Teacher Attunement to Classroom Social Dynamics as Related to Student Peer Relationships over a School Year

by

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Teacher attunement to classroom social dynamics as related to student peer relationships over a school year

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the degree of Master of Arts

in Psychology

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Abstract

Evidence suggests that teachers being attuned to students’ peer relationships may be conducive for creating a positive classroom social environment. Using data from 558 children (grades K-5) in the classrooms of 34 general education teachers, this study examined: (1) whether teacher attunement is associated with students’ peer relationships; and (2) whether the associations differ in classrooms participating in an intervention designed to bolster peer relationships, compared to a typical practice control condition. All measures were collected in fall and in spring of one school year. Students’ relationships with peers (positive and negative nominations received) were measured using a sociometric procedure. Teachers also estimated the proportion of peers who liked and disliked each child. Teacher attunement was operationalized as the degree to which teachers’ reports overlapped with the sociometric data. Hierarchical Linear Modelling was used for data analyses and all results accounted for fall nominations. When teachers overestimated a student’s peer liking in fall, reflecting a lower absolute attunement, this was associated with the student receiving more positive peer nominations in spring. Teacher overestimation of a student’s peer disliking in fall was associated with receipt of both more positive and more negative nominations in spring, and teacher absolute attunement to peer disliking predicted the student receiving more positive nominations in spring. Intervention versus control condition did not moderate any results. Findings underscore the importance of considering whether lack of attunement reflects overestimation versus underestimation of student peer relationships, and potential differences between peer liking and peer disliking.
Lay Summary

To create a positive classroom social environment, teachers may need to be attuned to the social dynamics in their classrooms. The present thesis investigates: (1) whether teacher attunement to students’ social dynamics is associated with students’ peer relationships over the course of one school year; and (2) whether the associations differ in classrooms that participate in an intervention designed to bolster peer relationships, compared to regular classrooms. The study results suggest that teachers overestimating students’ peer liking in fall was associated with students being better liked by classmates in spring. Teachers overestimating students’ peer disliking in fall was linked to students becoming more liked and disliked (receiving more votes of both liking and disliking) in spring. However, these associations did not differ in the two conditions (intervention vs. regular classroom). This study sheds new lights on how teacher attunement could affect students’ actual peer relationships.
Preface

This thesis uses data from a larger investigation of the MOSAIC program by Mikami and colleagues (2021). Dr. Amori Mikami was the supervisory author on this project and was involved throughout the project from concept formation to manuscript editing. The study design was created by Dr. Amori Mikami and I together. I conducted all data analyses and contributed to the majority of manuscript composition. This thesis is an intellectual product of the author, Tsz Yin Fung. This study has been approved by the Behavioral Research Ethics Board at the University of British Columbia (certificate number #H22-01665).
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Chapter One: Introduction

Accumulating evidence from the past two decades highlights the importance of children’s social relationships with their classroom peers. For example, elementary school children who are not accepted by their peers tend to withdraw from class participation, display declining academic performance after statistically accounting for earlier performance, and are more prone to depression and anxiety, as found in longitudinal designs (Bierman, 2004; Buhs & Ladd, 2001; Greene et al., 1997; Nangle et al., 2010). As such, there are reasons for educators to be concerned about classroom peer dynamics, and to bolster the social relationships between children and their classmates.

A growing body of research has documented the ways that elementary school teachers can influence the peer relationships of their students (Farmer et al., 2011). For example, teachers can promote a positive social climate in their classroom through various means such as group work, classroom culture, and even seating arrangements (Bierman, 2011; Farmer et al., 2011; van den Berg et al., 2012). Teacher factors, such as warmth and empathy, also encourage students’ positive peer relationships (Cornelius-White, 2007). The current study examines another teacher factor that may influence peer dynamics in the elementary classroom: teachers’ attunement to their students’ peer relationships.

Teacher Attunement

Teacher attunement is defined as teachers’ accurate knowledge of their students’ peer experiences (Hamm et al., 2011). Existing studies that examine teacher attunement typically assess agreement between teacher and student perceptions of peer networks, comparing a teacher’s report to the reports of their students. The extent to which these reports overlap has been referred to as the teacher’s attunement.
Ahn & Rodkin (2014) describe teacher attunement as reflecting teachers’ knowledge of the social characteristics of students as their classroom peers perceive them. Hamm and colleagues (2011) have further conceptualized teacher attunement as a dimension of teacher involvement with students because it reflects the teacher’s sensitivity to and awareness of students’ personal lives. These two definitions suggest that a teacher with high attunement is engaged with students, and can accurately identify students’ social worlds in the classroom.

Recent evidence suggests the degree to which a teacher is aware of the social dynamics in the classroom may be an important factor that can influence students’ classroom peer relationships (Ahn et al., 2013; Hoffman et al., 2015). As described in detail below, this may potentially happen in two ways: (a) teachers’ attunement communicates that teachers care about students and take a personal interest in students’ lives; and (b) teachers with higher attunement can strategically implement practices that help students build positive social bonds with one another (Hamm & Faircloth, 2005; Rodkin & Hodges, 2003).

**Benefits of Teacher Attunement for Student Peer Relationships**

When teachers have knowledge of student social dynamics, this is thought to benefit student peer relationships for several reasons. First, to the extent that high attunement reflects a warm and connected teacher-student relationship, where the teacher makes efforts to understand students’ personal lives and experiences, this type of teacher-student relationship can facilitate social bonds among students. This is because, as suggested by Farmer and colleagues (2011), if teachers demonstrate that they take interest in students and are willing to emotionally support them, this conveys the dynamic that students are expected to establish with each other.

This hypothesized relationship is supported by correlational studies that report a positive association between teacher-student relationship quality and children’s peer dynamics. For
instance, teachers’ emotional support was associated with students showing more positive interactions and prosocial behavior with their classmates (NICHD ECCRN, 2002). Specifically, students in first grade and kindergarten who received more emotional support from their teachers displayed more positive behavior with their peers (Pianta et al., 2002), and higher general social competence (Wilson et al., 2007), after accounting for prior peer behavior. Research suggests that higher levels of teacher emotional support, as reported by students, may create a classroom climate that fosters prosocial behavior in students’ interactions with one another (Luckner & Pianta, 2011).

Studies of teacher-student relationships have also found that students whose relationships with teachers are characterized as warm, close, and without conflict, are better accepted by classmates (Hughes et al., 2001). The quality of the teacher-student relationship in first grade even predicted children’s peer acceptance the following year, after statistically accounting for children’s previous peer acceptance and externalizing problems (Hughes & Kwok, 2006). In another study, teachers who were rated as warm and emotionally supportive by students had classrooms where students showed higher rates of friendship reciprocation (Gest & Rodkin, 2011). Again, this is thought to occur because when a teacher has a positive relationship with a student, it sets a relationship model for students to follow with each other.

Importantly, the studies reviewed thus far have examined the effects of teacher warmth and sensitivity (presumed to relate to teacher attunement) on students’ peer relationships, and not the effects of teacher attunement specifically. However, a study examined the effects of a training program designed to increase teachers’ attunement to students’ peer group affiliations and friendship status (Hamm et al., 2011). They found that teachers who participated in the program were significantly more aware of their students’ peer relationships, were able to manage
student social dynamics more effectively, and consequently, had classrooms with a more positive social climate. Students in these teachers’ classrooms also reported a significantly greater sense of school belongingness and higher quality of friendships. The control teachers who did not participate in the training program were less likely to support students and to create a classroom climate conducive to positive youth outcomes (Hamm et al., 2011).

Taken together, these studies suggest when teachers are highly attuned to their students’ social worlds (and presumably also, to students’ social needs), this tends to facilitate students’ positive relationships with one another. This may occur through the teacher showing warmth and sensitivity toward students, which sets a positive behavioral norm for how students should treat one another, and models a supportive social relationship that students can generalize to their peer interactions.

**Teacher Attunement in the Context of Intervention**

In addition to creating a positive social climate by modeling that the teacher takes interest in students’ lives, teacher attunement may also benefit classroom peer relationships to the extent that more observant teachers are better able to implement strategies to improve relationships between students. If teacher practices influence the peer dynamics of the classroom (e.g., van den Berg et al., 2012), then teachers who have accurate perceptions of students’ social relationships could be best situated to implement these practices. On a basic level, attuned teachers may be better at identifying students who are disliked by classmates, and therefore have more opportunities to help those students develop new social identities or roles that change how they are perceived by peers (Farmer et al., 1993).

In the context of intervention, attuned teachers may be able to achieve higher intervention efficacy because of their knowledge of students’ social dynamics. For example, teachers may be
able to manipulate students’ seating location to facilitate social relationships. Some research has found that arranging the seating chart so that certain students sat closer to the center of the classroom could increase these students’ likeability (van den Berg & Cillessen, 2015). In an intervention study, researchers created a seating chart where children who disliked one another (based on a sociometric procedure where students nominated the peers whom they liked and disliked) were strategically placed together. They found that children seated near one another developed more positive relationships (van den Berg et al., 2012). The authors speculated that close proximity created opportunities for students to learn about one another, which then led to more appreciation of each other (van den Berg et al., 2012).

The researchers in these studies created the seating assignments based on sociometric data, but they suggest that teachers could use the seating arrangement strategy in their typical practice. Because teachers usually do not have access to sociometric data, the teacher’s efficacy in implementing this strategy would depend upon the teacher having accurate knowledge about students’ peer relationships. Therefore, attuned teachers may have an advantage as they can tailor intervention strategies to accommodate each student’s specific social needs.

However, it is important to note that classroom interventions to improve student peer relationships, particularly when the outcome measures come from peer sociometric data, have inconsistent results. A follow-up seating chart intervention study by Braun et al. (2020), in which students in the intervention classes were strategically placed such that those who disliked one another were seated together, found unexpected effects. Namely, students in intervention classes reported higher aggression and lower levels of cooperation among classmates than students in control group. Another example of inconsistent results occurred in the Making Socially Accepting Inclusive Classrooms (MOSAIC) program, where an initial pilot test in a 2-week
summer camp containing previously unacquainted children found that the teacher highlighting a child’s positive personal qualities in front of peers could help the child gain a more positive reputation in the class (Mikami et al., 2013; Mikami & Mercer, 2017). The authors speculated that this is because peers may recognize that the teacher values the child’s personal qualities, and it also encourages peers to notice such positive attributes in the child. It would seem that teachers may be better at implementing this strategy if they are aware of students’ peer relationships, as they may take advantage of this knowledge when choosing for whom to highlight a positive personal attribute. However, a recent follow-up randomized trial of MOSAIC in general education classrooms during the school year found mixed results. MOSAIC, relative to typical practice, was associated with better social behavior, peer relationships, and teacher-student relationships as reported both by teachers and by children themselves. Reflecting the challenge of changing peer sociometric data, there were no differences on this outcome measure between MOSAIC and control classrooms on average, and potentially poorer sociometric perceptions of children with attention-deficit/hyperactivity disorder (ADHD) symptoms in MOSAIC (Mikami et al., 2021).

The current study data drew from the randomized trial of MOSAIC in Mikami et al. (2021). Despite the fact that the intervention strategies in MOSAIC may not result in positive sociometric benefits for children on average, we nonetheless sought to explore whether a good understanding of classroom peer social dynamics allows teachers to recognize the students in need of help, and to aid these students. In theory, teachers with high attunement can take advantage of their knowledge of students’ peer relationships to strategically apply intervention techniques, and be more efficacious at tailoring intervention techniques according to students’ unique needs. Perhaps these attuned teachers are able to apply MOSAIC strategies in such a way,
or to select the strategies most likely to be efficacious, for specific children. Indeed, perhaps one reason why there is a research-to-practice gap (Farmer et al., 2014) where teachers can have difficulty implementing evidence-based, manualized interventions is that classrooms are fluid entities. Classrooms involve continuous interactions of many students who have varying developmental, social, and psychological demands (Farmer et al., 2014). To implement intervention strategies in such fluid environments, the teacher must be observant, aware of students’ classroom experiences, and sensitive to individual differences between students, to select strategies that cater to each student.

The Current Study

The current study had two aims. The first aim was to identify the potential associations between teacher attunement and students’ peer relationships over the course of one school year. The second aim was to investigate whether such associations may differ in the context of a classroom intervention designed to bolster peer relationships. The teachers in the current study were randomly assigned to either take part in the MOSAIC intervention, or to be in a typical practice control group that did not receive any intervention training.

Specifically, Hypothesis 1 was that fall teacher attunement would predict better student peer relationships in spring, with statistical adjustment of fall peer relationships, regardless of whether the teacher was in the intervention or the control group.

Hypothesis 2 was that the potential associations between teacher attunement and student peer relationships would be moderated by treatment condition (being in the MOSAIC intervention versus the control group). Specifically, we hypothesized that in the intervention group, teacher attunement would have the strongest association with positive peer relationships.
In the control group, although teacher attunement might still be associated with positive peer relationships, the magnitude of this association would be less than in the intervention condition.
Chapter Two: Method

The study used data from a larger investigation testing the efficacy of the MOSAIC program (Mikami et al., 2021). Teachers in the MOSAIC group received coaching to increase day-to-day practices designed to help children have more positive and socially supportive peer experiences in the classroom. These practices (described below) revolve around MOSAIC’s core philosophy that the teacher’s behaviors, and the way in which the teacher interacts with students, can build a positive and inclusive peer community in the classroom.

The MOSAIC intervention was originally piloted in the context of a summer program (see Mikami, Griggs, et al., 2013; Mikami, Reuland, et al., 2013). In a subsequent study conducted during the 2017-2018 academic year, the MOSAIC intervention was adapted and modified from its summer camp version for general education classrooms (Mikami et al., 2019). Participating teachers in that study were encouraged to give feedback on the MOSAIC strategies, to help revise the intervention manual. In the 2018-2019 academic year, our research team undertook a randomized trial of MOSAIC versus a typical practice control group in general education classrooms (Mikami et al., 2021). The current thesis is based on data gathered from this randomized trial.

Participants

Participants were 558 children (grades K-5; 49.3% female, 50.7% male) in 34 general education classrooms during the 2018-2019 academic year. All were 4 – 10 years old. Children’s racial demographics were: 40% White, 19.7% Asian, 15.6% Black, 0.7% First Nations, 16.7% biracial/multiracial, and 7.3% other or missing. Approximately 15% of children identified as Hispanic/Latinx. Most teacher participants were female (92.1%), with 78.9% White, 7.9% Asian, 2.6% biracial/multiracial, and 10.5% other or missing. The 34 classrooms were located in 11
schools across two sites: an urban and suburban area in western Canada and a rural area in the mid-west United States. Classrooms were randomly assigned to receive either the MOSAIC program \((n = 17)\) or to a typical practice control condition \((n = 17)\). Both intervention and control teachers were compensated financially for completing research measures.

**Procedure**

The research ethics boards at the participating universities and school districts approved the procedures of the present study. In June and September of 2018, the study team set up school staff meetings to describe the procedures and recruit teacher participants. Eligible teachers were general education teachers of grades K-5 who taught in the classroom the majority of the week. All teacher participants provided informed consent.

Teachers were randomly assigned within school to the MOSAIC intervention group or to the typical practice control group. Teachers in the MOSAIC group received a 2-hour orientation to study procedures as well as to the MOSAIC strategies. Teachers also received an intervention manual and were encouraged to review it over the summer (if they were recruited before the summer). In the control group, teachers received regular professional development offered by their school district, but were not provided with the MOSAIC intervention.

At the start of the 2018-2019 academic year, all teachers (intervention and control) distributed information about the study to all parents of children in their classroom. Child participants had both active written parent consent, and child assent, to participate in the program. There was an average consent rate of 69% of children in a classroom (range: 48% to 96% across the 34 classrooms).

During the academic year, MOSAIC teachers met with a consultant (study staff member) twice per month for 45 minutes to discuss goals for students and the classroom community and
intervention strategies to help meet these goals. To measure teachers’ adherence to MOSAIC, trained research staff and consultants visited each classroom bi-weekly and conducted a 40-minute observation where teachers’ use of MOSAIC strategies was recorded. MOSAIC teachers received email feedback from consultants after each observation with the intention of encouraging them to use the MOSAIC strategies. Teachers were also surveyed monthly about whether they had employed specific MOSAIC strategies during the last school day.

In September (fall) and April (spring) of the academic year, child participants completed a sociometric procedure in which study staff interviewed each child privately for approximately 5 minutes. In the interview, study staff read questions from the sociometric procedure (described below) and recorded the child’s answers. At the same assessment timepoints, teachers were asked to estimate the proportion of peers who like, dislike, and are neutral about each child participant in their classroom.

**Measures**

*Peer Reports of Student Peer Relationships*

A sociometric procedure (Coie et al., 1982) was conducted in each classroom. Trained study research assistants interviewed each consented child in private, and recorded the child’s answers. A board containing names and pictures of all consented children was provided to the children to encourage better recall. Children nominated an unlimited number of consented classroom peers whom they liked (positive nominations) and disliked (negative nominations). Proportion scores of each type of nomination were calculated for each child by dividing the number of nominations received, by the number of children making nominations minus 1. The sociometric techniques have a long and rich history in the educational research literature, and have often been considered the gold standard for assessing peer relationships. The satisfactory
validity and reliability of sociometrics have been documented in previous studies (Cillessen & Bukowski, 2018).

**Teacher Reports of Student Peer Relationships**

To measure teacher perceptions of student peer relationships, teachers were asked to complete the Dishion Social Acceptance Scale (DSAS; Dishion & Kavanagh, 2003), where they estimated the proportion of peers who like, who dislike, and who are neutral/ignore each consented child. Teachers were instructed that all three proportions should sum to 100%. The DSAS has been found to demonstrate good validity and reliability (Dishion et al., 2014). Dishion and Kavanagh (2003) report small to medium correlations between teacher reports of children’s liking/disliking by peers with peer-reported sociometric measures. The modest correlation suggests that there may be variability between teachers in their attunement, and this variability may be meaningful.

**Calculation of Teacher Attunement**

As research on teacher attunement is in its early stage, there is no clear consensus as to how the variable should be operationalized. Importantly, there is no established measures of teacher attunement, and many researchers develop their own measure, following the general principle that teacher attunement is the extent to which teachers’ knowledge of classroom dynamics overlap with their students’ reports (Serdiouk et al., 2015).

**Broad and Precise Attunement**

The first consideration when deciding how to measure teacher attunement is whether to investigate “broad” or “precise” attunement. In the current literature, attunement to student peer-group affiliation patterns (who hangs out together?) is considered “broad” attunement (Hoffman et al., 2015). This type of attunement reflects teachers’ accuracy in identifying affiliations among
students in the class as a whole, but not necessarily individual students’ experiences. Notably, teachers’ broad attunement to peer group memberships has only been shown to associate with students’ perceptions of aspects of the peer ecology, and not to students’ actual relationships in the class (Hoffman et al., 2015).

Teachers’ accuracy about students’ individual social experiences is considered “precise” attunement. In other words, precise attunement indicates that a teacher is aware of how each individual student is seen by their peers, whereas broad attunement occurs when a teacher knows which students associate together. Some researchers suggest that a precise attunement has the potential to best promote students’ actual relationships in classrooms (Kindermann, 2011); nonetheless, it should be noted that no research has examined this claim. In addition, it has been suggested that precise attunement is more difficult for teachers to maintain than broad attunement, and teachers with high precise attunement are likely to also have high broad attunement (Hoffman et al., 2015). We decided to investigate precise attunement.

Types of Teacher Attunement

Early research initially assessed teachers’ ability to identify peer groups among students in their classroom (broad attunement). Subsequent research has expanded to assess teacher attunement to which students are aggressive (Ahn & Rodkin, 2014; Dawes et al., 2017) or victimized (Norwalk et al., 2017), as well as attunement to who is liked and disliked (Marucci et al., 2018). The current study follows the procedure of Marucci and colleagues (2018) and investigates teacher attunement to who is liked and disliked in the class, as it is most related to the MOSAIC intervention. A teacher does not need to correctly identify students’ peer group affiliations to effectively use strategies that the MOSAIC intervention provides. Yet, it is essential for teachers to be aware of which students are liked and disliked in order to select the
most appropriate strategies to help these students. For instance, a teacher could potentially help
disliked students to gain a more positive social status in class by calling attention to their
personal positive qualities in front of the class. However, no changes might be expected if the
teacher uses such a strategy on students who are already well-liked.

**Attunement to Liking and Disliking**

Combining the two ideas of measuring precise attunement and measuring attunement to
liking and disliking, we calculated teacher attunement by comparing teachers’ estimation of
students’ acceptance (liking) and rejection (disliking) on the DSAS with student reports of
positive (liking) and negative (disliking) nominations from sociometrics. This method measures
precise attunement because it asks the teacher to estimate each child’s social relationships.

Marucci and Colleagues (2018) combined attunement to liking and to disliking to obtain
an average score representing teachers’ overall attunement levels. However, in the current study,
we retained the two types separately to investigate whether each might differentially and
uniquely associate with student peer relationships. Perhaps, attunement to disliking allows the
teacher to identify the most socially vulnerable children. A teacher who is aware that such
students exist in the class may be more capable of paying conscious efforts to change those
students’ negative reputations, compared to a less attuned teacher. Thus, attunement to disliking
(as opposed to liking) may be the most crucial for teachers’ ability to implement intervention
strategies. On the other hand, teacher attunement to liking may play a different role. Research
shows that prosocial, cooperative behavior and good social cognitive skills are linked with
positive peer regard (Gifford-Smith & Brownell, 2003). It is possible that teachers who are
particularly attuned to liking may pay more attention to prosocial behaviors and actively direct
other students’ attention to those behaviors. This may set up a unique path to improving peer relationships through increasing positive behaviors, as opposed to reducing negative reputations.

**Calculation of Attunement Scores**

There are different potential ways of calculating teacher attunement. First, a simple bivariate correlation between teacher reports of students’ relationships with peer sociometrics has been used in the literature as the attunement score (Ahn & Rodkin, 2014; Gest et al., 2014). However, correlations could be susceptible to the skewness of data (Marucci et al., 2018), rendering them less interpretable. As can be seen in Table 2, there was a considerable amount of skewness in the current data set. This approach was not selected.

Instead, we calculated the difference between the fall teacher reports and fall sociometrics as the attunement score. For example, if a teacher reports 70% of the class likes a child, and the result of the sociometric procedure shows that 50% of the class likes a child, the child would have a score of 0.7 – 0.5 = 0.2, showing that the teacher incorrectly estimated by 20%. This approach therefore obtained scores that reflected the degree to which a teacher was accurate in their knowledge of peer dynamics for each student (as reflected by sociometric nominations). Notably, though data to calculate spring teacher attunement were available, we used fall teacher attunement as predictor in the data analysis because teachers’ attunement to their students’ peer relationships early in the school year has been conceptualized to be fundamental in guiding the classroom peer ecology across the year (Rodkin & Gest, 2010).

This difference score was then used in two ways. First, we considered the absolute value of the difference score to represent teacher attunement. In this conceptualization, high teacher attunement would be characterized by a score close to 0, and lower attunement by scores that are increasingly larger (up to a maximum of 1.0). In addition to using the absolute value of the
difference score in one set of analyses, we also considered the direction (positive or negative) of
the difference score in a second set of analyses. This relative approach provided information
about overestimation and underestimation. As a teacher overestimates the proportion of the class
who likes a child, a positive attunement score is obtained. In the previous example, the teacher
who estimates that 70% of peers liked a child whereas the sociometric procedure suggests that
50% of peers liked that child, would have an attunement score of +0.2. However, if the teacher
reports that only 10% of class likes the child, and the sociometric procedure suggests that 50% of
class likes the child, the teacher would have a negative attunement score (0.1 – 0.5 = -0.4).

**Delimited Sample**

In an investigation using a previous dataset (Fung et al., 2019), we found that many
students received zero negative nominations from peers in fall. We therefore expected that the
negative nominations may be similarly skewed in the present sample. This presents a problem
for the current research questions, because it is impossible for a teacher to underestimate a
student’s disliking if the student has a score of zero for negative nominations, thus making it
difficult to probe the effect of attunement to disliking. Thus, we made an a priori decision that
the data analytic procedures involving attunement to disliking would be conducted twice, once
using the full sample detailed in the Method section, and once with a sample excluding the
students whose fall negative nomination scores were zero (delimited sample; n = 405).

To summarize, data analyses for both hypotheses 1 and 2 were conducted using the
absolute value of attunement to liking and disliking to examine the overall accuracy of
attunement, and repeated with the relative attunement value to examine overestimation and
underestimation. After completing the entire procedure with the full sample, we conducted the
same procedure (involving attunement to disliking) with the delimited sample.
Data Analytic Plan

Analyses were conducted using Hierarchical Linear Modelling (HLM; also referred to as multilevel modeling, mixed modeling, and random coefficient modeling; Raudenbush & Bryk, 2002). HLM has risen in popularity as the method of choice for analyzing hierarchically organized data in social science research (for details, please refer to Huta, 2016). The data in the present study are hierarchically organized, with student data nested within classrooms. We followed the HLM guide by Woltman and colleagues (2012) in the analyses.

We first created an unconditional model with spring positive nominations as the outcome variable, and fall positive nominations included as a covariate. The intraclass correlation coefficient from this model representing the proportion of variance at Level 2 was 0.206. Thus, 20.6% of the variance in students’ spring positive nominations was at the classroom level and 79.4% of the variance was at the student level within a classroom. We then repeated this procedure and created another unconditional model using spring negative nominations, with fall negative nominations included as a covariate. The ICC value for the negative nomination model was 0.082. Both ICCs were statistically significant ($p < .001$) and justified the use of HLM.

Hypothesis 1

Starting with the positive nomination model, we first placed fall teacher attunement to liking (calculated with absolute value) as a predictor variable. We then repeated this procedure using teacher attunement to disliking (calculated with absolute value) as a predictor variable. We subsequently repeated this procedure with teacher attunement to liking and disliking (calculated with relative value), for a total of four models. This determined the main effects of teacher attunement in fall in predicting students’ positive nominations received in spring after accounting for fall positive nominations. Therefore:
Level 1: Spring **positive** nominations = $\beta_0 + \beta_1 (\text{fall teacher attunement}) + \beta_2 (\text{fall positive nominations}) + r_{ij}$

Level 2: $\beta_0 = \gamma_{00} + u_{0j}$

$\beta_1 = \gamma_{10}$

$\beta_2 = \gamma_{20}$

We then repeated the same procedure (four models) with negative nominations as the outcome variable:

Level 1: Spring **negative** nominations = $\beta_0 + \beta_1 (\text{fall teacher attunement}) + \beta_2 (\text{fall negative nominations}) + r_{ij}$

Level 2: $\beta_0 = \gamma_{00} + \gamma_{01} (\text{treatment condition}) + u_{0j}$

$\beta_1 = \gamma_{10} + \gamma_{11} (\text{treatment condition})$

$\beta_2 = \gamma_{20}$

*Hypothesis 2*

We added the cross-level interaction between teacher attunement and treatment condition to each model. Thus:

Level 1: Spring **positive** nominations = $\beta_0 + \beta_1 (\text{fall teacher attunement}) + \beta_2 (\text{fall positive nominations}) + r_{ij}$

Level 2: $\beta_0 = \gamma_{00} + \gamma_{01} (\text{treatment condition}) + u_{0j}$

$\beta_1 = \gamma_{10} + \gamma_{11} (\text{treatment condition})$

$\beta_2 = \gamma_{20}$

Similar to Hypothesis 1, we repeated this procedure (four models) with negative nominations as the outcome variable:

Level 1: Spring **negative** nominations = $\beta_0 + \beta_1 (\text{fall teacher attunement}) + \beta_2 (\text{fall
negative nominations) + rij

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}$ (treatment condition) + $u_{0j}$

$\beta_{1j} = \gamma_{10} + \gamma_{11}$ (treatment condition)

$\beta_{2j} = \gamma_{20}$

**Exploratory Analyses**

As mentioned in the Method section, after completing the analyses with the full sample, we repeated these analyses involving teacher attunement to disliking with the delimited sample that only included students who had received at least some negative nominations from peers.
Chapter Three: Results

Tables 1 and 2 show the descriptive statistics of all participant variables and study variables, respectively. Table 3 displays the bivariate correlations between teacher attunement and sociometric nominations. As mentioned in the Method, the attunement scores calculated using absolute value shed light on the accuracy of attunement, whereas the relative scores provide information about overestimation and underestimation. Table 2 shows an interesting trend that most teachers are inaccurate when judging whether their students are liked by classroom peers (absolute score method: $M = 0.47$, $SD = 0.21$), and specifically that teachers tend to overestimate how liked students are (relative score method: $M = 0.46$, $SD = 0.23$). In terms of attunement to students’ disliking by peers, teachers are more accurate than they are for estimating liking (absolute score method: $M = 0.12$, $SD = 0.14$), and teachers typically slightly underestimate how disliked students are (relative score method: $M = -0.10$, $SD = 0.15$). As seen in Table 3, the relative values of attunement to liking and attunement to disliking are correlated ($r = -0.22$, $p < .01$), meaning that teachers who underestimated a student’s liking tended to overestimate the student’s disliking, and vice versa.

Full Sample Analyses

**Hypothesis 1 (Main Effects of Teacher Attunement on Sociometrics)**

Positive nominations and teacher attunement calculated in absolute value. As seen in Table 4, the absolute value of fall teacher attunement to liking predicted children’s receipt of spring positive nominations ($\beta = .21$, $p < .001$), after accounting for positive nominations in fall. Notably, because of the way teacher attunement was calculated (smaller values equal more attunement), the positive beta coefficient indicated that less absolute teacher attunement to liking was associated with more positive nominations. Next, fall teacher attunement to disliking also
predicted children’s receipt of spring positive nominations \( (\beta = -.15 \ p < .001) \), after adjusting for fall positive nominations. In this case, the negative beta coefficient indicated that more absolute attunement to disliking was associated with more positive nominations.

**Positive nominations and teacher attunement calculated in relative value.** Table 4 also presents the results when teacher attunement was calculated using the relative value. Here, the sign of the beta coefficient indicates either teacher overestimation (positive beta) or underestimation (negative beta) of peer relationships. First, teacher overestimation of children’s liking in fall was associated with children receiving more spring positive nominations \( (\beta = .20 \ p < .001) \), after accounting for fall positive nominations. Interestingly, teacher overestimation of disliking in fall also significantly predicted receipt of more spring positive nominations \( (\beta = .10, \ p < .001) \), after adjusting for fall positive nominations.

**Negative nominations and teacher attunement calculated in absolute value.** Neither teacher attunement to liking nor to disliking was found to predict spring negative nominations after accounting for fall negative nominations.

**Negative nominations and teacher attunement calculated in relative value.** No effects were found for fall teacher attunement to liking for predicting negative nominations. However, teacher overestimation of disliking in fall was significantly associated with children’s receipt of more negative nominations in spring \( (\beta = .14, \ p = .003) \), after accounting for fall negative nominations.

**Hypothesis 2 (Moderation by Treatment Condition)**

There were no moderating effects of treatment condition on the relationship between either type of teacher attunement with any sociometric outcome variable. This was the case regardless of whether teacher attunement was calculated in absolute or relative terms.
Additional Analyses with Delimited Sample

Table 5 illustrates the results from HLM analyses involving attunement to disliking with a sample excluding the students whose fall negative nomination scores were zero. ICCs of 0.21 for spring positive nominations and 0.05 for spring negative nominations were found and both were statistically significant ($p < .001$ and $p = .011$, respectively), justifying the use of HLM. Findings from the delimited sample remained similar to those found in the full sample, except that teacher attunement to disliking calculated in relative terms no longer predicted spring positive nominations. Results are explained in more detail below.

**Hypothesis 1 (Main Effects of Teacher Attunement on Sociometrics)**

**Positive nominations and teacher attunement calculated in absolute value.** In line with the result obtained from the full sample, fall teacher attunement to disliking predicted children’s receipt of spring positive nominations ($\beta = -.13$, $p < .001$), after adjusting for fall positive nominations. That is, the greater the teacher attunement to disliking overall (indicated by a smaller absolute value), the more positive nominations the child received.

**Positive nominations and teacher attunement calculated in relative value.**
Inconsistent with what was found in the full sample, fall teacher attunement to disliking (calculated in relative value) did not show a statistical relationship with spring positive nominations after adjusting for fall positive nominations.

**Negative nominations and teacher attunement calculated in absolute value.**
Consistent with the result obtained in the full sample, teacher attunement to disliking did not predict spring negative nominations after adjusting for fall negative nominations.

**Negative nominations and teacher attunement calculated in relative value.** In accordance with the result from the full sample, teacher overestimation of disliking in fall
significantly predicted more spring negative nominations ($\beta = .14$, $p = .02$), after adjusting for fall negative nominations.

**Hypothesis 2 (Moderation by Treatment Condition)**

As in the full sample, no moderating effects of treatment condition were found on the relationships between teacher attunement to disliking and sociometric variables. This was the case when teacher attunement to disliking was calculated in absolute and in relative terms.
Chapter Four: Discussion

Using a sample of elementary school students in general education classrooms, this study examined: (1) whether teacher attunement, or teachers’ knowledge of students’ social relationships, in fall would predict better student peer relationships in spring; and (2) whether treatment condition (being in the control group versus receiving MOSAIC, a classroom intervention to bolster social functioning of elementary school-age children) would moderate any associations between teacher attunement and student peer relationships. We found some associations between teacher attunement in fall with student peer relationships in spring, which differed depending on the outcome measure (positive versus negative nominations) and the type of teacher attunement (attunement to liking versus to disliking). The majority of the results remained when using a delimited sample of children who had received at least some negative sociometric nominations from peers. We found no evidence that treatment condition related to the pattern of results.

Positive Nominations and Teacher Attunement

Less absolute teacher attunement to liking, as well as more relative overestimation of liking, were each associated with children receiving more positive nominations in spring, after statistically accounting for fall positive nominations. Taken together, these findings suggest that when a teacher thinks that a student is better liked by peers than peers indicate (i.e., reflecting lower absolute attunement but higher overestimation in relative attunement), this is associated with the student becoming better liked by peers over the course of the school year. There may be several reasons for this. Especially because the children in this study were relatively young, teachers may be picking up on positive characteristics of certain students - characteristics which peers have not yet noticed, but that the teacher knows relate to good peer relationships. This may
result in teachers overestimating those students’ peer liking in fall, but those students do in fact receive more positive peer nominations in spring once their classmates recognize the characteristics that the teacher perceived earlier. Another explanation is that a teacher’s perception that a student is well liked creates a positive expectation, which is communicated to the student and to their peers. This expectation results in a self-fulfilling prophecy.

More absolute attunement to disliking was associated with children receiving more positive nominations in spring, after accounting for fall positive nominations. This could be consistent with previous research that attuned teachers who could identify disliked children were more able to help those children, potentially by helping those children develop new social identities or roles that enhance how they are perceived by peers (Farmer et al., 1993; Hamm et al., 2011). Presumably, teachers who are aware of disliking are also more motivated to try actionable strategies to improve classroom climate in general, as opposed to being complacent about their classroom peer dynamics.

In the full sample, a small relative overestimation of disliking was also associated with children’s receipt of more positive nominations, after accounting for fall positive nominations. However, this finding did not remain in the delimited sample of students who had at least one negative peer nomination. This pattern may have occurred because teachers in the current study frequently estimated that students in their classroom were disliked by zero peers, so overestimation of disliking by a small amount may reflect a teacher’s acknowledgement that peer disliking exists in their classroom. When put together with the finding that more absolute attunement to disliking was associated with children receiving more positive nominations, teacher attunement to disliking (as well as acknowledgement that disliking exists) may raise
teachers’ awareness that some students need extra support, and even convey an urgency for the teacher to make efforts to assist those students who the teacher perceives to be disliked by peers.

**Negative Nominations and Teacher Attunement**

Teacher attunement to liking was not associated with children’s receipt of negative nominations, regardless of whether attunement was calculated using absolute or relative value. Teacher attunement to disliking was not associated with negative nominations when calculated with absolute value, but overestimating disliking (when calculated with relative value) predicted children’s receipt of more negative nominations in the spring, after accounting for fall negative nominations. This pattern may have occurred in a similar fashion to the hypothesized processes for the outcome of positive nominations. Namely, teachers who overestimate disliking in fall may be picking up on socially unfavorable characteristics in those students that peers have not yet noticed (or that do not yet bother peers sufficiently), but this changes by spring. Alternatively, a teacher who overestimates a student’s peer disliking may then act in a manner that creates a self-fulfilling prophecy.

However, when put together with the finding that overestimating the amount that a student is disliked also predicted receipt of more positive nominations (with the caveat that this latter finding was not replicated in the delimited sample), it is possible that a complicated process is occurring. As overestimating a child’s disliking presumably reflects that the teacher is concerned about the child, this could result in the teacher devoting extra attention to that child. The extra teacher attention could highlight the child for peers and raise the child’s social prominence, which is defined as the amount a child is noticed (Evan & Eder, 1993; Farmer & Rodkin, 1996). Crucially, social prominence simply captures being noticed by peers, and it can reflect both peer liking and peer disliking at the same time.
Positive versus Negative Nominations

Overall, the findings suggest that teacher attunement may have stronger connections with children’s receipt of positive, rather than negative nominations. Although positive and negative nominations are typically negatively correlated, they are not simply opposite constructs. Literature has indicated that positive and negative nominations may associate with different constructs psychometrically. In one study, positive nominations were shown to correlate most strongly with likeability, whereas negative nominations were associated more with aggression and withdrawal (Johnston et al., 1988). Perhaps, a small factor such as the teacher being aware of students’ social relationships has more ability to affect positive nominations than negative nominations, because it affects peers’ perceptions of that child’s likeability. By contrast, changing negative nominations may require additional factors, such as efforts to address children’s aggressive or withdrawn social behaviors. That teacher attunement appears to associate more strongly with positive rather than negative nominations is consistent with meta-analytic evidence showcasing that children’s liking of their peers is less stable and more susceptible to fluctuations than their disliking of peers (Jiang & Cillessen, 2005).

Lack of Moderation by Treatment Condition

We had expected that teacher attunement would have the strongest association with positive peer relationships in the MOSAIC intervention group, because teachers with good understanding of students’ social lives can be more strategic when implementing intervention practices. However, there were no moderating effects of treatment condition in any model, regardless of how teacher attunement was calculated, and regardless of whether the outcome was positive or negative nominations.
This could have occurred for a few reasons. First, because MOSAIC, on average, did not improve children’s sociometric nominations, the teachers in the MOSAIC condition may not have had useful strategies to implement (at least, if the outcome variable is sociometrics). We note that there are no classroom interventions that consistently demonstrate positive effects on peer sociometrics. Therefore, without a suite of efficacious teacher strategies that impact peer sociometrics, it may not matter whether the teacher is trying to apply a strategy with a child who they correctly perceive to be disliked.

It is also possible that the MOSAIC intervention, specifically, did not provide enough opportunities for teachers to take advantage of their knowledge of students’ social relationships when implementing practices. Specifically, MOSAIC is a universal intervention where teachers are instructed to deliver all intervention strategies to the whole class (with selective supports for students with elevated ADHD symptoms). Thus, for the most part, teachers do not choose the students with whom to implement MOSAIC strategies based on their accurate understanding of students’ social relationships. The potential interaction effect may be more pronounced in a different intervention, such as manipulating students’ seating arrangements, where teachers more directly leverage their understanding of peer relationships in the classroom.

**Study Strengths and Limitations**

The present study contains multiple strengths. First, the findings may have good generalizability across settings as participants were recruited from a variety of sources, involving many schools across two countries in different geographic areas. Second, the use of a short-term longitudinal design allows for the measurement of teacher attunement in fall, and the statistical adjustment of fall nomination scores. This design increases the confidence that teacher attunement in the fall incrementally predicted students’ peer relationships in the spring. Other
strengths include the randomized design (to test moderation by treatment condition in Hypothesis 2) and the appropriate use of HLM given the hierarchically organized structure of the data.

Some study limitations must also be noted. First, due to the exploratory nature of the current study, the data analytic procedure involved conducting several models without applying a correction for multiple comparisons. This might increase the risk for Type I error. Results should be considered in light of the number of tests conducted. Second, the present study focuses on teacher attunement, not on the processes that may link attunement to children’s peer relationships. Therefore, the mechanisms through which teacher attunement shapes peer relationships are inferred. Third, sociometric nominations are affected by many factors, including some that were unmeasured in this study. For example, students’ academic performance, personality, and communication style certainly impact the sociometric nominations they receive, likely above and beyond (or in interaction with) teacher attunement.

**Directions for Future Research**

To broaden our knowledge of how teacher attunement may be associated with peer relationships, future research could examine the mechanisms through which this pathway may occur. There are two potential mechanisms worthy of further inspection. First, based on the results of the current study, it is possible that attunement to liking or disliking affects peer relationships by influencing the teacher’s expectations of the student; this could be tested as a mediator. Second, it was inferred that attuned teachers are more likely to take actions to facilitate their students’ social adjustment, whereas teachers who are not aware of students’ social status may be complacent about their classroom peer dynamics. This implies an association between teacher attunement and teachers’ attempts to help their students, which could be directly tested.

**Conclusion**
In summary, the associations between teacher attunement with students’ peer relationships in the classroom may vary depending on how attunement is calculated, and whether positive or negative nominations are the outcome. Study findings underscore the importance of considering whether lack of attunement reflects an overestimation or an underestimation of the amount students are liked or disliked.
Table 1

Characteristics of Child and Teacher Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Children (%)</th>
<th>Teachers (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Children (%)</strong></td>
<td><strong>Teachers (%)</strong></td>
</tr>
<tr>
<td><strong>Age (Mean, SD)</strong></td>
<td>7.5 (1.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>275 (49.3)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>283 (50.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kindergarten</td>
<td>40 (7.2)</td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>64 (11.5)</td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td>158 (28.3)</td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>191 (34.2)</td>
<td></td>
</tr>
<tr>
<td>4th</td>
<td>76 (13.6)</td>
<td></td>
</tr>
<tr>
<td>5th</td>
<td>29 (5.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>223 (40.0)</td>
<td></td>
</tr>
<tr>
<td>Asian/Asian Canadian/Asian American</td>
<td>110 (19.7)</td>
<td></td>
</tr>
<tr>
<td>Black/Black Canadian/African American</td>
<td>87 (15.6)</td>
<td></td>
</tr>
<tr>
<td>First Nations/American Indian/Alaska Native</td>
<td>4 (0.7)</td>
<td></td>
</tr>
<tr>
<td>Multiracial</td>
<td>93 (16.7)</td>
<td></td>
</tr>
<tr>
<td>Other/Missing</td>
<td>41 (7.3)</td>
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<tr>
<td><strong>Ethnicity</strong></td>
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</tr>
<tr>
<td>Hispanic</td>
<td>83 (14.9)</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>409 (73.3)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>66 (11.8)</td>
<td></td>
</tr>
<tr>
<td><strong>Years of Teaching Experience (Mean, SD)</strong></td>
<td>11.4 (9)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>30 (78.9)</td>
<td></td>
</tr>
<tr>
<td>Asian/Asian Canadian/Asian American</td>
<td>3 (7.9)</td>
<td></td>
</tr>
<tr>
<td>Multiracial</td>
<td>1 (2.6)</td>
<td></td>
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<tr>
<td>Other/Missing</td>
<td>4 (10.5)</td>
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<tr>
<td><strong>Ethnicity</strong></td>
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<td></td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>34 (89.5)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>4 (10.5)</td>
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</table>
Table 2

*Descriptive Statistics of Study Variables*

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<thead>
<tr>
<th>Peer Relationships</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
<th>Skewness a</th>
<th>Kurtosis a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive nominations b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>0.32</td>
<td>0.17</td>
<td>0.00-1.00</td>
<td>0.69(0.10)</td>
<td>0.92(0.21)</td>
</tr>
<tr>
<td>Spring</td>
<td>0.30</td>
<td>0.17</td>
<td>0.00-0.86</td>
<td>0.47(0.10)</td>
<td>-0.02(0.21)</td>
</tr>
<tr>
<td>Negative nominations b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>0.14</td>
<td>0.16</td>
<td>0.00-0.88</td>
<td>1.55(0.10)</td>
<td>2.14(0.21)</td>
</tr>
<tr>
<td>Spring</td>
<td>0.15</td>
<td>0.17</td>
<td>0.00-0.87</td>
<td>1.51(0.10)</td>
<td>2.20(0.21)</td>
</tr>
<tr>
<td>Teacher report of liking b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>0.78</td>
<td>0.21</td>
<td>0.00-1.00</td>
<td>-1.24(0.10)</td>
<td>1.20(0.21)</td>
</tr>
<tr>
<td>Teacher report of disliking b</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fall</td>
<td>0.05</td>
<td>0.11</td>
<td>0.00-1.00</td>
<td>3.73(0.10)</td>
<td>17.74(0.21)</td>
</tr>
<tr>
<td>Teacher attunement to liking (absolute)</td>
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<td></td>
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<tr>
<td>Fall</td>
<td>0.47</td>
<td>0.21</td>
<td>0.00-0.94</td>
<td>-0.34(0.11)</td>
<td>-0.56(0.21)</td>
</tr>
<tr>
<td>Teacher attunement to disliking (absolute)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Fall</td>
<td>0.12</td>
<td>0.14</td>
<td>0.00-0.88</td>
<td>1.94(0.11)</td>
<td>4.64(0.21)</td>
</tr>
<tr>
<td>Teacher attunement to liking (relative)</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Fall</td>
<td>0.46</td>
<td>0.23</td>
<td>-0.37-0.94</td>
<td>-0.70(0.11)</td>
<td>0.38(0.21)</td>
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<tr>
<td>Teacher attunement to disliking (relative)</td>
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<td></td>
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</tr>
<tr>
<td>Fall</td>
<td>-0.10</td>
<td>0.15</td>
<td>-0.87-0.60</td>
<td>-1.00(0.11)</td>
<td>4.14(0.21)</td>
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</tbody>
</table>

*Parenthesis contains standard error values.*

*Scores are proportional.*
Table 3

*Bivariate Correlations between Teacher Attunement and Sociometrics*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Teacher attunement to liking (absolute)</td>
<td>-</td>
<td>.002</td>
<td>.96**</td>
<td>-.16**</td>
<td>-.19**</td>
<td>-.07</td>
</tr>
<tr>
<td>2 Teacher attunement to disliking (absolute)</td>
<td>-</td>
<td>-.04</td>
<td>-.77**</td>
<td>-.29**</td>
<td>.57**</td>
<td></td>
</tr>
<tr>
<td>3 Teacher attunement to liking (relative)</td>
<td>-</td>
<td>-.22**</td>
<td>-.19**</td>
<td>-.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Teacher attunement to disliking (relative)</td>
<td>-</td>
<td>.24**</td>
<td>-.47**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Spring positive nominations</td>
<td>-</td>
<td>-.47**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Spring negative nominations</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
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</table>

**p < .01 (two-tailed)**
### Table 4

*Hierarchical Linear Modelling Analyses Predicting Peer Sociometrics (Full Sample)*

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>B(SE)</th>
<th>t(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring positive nominations $\beta_{0j}$</td>
<td>0.02(0.09)</td>
<td>0.265(33)</td>
<td>0.79</td>
</tr>
<tr>
<td>Teacher attunement to liking (absolute) $\beta_{ij}$</td>
<td>0.21(0.04)</td>
<td>5.12(509)</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>0.01(0.08)</td>
<td>0.15(32)</td>
<td>0.89</td>
</tr>
<tr>
<td>Teacher attunement to disliking (absolute) $\beta_{ij}$</td>
<td>-0.15(0.03)</td>
<td>-4.39(509)</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>-0.09(0.06)</td>
<td>-1.58(32)</td>
<td>0.12</td>
</tr>
<tr>
<td>Teacher attunement to liking (relative) $\beta_{ij}$</td>
<td>0.20(0.04)</td>
<td>4.52(509)</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>-0.01(0.09)</td>
<td>-0.01(32)</td>
<td>0.99</td>
</tr>
<tr>
<td>Teacher attunement to disliking (relative) $\beta_{ij}$</td>
<td>0.10(0.04)</td>
<td>2.50(509)</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>0.01(0.07)</td>
<td>0.03(32)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>B(SE)</th>
<th>t(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring negative nominations $\beta_{0j}$</td>
<td>0.02(0.06)</td>
<td>0.31(33)</td>
<td>0.76</td>
</tr>
<tr>
<td>Teacher attunement to liking (absolute) $\beta_{ij}$</td>
<td>0.02(0.04)</td>
<td>0.41(509)</td>
<td>0.69</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>0.01(0.08)</td>
<td>0.05(32)</td>
<td>0.96</td>
</tr>
<tr>
<td>Teacher attunement to disliking (absolute) $\beta_{ij}$</td>
<td>-0.04(0.06)</td>
<td>-0.70(509)</td>
<td>0.48</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>0.08(0.08)</td>
<td>0.10(32)</td>
<td>0.33</td>
</tr>
<tr>
<td>Teacher attunement to liking (relative) $\beta_{ij}$</td>
<td>0.01(0.05)</td>
<td>0.28(509)</td>
<td>0.78</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>-0.03(0.09)</td>
<td>-0.36(32)</td>
<td>0.72</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>Teacher attunement to disliking (relative)</td>
<td>0.14(0.06)</td>
<td>2.25(509)</td>
<td>0.03*</td>
</tr>
</tbody>
</table>

| Interaction with treatment condition $\gamma_{11}$ | -0.03(0.09) | -0.35(32) | 0.73 |

*Note.* Results are reported with robust standard errors. All level 1 variables were group mean centered; treatment condition (0 = Typical Practice Control, 1 = MOSAIC) was uncentered. All values were standardized before analyses were conducted. All missing data were handled by listwise deletion in the HLM software.
Table 5

Hierarchical Linear Modelling Analyses Predicting Peer Sociometrics (Delimited Sample)

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>$B(\text{SE})$</th>
<th>$t(\text{df})$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring positive nominations $\beta_{0j}$</td>
<td>-0.01(0.09)</td>
<td>-0.15(33)</td>
<td>0.88</td>
</tr>
<tr>
<td>Teacher attunement to disliking (absolute) $\beta_{1j}$</td>
<td>-0.13(0.04)</td>
<td>-2.89(358)</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>-0.05(0.08)</td>
<td>-0.61(32)</td>
<td>0.54</td>
</tr>
<tr>
<td>Teacher attunement to disliking (relative) $\beta_{1j}$</td>
<td>0.04(0.05)</td>
<td>0.80(357)</td>
<td>0.43</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>-0.05(0.08)</td>
<td>-0.71(32)</td>
<td>0.49</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>$B(\text{SE})$</th>
<th>$t(\text{df})$</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring negative nominations $\beta_{0j}$</td>
<td>0.01(0.06)</td>
<td>0.13(33)</td>
<td>0.90</td>
</tr>
<tr>
<td>Teacher attunement to disliking (absolute) $\beta_{1j}$</td>
<td>-0.06(0.08)</td>
<td>-0.78(358)</td>
<td>0.44</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>0.06(0.08)</td>
<td>0.74(32)</td>
<td>0.46</td>
</tr>
<tr>
<td>Teacher attunement to disliking (relative) $\beta_{1j}$</td>
<td>0.14(0.06)</td>
<td>2.28(357)</td>
<td>0.02*</td>
</tr>
<tr>
<td>Interaction with treatment condition $\gamma_{11}$</td>
<td>-0.01(0.09)</td>
<td>-0.11(32)</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Note. Results are reported with robust standard errors. All level 1 variables were group mean center; treatment condition was uncentered. Treatment condition: 0 = Typical Practice Control, 1 = MOSAIC. All values were standardized before analyses were conducted. All missing data were handled by listwise deletion in the HLM software.
References


positions: The social network centrality perspective. *Social Development, 5,* 174-188.
https://doi.org/10.1111/j.1467-9507.1996.tb00079.x

https://doi.org/10.1001/19.762.229.22


https://doi.org/10.1001/a22019793.22


