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Promoting Equal Interactions in Early Childhood Settings

Daphne Snyder
Western Michigan University

PROMOTING EQUAL INTERACTIONS IN EARLY CHILDHOOD SETTINGS

Daphne Snyder, Ph.D.

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In the United States, Black, Indigenous, and People of Color (BIPOC) students are more likely to face disciplinary action (e.g., exclusion, suspension, and expulsion from the classroom) for engaging in the same challenging behaviors as their white peers (Badger et al., 2018; Little & Tolbert, 2018; Noguera, 2003). Due to the discrepancy in disciplinary practices, students are at risk of continued negative interactions with their teachers (Decker et al., 2007; Wymer et al., 2020). One way to improve teacher interactions toward BIPOC students is through equity-focused performance feedback regarding praise and reprimand rates (Knochel et al., 2022). The purpose of this study was to extend the research conducted by Knochel et al. (2020) by examining teacher-student interactions during unstructured times (i.e., choice/free play), expanding the topographies of teacher behaviors measured to include demands and social comments, and including measures of child behavior preceding teacher interactions. This study consisted of two experiments. During the first experiment, a descriptive analysis of teacher interactions was conducted. During the second experiment, the effect of self-monitoring and equality-focused performance feedback on teacher interactions was examined.

PROMOTING EQUAL INTERACTIONS IN EARLY CHILDHOOD SETTINGS

by

Daphne Snyder

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Doctoral Committee:

Stephanie Peterson, Ph.D., Chair
Sacha Pence, Ph.D.
Jessica Van Stratton, Ph.D.
Kwang-Sun Blair, Ph.D.

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Daphne Snyder

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INTRODUCTION

In the United States, Black, Indigenous, and People of Color (BIPOC) students are more likely to face disciplinary action (e.g., exclusion, suspension, and expulsion from the classroom) for engaging in the same challenging behaviors as their White peers (Badger et al., 2018; Little & Tolbert, 2018; Noguera, 2003). This discrepancy in disciplinary actions has been coined the "Discipline Gap" and has been known to exist for more than 30 years (Krezmien et al., 2016). The discrepancy seems to worsen as students progress through their academic career (Gopalan & Nelson, 2019). This leads to BIPOC students spending significantly more time outside the educational environment than their White peers (Noltemeyer & Mcloughlin, 2010). As a result of inequitable discipline practices involving exclusion from the classroom, BIPOC students are at risk of educational difficulties that can affect their overall life trajectory. Specifically, compared to their White peers, BIPOC students have higher dropout rates in secondary school (6.4% for Black students as compared to 4.2% for White students; Ekstrom et al., 1986; Hallinan, 2008; Marcus & Sanders-Reio, 2001), experience decreased income as an adult, and become more frequently involved with the criminal justice system (Monahan et al., 2014; Pascoe & Richman, 2009).

Teacher-student relationship and students' attitudes toward school are likely impacted by the ongoing and bi-directional interactions that occur as a function of exclusionary disciplinary actions (Fisher & Rickards, 1998). Research suggests that teachers often view Black students as more culpable for problem behavior within the classroom (Goff & Kahn, 2012). Teachers are also more likely to closely observe BIPOC students as opposed to their peers (Gilliam et al., 2016; Pit-ten Cate & Glock, 2019), which may lead to discrepant disciplinary practices. Taken

together, these behaviors may place BIPOC students at risk of continued negative interactions with their teachers (Decker et al., 2007; Wymer et al., 2020).

This tendency toward more negative interactions toward BIPOC students has been conceptualized as implicit bias (i.e., biases that the individual is unaware of). De Houwer (2019) proposed a behavioral approach to conceptualizing implicit bias. De Houwer defines implicit bias as behaviors influenced by cues that function as an indicator of the social group to which others belong. As such, implicit bias can be characterized as behavior, which can be measured and thus changed. However, there has been limited research to date evaluating implicit bias specifically related to the classroom setting (Matsuda et al., 2020).

To change biased behavior, the behavior must first be measured. One way implicit bias has been measured is through the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes et al., 2006). The IRAP presents two stimuli and requires participants to make a response related to the stimuli. For example, the participant may be presented with the stimuli "Black" and "Clever" must then select true or false as instructed by the assessment (Power et al., 2017). Barnes-Holmes et al. (2006) hypothesize that the shorter the response latency, the more congruent the response is with the participants' beliefs. The IRAP has been used to examine implicit bias across several domains including racial groups (Barnes-Holmes et al., 2010; Power et al., 2017), employee attractiveness (Murphy et al., 2021), and ageist attitudes (Cullen et al., 2009). In the school setting, the IRAP has been used to evaluate teacher attitudes toward students diagnosed with emotional behavior disorders (Scanlon & Barnes-Holmes, 2013; Scanlon et al., 2020). While the IRAP has been empirically validated to measure implicit bias, there is little empirical evidence to date in which IRAP results are used to design interventions to change behavior (Sereno, 2022). Further, there is little evidence relating to whether the results of the

IRAP represent actual biased behavior in the natural environment. That is, there is little research examining whether the biases identified by the IRAP are evidenced in actual interactions between the participant and their peers and colleagues. It is unclear whether bias measured via the IRAP is then displayed in equitable disciplinary practices in the classroom. Thus, a more direct assessment of behaviors that demonstrate inequity may be more beneficial in reducing the Discipline Gap.

Teacher praise and reprimands have particular relevance when considering teacher interactions with students. Previous research has demonstrated that high rates of praise increase students' pro-social behavior (Marchant & Young, 2001; Sutherland et al., 2000) and at the same time decrease student challenging behavior (Reinke et al., 2008). Further, praise can increase overall student engagement within the classroom (Martens et al., 1997). In contrast, reprimands are correlated with problem behavior in the classroom (Kestner et al., 2019). Knochel, Cho Blair, Kincaid, and Randazzo (2020) measured teacher praise and reprimand statements provided to students of varying backgrounds and found that teachers provided unequitable rates of praise and reprimands across elementary-aged students of varying demographics. Specifically, the researchers measured the rate of behavior-specific praise statements across teachers for White, Black, Latinx, and other BIPOC students. They also assessed overall behavior-specific praise rates. The authors found that all teachers displayed low rates of praise across all students and, further, inequitable rates of behavior-specific praise across demographic categories. For example, some teachers demonstrated a higher rate of praise toward White students than BIPOC students. Furthermore, Knochel et al. (2020) found that all of the teachers were more likely to deliver reprimands than praise and that Black students were more likely to receive reprimands than White, Latinx, and Other students.

Given that high rates of teacher praise and low rates of reprimands are key elements in improving teacher-student interactions, increasing appropriate behavior, increasing learning, and decreasing problem behavior, it is imperative that *all* students in the classroom experience high rates of praise and low rates of reprimands to reduce the Discipline Gap. Thus, after observing bias in teacher's interactions with their classroom students, Knochel and colleagues (2020) first implemented behavioral skills training in an effort to increase the teachers' mean rates of behavior-specific praise and decrease the teachers' mean rates of reprimands. Following BST, teachers demonstrated increased mean rates of behavior-specific praise and decreased mean rates of reprimands. However, teachers continued to provide higher rates of behavior-specific praise to White students than their BIPOC peers. Thus, the authors then implemented self-monitoring and performance feedback to promote equitable interactions across students. This was done by providing teachers with a prompt to praise every student at least once during their lesson and to measure their praise via a golf counter. After the lesson, teachers were provided with written feedback regarding the students receiving the most and least behavior-specific praise and reprimands. Knochel et al. (2020) found that following the implementation of equity-focused performance feedback, the rate of behavior-specific praise was provided equitably across students of each demographic.

Knochel et al. (2020) demonstrated that it may be possible to measure/identify bias by directly observing the distribution of teacher interactions across students. Subsequently, Knochel and colleagues (2020) demonstrated that more equal interactions can be produced using performance feedback and self-monitoring of praise rates. As such, the intervention conducted by Knochel et al. (2020) provides a promising start to decreasing the Discipline Gap. However, while Knochel et al. (2020) identified discrepancies between teacher praise and reprimand rates,

their study was limited to only these types of interactions. Discrepancies in other interactions, such as teacher demands and social comments with students, may have been present but were not measured. Given that these interactions may also contribute to overall teacher-student interactions and the level of attention a student receives, they should be considered. Additionally, Knochel et al. (2020) intervened during a formal instructional time, when interactions tend to be structured around academic content. In elementary settings, the majority of the school day is spent in structured interactions. It may be important to evaluate interactions in early childhood settings, because these are the first interactions children have with teachers and school-like settings. In early childhood settings, much of the day is less structured. It is unclear whether these findings would be similar with young children in less structured settings. Examining whether similar discrepancies occur during less formal activities, such as free play/choice time, when interactions are less likely to be structured around academic content may be of interest.

Before proceeding, it is important to address an issue with terminology. It is important to note that Knochel and colleagues (2020) termed their intervention "equity-focused performance feedback." In fact, Knochel and colleagues' (2020) intervention was designed to produce "equal" rates of feedback. While often used interchangeably, equity and equality have different implications (Espinoza, 2007). Equity is defined as treating individuals or groups fairly based on their unique needs (Paul, 2019). For example, if one student requests a high-five and another requests a hug from the same teacher, to be "equitable," the teacher would provide the type of attention the student requested in response to their individual needs. In contrast, equality is viewed as the uniform distribution of tools and resources regardless of the unique needs of the group or individual (Paul, 2019). Considering the example above, a teacher who gives one high-

five to every student during the school day is displaying equality as opposed to equity.. Based on these definitions of equity and equality, providing students of all demographic groups with similar rates of praise and reprimands may more appropriately be referred to as "equality-focused" rather than "equity-focused." Thus, for the remainder of this paper, I will use the term "equality" and "equality-focused" to refer to measures and interventions similar to those described by Knochel et al. (2020) as "equity" and "equity-focused."

The purpose of this study was to extend the research conducted by Knochel et al. (2020) by examining teacher-student interactions during unstructured times (i.e., choice/free play), expanding the topographies of teacher behaviors measured to include demands and social comments, and including measures of child behavior preceding teacher interactions. The study consisted of two experiments.

Experiment 1 addressed the following questions:

1. What were the mean rates of interactions (i.e., praise, reprimands, social comments, and demands) aggregated across all children in the classroom?
2. What were the mean rates of interactions aggregated across racial and gender groups in the classroom?
3. To what extent were praise and reprimands equal across groups (i.e., the mean responses per min per student plus or minus 25%) demonstrated?

Experiment 2 was then conducted with classrooms in which either higher rates of reprimands than praise were observed or where praise and reprimands were unequal across groups of children. Experiment 2 addressed the following questions:

1) In classrooms where higher rates of reprimands than praise were observed, what were the effects of implementing behavioral skills training to identify and self-monitor praise paired with performance feedback on rates of praise and reprimands?
    a) What were the mean rates of interactions (i.e., praise, reprimands, social comments, and demands) aggregated across all children in the classroom?
    b) What were the mean rates of interactions aggregated across racial and gender groups in the classroom?
    c) To what extent were praise and reprimands equal between groups (i.e., the mean responses per min per student plus or minus 25%) demonstrated?
2) In classrooms where there were unequal interactions across student demographic groups, what were the effects of implementing equality-focused performance feedback as described by Knochel et al. (2020) on teacher interactions? Specifically,
    a) What were the mean rates of interactions (i.e., praise, reprimands, social comments, and demands) aggregated across all children in the classroom?
    b) What were the mean rates of interactions aggregated across racial and gender groups in the classroom?
    c) To what extent were praise and reprimands equal between groups (i.e., the mean responses per min per student plus or minus 25%) demonstrated?

METHOD FOR EXPERIMENT 1

The purpose of Experiment 1 was to conduct a descriptive analysis of the teacher interactions (i.e., praise, reprimands, social comments, and demands) occurring in the classroom during unstructured times (i.e., choice time). Like Knochel et al. (2020), data were first aggregated across all students and across racial and gender demographic groups to determine if

praise exceeded reprimands. If so, data were further analyzed to determine whether interactions were equally distributed across demographic groups. This was done to better understand how teachers interacted with students in the absence of intervention.

Settings and Participants

This study was conducted in four early childhood settings including two preschool classrooms, one early childhood special education classroom, and one daycare classroom in a suburban, midwestern city. All participating classrooms were receiving ongoing services from a local, university-based consulting group that provided behavior support services to assist teachers with classroom management reducing of student challenging behavior. The consulting group received referrals from the county's coaching teachers and administrators, who routinely met to review difficult cases involving challenging behavior in the classroom. The typical consultation process included the assessment of teacher-child interactions within the classroom. Sometimes a functional behavior assessment was also completed for specific children. After assessments were completed, the consultation group provided behavioral skills training to the teachers on recommended strategies to improve classroom management and decrease student challenging behavior. Because the standard operating procedures for the consulting group included the assessment of teacher-student interactions, all classrooms referred for consultation were included as settings for this study. This study was reviewed and approved by Western Michigan University's Human Subjects Institutional Review Board as analysis of secondary data (See Appendix B).

Each classroom typically included a lead teacher and multiple paraprofessionals. For purposes of this study, only the lead teacher in the classroom served as the teacher participant. Although paraprofessionals were present in the classroom, no data were taken on their

interactions. Table 1 provides demographic information for the teachers included in this study. Students in the classroom served as secondary participants. Table 2 provides general and student demographic information for each included classroom. The number of students in each classroom varied during the study, due to children moving, changing classrooms, and the like.

Table 1

Teacher Demographic Information

	Race	Gender	Highest level of education	Years of experience
Kelly	White	Female	Master's degree	28
Maggie	White	Female	Master's degree	40
Adrienne	Multiracial	Female	Some college	6
Mackenzie	White	Female	Master's degree	16

Table 2

Classroom and Student Demographic Information

	Kelly's classroom		Maggie's classroom		Adrienne's classroom		Mackenzie's classroom	
Type of classroom	Preschool		ECSE		Daycare		Preschool	
Number of paraprofessionals	2		1		1		2	
	N	*M* (Range)	*N*	*M* (Range)	*N*	*M* (Range)	*N*	*M* (Range)
Class size	16	13 (12-14)	4	3 (3-4)	15	24 (7-18)	16	16 (16-16)
Student race								
Black	8	7 (6-7)	1	1 (1-1)	1	1 (1-1)	8	8 (8-8)
White	4	5 (4-5)	2	2 (1-2)	19	9 (5-13)	8	8 (8-8)
Latinx	1	1 (0-1)	1	1 (0-1)				
Other	1	1 (1-1)			4	2 (1-4)		
Student gender								
Male	8	7 (6-7)	2	2 (1-2)	14	7 (3-9)	4	4 (4-4)
Female	8	7 (5-8)	2	2 (1-2)	10	5 (2-9)	12	12 (12-12)

Note. ECSE = early childhood special education.

For purposes of this study, the researchers observed the classrooms during unstructured activities (i.e., choice time). During this time, students chose amongst a variety of activities

including but not limited to arts and crafts, imaginary play, gross motor activities, and fine motor activities. During this time, teachers typically engaged with the students on social and language skills.

Materials

Data were collected using paper and pencil. See Appendix A for a sample of the datasheet. Researchers were also equipped with a watch to record the start and stop time of each observation. Classrooms were all equipped with toys and educational materials provided by each school.

Dependent Variables, Measurement, and Interobserver Agreement

Dependent variables included teacher behaviors (praise, reprimands, social comments, and demands), as well as appropriate and inappropriate student behaviors. Table 3 provides definitions of the dependent variables. The definitions for praise, reprimands, and demands were based on definitions used by Kestner et al (2018). Social comments were intended to capture all other teacher interactions with students during observations.

Teachers' engagement in praise, reprimands, demands, and social comments were recorded using an event recording procedure that also indicated the student with whom these target behaviors occurred. Each student was identified by a code on the datasheet indicating the first letter of their race, gender, and a unique number. For example, a white male may have been provided with the identifier of WM1. A tally for each occurrence of one of the target teacher behaviors was made next to the specific identifier for each individual student. At the end of a session, the total number of each type of teacher behavior was divided by the session time to identify the overall mean rate of that response. This rate was then further divided by the number of children present in the classroom during the observation to determine the overall mean rate

per child of that response. These were the aggregated measures. These measures were then disaggregated by demographic. The number of each teacher target behaviors were then totaled by demographic and divided by the session time and number of children in that demographic. For example, the number of praise statements made toward girls in the classroom were totaled and divided by the session time, which was then divided by the number of girls in the classroom that day to obtain the mean rate of praise for girls during that session.

Table 3

Operational Definitions of Teacher and Student Behaviors

	Type of interaction	Definition	Example	Nonexample
Teacher Behavior	Praise	Any instance where the teacher provides a statement of approval.	The teacher states, "Wow, your painting looks so good!"	The teacher tells a student to add yellow to their painting.
	Reprimands	Any instance where the teacher provides a statement of disapproval or warning.	The teacher says, "Don't take your friend's toy!"	The teacher says, "Give the toy to your friend."
	Social Comments	Any instance where the teacher is providing the student with an interaction that is not a reprimand or praise statement, and/or manipulating a shared toy with the child.	The teacher makes train noises while pushing a train toward a specific student.	The teacher tells a student to put a block on top of a tower.
	Demands	Any instance where the teacher places an instruction on the student.	The teacher says, "how about we put the block on top of the tower."	The teacher says, "I love how you're playing with your friend!"
Student Behavior	Appropriate Behavior	Any instance of behavior that aligns with the individual classroom rules.	A student shares a toy with their peer.	A student pushes their peer out of the way to get a toy.
	Inappropriate Behavior	Any instance of behavior that is dangerous or disruptive in nature.	A student aggresses toward another student	A student throws a ball to a peer to catch

Whether children were engaged in appropriate or inappropriate behavior immediately prior to the teacher's interaction with the child was also measured. Each time a teacher interaction was recorded as described above, the observer indicated whether that interaction was preceded by an appropriate or inappropriate student behavior. For example, if a teacher interaction was preceded by the student playing appropriately, a tally was recorded to indicate the teacher response next to the specific student identifier. If the teacher interaction was preceded by a student engaging in inappropriate behavior, an "x" was recorded to indicate the teacher response next to the specific student identifier. By doing so, teacher behavior was analyzed in relation to student behavior for each interaction. See Appendix C for an example completed datasheet.

A second observer simultaneously but independently recorded data on classroom interactions for 13% of sessions. These data sheets for each observer were compared. Interobserver agreement (IOA) was calculated using total count IOA. IOA averaged 79% (64-93%) overall. IOA averaged 70% for social comments, 75% for demands, 73% for praise, and 97% for reprimands.

Procedures

Prior to beginning the study, the researcher met with the lead teacher to discuss the services provided by the consultation group and obtained consent for data collection on classroom-wide variables, including teacher interactions with students. The researcher also requested a class roster with student demographic information (i.e., race and gender). The researcher then observed the classroom during choice time periods. The duration of observations averaged 22 min (range 16-34 min). No feedback was provided following the observations. The

researcher did not provide the teacher with any further information so as not to influence teacher praise or the equal delivery of praise. Observations continued until stable responding was observed and at least 30 combined praise and reprimand statements were observed.

Data Analysis

Following observations, the data on mean rate of praise, reprimands, demands and social comments per child were graphed in aggregate and by demographic groups were graphed using Microsoft Excel and analyzed visually. Data were first analyzed to determine whether teachers displayed higher rates of praise than reprimands overall. If teachers displayed higher rates of praise than reprimands, the data were further analyzed to determine if praise and reprimands were equally distributed across demographic groups. Equal distribution was defined as plus or minus 25% of the teacher's overall mean rate of praise per student as mean rates per student. This range was chosen to allow for some variability across student demographic groups while attempting to detect discrepancies between student groups. Secondarily, the mean rate of each type of teacher interaction provided following appropriate and inappropriate student behavior across all children combined and disaggregated across each demographic was also analyzed.

RESULTS AND DISCUSSION FOR EXPERIMENT 1

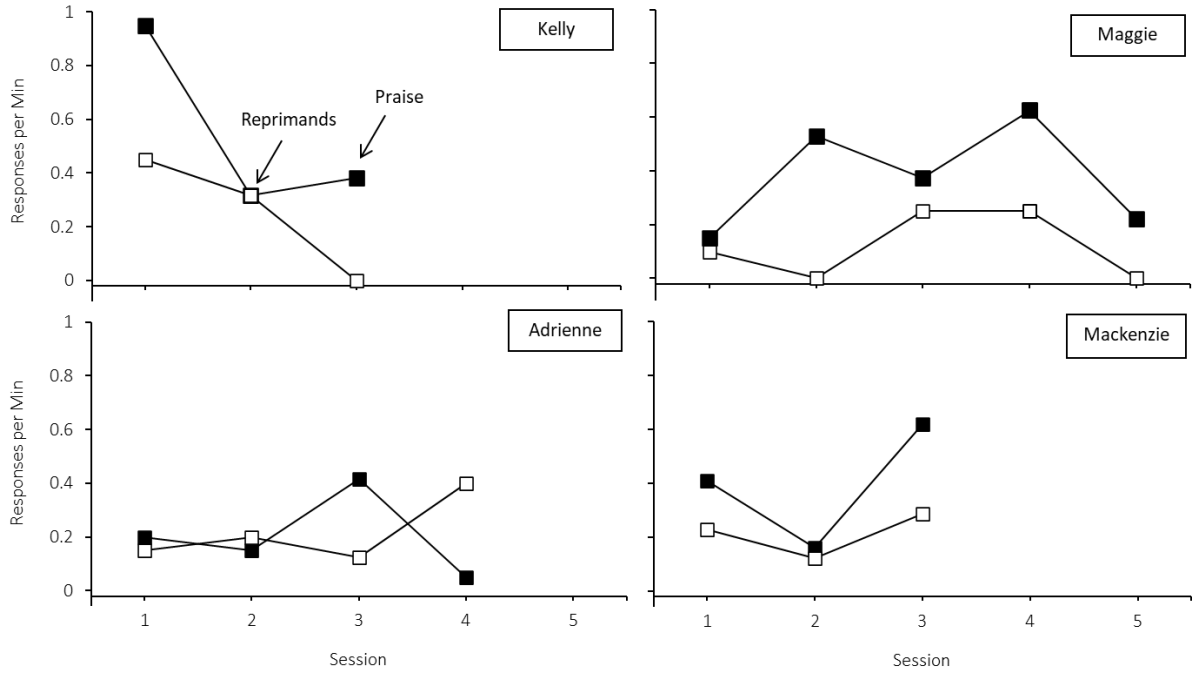
Teacher Interaction Data Aggregated Across all Students

Figure 1 displays the data for teachers' overall praise and reprimands per min per session. Kelly, Maggie, and Mackenzie demonstrated more praise than reprimand statements. Adrienne demonstrated variability in responding but, overall, provided more reprimands than praise statements. While Kelly, Maggie, and Mackenzie demonstrated more praise than reprimand statements, praise rates among all teachers were less than 1 per min. In general, Kelly's praise averaged .55 praise statements per min (.32-.95), Maggie's praise averaged .38 praise statements

per min (.15-.62), Mackenzie's praise averaged .40 praise statements per min (.16-.62), and Adrienne's praise averaged .20 praise statements per min (.05-.42). In general, teacher praise rates are low during unstructured times in the absence of intervention.

Figure 1

Teachers' Praise and Reprimands per Minute Aggregated Across Students



Teacher Interaction Data Disaggregated Across Student Racial and Gender Groups

The top row of Table 4 shows the mean praise statements per min per student across teachers aggregated across all students and disaggregated across student demographic groups. The second row of Table 4 indicates the equality range for each teacher, which was plus or minus 25% of the teacher's overall mean rate of praise per student. The remaining rows of the table show each teacher's mean rate of praise per student for each demographic. Table 5 shows the same information but for reprimands.

Table 4

Mean Praise per Min per Student Aggregated as Across all Students and Across Demographic Groups

	Kelly	Maggie	Adrienne	Mackenzie
	M(Range)	*M*(Range)	*M*(Range)	*M*(Range)
Overall	.04 (.03-.07)	.11 (.05-.18)	.02 (.00-.04)	.02 (.01-.04)
Equality range	.01-.05	.08-.14	.01-.02	.02-.03
Race				
Black	.04 (.03-.06)	.20 (.00-.44)	.06 (.04-.10)	.03 (.00-.05)
White	.04 (.03-.06)	.07 (.00-.11)	.01 (.00-.03)	.02 (.02-.03)
Latinx	.05 (.00-.10)	.07 (.00-.24)		
Other	.07 (.00-.15)		.02 (.00-.06)	
Gender				
Male	.06 (.04-.08)	.07 (.00-.11)	.03 (.01-.06)	.03 (.01-.06)
Female	.02 (.01-.06)	.13 (.00-.24)	.01 (.00-.03)	.02 (.01-.03)

Table 5

Mean Reprimands per Min per Student Aggregated as Across all Students and Across Demographic Groups

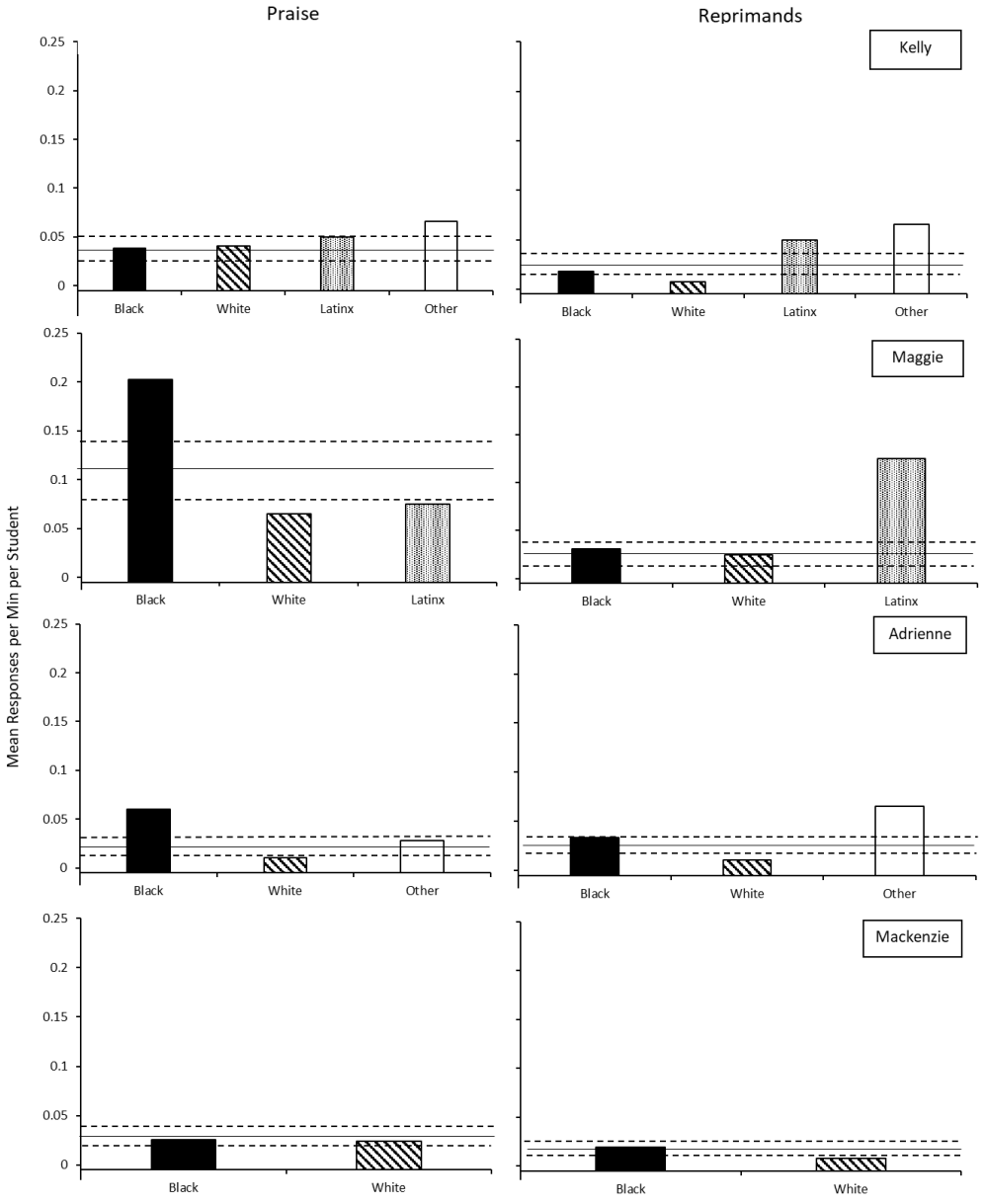
	Kelly	Maggie	Adrienne	Mackenzie
	M(Range)	*M*(Range)	*M*(Range)	*M*(Range)
Overall	.02 (.00-.03)	.03 (.00-.06)	.02 (.01-.03)	.01 (.00-.02)
Equality range	.01-.02	.02-.04	.01-.02	.01-.02
Race				
Black	.02 (.00-.03)	.03 (.00-.13)	.03 (.00-.08)	.02 (.01-.03)
White	.01 (.00-.01)	.03 (.00-.10)	.01 (.00-.02)	.01 (.00-.01)
Latinx	.05 (.00-.10)	.13 (.00-.25)		
Other	.07 (.00-.15)		.07 (.01-.15)	
Gender				
Male	.03 (.00-.05)	.03 (.00-.10)	.03 (.02-.03)	.01 (.00-.01)
Female	.01 (.00-.02)	.13 (.00-.24)	.02 (.00-.04)	.02 (.01-.02)

The data in Tables 4 and 5 were graphed for visual analysis. Figure 2 displays the data for the teachers' mean rates of praise and reprimands per min per student disaggregated across student racial groups. The horizontal lines on the figure represent the teacher's the overall mean rates of praise or reprimands per student aggregated across all students and sessions in

Experiment 1. The two dashed horizontal lines are included to represent the equality range, which represent plus or minus 25% of each teacher's mean. Kelly, Maggie, and Adrienne engaged in unequal interactions across student racial groups. Kelly's praise to students in the Other racial group exceeded the equality range. Her reprimands to students in the Latinx, and Other racial group exceeded the equality range. Her reprimands to White students were below the equity range. Maggie's praise to Black students exceeded the equality range while her praise to White and Latinx students were below the equality range. Maggie's reprimands to Latinx students exceeded the equality range. Adrienne's praise to Black students exceeded the equality range. Her reprimands for students in the Other racial group exceeded the equality range. Additionally, her reprimands to White students were below the equality range. Mackenzie's praise and reprimands were within the equality range for Black and White students.

Figure 2

Teachers' Mean Praise and Reprimands per Min per Student Disaggregated by Student Racial Group

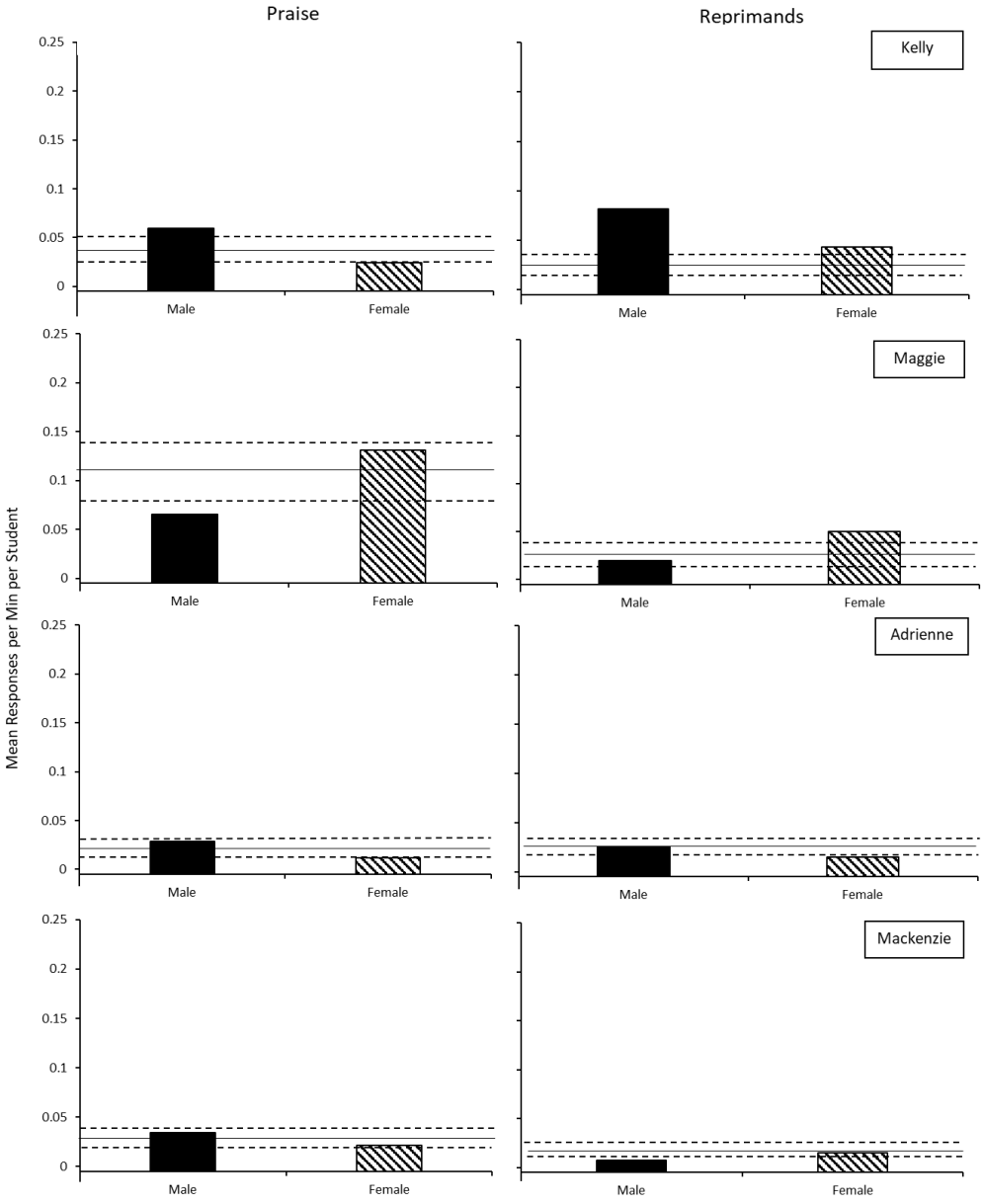


Note. The solid horizontal line on each panel represents that teacher's overall mean rate of praise (left panels) and reprimands (right panels) per student. The dashed horizontal lines above and below the solid line represent plus and minus the overall mean, respectively.

Figure 3 displays mean praise and reprimands per min per student disaggregated by student gender groups. Figure 3 is presented in a manner consistent with Figure 2, including a solid horizontal line indicating the overall mean praise or reprimands per min per student and dashed lines indicating the equality range (i.e., plus or minus 25% of the overall mean). Kelly's praise and reprimands to male students exceeded the equality range. Maggie's praise to male students were below the equality range. Her reprimands to female students also exceeded the equality range. Adrienne's and Mackenzie's praise and reprimands to male and female students were within the equality range.

Figure 3

Teachers' Mean Rates of Praise and Reprimands per Min per Student Disaggregated Across Student Gender Group



Note. The solid horizontal line on each panel represents that teacher's overall mean rate of praise (left panels) and reprimands (right panels) per student. The dashed horizontal lines above and below the solid line represent plus and minus the overall mean, respectively.

The results of Experiment 1 demonstrate that teacher praise rates were consistently low during unstructured times. Furthermore, praise and reprimand rates were disproportionately distributed among student demographic groups for three of the teachers. Thus, it seemed clear intervention to increase equality was needed for these teachers. However, Adrienne also demonstrated higher overall rates of reprimands than praise. Thus, prior to her receiving intervention for equality, intervention was warranted to first increase her praise rates so they were more frequent than reprimands. This was done prior to intervening on equality as best practices within the field suggest a higher ratio of praise statements than reprimands is beneficial for overall classroom management practices (Sutherland et al., 2000).

METHOD FOR EXPERIMENT 2

The purpose of Experiment 2 was to assess the effects of self-monitoring and equality-focused performance feedback on the rate and distribution of teachers' interactions (i.e., praise, reprimands, social comments, and demands) across student racial and gender groups. The goal was to increase praise rates and decrease reprimand rates if reprimands exceeded praise in Experiment 1 and to equalize praise across demographic groups when it was unequal. Experiment 2 consisted of two phases. During Phase 1, Adrienne, who had previously demonstrated lower rates of praise than reprimands was taught to self-monitor of her praise and received performance feedback on her rates of praise and reprimands. During Phase 2, Adrienne, Maggie, and Kelly, who demonstrated inequality in their praise and reprimand rates across student demographic groups (i.e., race or gender), were taught to self-monitor their praise and received equality-focused performance on their distribution of praise and reprimands.

Settings and Participants

Teachers from Experiment 1 were included in Experiment 2 if they demonstrated lower rates of praise than reprimands or unequally distributed praise and reprimands during Experiment 1. Thus, included teachers were Kelly, Maggie, and Adrienne. Mackenzie was excluded from participation in Experiment 2 because she demonstrated higher rates of praise than reprimands and equal distribution of praise and reprimands across both racial and gender groups. Only Adrienne participated in Phase 1 – Self-monitoring and General Performance Feedback because she demonstrated higher rates of reprimands than praise in Experiment 1. Adrienne, Maggie, and Kelly participated in Phase 2 – Self-monitoring and Equality-focused Performance Feedback because all three demonstrated unequal distributions of praise in Experiment 1 or Phase 1 of Experiment 2. The classrooms were the same as in Experiment 1. Prior to beginning Experiment 2, the researcher explained to participants that she was conducting a study on teacher-student interactions in which participants would be provided training and coaching on improving their positive interactions with students. Teachers were provided with the opportunity to learn more about the study and then asked if they were willing to consent for further participation. If eligible teachers signed the consent form, they participated in Experiment 2. All participants who were offered the opportunity to participate in Experiment 2 provided consent to do so.

Design

A nonconcurrent multiple baseline across participants design (Watson & Workman, 1981) was used for teachers who participated in Phases 2 and 3. For these teachers, the data from Phase 1 served as the baseline for Phases 2 and 3, and Phases 2 and 3 were implemented in a staggered fashion across participants. This nonconcurrent design was used because the referrals for the various classrooms/teachers came to the consulting group at different points in time. The

duration of each phase was guided both by the performance of the teachers and by the number of data points required to stagger implementation of the interventions.

Materials

Materials were consistent with those used in Experiment 1 (i.e., paper and pencil datasheets, a watch, and general classroom materials). Additional materials for Experiment 2 included written operational definitions of praise and clicker counters, which teachers could use to self-monitor praise statements. Written feedback forms were used to provide teachers with feedback following each observation. This form provided a space for the researcher to write information regarding the frequency of praise and reprimands during observations, as well as written feedback on self-monitoring (described below; see Appendix F). The form also included a place where the teacher could write a goal for the following observation. Teachers also used a self-monitoring data sheet. During Phase 2, the feedback form provided to teachers was modified to include a space where the researcher could indicate the three students who received the most and least number of praise and reprimands during an observation (see Appendix G).

Dependent Variables and Measurement

Dependent variables were the same as those used in Experiment 1. During Experiment 2, IOA data were recorded for 60% of sessions. IOA averaged 84% (75-94%) across Phases 2 and 3. (Recall that IOA on baseline were collected in Experiment 1.) IOA averaged 78% for social comments, 73% for demands, 84% for praise, and 98% for reprimands.

In addition to data on interactions and student behavior, the goals set by each teacher during feedback sessions were recorded following each session. Specifically, the researcher recorded the goal set by each teacher in the notes section of their datasheet following completion

of that session's feedback form. Goals set during the previous session were then reviewed by the researcher prior to beginning each subsequent session.

Procedures

Phase 1 – Self-Monitoring and General Performance Feedback

The researcher conducted BST to teach Adrienne how to identify and record the frequency of her praise using a clicker. This was done by reviewing the definition of praise (see Table 3), providing Adrienne with examples and nonexamples of praise statements, practicing recording praise in vivo, and providing feedback on the correct identification of praise. After this training, Adrienne was instructed to record her own praise rates using a clicker counter during choice time both on the days the researcher was in the classroom and on the days the researcher was not present. Adrienne was also encouraged to provide students with more praise than reprimands during each day. Adrienne was instructed to record the number of praise statements she made each day during choice time on a datasheet (see appendix E) immediately following choice time.

The researcher visited the classroom 2 to 3 times per week to observe choice time and record data on the dependent variables, for a minimum of three observations lasting an average of 20 min. During observations, Adrienne was instructed to continue to self-monitor her delivery of praise. Following each observation, the researcher met with Adrienne to discuss her rate of praise she recorded and compared it to the data the researcher collected. The researcher and Adrienne also reviewed Adrienne's self-monitoring datasheet from days when the researcher was not present in the classroom. The researcher provided Adrienne with feedback on her self-monitoring, her rate of praise, and her rate of reprimands. Written feedback was provided using the feedback form shown in Appendix F. The researcher then asked Adrienne to set a goal for the

rate of praise for the next observation. Adrienne was provided with no guidelines regarding what her goal should be for the subsequent session. The researcher then confirmed a date and time for the next observation. Prior to beginning the next observation, the researcher reminded Adrienne of the goal she set at the end of the previous session, as previous research has indicated that feedback is most effective when provided prior to the next performance of the skill (Aljadeff-Abergell et al., 2017).

Adrienne continued in this phase until she demonstrated higher rates of praise than reprimands across three consecutive observations. Adrienne continued to demonstrate higher rates of reprimands than praise across three consecutive observations. Thus, additional prompts were added similar to the audio cue used by Van Houten and Sullivan (1975). Specifically, Adrienne was provided with an interval timer that buzzed at a predetermined interval. Each session, the interval timer was set to buzz at the interval goal set during the prior observation (e.g., the interval was set to 1 min if Adrienne's goal was to provide 1 praise statement per min). Adrienne was encouraged to praise students when the interval timer buzzed. This was done until Adrienne met the criterion stated above.

Phase 2 – Self-Monitoring and Equality-Focused Performance Feedback

Because Maggie and Kelly did not participate in Phase 1, they were first taught to self-monitor their praise using the same procedures as described in Phase 2. All teachers participating in this phase were instructed to record their own praise rates using a clicker counter during each choice time, regardless of researcher presence. Teachers were also encouraged to provide students with more praise than reprimands during each day and to provide each student with at least one praise statement. At the end of each choice time, teachers were instructed to record the number of praise statements they made on a datasheet (see appendix E).

The researcher visited the classroom two to three times per week and conducted a minimum of three choice time observations lasting an average of 20 min each. During observations, teachers were instructed to continue self-monitoring their delivery of praise. The researcher recorded data in the same manner as during Experiment 1 and Phase 1 of Experiment 2. Following each observation, the researcher met with the teacher to discuss their rates of praise, as recorded by the teacher and the researcher, and to review the teacher's self-monitoring datasheet from days when the researcher was not present. The researcher provided the teachers with feedback on self-monitoring and told the teachers which students received the highest and lowest rates of praise and reprimands. All of this was recorded on the written feedback form shown in Appendix F. The researcher also asked each teacher to set a goal for their rate of praise for the next researcher observation. The researcher then confirmed a date and time for the next observation. Prior to beginning the next observation, the feedback from the previous observation was reviewed with teachers, as previous research has indicated that feedback is most effective when provided prior to the next performance of the skill (Aljadeff-Abergel et al., 2017).

This intervention continued until the teachers demonstrated equal rates of praise and low rates of reprimands across three consecutive observations. After equal rates of praise were achieved, the researcher met with the teachers to explain she were discontinuing the intervention for teacher-student interactions due to their success. Teachers were then provided with a social validity and demographic survey. Teachers were also provided with a document describing the importance of providing equal praise in the classroom (see Appendix H).

Treatment Integrity

Treatment integrity data were collected by a secondary observer, who observed all of the trainings provided to teachers. This observer used a treatment integrity checklist (See Appendix

D) to indicate whether each step of the training was implemented correctly. Treatment integrity was 100% for training. Treatment integrity data were also taken by a secondary observer on the primary researcher's use of the written feedback forms using a treatment integrity checklist for 40% of sessions. Treatment integrity averaged 95% (range 80-100%).

Social Validity Measures

At the conclusion of intervention, teachers were provided with a form asking them for their demographic information (i.e., gender, race, highest level of education, years of experience teaching, etc.). They were also asked to complete a modified version of the Treatment Acceptability Rating Form-R (TARF-R; Reimers & Wacker, 1988) to obtain their feedback on the teacher-student interactions intervention. The Modified TARF-R asked participants eight questions relating to the effectiveness, feasibility, and practicality of the intervention. Participants could select between 1 (strongly disagree) and 5 (strongly agree) for each item. Participants also had the opportunity to provide comments on what they enjoyed most and least, what they would change, and general feedback. This was administered and recorded using Qualtrics. Demographic and social validity surveys can be found in Appendix I.

Data Analysis

Data were analyzed in Experiment 2 similar to how they were analyzed in Experiment 1.

RESULTS AND DISCUSSION FOR EXPERIMENT 2

Teacher Interaction Data Aggregated Across all Students

Figure 4 shows the teachers' mean rate of praise and reprimands per student aggregated across all students. The data from Experiment 1 are included as baseline for each teacher. During baseline, Kelly and Adrienne displayed very low rates of praise and reprimands, with Adrienne displaying more reprimands than praise. Maggie displayed higher rates of praise than the other

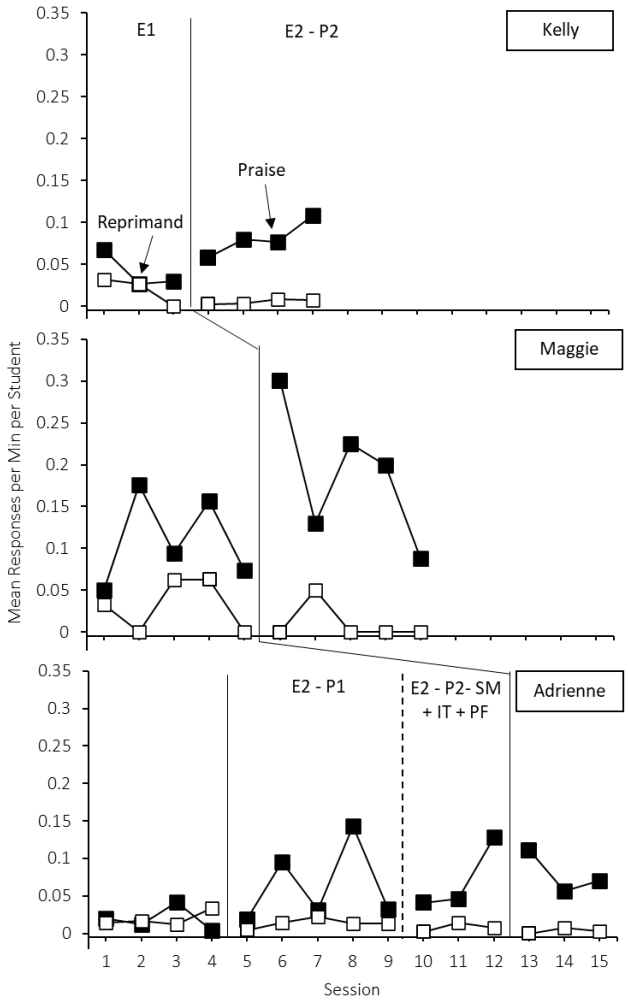
two teachers, but her praise rates were highly variable. Because Adrienne's reprimands exceeded praise, she participated in Phase 1 to increase her praise rate. During Phase 1, Adrienne's praise increased to a mean of .06 praise statements per min per student but remained variable (range .01-.14 per min per student). In addition, reprimands continued to occur. Adrienne provided a mean of .01 reprimands per min per student (range .00-.02 per min per student). For this reason, an interval timer was introduced to cue her to praise more frequently. Following the introduction of the interval timer, Adrienne's mean praise per min per student was consistently higher than her mean reprimand rates per min per student. Adrienne's mean praise was .07 responses per min per student (range .04-.13 per min per student), and her mean reprimands were .01 (range .00-.01 per min per student).

Kelly and Maggie proceeded from Experiment 1 directly to Phase 2 of Experiment 2 because their praise rates were higher than reprimands in Experiment 1. Both Kelly and Maggie demonstrated an increase in mean praise per min per student while mean reprimands per min per student decreased. Kelly's mean praise per min per student was .08 (range .03-.10 per min per student) and her mean reprimands per min per student was .01 (range .00-.01 per min per student). Across sessions, Kelly displayed an increasing trend in her praise rates and declining trend in her reprimand rates. Maggie's mean praise per min per student was .19 (range .09-.30 per min per student) and her mean reprimands per min per student was .01 (range .00-.05 per min per student). While there was an overall increase in Maggie's praise rates during Phase 2, praise rates had a declining trend as the phase progressed. Following Phase 1, Adrienne was included in Phase 2 as her praise and reprimand rates were not distributed equally during Phase 1. Adrienne continued to use the interval timer in Phase 2. During Phase 2, Adrienne demonstrated consistently higher rates of praise than reprimands. Adrienne's mean praise per min per student

was .08 (range .06-.11 per min per student) and her mean reprimands per min per student was .00 (range .00-.01 per min per student). Adrienne demonstrated stable rates of reprimands and praise across Phase 2.

Figure 4

Teachers' Mean Praise and Reprimands per Min per Student Aggregated Across all Students



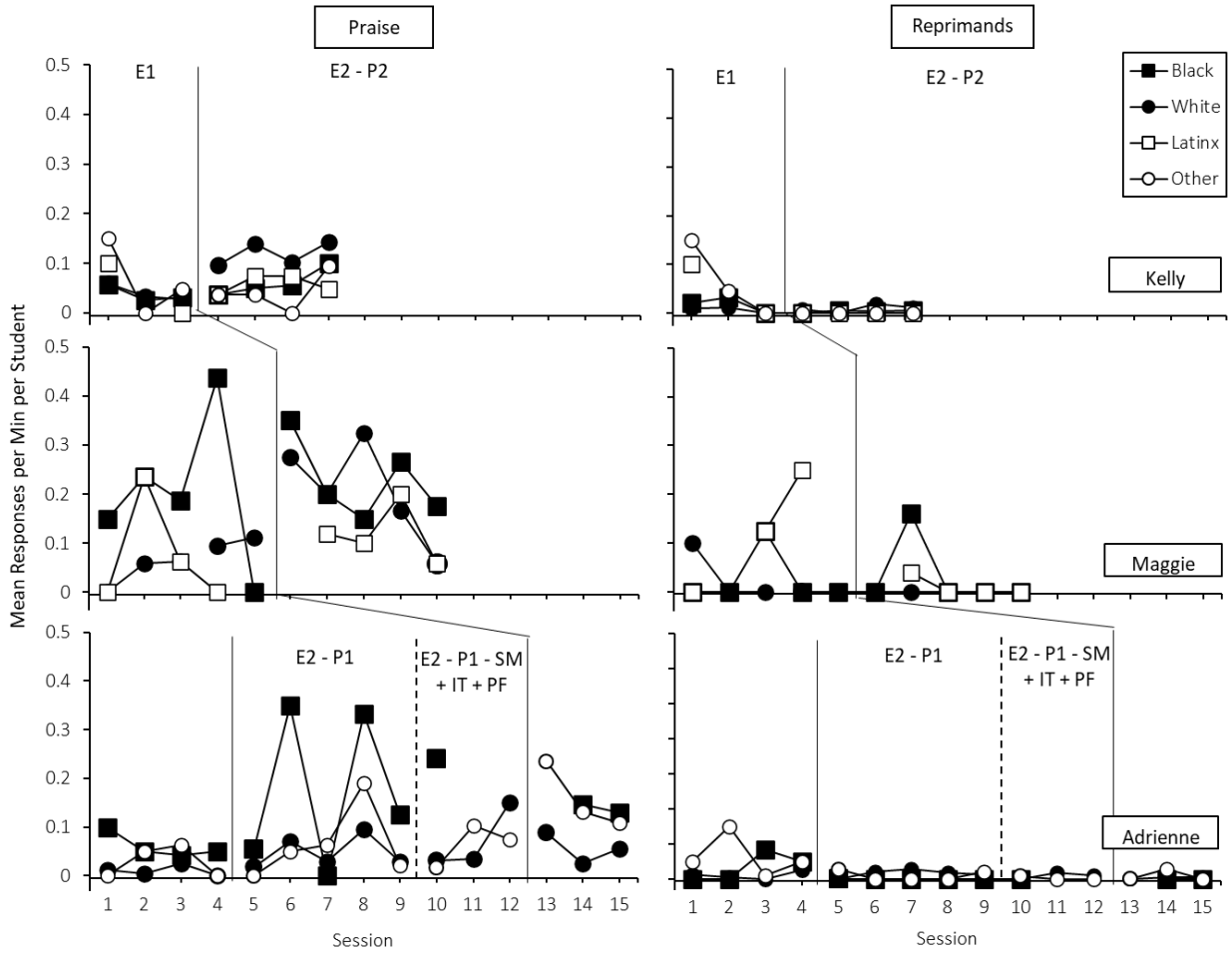
Note. E1 = Experiment 1, E2 – P1 = Experiment 2, Phase 1, and E2 – P2 = Experiment 2 – Phase 2. Experiment 1 data is presented as baseline. SM + EFPF is self-monitoring plus equality-focused performance feedback. SM + PF is self-monitoring plus performance feedback. SM + IT + PF is self-monitoring plus interval timer, plus performance feedback.

Teacher Interaction Data Disaggregated Across Student Racial and Gender Groups

Figure 5 displays the data for each teachers' mean praise and reprimands per minute per student disaggregated across student racial groups (i.e., Black, White, Latinx, and Other). Data were analyzed for equal interactions across racial groups, which was observed when data paths representing racial groups converged. During Experiment 1, Kelly demonstrated equal levels of praise, however reprimands were unequal across student racial groups. Following Phase 2, Kelly demonstrated equal levels of reprimands and her levels of praise were beginning to converge. During Phase 2, Kelly consistently provided White students with more praise (*M*=.11, range .09-.14) as compared to Black (*M*=.05, .03-.10), Latinx (*M*=.06, range .04-.07), and Other students (*M*=.02, range .00-.10). During Experiment 1, Maggie demonstrated inequality across racial groups for praise and reprimand rates. Following implementation of Phase 2, reprimand rates converged and praise rates began to converge. Maggie provided Black students with higher rates of praise (*M*=.23, range .15-.35), however there was some variability across sessions in Maggie's data in which White students received greater praise. Latinx students consistently received the lowest rates of praise (*M*=.12, range .06-.20). During Experiment 1, Adrienne demonstrated inequality across racial groups for praise and reprimands. Following implementation of Phase 1, reprimand rates began to converge, but praise rates remained unequal across student racial groups. Thus, Phase 2 was implemented. During Phase 2, the data paths for Adrienne's praise and reprimands across racial groups began to converge as the phase progressed. Adrienne consistently provided Black (*M*=.14, range .13-.15) and Other (M=.16, range .12-.24) students with higher rates of praise than White students (*M*=.06, range .03-.09); however, these differences lessened as the intervention progressed.

Figure 5

Teachers' Mean Praise and Reprimands per Min per Student Disaggregated Across Student Racial Group across Sessions

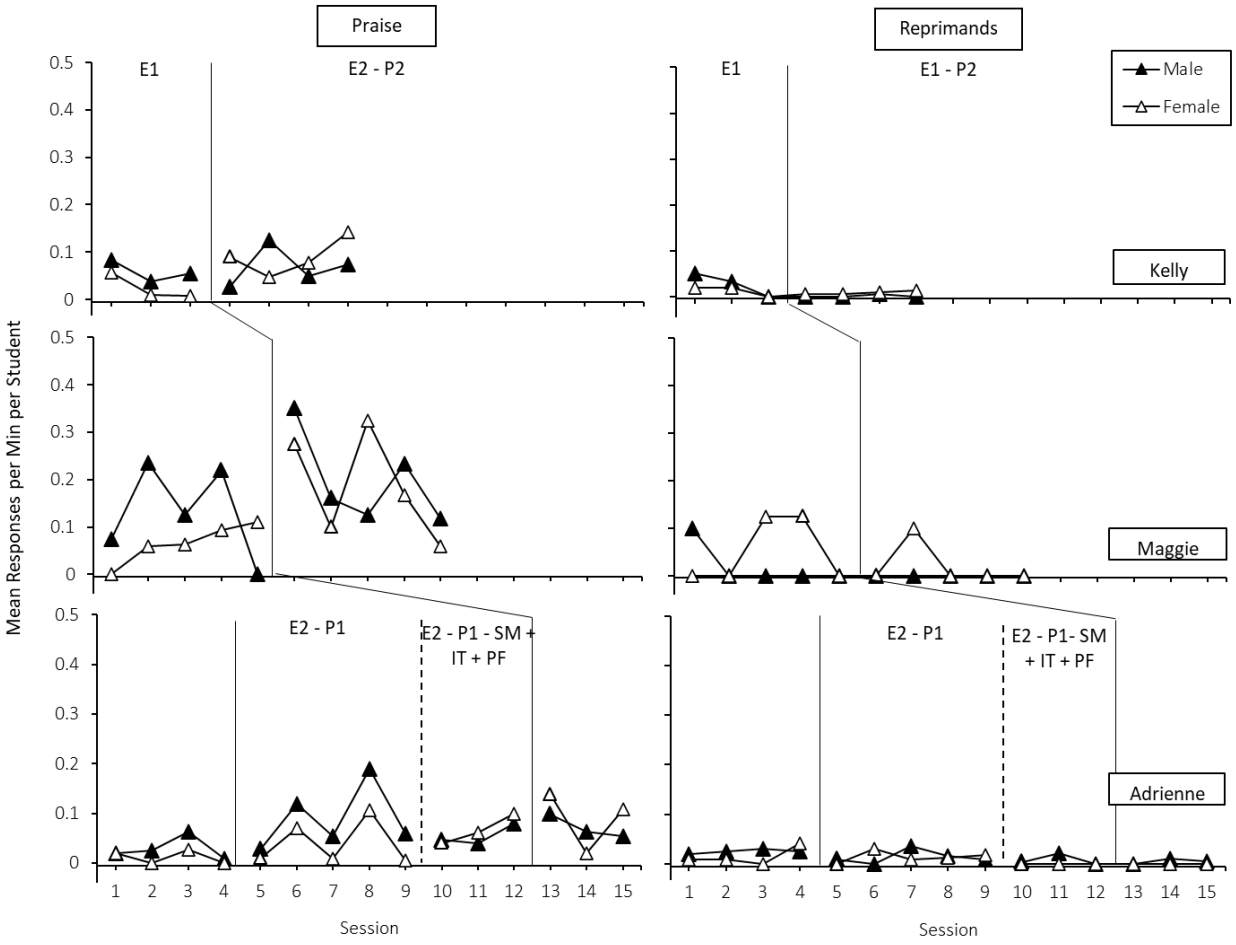


Note. E1 = Experiment 1, E2 – P1 = Experiment 2, Phase 1, and E2 – P2 = Experiment 2 – Phase 2. Experiment 1 data is presented as baseline. SM + EFPF is self-monitoring plus equality-focused performance feedback. SM + PF is self-monitoring plus performance feedback. SM + IT + PF is self-monitoring plus interval timer, plus performance feedback. Note, if data points for a demographic are not present on the graph for a specific session, this is because those children were absent that day.

Figure 6 displays the data for the teachers' mean praise and reprimands per minute per student disaggregated across student gender groups (male/female). Data were analyzed for equal interactions across student gender groups, which was observed when data paths representing gender groups converged. During Experiment 1, all teachers demonstrated some degree of inequality in praise rates across gender groups; however, only Maggie demonstrated inequality in reprimand rates across gender groups. Following implementation of Phase 2 for Kelly and Maggie, praise rates began to converge across gender groups. Kelly's mean praise per min per student for male students was .08 (range .03-.12 per min per student) and was .09 (range .04-.14 per min per student) for female students. Maggie's mean praise per min per student for male students was .19 (range .06-.33 per min per student) and was .20 (range .13-.35 per min per student) for female students. Reprimand rates for Maggie were distributed equally and were nearly equal for Kelly. Kelly's mean reprimands per min per student for male students was .00 (range .00-.01 per min per student) and was .01 (range .01-.01 per min per student) for female students. Maggie's mean reprimands per min per student for male students was .00 and was .02 (range .00-.10 per min per student) for female students. Following implementation of Phase 1 for Adrienne, inequality in the distribution of praise rates across gender groups continued while reprimand rates remained equally distributed. As a result, Adrienne proceeded to Phase 2. During Phase 2, Adrienne's praise and reprimand rates began to converge across gender groups. Maggie's mean praise per min per student for male students was .07 (range .05-.10 per min per student) and was .09 (range .02-.14 per min per student) for female students. Maggie's mean reprimands per min per student for male students was .01 (range .00-.01 per min per student) and was .00 for female students.

Figure 6

Teachers' Mean Praise and Reprimands per Min per Student Disaggregated Across Student Gender Group



Note. Experiment 1 data is presented as baseline. SM + EFPF is self-monitoring plus equality-focused performance feedback. SM + PF is self-monitoring plus performance feedback. SM + IT + PF is self-monitoring plus interval timer, plus performance feedback.

To supplement the analyses above, the data were regraphed such that a horizontal line on the graph at 0 represents the overall mean for each given session and each bar extending up or down from 0 represents the variation from the mean for each specific demographic group for that

session. The graph for praise across racial groups can be found in Appendix J and the graph for reprimands across racial groups can be found in Appendix K. The graph for praise across gender groups can be found in Appendix L and the graph for reprimands across gender groups can be found in Appendix M.

Teacher-Specific Analyses

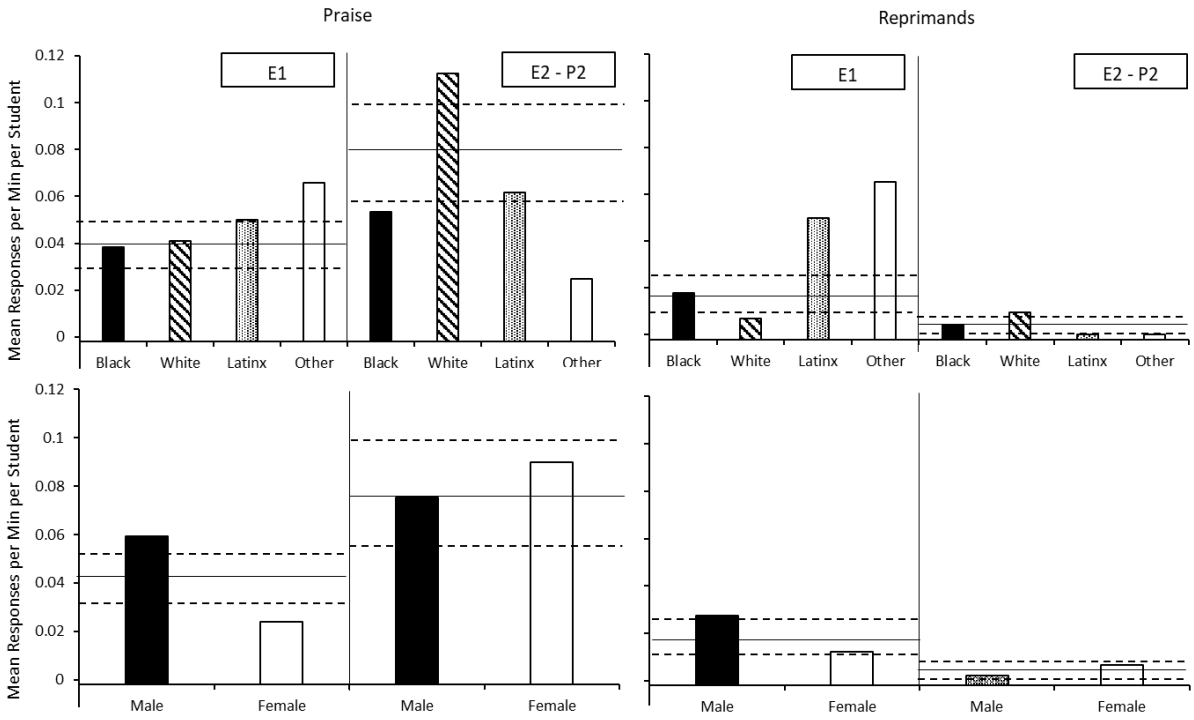
In addition to analyzing data across each individual session, overall mean interactions aggregated across racial and gender groups per phase were assessed. These were used to assess for equal distribution of praise and reprimands and to analyze the effects on other interactions (i.e., demands and social engagement). These data for each teacher are presented below. As a supplemental analysis, distribution of all teacher interactions across individual students were graphed to identify trends across individual students. Kelly's data are in Appendix N, Maggie's data are in Appendix O, and Adrienne's data are in Appendix P.

Kelly's Data

Figure 7 displays data for Kelly's mean praise and reprimands per minute per student disaggregated across student racial and gender groups per phase. Figure 7 includes a solid horizontal bar indicating the overall mean praise or reprimands per min per student aggregated across all students and dashed lines indicating the equality range (i.e., overall mean plus or minus 25%) for each phase Kelly participated in. During Phase 2, Kelly's praise and reprimand rates were within the Equality range for student gender groups, but praise and reprimand rates across student gender groups remained inequal. However, considering Figures 5, 6, and 7 together suggests that Kelly's interactions may have been becoming more equal throughout Phase 2. That is, the longer Kelly was in Phase 2, the more equal her interactions became.

Figure 7

Kelly's Mean Praise and Reprimands per Min per Student Disaggregated Across Student Racial and Gender Groups per Phase



Note. This figure depicts Kelly's praise and reprimands per min per student across all Experiment 1 and Experiment 2 – Phase 2 sessions. E1 = Experiment 1. E2 – P2 = Experiment 2 – Phase 2. The aggregate mean across all students for each experiment is represented by the solid line and 25% above and below the aggregate mean are represented by the dashed lines. Data for praise are presented in the left panel and data for reprimands are presented in the left panel.

Kelly's mean rates of each type of interaction (i.e., praise, reprimands, social comments, and demands) aggregated across the entire class and racial and gender groups for each phase are presented in Table 6. The mean and range for each interaction as a whole and per demographic group are presented. Additionally, the Equality range for each phase and interaction are

presented. The amount and direction of change from Experiment 1 to Phase 2 are also presented. Results indicate that Kelly demonstrated an overall increase in praise, social comments, and demands and a decrease in reprimands between Experiment 1 and Experiment 2 – Phase 2. However, increases in pro-social interactions did not occur equally across student racial and gender groups.

Table 6

Kelly's Mean, Range, and Change of Interactions across Phases

	M (Range)		
	E1	E2 – P2	Change
Praise			
White	.04 (.03-.06)	.11 (.10-.14)	+.07
Black	.04 (.03-.06)	.05 (.04-.10)	+.01
Latinx	.05 (.00-.10)	.06 (.04-.07)	+.01
Other	.07 (.00-.15)	.02 (.00-.10)	-.05
Male	.06 (.04-.08)	.08 (.03-.13)	+.02
Female	.02 (.01-.06)	.09 (.05-.14)	+.07
Overall	.04 (.03-.07)	.08 (.06-.11)	+.04
Equality range	.01-.05	.07-.10	
Reprimands			
White	.01 (.00-.01)	.01 (.00-.01)	
Black	.02 (.00-.03)	.00 (.00-.01)	-.02
Latinx	.05 (.10-.00)	.00 (.00-.00)	-.05
Other	.07 (.00-.15)	.00 (.00-.00)	-.07
Male	.03 (.00-.05)	.00 (.00-.01)	-.03
Female	.01 (.00-.02)	.01 (.00-.01)	
Overall	.02 (.00-.03)	.01 (.00-.01)	-.01
Equality Range	.01-.02	.00-.01	
Social comments			
White	.06 (.05-.08)	.15 (.12-.19)	+.09
Black	.03 (.01-.06)	.08 (.07-.08)	+.05
Latinx	.15 (.05-.25)	.10 (.04-.15)	-.05
Other	.23 (.05-.55)	.13 (.04-.22)	-.10
Male	.08 (.02-.18)	.12 (.08-.17)	+.04
Female	.04 (.03-.07)	.10 (.07-.12)	+.06
Overall	.06 (.03-.11)	.10 (.10-.11)	+.04
Equality Range	.05-.08	.08-.13	
Demands			
White	.07 (.04-.10)	.21 (.13-.29)	+.14
Black	.09 (.03-.13)	.10 (.06-.14)	+.01
Latinx	.03 (.00-.05)	.10 (.07-.15)	+.07
Other	.30 (.10-.65)	.14 (.00-.38)	-.16
Male	.16 (.06-.22)	.15 (.06-.19)	-.01
Female	.03 (.02-.06)	.13 (.06-.22)	+.10
Overall	.10 (.04-.13)	.14 (.09-.20)	+.04
Equality Range	.07-.12	.10-.17	

Note. E1 = Experiment 1 and E2 – P2 = Experiment 2 – Phase 2.

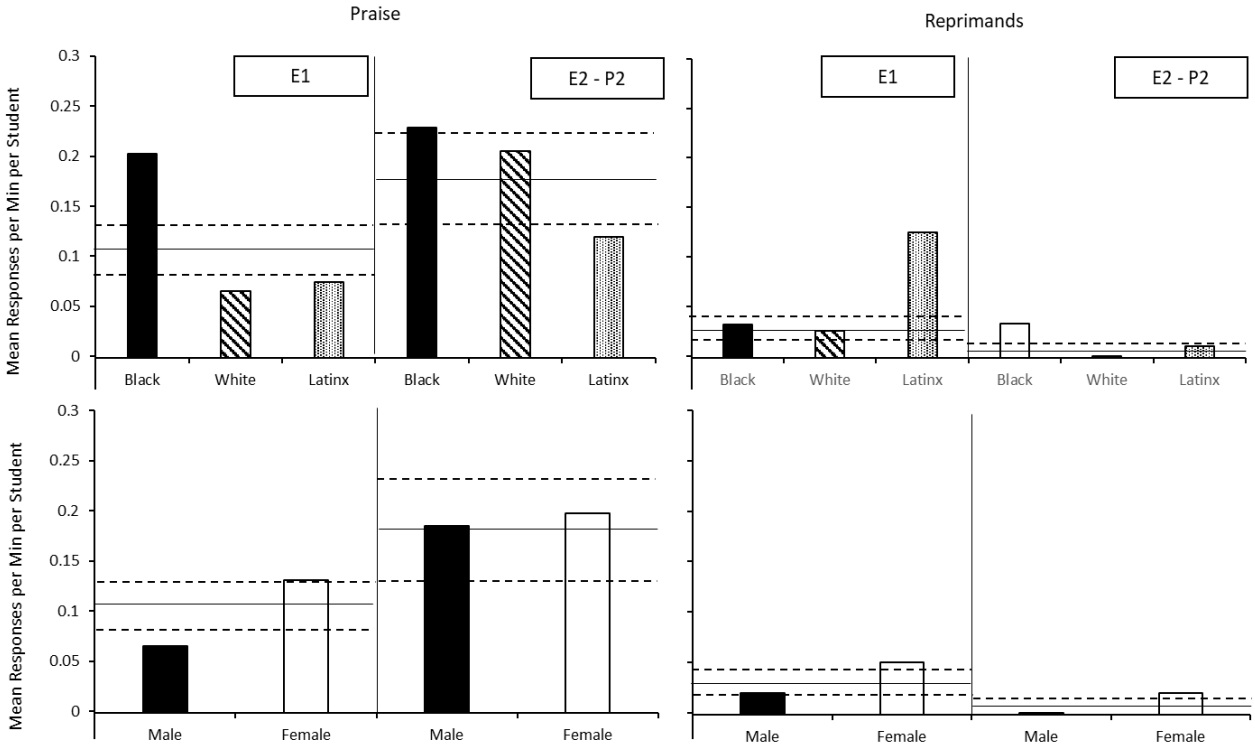
Maggie's Data

Figure 8 displays data for Maggie's mean praise and reprimands per minute per student disaggregated across student racial and gender groups per phase. Figure 8 includes a solid horizontal bar indicating the overall mean praise or reprimands per min per student aggregated across all students and dashed lines indicating the Equality range (i.e., overall mean plus or minus 25%) for each phase in which Maggie participated. During Phase 2, Maggie's praise rates were within the Equality range for student racial and gender groups. However, Maggie's reprimand rates for Black and Female students fell outside the equality range.

Maggie's mean rates of each type of interaction (i.e., praise, reprimands, social comments, and demands) aggregated across the entire class and racial and gender groups for each phase are presented in Table 7. The mean and range for each interaction as a whole and per demographic group are presented. Additionally, the Equality range for each phase and interaction are presented. The amount of change from Experiment 1 to Experiment 2 - Phase 2 are also presented. Results indicate that Maggie demonstrated an overall increase in praise, social comments, and demands and a decrease in reprimands between Experiment 1 and Experiment 2 - Phase 2. Increases in social comments occurred equally while increases in demands did not.

Figure 8

Maggie's Mean Praise and Reprimands per Min per Student Disaggregated Across Student Racial and Gender Groups per Phase



Note. This figure depicts Maggie's mean praise and reprimands per min per student across all Experiment 1 and Experiment 2 – Phase 2 sessions. E1 = Experiment 1. E2 – P2 = Experiment 2 – Part 2. The aggregate mean across all students for each phase is represented by the solid line and 25% above and below the aggregate mean are represented by the dashed lines. Data for praise are presented in the left panel and data for reprimands are presented in the left panel.

Table 7

Maggie's Mean, Range, and Change of Interactions across Phases

	M (Range)		
	E1	E2 – P2	Change
Praise			
White	.07 (.00-.11)	.20 (.06-.32)	+.13
Black	.20 (.00-.44)	.22 (.15-.35)	+.02
Latinx	.07 (.00-.24)	.12 (.06-.20)	+.05
Male	.07 (.00-.11)	.19 (.06-.28)	+.12
Female	.13 (.00-.24)	.20 (.12-.35)	+.07
Overall	.11 (.05-.18)	.19 (.08-.30)	+.07
Equality Range	.08-.14	.14-.24	
Reprimands			
White	.03 (.00-.10)	.00 (.00-.00)	-.03
Black	.03 (.00-.13)	.03 (.00-.16)	NA
Latinx	.13 (.00-.25)	.01 (.00-.04)	-.12
Male	.03 (.00-.10)	.00 (.00-.00)	-.03
Female	.13 (.00-.24)	.02 (.00-.10)	-.11
Overall	.03 (.00-.06)	.01 (.00-.05)	-.02
Equality Range	.02-.04	.00-.01	
Social comments			
White	.29 (.22-.72)	.60 (.40-.74)	+.31
Black	.63 (.11-.76)	.69 (.33-1.40)	+.06
Latinx	.48 (.25-.71)	.47 (.35-.60)	-.01
Male	.37 (.22-.72)	.52 (.40-.74)	+.15
Female	.46 (.11-.73)	.50 (.12-1.40)	+.04
Overall	.45 (.25-.57)	.57 (.40-.90)	+.12
Equality range	.34-.56	.43-.72	
Demands			
White	.21 (.10-.50)	.38 (.12-.50)	+.17
Black	.71 (.17-1.30)	.44 (.11-.80)	-.27
Latinx	.56 (.35-.88)	.20 (.00-.32)	-.36
Male	.27 (.10-.50)	.34 (.12-.50)	+.07
Female	.54 (.17-.82)	.38 (.22-.75)	-.16
Overall	.47 (.39-.58)	.35 (.09-.58)	-.12
Equality range	.35-.59	.26-.43	

Note. E1 = Experiment 1 and E2 – P2 = Experiment 2 – Phase 2.

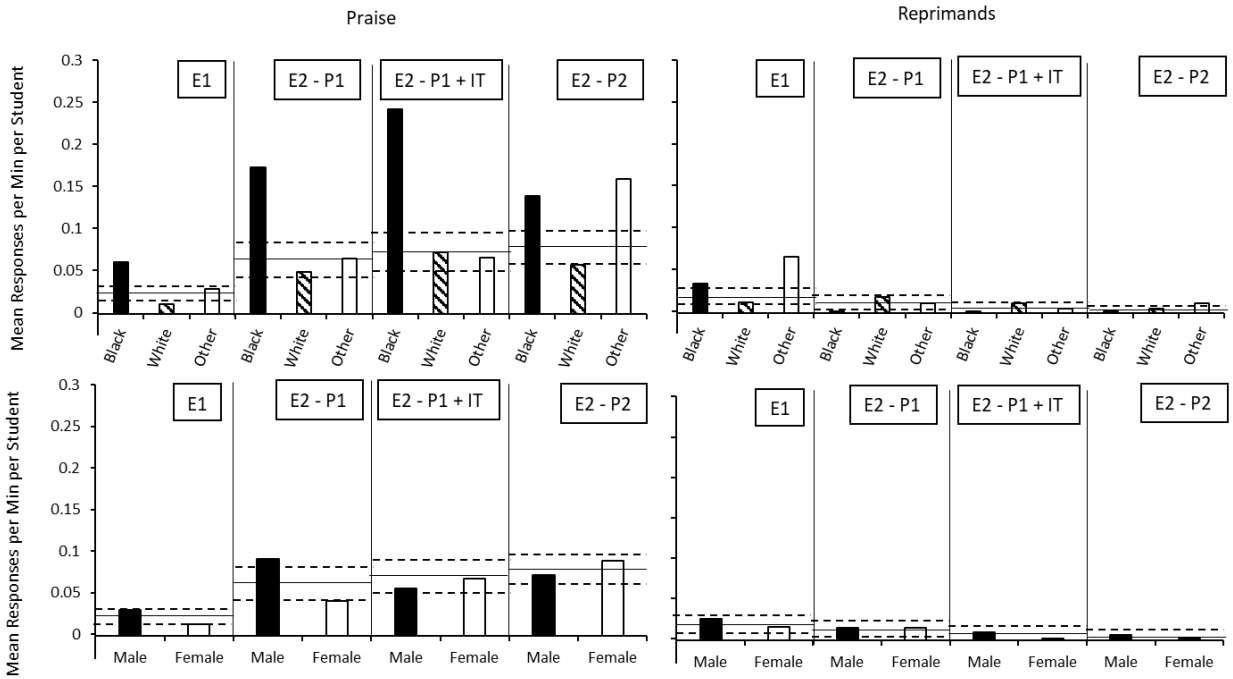
Adrienne's Data

Figure 9 displays data for Adrienne's mean praise and reprimands per minute per student disaggregated across student racial and gender groups per phase. Figure 9 includes a solid horizontal bar indicating the overall mean praise or reprimands per min per student aggregated across all students and dashed lines indicating the Equality range (i.e., overall mean plus or minus 25%) for each phase Adrienne participated in. Results indicate that across both Experiment 1 and Experiment 2 – Phase 1, Adrienne's praise and reprimand rates remained unequal across racial groups. Adrienne's praise rates also remained unequal across gender groups; however, Adrienne's reprimand rates during Phase 1 fell within the equality range across gender groups. During Phase 2, Adrienne demonstrated equality in praise rates across gender groups but inequality in reprimand rates across gender groups and praise and reprimand rates across racial groups.

Adrienne's mean rates of each type of interaction (i.e., praise, reprimands, social comments, and demands) aggregated across the entire class and racial and gender groups for each phase are presented in Table 8. The mean and range for each interaction as a whole and per demographic group are presented. Additionally, the Equality range for each phase and interaction are presented. The amount of change from Experiment 1 to Experiment 2 - Phase 1 and Phase 2 are also presented. Results indicate that Adrienne demonstrated an overall increase in praise, social comments, and demands and a decrease in reprimands between Experiment 1 and Experiment 2 – Phase 1. However, increases in pro-social interactions did not occur equally across student racial and gender groups.

Figure 9

Adrienne's Mean Praise and Reprimands per Min per Student Disaggregated Across Student Racial and Gender Groups per Phase



Note. This figure depicts Adrienne's mean praise and reprimands per min per student across all Experiment 1 and Experiment 2 sessions. E1 = Experiment 1. E2 – P1 = Experiment 2 – Phase 1. E2 – P1 + IT = Experiment 2 – Phase 1 with interval timer. E2 – P2 = Experiment 2 – Phase 2. The aggregate mean across all students for each phase is represented by the solid line and 25% above and below the aggregate mean are represented by the dashed lines. Data for praise are presented in the left panel and data for reprimands are presented in the right panel.

Table 8

Adrienne's Mean, Range, and Change of Interactions across Phases

	M (Range)				
	E1	E1 – P1	Change	E1 – P2	Change
Praise					
White	.01 (.00-.03)	.05 (.02-.10)	+.04	.06 (.03-.09)	+.02
Black	.06 (.04-.10)	.17 (.00-.33)	+.11	.14 (.13-.15)	-.03
Other	.02 (.00-.06)	.06 (.00-.19)	+.04	.16 (.11-.24)	+.10
Male	.03 (.01-.06)	.08 (.03-.12)	+.05	.09 (.14-.02)	+.01
Female	.01 (.00-.03)	.04 (.00-.10)	+.03	.07 (.05-.10)	+.03
Overall	.02 (.00-.04)	.06 (.03-.14)	+.04	.08 (.06-.11)	+.02
Equality range	.01-.02	.05-.09		.06-.10	
Reprimands					
White	.01 (.00-.02)	.02 (.00-.03)	+.01	.00 (.00-.00)	-.02
Black	.03 (.00-.08)	.00 (.00-.00)	-.03	.00 (.00-.00)	NA
Other	.07 (.01-.15)	.01 (.00-.03)	-.06	.01 (.00-.03)	NA
Male	.03 (.02-.03)	.01 (.00-.04)	-.02	.01 (.00-.01)	NA
Female	.02 (.00-.04)	.01 (.00-.01)	-.01	.00 (.00-.00)	-.01
Overall	.02 (.01-.03)	.01 (.00-.02)	-.01	.00 (.00-.01)	-.01
Equality range	.01-.02	.01-.01		.00-.00	
Social comments					
White	.03 (.02-.03)	.11 (.04-.26)	+.08	.09 (.05-.17)	-.02
Black	.12 (.00-.17)	.20 (.08-.35)	+.08	.36 (.30-.41)	+.16
Other	.10 (.04-.30)	.20 (.10-.33)	+.10	.23 (.06-.47)	+.03
Male	.06 (.05-.08)	.17 (.08-.32)	+.11	.13 (.08-.18)	-.05
Female	.03 (.02-.04)	.10 (.01-.18)	+.07	.13 (.03-.29)	+.03
Overall	.04 (.04-.05)	.14 (.06-.28)	+.10	.13 (.07-.22)	-.01
Equality range	.03-.06	.11-.18		.10-.16	
Demands					
White	.09 (.07-.12)	.14 (.05-.25)	+.05	.09 (.06-.16)	-.05
Black	.38 (.10-.60)	.32 (.11-.54)	-.06	.08 (.04-.12)	-.24
Other	.20 (.10-.30)	.16 (.03-.29)	-.04	.16 (.10-.21)	NA
Male	.19 (.10-.28)	.15 (.07-.32)	-.04	.10 (.07-.16)	-.05
Female	.08 (.07-.10)	.15 (.05-.23)	+.07	.09 (.03-.14)	-.06
Overall	.13 (.09-.15)	.16 (.06-.27)	+.03	.10 (.07-.15)	-.06
Equality range	.10-.16	.12-.20		.08-.13	

Note. E1 = Experiment 1, E2 – P1 = Experiment 2 – Phase 1, E2 – P2 = Experiment 2 – Phase 2.

Measures of Effect Size

In an effort to assess the overall effect of the intervention on teacher praise and reprimands rates as a whole and across student demographic groups effect sizes were calculated. Effect size calculations in single-case experimental research can be used to provide a quantitative measure of data traditionally analyzed using visual analysis (Rakap et al., 2020). To assess differences between Experiment 1 and Experiment 2 – Phase 2, Percentage of Data Exceeding the Median (PEM; MA, 2006) and Percentage of Nonoverlapping Data (PND; Scruggs et al., 1987) were calculated. PEM is a measure demonstrating the percentage of datapoints following intervention that exceed the median datapoint during baseline (Ma, 2006). PEM values between .70 and .90 indicate a moderate effect size and values exceeding .90 indicate a large effect size (Scruggs et al., 1987). In this study, Experiment 1 was used as baseline and PEM was evaluated using data from Experiment 2 – Phase 2. A higher percentage of PEM indicates a greater increase in the rate of praise in Experiment 2 - Phase 2, thus a greater effect size of the intervention. PND is the percentage of data points following intervention that are higher than the highest point in the baseline phase. If the aim of the intervention is to decrease the dependent variable, the lowest point in baseline and points below that point following intervention can be used (Parker et al., 2011). PND is calculated by identifying the highest or lowest point in baseline, drawing a line parallel to the x-axis from that datum point, counting the number of data points above or below that line following intervention, and dividing the number above or below by the total number of data points following intervention. Values between .50 and .70 are interpreted as a moderate effect whereas values exceeding .70 are interpreted as a large effect (Scruggs & Mastropieri, 1998). Similar to the calculations conducted for PEM, this study used PND to compare data from Experiment 1 to data from Experiment 2 – Phase 2.

In addition to PEM and PND, this study used modifications to both analyses to attempt to quantify the differences between racial groups. To do so, aggregate data across all students from Experiment 2 – Phase 2 was compared to demographic-specific data from Experiment 2 – Phase 2. For example, when conducting a modified PEM analysis, the median praise per min per student aggregated across all students from Experiment 2 – Phase 2 was identified and used as the comparison for demographic specific comparisons. The number of data points exceeding that reference point across each demographic group for Experiment 2 – Phase 2 was assessed to calculate the percent exceeding the median. When analyzing modified PEM and PND data, more consistent measures across demographic groups indicate more equal distribution of interactions.

Table 9 displays measures of PEM, PND, modified PEM, and modified PND across teachers' praise rates. Both PND and PEM measures indicate a large effect size for Kelly's and Adrienne's praise rates during Experiment 2 – Phase 2. For Maggie, a moderate effect size was observed. This suggests BST and self-monitoring was effective in increasing praise rates. At the same time, PND and PEM also indicated a large effect size for decreasing Adrienne's reprimands. However, for Maggie a moderate effect size and for Kelly no effect was observed for reprimands. BST and self-monitoring appeared to have less effect and more variable effects on reprimands, overall. Modified PEM indicates that Maggie demonstrated equally distributed praise across gender groups in Phase 2 of Experiment 2. Modified PND measures indicate that Kelly and Maggie demonstrated equally distributed praise across gender groups. Modified PEM and PND measures are more variable across racial groups indicating less overall equality across racial groups during Experiment 2 – Phase 2.

Table 9

Effect Sizes for Equality-Focused Performance Feedback

	Kelly		Maggie		Adrienne	
	Praise	Reprimands	Praise	Reprimands	Praise	Reprimands
PEM	1.00	1.00	.80	.80	1.00	1.00
Mod. PEM						
Race						
Black	.25	.50	.60	.40	1.00	1.00
White	1.00	.25	.40	.00	.33	.33
Latinx	.00	.00	.25	.25		
Other	.25	.00			1.00	.67
Gender						
Male	.25	.25	.40	.00	.33	.00
Female	.50	.00	.40	.40	1.00	.33
PND	.75	.00	.60	.80	1.00	1.00
	$p = .07$	$p = 1.00$	$p = .05$	$p = .02$	$p = .01$	$p = .02$
Mod. PND						
Race						
Black	.00	.00	.40	.20	1.00	1.00
White	.50	.25	.40	.00	.33	.33
Latinx	.00	1.00	.00	.25		
Other	.00	1.00			1.00	.67
Gender						
Male	.50	.75	.40	.00	.33	.00
Female	.50	.00	.40	.40	.67	.33

Note. PEM = percent of data exceeding the median. PND = percent of nonoverlapping data. Mod. = modified.

Teacher Goals

Throughout the study, the goals set by each teacher were recorded by the researchers. Table 10 displays the goals set by each teacher during each phase. Additionally, Table 10 indicates whether the teacher met their goal during the subsequent session. Kelly met her goal once out of the two opportunities she had. When Kelly did not meet her goal, she set her new goal based on the equality-focused performance feedback she received. Specifically, Kelly chose to set a goal of ensuring that she interacted most with the two students who received no praise

during the prior session noting that she often did not have an opportunity to interact with those students. Maggie's goals were met during every session, indicating that they may have served as motivation for her engagement with students. Additionally, Maggie often based her goal on the performance equality-focused performance feedback she had received. However, during the last session where Maggie set her goal based on her perceived needs of her students (i.e., "Interact with WM2 to ensure he felt valued because it was his last day in the classroom."). This may represent an instance of an equality-focused goal as opposed to an equality-focused goal as Maggie reflected on what her individual students needed to be successful as opposed to focusing on ensuring all students were receiving the same level of interactions. During Phase 1, Adrienne's goals centered around her rate of praise. However, during Phase 2 her goals shifted toward ensuring all students were praised within a given session. Additionally, Adrienne did not frequently achieve the goals she set, indicating that the goal itself may not have served as motivation for Adrienne.

Table 10

Teacher's Goals Set During each Session

	Goal	Met (Y/N)
Kelly		
Phase 2 – SM + EFPF	Provide all students with at least one praise statement.	N
	Provide all students with at least one praise statement while ensuring to provide BF1 and BF3 (students who received no praise) with more interactions.	Y
Maggie		
Phase 2 – SM + EFPF	Praise every student at least once.	Y
	Provide no reprimands.	Y
	Ensure AF1 (i.e., student who did not receive praise) was praised.	Y
Adrienne		
Phase 1 – SM+PF	Interact with WM2 to ensure he felt valued because it was his last day in the classroom.	Y
	Provide .5 praise statements per minute.	Y
	Provide 1 praise statement per minute.	N
	Provide 1 praise statement every minute and a half.	N
Phase 1 – SM+IT+PF	Provide 1 praise statement every minute and a half.	N
	Provide 1 praise statement per minute.	N
	Provide 1 praise statement per minute.	Y
Phase 2 – SM + EFPF	Provide 1 praise statement per minute and praise every student once.	N
	Praise every student at least once.	N
	Praise every student at least once.	N

Note. SM+PF = Self-monitoring and performance feedback. SM+IT+PF = Self-monitoring, interval timer, and performance feedback. SM+EFPF = Self-monitoring and equality-focused performance feedback. Y = yes. N = no.

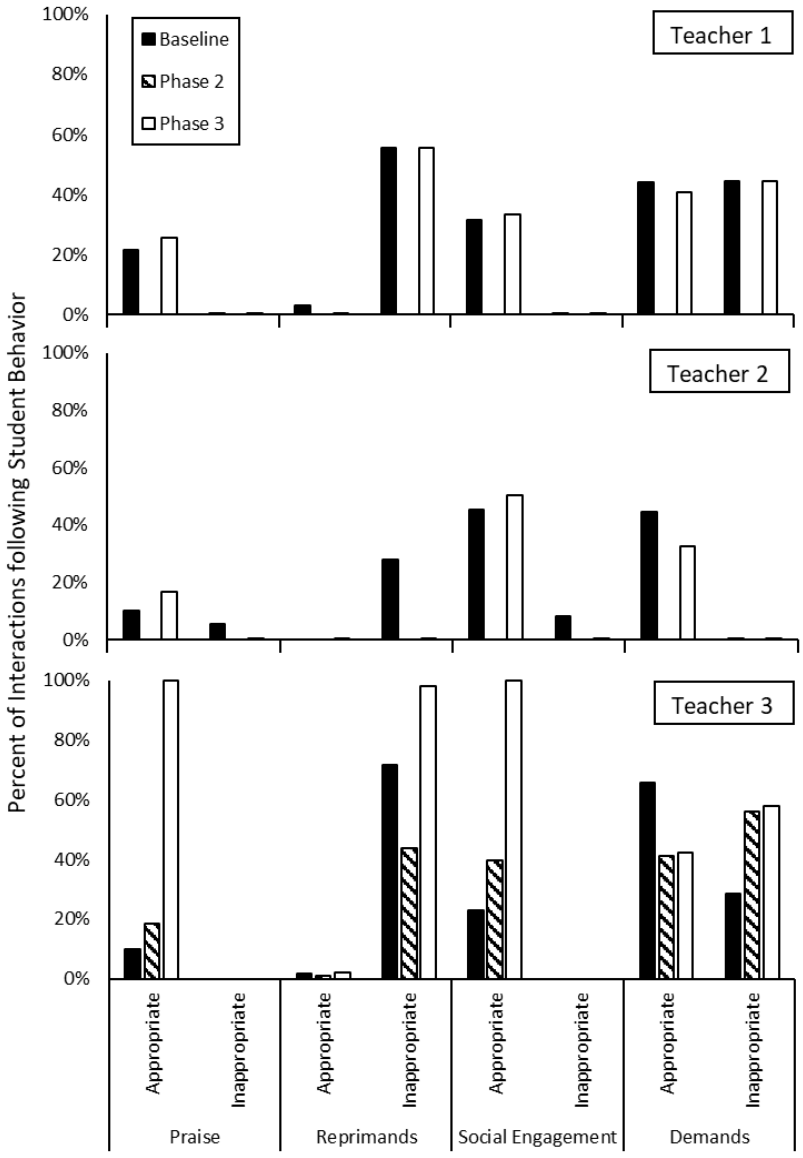
Student Behavior

Figure 10 shows the percentage of each type of interaction that followed inappropriate and appropriate student behavior. Percentages were calculated by dividing the number of a specific type of interaction that followed inappropriate or appropriate behaviors by the total number of interactions that followed inappropriate or appropriate student behaviors. Results

indicate that when a teacher interacted with a student following inappropriate behavior, the interaction was most likely to be a reprimand or a demand. This did not change across phases.

Figure 10

Teacher's Percent of Interactions following Inappropriate and Appropriate Student Behavior



Note. This graph depicts the percentage of each type of interaction that followed inappropriate and appropriate student behavior that received an interaction.

Social Validity

Social validity results can be found in Table 11. Overall, teachers participating in Experiment 2 indicated strong social validity.

Table 11

Social Validity Results

Question	*M*	*SD*
I find this approach to be an acceptable way of improving teacher student interactions.	4.00	0.82
I would be willing for this procedure to be used again to improve teacher student interactions.	4.67	0.47
I like the procedures used in this intervention.	4.67	0.47
I believe the procedures used in this intervention were helpful in improving teacher student interactions.	4.33	0.94
I felt discomfort during the teacher student interaction intervention.	1.00	0.00
I believe that the intervention was cost effective.	4.33	0.94
I believe the procedures used in this intervention will result in lasting change in my teacher student interactions.	4.33	0.94
Overall, I had a positive reaction to this intervention.	4.33	0.94
Participant Comments		
"[I enjoyed] having an outside observer document my connection/interaction with the students. Providing concrete data on who I was interacting with."		
"When the intervention was taking place, I no longer had time to write the daily notes to the parents."		
"I would have like the intervention earlier in the year."		
"I appreciated the help!"		

Note. $N = 3$. Questions were asked on a scale of 1.00 being strongly disagree and 5.00 being strongly agree.

GENERAL DISCUSSION

The purposes of this study were to assess teacher-student interactions during unstructured times aggregated across the whole class and across demographic groups to identify whether interactions were equally distributed across demographic groups. Subsequently, intervention was implemented when unequal praise and reprimands across demographic groups occurred. In some cases, researchers first intervened to increase praise and decrease reprimand rates. This was done

by first assessing teacher praise and reprimand rates in Experiment 1. If teachers had lower rates of praise than reprimands, they were provided with training on self-monitoring and performance feedback on their praise and reprimands (Experiment 2 – Phase 1). Teacher data were also assessed for equality and if unequal distribution of teacher praise was demonstrated, teachers participated in training on self-monitoring and received equality-focused performance feedback on their distribution of praise and reprimands (Experiment 2 – Phase 2).

Overall, the results of this study showed that only one teacher (Mackenzie) from Experiment 1 had relatively equal interactions with students across demographic groups. All other teachers demonstrated unequal interactions with students across demographic groups. One teacher, Adrienne, required intervention to increase her praise rates because her reprimands exceeded praise statements in Experiment 1. Experiment 2-- Phase 1 was implemented with Adrienne to increase her praise rates. Initially, Adrienne demonstrated variable responding with self-monitoring and performance feedback, so an interval timer was introduced. Following the introduction of the interval timer, praise rates increased steadily. However, the disproportionate praise rates across racial and gender groups remained unequal and were actually exacerbated with the increased praise rates. During Experiment 2—Phase 2, intervention was implemented with three of the four teachers (i.e., Kelly, Maggie, and Adrienne) in an effort to equalize interactions across the children in their classrooms. During Experiment 2 – Phase 2, teachers were provided with equality-focused performance feedback which produced variable results across teachers.

While only Adrienne required intervention to increase praise rates above her reprimand rates, it should be noted that *all teachers* demonstrated low rates of praise during the unstructured sessions observed in this study. High praise rates are an essential component of

classroom management (Kestner et al., 2019). Interestingly, all teachers who participated in Experiment 2 demonstrated increases in their praise rates during Phase 2, even though the intervention was not designed to do so. Rather, the intervention was designed only to equalize interactions across demographic groups. This effect was likely do to feedback given to teachers on who was receiving praise and who was not. Teachers may have become more aware of how little they were praising children and may have subsequently increased their praise as a result. This is an important consideration because intervening directly on equal distribution of praise and reprimands may have the positive side effect for improving overall praise rates and decreasing overall reprimand rates, increasing the overall efficiency of the intervention.

Results of this study suggest that teachers may need support to ensure their praise and reprimands are equal across children. These results are consistent with those of Knochel et al. (2020). Both studies suggest that self-monitoring and performance feedback can be effective interventions for improving equality of interactions. These interventions may be necessary for teachers to (a) maintain higher praise rates than reprimands, (b) to ensure they are contacting all students in the class, and (c) that there is equality in interactions. However, the feasibility of self-monitoring may be a challenge for teachers. During this study, several participants noted it was difficult to accurately self-record their praise rates given that they were often using their hands to engage with students. Additionally, there were no external contingencies aside from feedback to motivate teachers to continue self-monitoring which may have limited its utility (Kanfer, 1970). Future research should evaluate alternative self-monitoring methods, such as a bracelet with movable beads (Holman & Baer, 1979), which allow teachers to use both hands while still having access to the self-monitoring devices or the video self-monitoring (Alexander et al., 2012; Hager, 2018) which would allow teachers to review their behavior at a later time.

The benefits and limitations of each type of self-monitoring procedure should be carefully considered in relation to the feasibility and available resources.

The self-monitoring procedure used in this study consisted of several components, including goal setting and feedback, in addition to self-monitoring. It may be useful to conduct a component analysis of the intervention to improve its efficiency outside of research. Such analyses could identify whether the components of the feedback forms utilized and feedback are critical to the improvement of teacher-student interactions. Of particular interest is the goal setting requirement of the feedback forms. This study did not set parameters around what comprised an acceptable goal following each observations. As such, teachers were free to nominate their own goals. While teachers often nominated a goal related to the feedback they were provided, teachers occasionally nominated a goal outside of the aims of this study. For example, Maggie set a goal of allocating most of her interactions with a specific student one day, because that student would be no longer be in her classroom following the subsequent observation. She wanted to make sure the student received extra attention on her last day. Future research on what parameters surrounding goal setting lead to more equal interactions should be conducted. Additionally, coaching teachers on goal setting may also be of interest in relation to teacher interactions (Floress et al., 2017). That is, it may be beneficial to consider whether providing feedback to shape the teachers' goals to better meet the aims of the study as opposed to allowing teachers to freely select goals may yield more equal interactions across students. By doing so, future teacher goals may yield greater and more efficient behavior change in the teacher.

It is interesting that the self-monitoring appeared to impact social comments and demands directed toward students when self-monitoring was in place, even though neither of these were

targeted in the intervention. Following Experiment 2, all teachers demonstrated an increase in social comments and Kelly demonstrated an increase in demands, even though these were not explicitly targeted. However, like praise and reprimands, changes in these other social interactions were not always distributed equally across student demographic groups. The results indicate that providing feedback and goal setting to equalize distribution of praise and reprimands both equalized praise and reprimands and, as a positive side effect increased praise rates as well as social comments and demands; however, the more equal distribution of praise did not generalize to more equal distributions of the other interactions. This is notable, as praise and reprimands comprise only a portion of the interactions that occur in classrooms. While the results of this study are beneficial in considering how other interactions may be affected by equality-focused performance feedback, it is also necessary to consider whether all forms of teacher-student interactions were captured by this study. Thus, future research using more narrowly defined interactions in the classroom such as teacher modeling (Chang & Shire, 2015), narration (Hakkarainen & Bredikyte, 2014), and physical touch (Cekaite & Bergnehr, 2018) may prove fruitful. Future research should explore how equality-focused performance feedback can produce generalization to social comments and demand across demographic groups.

Another noteworthy finding was that Kelly, Maggie, and Mackenzie provided most students with at least one interaction per observation even in the absence of intervention, indicating that a student was rarely ignored. However, Adrienne had several sessions where at least one student was not interacted with. This may be due, in part, to the setting in which each teacher taught. That is, Kelly, Maggie, and Mackenzie each taught in structured settings (i.e., preschool and ECSE classrooms) whereas Adrienne taught in a daycare setting which had less structure (e.g., no formal curriculum, less structured activities throughout the day, etc.). As such,

it may be worthwhile to consider differences across different types of early childhood settings and how these influence teacher-student interactions.

This study focused on equal interactions across demographic groups. A limitation of this study is that equality is not the same as equity. It could be argued that equal interactions are not what the target should be. Rather, perhaps the target should be equity in interactions. Previous research has suggested students with emotional and behavioral disorders (EBD) require a praise to reprimand ratio of 9:1 as compared to the general recommendation of 3:1 (Caldarella et al., 2019), suggesting that students with EBD require three times the number of praise statements that a child without EBD needs. In this case, equitable interactions would *not* be equal. This study found that many of the interactions teachers had with children followed inappropriate student behavior and most often, these interactions were reprimands. Students with EBD frequently engage in challenging behaviors, and teachers who praise students nine times following appropriate behavior to every one reprimand that follows problem behavior would likely change the dynamic of teacher-student interactions greatly, along with changing the child's behavior in a positive way. Previous research has demonstrated that the teacher-student relationship is bi-directional indicating student behavior has an effect on teacher behavior and teacher behavior has an effect on teacher behavior (Decker et al., 2007; Wymer et al., 2020). While this study did not directly account for students with EBD, each teacher explicitly mentioned to the researchers at least one student about whom they were concerned, which may indicate that some students in each classroom required greater attention than others. Future research should analyze the distribution of interactions in relation to student appropriate and inappropriate behavior to better determine the factors that could lead to inequality or inequity in the classroom.

Equal and *equitable* interactions are likely complex and not as simple as praise, reprimands, race, and gender. Future research should evaluate other facets of a student's identity not assessed in this study, such as special education eligibility and inclusion (Cole et al., 2021; Hibel et al., 2010) and socioeconomic status (White, 1982). Research suggests that each of these variables contributes to a student's educational experience, thus it is not without reason that they may impact teacher-student interactions as well. Further, consideration of how the intersectionality of student identities affect teacher-student interactions would be beneficial when considering how to foster equitable interactions for students (Feldman, 2011).

A limitation of the study related to measurement of appropriate and in appropriate behavior was that we only measured student behavior that occurred immediately preceding an interaction with the teacher. Appropriate and inappropriate behavior that occurred in the absence of any teacher interaction was not recorded. Thus, there were likely a number of inappropriate student behaviors that were not followed by teacher interactions and there were a number of appropriate behaviors that were not followed by a teacher interaction that are not considered in this analysis. Analysis of such behaviors might provide meaningful insight into the distribution of teacher-student interactions and the students who are most likely to receive interactions. We did not measure all these behaviors because the research team did not have the capacity to capture all of these data at the same time. Doing so would have required the use of videotaping in the classroom so that the sessions could be viewed several times. This was not possible in the classrooms where this study took place. Future research should attempt to capture all of these complex nuances in the classroom context. Capacity issues also contributed to limited is limited data for IOA in Experiment 1.

Another limitation to the study is that that only the behavior of lead teachers was measured. All of the classrooms had multiple adults in them, with paraprofessionals in addition to the teachers. Students may have received additional interactions from paraprofessionals in the classroom; however, these interactions were not captured in this study. Again, this was due to limitations imposed by the capacity of the data collectors, and future research should attempt to capture all of the interactions children receive in the classroom.

Finally, the amount of data that could be collected during intervention (i.e., Phases 1 and 2) was limited. This was due to frequent teacher illness/absence, school breaks, and the end of the school year. While these are all practical issues affecting classrooms, more data on the effectiveness of self-monitoring and equality-focused performance feedback during unstructured times would provide more data over a longer period of time. This would have been helpful in that stable trends in praise were not achieved by the end of the study and researchers were not able to assess for maintenance effects. Fading researcher presence and assessing for maintenance is necessary to assess the long-term effects of an intervention. While previous research (Mrachko et a., 2017; Noell et al., 1997) has shown that ongoing feedback is critical to the maintenance of performance gains with teacher interventions, the use of self-monitoring in this study may have contributed to lasting effects such as those demonstrated by Knochel et al. (2020). Future research should assess the maintenance of equal interactions using self-monitoring in the absence of researcher-directed performance feedback. One way this could be done is through fading performance feedback or fading self-monitoring similar to the fading procedure used by Knochel et al. (2019). Another approach could be to train a supervisor or paraprofessional to deliver performance feedback using a peer-coaching model (Valencia & Killion, 1988), which may promote better support in the classroom.

Despite these limitations, the current study represents only one of a couple of studies that have addressed bias in the classroom. So few studies have been conducted on this topic that many of the nuances are not yet well understood. Though clumsy in some ways, this study represents an initial attempt decrease the Discipline Gap by ensuring all children in the classroom receive similar numbers of positive interactions with their teachers and as few reprimands as possible. This may improve bi-directional relationships between children and their teachers. This study demonstrated that most teachers displayed unequal amounts of praise and reprimands across different demographic groups, specifically race and gender. Further, the study demonstrated that self-monitoring and equality-focused performance feedback may be useful in equalizing distribution of praise and reprimands to students across these groups during unstructured times. More research is necessary to identify the best ways to measure inequality and inequity. This is a first step in intervening to promote equality and equity. First, we must be able to measure the interactions. Second, we need to determine what the goals for interactions should be (e.g., equal or equitable?). Third, we need interventions to promote consistent, ongoing goal attainment. In doing so, we may better understand the factors that contribute to the Discipline Gap (i.e., inequality and inequity in the classroom) and produce systematic change to make obsolete the Discipline Gap and its negative effects on specific groups of students.

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Appendix A

HSIRB Approval

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: June 22, 2023

To: Stephanie Peterson, Principal Investigator

Re: Initial - IRB-2023-197 Promoting Equitable Interactions in a Preschool Setting

This letter will serve as confirmation that your research project titled Promoting Equitable Interactions in a Preschool Setting has been reviewed by the Western Michigan University Institutional Review Board (WMU IRB) and **approved** under the **Exempt** Category 4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if at least one of the following criteria is met:

(i) The identifiable private information or identifiable biospecimens are publicly available;

(ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects;

(iii) The research involves only information collection and analysis involving the investigator's use of identifiable health information when that use is regulated under 45 CFR parts 160 and 164, subparts A and E, for the purposes of "health care operations" or "research" as those terms are defined at 45 CFR 164.501 or for "public health activities and purposes" as described under 45 CFR 164.512(b); or

(iv) The research is conducted by, or on behalf of, a Federal department or agency using government-generated or government-collected information obtained for nonresearch activities, if the research generates identifiable private information that is or will be maintained on information technology that is subject to and in compliance with section 208(b) of the E-Government Act of 2002, 44 U.S.C. 3501 note, if all of the identifiable private information collected, used, or generated as part of the activity will be maintained in systems of records subject to the Privacy Act of 1974, 5 U.S.C. 552a, and, if applicable, the information used in the research was collected subject to the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 et seq.

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The conditions and duration of this approval are specified in the policies of Western Michigan University. You may now begin to implement the research as described in the application. **Please note:** This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes to this project (e.g., ***add an investigator, increase number of subjects beyond the number stated in your application, etc.***). Failure to obtain approval for changes will result in a protocol deviation.

In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the IRB or the Associate Director Research Compliance for consultation.

The Board wishes you success in the pursuit of your research goals.

Sincerely,

Amy Naugle, Ph.D., WMU IRB Chair

For a study to remain open after one year, a Post Approval Monitoring report (please use the continuing review submission form) is required on or prior to (no more than 30 days**) June 21, 2024** and each year thereafter until closing of the study. When this study closes, complete a Closure Submission.
Note: All research data must be kept in a secure location on the WMU campus for at least three (3) years after the study closes.

Appendix B

Copy of Researcher Datasheet - Blank

Indicate only interactions for the lead teacher. Indicate interactions that followed appropriate behavior using an I and interactions that followed an inappropriate behavior using an X.

Student	Date:	Teacher #:	Initials:	Primary / IOA
	Engagement			
	Social engagement	Demands	Praise	Reprimands
Notes:				

Appendix C

Copy of Researcher Datasheet – Filled in

Indicate only interactions for the lead teacher. Indicate interactions that followed appropriate behavior using an 1 and interactions that followed an inappropriate behavior using an X.

Student	Date:	Teacher #:	Initials:	Primary / IOA
	Engagement			
	Social engagement	Demands	Praise	Reprimands
WF1	111			
BF1		1		
WF2	1X		1	XX
WF3	111			
WM1	1		11	
BM1	11	X		X
Notes:				

Indicates interaction occurring following appropriate student behavior.

Indicates interaction occurring following inappropriate student behavior.

Appendix D

Treatment Integrity Checklist

Training	
Trainer provides definition of behavior specific praise (BSP): Any instance where the teacher provides a statement of approval.	
Trainer provides definition of reprimand: Any instance where the teacher provides a statement of disapproval or warning.	
Trainer models how to provide BSP.	
Trainer models how to track BSP on clicker.	
Trainer provides rehearsal of providing and tracking BSP.	
Trainer provides feedback on BSP and tracking.	
Trainer provides instruction on recording BSP on datasheet.	
Feedback on Phase 1	
Trainer reviews rate of BSP.	
Trainer reviews rate of reprimands.	
Trainer reviews feedback on self-monitoring.	
Teacher and trainer set goal for the next session.	
Trainer completes and provides teacher with the feedback form.	
Feedback on Phase 2	
Before session, trainer reminds teacher to try and interact with every student during the session.	
Trainer provides the top 3 students who received praise.	
Trainer reviews the bottom 3 students who received praise.	
Trainer reviews the top 3 students who received reprimands.	
Trainer reviews the bottom 3 students who received reprimands.	
Trainer provides feedback on self-monitoring.	
Teacher and trainer set goal for the next session.	
Trainer completes and provides teacher with the feedback form.	

Appendix E

Teacher Datasheet

Following each choice time period, indicate the number of praise statements you recorded on your clicker counter.

Week of:	**Praise Statements**
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Appendix F

Self-Monitoring and General Performance Feedback Form

Date:

Rate of Praise:

Rate of Reprimands:

My goal for next session:

Notes:

Appendix G

Self-Monitoring and Equality-Focused Performance Feedback Form

Date:

Glows

Most Praise:

1.
2.
3.

Least Reprimands:

1.
2.
3.

Grows

Least Praise:

1.
2.
3.

Most Reprimands:

1.
2.
3.

My Goal for next time:

Notes:

Appendix H

Teacher Informational Flier

Praise in the Classroom

1. High rates of behavior-specific praise can decrease challenging student behavior and increase engagement in the classroom (Kestner et al., 2018).

2. Praise may also improve the overall teacher-student relationship (Ferguson, 2013).

3. Monitoring praise rates in the classroom may help with promoting equity among students within the classroom (Knochel et al., 2020).

Appendix I

Demographic and Social Validity Survey

Thank you for participating in the teacher student interaction intervention. Please fill out the following demographic questions and provide your feedback on the intervention implemented. This feedback will be used to improve the intervention in the future.

Are you White, Black or African American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, or some other race?

- White
- Black or African American
- American Indian or Alaskan Native
- Other (please specify)

What is your gender?

- Male
- Female
- Non-binary/third gender
- Prefer not to say

What is the highest level of school you have completed or the highest degree you have received?

- High school degree or equivalent
- Some college but no degree
- Associate degree
- Bachelor degree
- Graduate degree

If you received a degree, what was your degree in?

How long have you been working in education?

Please indicate on a level of strongly disagree (1) to strongly agree (5) how you felt about the intervention on teacher student interactions.

I find this approach to be an acceptable way of improving teacher student interactions.

1 2 3 4 5

I would be willing for this procedure to be used again to improve teacher student interactions.

1 2 3 4 5

I like the procedures used in this intervention.

1 2 3 4 5

I believe the procedures used in this intervention were helpful in improving teacher student interactions.

1 2 3 4 5

I felt discomfort during the teacher student interaction intervention.

1 2 3 4 5

I believe that the intervention was cost effective.

1 2 3 4 5

I believe the procedures used in this intervention will result in lasting change in my teacher student interactions.

1 2 3 4 5

Overall, I had a positive reaction to this intervention.

1 2 3 4 5

What did you enjoy most about this intervention?

What did you enjoy least about this intervention?

What would have made you enjoy the intervention more?

Please provide any other feedback that you would like the researchers to know.

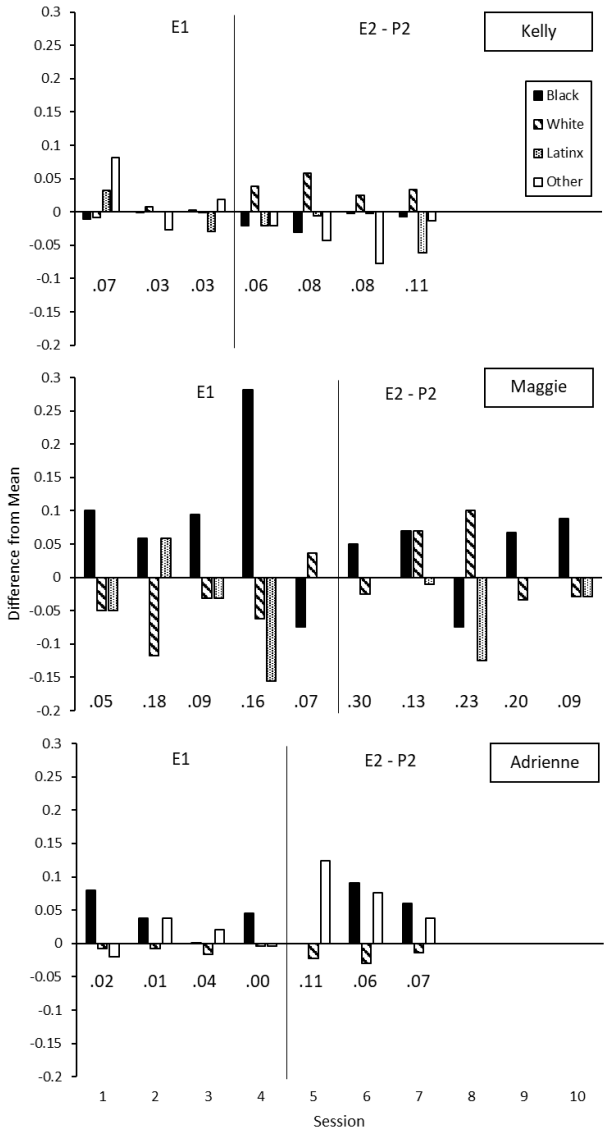
We thank you for your time spent taking this survey.
Your response has been recorded.

Appendix J

Teachers' Difference Between the Aggregated and Disaggregated Mean Praise Across Racial Groups

Figure 11

Teachers' Difference between the Aggregated and Disaggregated Mean Praise across Racial Groups



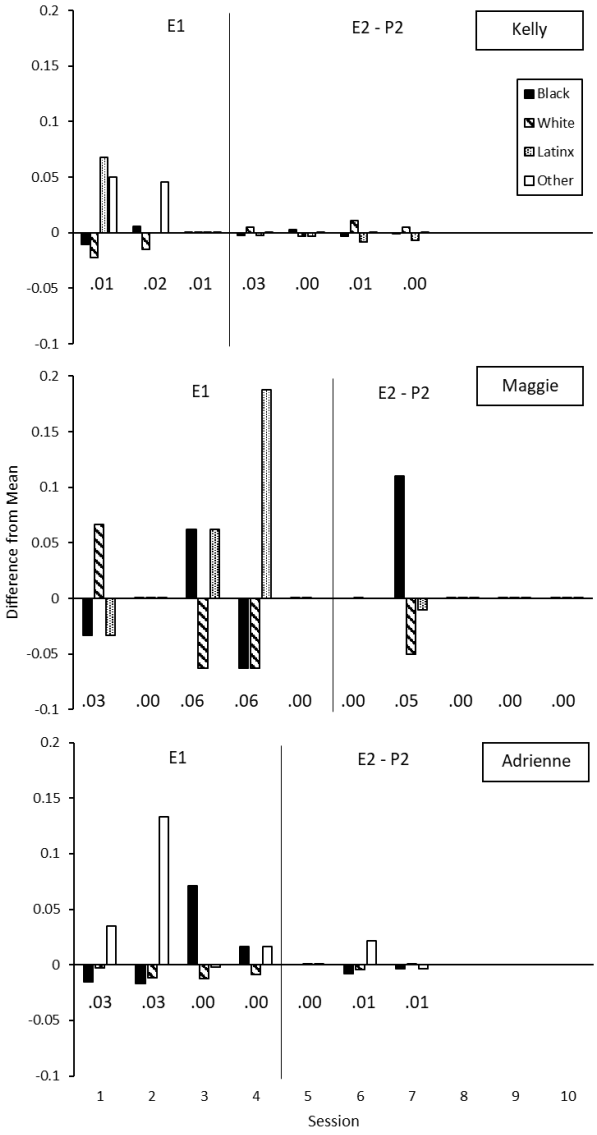
Note. E1 = Experiment 1. E2 – P2 = Experiment 2 – Phase 2. The 0 represents the mean for each session and the height of each bar represents the difference of each group's mean. Aggregated mean reprimands per min per student is presented under the data for each session.

Appendix K

Teachers' Difference Between the Aggregated and Disaggregated Mean Reprimands Across Racial Groups

Figure 12

Teachers' Difference between the Aggregated and Disaggregated Mean Reprimands across Racial Groups



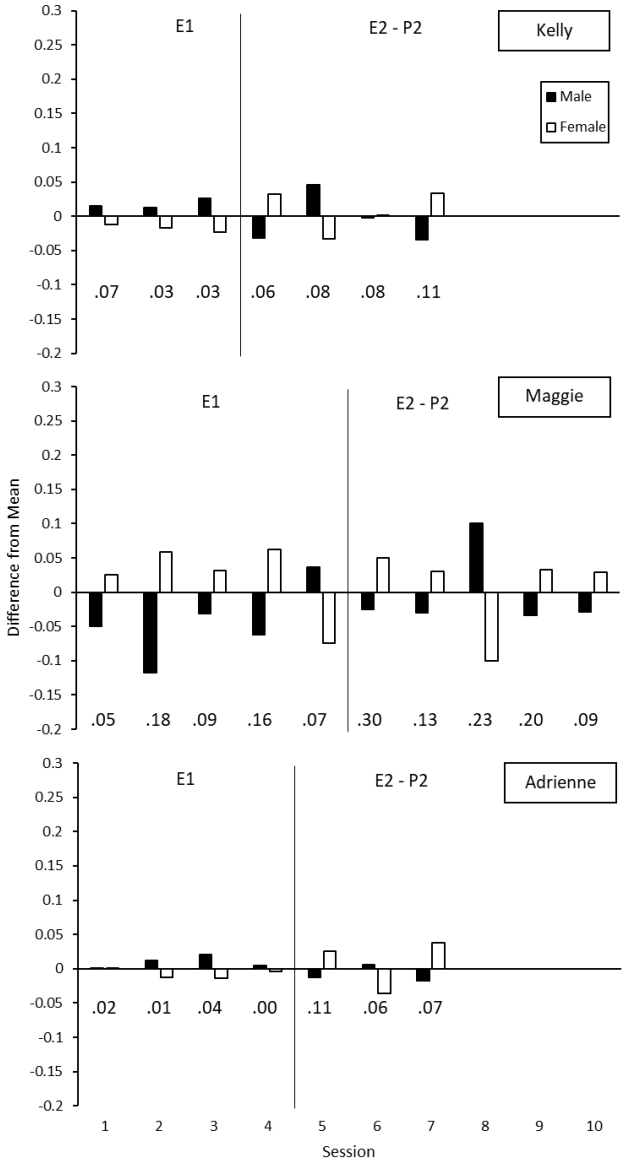
Note. E1 = Experiment 1. E2 – P2 = Experiment 2 – Phase 2. The 0 represents the mean for each session and the height of each bar represents the difference of each group's mean. Aggregated mean reprimands per min per student is presented under the data for each session.

Appendix L

Teachers' Difference Between the Aggregated and Disaggregated Mean Praise Across Gender Groups

Figure 13

Teachers' Difference between the Aggregated and Disaggregated Mean Praise across Gender Groups



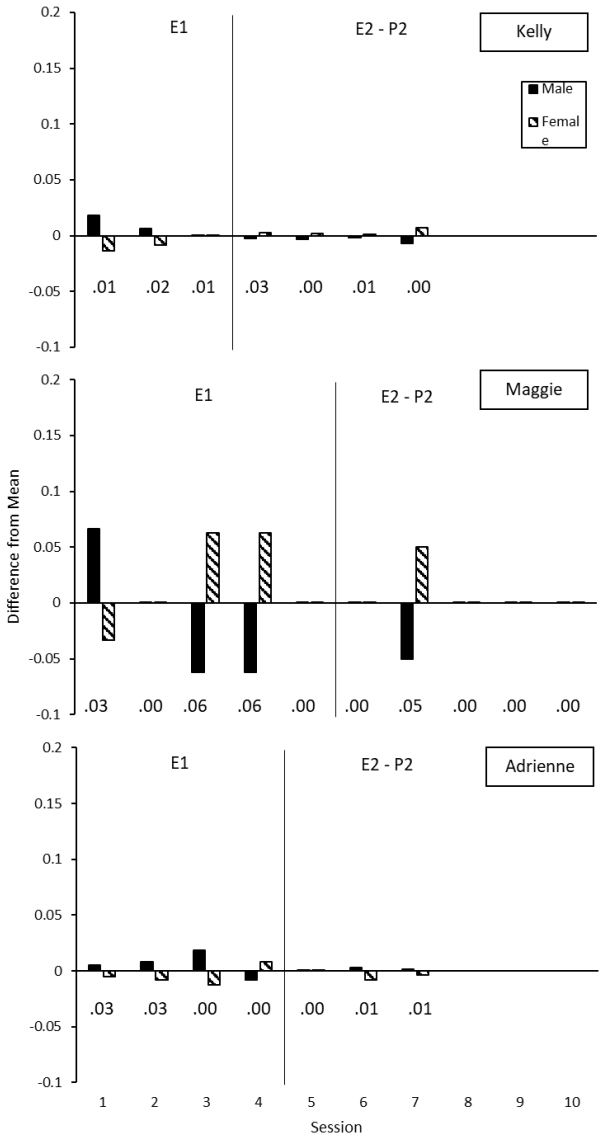
Note. E1 = Experiment 1. E2 – P2 = Experiment 2 – Phase 2. The 0 represents the mean for each session and the height of each bar represents the difference of each group's mean. Aggregated mean praise per min per student is presented under the data for each session.

Appendix M

Teachers' Difference Between the Aggregated and Disaggregated Mean Reprimands Across Gender Groups

Figure 14

Teachers' Difference between the Aggregated and Disaggregated Mean Reprimands across Gender Groups



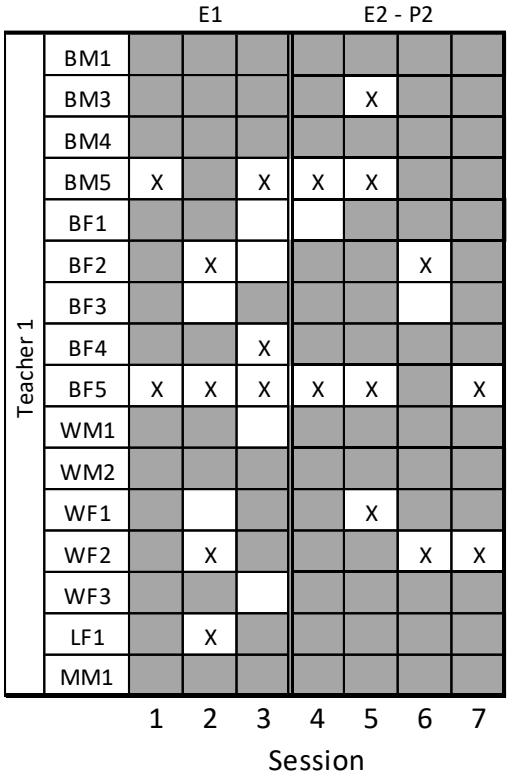
Note. E1 = Experiment 1. E2 – P2 = Experiment 2 – Phase 2. The 0 represents the mean for each session and the height of each bar represents the difference of each group's mean. Aggregated mean reprimands per min per student is presented under the data for each session.

Appendix N

Kelly's Interactions Distributed Across Students and Sessions

Figure 15

Kelly's Interactions Distributed across Students and Sessions



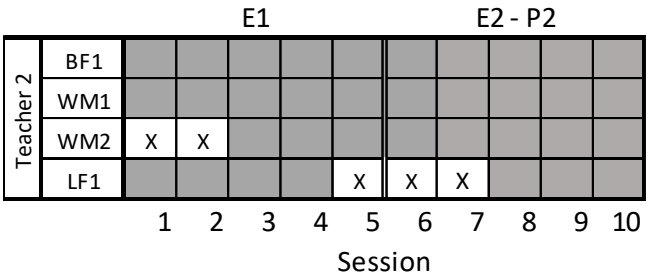
Note. This figure indicates when Kelly interacted with a student. Interactions are represented by gray squares. E1 = Experiment 1. E2 – P2 = Experiment 2 – Phase 2. A lack of interactions is represented by white squares. An X indicates that a student was not present during the corresponding session. The double line indicates a change between Experiment 1 and Experiment 2 - Phase 2.

Appendix O

Maggie's Interactions Distributed Across Students and Sessions

Figure 16

Maggie's Interactions Distributed across Students and Sessions



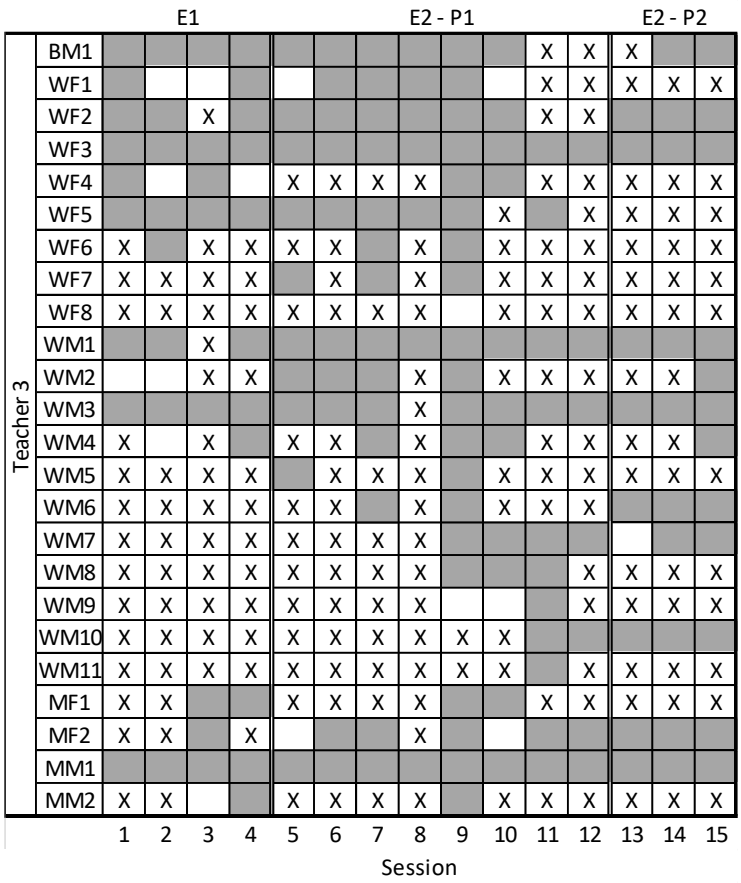
Note. This figure indicates when Maggie interacted with a student. E1 = Experiment 1. E2 – P2 = Experiment 2 – Phase 2. Interactions are represented by gray squares. A lack of interactions is represented by white squares. An X indicates that a student was not present during the corresponding session. The double line indicates a change between Experiment 1 and Experiment 2 – Phase 2.

Appendix P

Adrienne's Interactions Distributed Across Students and Sessions

Figure 17

Adrienne's Interactions Distributed across Students and Sessions



Note. This figure indicates when Adrienne interacted with a student. Interactions are represented by gray squares. A lack of interactions is represented by white squares. An X indicates that a student was not present during the corresponding session. The double line indicates a change between Experiment 1, Experiment 2 – Phase 1, and Experiment 2 – Phase 2.