support (Cloran et al, in press). As antecedent interventions (eg, scaffolding and co-regulation) have demonstrated efficacy at reducing both severe and high-frequency problematic behaviours (Lavigna & Willis, 2012), it is likely that the frequency of constructive behaviour support in NGs (ie, five times more frequent in Montreal NGs vs mainstream settings) contributed to student improvement in emotional and behavioural regulation. Other practices which may have contributed to the effectiveness of these NGs include counselling sessions offered to students (weekly) and their families (monthly), frequent communication with health and social services to initiate and/or coordinate community support, as well as four hours of bi-weekly clinical supervision and training for NG personnel.

Limitations and future directions

This study had a few noteworthy limitations. First, despite the significant improvements in school functioning experienced by NG students, the small sample size limits the generalisation of the results. To build on the findings of this study, investigators seeking to link student outcomes with specific NG practices should aim to achieve a sample size that would allow, at a minimum, for power calculations to be performed. Furthermore, this study did not investigate whether improvements in school functioning were maintained post-intervention. As such, it is impossible to determine the extent to which the improvements demonstrated by students were transferable and stable in mainstream settings. As longitudinal studies are an identified research need in the NG literature (Bennett, 2015), systematic follow-ups would provide an indication of NG effectiveness over time.

Finally, data collection for this study took place at the height of the Covid-19 pandemic. External variables unique to this unprecedented crisis may have indirectly impacted NG effectiveness. For example, a recent study evaluated the impact of Covid-19 on 3,000 parents of children under the age of 18 years in Canada and found: (a) declines in mental health, (b) increased alcohol consumption, (c) increased suicidal thoughts/feelings, and (d) increased distress related to not being safe from physical, emotional and domestic violence (Gadermann et al, 2021). These findings suggest that problematic household dynamics among NG families could have been aggravated during this study, which in turn, may have had led to more adverse effects on NG participants (ie, worsening of SEMH difficulties). Additionally, NG personnel reported that the pandemic consistently made it more difficulty to meet students' proximity-seeking needs and to convey and interpret emotional tone (ie, to be as attuned as they would have been under normal circumstances). A comparison of studies conducted during and following the Covid-19 pandemic may reveal some of the ways in which implementation and outcomes were impacted in NGs.

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