Understanding and Measuring Coach-Teacher Alliance: A Glimpse Inside the 'Black Box'

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Abstract

Coaching models are increasingly used in schools to enhance fidelity and effectiveness of

evidence-based interventions, yet little is known about the relationship between the coach and

teacher (i.e., coach-teacher alliance), which may indirectly enhance teacher and student

outcomes through improved implementation quality. There is also limited research on measures

of coach-teacher alliance, further hindering the field from understanding the active components

for successful coaching. The current study examined the factor structure and psychometric

characteristics of a measure of coach-teacher alliance as reported by both teachers and coaches,

and explored the extent to which teachers and coaches reliably rate their alliance. Data come

from a sample of 147 teachers who received implementation support from one of four coaches;

both the teacher and the coach completed an alliance questionnaire. Separate confirmatory factor

analyses for each informant revealed four factors (relationship, process, investment, and

perceived benefits) as well as an additional coach-rated factor (perceived teacher barriers). A

series of analyses, including cross-rater correlations, intraclass correlation coefficients, and

Kuder-Richardson reliability estimates suggested that teachers and coaches provide reliable,

though not redundant, information about the alliance. Implications for future research and the

utilization of the parallel coach-teacher alliance measures to increase the effectiveness of

coaching are discussed.

KEYWORDS: teachers; coaching; alliance; implementation of evidence-based interventions

Understanding and Measuring Coach-Teacher Alliance: A Glimpse Inside the 'Black Box'

Coaching is increasingly used as a professional development strategy to strengthen the fidelity and effectiveness of evidence-based interventions in schools (Domitrovich et al., 2010; Pas, Bradshaw, & Cash, 2014). Domitrovich and colleagues (2008) conceptualized coaching as an implementation support, for which the quality, fidelity, and dosage of coaching delivery may vary. However, coaching as an implementation support has received limited attention within the literature, and thus little is known about variables affecting the success of coaching (Pas et al., 2014). As a result, coaching could be viewed as a 'black box', implying questions remain regarding underlying components and best practices (Nadeem, Gleacher, & Beidas, 2013; Pas et al., 2014). This highlights the need for measuring the coaching process to improve implementation and targeted outcomes. Coach-teacher alliance is one such attribute for which there is emerging evidence of an association with improved implementation (Wehby, Maggin, Moore Partin, & Robertson, 2012). The current study examined the psychometric properties and factor structure of parallel coach-teacher alliance measures, as completed by both teachers and coaches. This line of research aims to fill several gaps in the coaching literature regarding measurement and various dimensions of the coaching relationship, which in turn may inform our understanding of the coaching process and coaching as an implementation support.

Defining Coach-Teacher Alliance

Alliance is well documented as a crucial process variable in the therapeutic context (Horvath & Symonds, 1991; Martin, Garske, & Davis, 2000), consistently demonstrating a significant relationship with client behavior change (Ackerman & Hilsenroth, 2003; Horvath & Greenberg, 1989). Therapeutic alliance has been typically defined as the therapist-client relational bonding and agreement on goals and tasks (Bordin, 1979). Considerably less literature

has focused on the formation of alliance between teachers and support providers in schools, particularly within the context of implementation support. Similar to the relationship between a clinician and a patient, a coach and teacher develop a relational bond and need to agree upon the coaching goals and tasks. With regard to the alliance, however, coach-teacher alliance may include additional dimensions as shown in other fields of coaching (Hart, Blattner, & Leipsic, 2001) as well as in school-based implementation research (e.g., Han & Weiss, 2005).

Dimensions of Coach-Teacher Alliance

An identified dimension of alliance across multiple fields is the *relationship quality* between the two stakeholders. This is of particular importance for collaborative coaching models, as opposed to traditional expert models of professional development (Burbank & Kauchak, 2003), as the first step is relationship building (Frank & Kratochwill, 2014). This relationship building recognizes that teachers who feel understood and have confidence and trust in the coach will be more successful (Allen & Graden, 2002; Frank & Kratochwill, 2014). Consultation research further emphasizes this in the focus on language-based processes (e.g., using the "we" pronoun) to specifically encourage collaboration (Newman, Guiney, & Barrett, 2015). In using such language, a coach's willingness to work with the teacher and promote an authentic shared ownership is expressed and relates to improved teacher skills (Newman et al., 2015). Similarly, therapeutic research shows that therapists perceived as trustworthy, warm, interested, flexible, and honest form more positive alliances (Ackerman & Hilsenroth, 2003).

Collaboration is not only reflected in the relationship quality, but also underlies the agreed-upon tasks within the coaching implementation *process*. Traditional professional development is typically passive and lacks personalization to individual needs, and consequently these models are often found to be ineffective in producing positive teacher change (Burbank &

Kauchak, 2003; Hamre et al., 2012). Collaborative coaching seeks to include the teacher in personalized goal setting and action planning, facilitating a sense of ownership and acceptance, and ultimately adoption of the skills. Similarly, in the therapeutic context, alliance is partially defined as agreement on the tasks needed to accomplish specific goals (Horvath & Greenberg, 1989). Therefore, aligning with the available literature, there is likely value in considering the perceived implementation of the coaching process as a dimension of coach-teacher alliance.

A third alliance dimension is the *teacher's investment* in working with the coach, which reflects their support, cooperation, and involvement in an intervention (Power et al., 2009). This dimension is important to consider, as the relationship and coaching process may not be sufficient in producing valuable results without teacher investment. Both level of investment and exposure have been used as indicators for intervention fidelity and have been shown to predict teachers' use of targeted skills (Reinke, Herman, Stormont, Newcomer, & David, 2013; Wanless, Rimm-Kaufman, Abry, Larsen, & Patton, 2014). Greater teacher investment, as well as coaches' perceptions of teachers' investment, likely lead to increased dosage of coaching, and thus, improved program outcomes.

Perceptions of the *benefits* of an intervention have also been shown to relate to treatment success and integrity (Cowan & Sheridan, 2003; Eckert & Hintze, 2000; Elliott, 1988). Perceived effectiveness reflects teachers' beliefs that targeted behaviors and skills have moved in the desired direction and is often related to implementer perceptions of treatment acceptability (Von Brock & Elliott, 1987). Positive attributions about a program's effectiveness importantly related to motivation to continue applying skills and engaging in an intervention (Datnow & Castellano, 2000; Han & Weiss, 2005). It is possible that coaching models that incorporate performance

feedback emphasizing positive gains may be related to perceived intervention gains (Han & Weiss, 2005; Rose & Church, 1998).

Finally, it may be relevant to consider potential *barriers*, which may hinder alliance formation and the success of coaching. Barriers to teachers' implementation of interventions and engagement with professional development can range from burnout to organizational health issues to personal mental health difficulties. Reasons for burnout are varied and include work-related problems, as well as difficulties in private life and mental health (Huberman, 1993; Maslach, Schaufeli, & Leiter, 2001). Such problems that may lead to burnout also are negatively associated with intervention implementation, and may impede alliance (Domitrovich et al., 2015; Han & Weiss, 2005; Ross, Romer, & Horner, 2011; Wehby et al., 2012).

Measuring Coach-Teacher Alliance from Both Perspectives

There has been limited empirical work on how best to conceptualize, define, and thus measure alliance across such varied dimensions within school-based coaching. The availability of a comprehensive tool that is valid and reliable can inform the development, refinement, and evaluation of coaching models to support interventions. This work may also advance our understanding of the core dimensions of alliance that lead to improved or new teacher practices.

Given the transactional process that exists within coaching and the importance of collaboration and personalization in successful coaching models, it is advantageous to consider both teachers' and coaches' perspectives. Traditionally, research examining the behavioral ratings of teachers, parents, and students has shown low to moderate correlations between raters (Renk & Phares, 2004; Wright & Torrey, 2001). Similarly, teacher and coach ratings may also be only moderately correlated, indicating the possibility that the two raters apply different standards and conceptualizations about alliance (Renk & Phares, 2004). It may be that one rater has better

predictive validity for intervention outcomes, or that each perspective contributes unique information. For example, coach ratings of the coaching process may operate akin to a dosage checklist, and teacher ratings may provide more information about the quality, that can in turn be used to provide feedback to coaches. Measurement development and research using the ratings of both teachers and coaches are needed to examine these possibilities. The inclusion of both raters may provide a more comprehensive and practical assessment of coach-teacher alliance.

Current Study

The current study aimed to advance our understanding of the core dimensions of coach-teacher alliance through the analysis of data from both coaches and teachers. These data came from a set of trials testing a culturally-responsive classroom management and student engagement preventive framework called Double Check (Bottiani et al., 2012; Bradshaw & Rosenberg, 2016; Hershfeldt et al., 2009). To facilitate teacher implementation of positive behavior supports and cultural responsivity, Double Check used a previously-developed and tested coaching model called the Classroom Check-Up (Reinke, Lewis-Palmer, & Merrell, 2008). The Classroom Check-Up is a collaborative coaching model which uses motivational interviewing, data-informed coaching practices, and ongoing performance feedback to facilitate new teacher practices. Specifically, in the current study we analyzed data from two trials of the Double Check framework, through which data were collected about the coach-teacher alliance via a self-reported measure adapted from Wehby et al. (2012) and other prior instruments (e.g., Domitrovich, Poduska, & Bradshaw, 2008a, 2008b). In this study, we examined the factor structure and psychometric characteristics of the two coach-teacher alliance measures, using confirmatory factor analysis and other related approaches to assess inter-rater reliability. Based on previous research on the variables related to alliance and successful coaching (Pas et al.,

2014; Wehby et al., 2012), we sought to confirm the following four factors: working relationship, competent implementation of the coaching process, teacher investment in the process, and the benefits of coaching. We also anticipated a fifth factor in the coach-reported measure pertaining to barriers to coaching. Together, these analyses were intended to inform our understanding of both the measurement of alliance as well as its various dimensions which are important considerations for the field of implementation science.

Method

Study Design and Procedures

Data for this study were collected as a part of a series of two trials of the Double Check framework (Bottiani et al., 2012; Bradshaw & Rosenberg, 2016; Hershfeldt et al., 2009), in which teachers received coaching using the Classroom Check-Up (Reinke et al., 2008) to support their implementation of positive behavioral classroom management and culturally responsive teaching practices. In addition to coaching, Double Check included five one-hour professional development sessions provided by the coach to all teachers within a school. Coaches tracked all contacts and activities using an electronic log, which included detailed documentation that all five professional development sessions were delivered as intended across all schools. The alliance data were consistently collected across both of these consecutive trials of Double Check, the first of which used a quasi-experimental design (52 teachers in 6 schools, across 3 elementary and 3 middle schools) in which teachers provided pre-post data in reference to non-randomized comparison teachers. The second trial used a randomized controlled design (100 coached teachers in 12 schools, across 6 elementary and 6 middle schools) in which a random assignment process was used to assign teachers to receive coaching (vs. no coaching). As noted above, coaches tracked all contacts and activities using an electronic log, which included detailed

documentation that each component of the coaching process was implemented with each teacher. None of the non-coached comparison/control teachers are included in this study, as they provided no data on coaching alliance. The Double Check framework, including coaching, was implemented consistently across both trials (only the use of random assignment was added in the second trial), and thus the data were pooled in the current study. The study took place in a large east coast public school district. Teacher participation in the intervention and data collection was voluntary and consent was provided. The Institutional Review Boards at John Hopkins University and the University of Virginia approved this study.

Participants

Coaching was completed with 147 teachers in grades K-8, of which 52 were in the first trial and 95 were in the second trial (i.e., of the 100 teachers in the second trial, 5 teachers were never coached, for reasons including leaving the teaching field, extended health-related leave); 37% taught in elementary schools. The vast majority of teachers were female (i.e., 85%) and White (i.e., 80%), and 36% were 30 or younger. Approximately 27% were within the first three years in their role as teacher. Of the 147 teachers who were coached, 20 did not submit the alliance measure, resulting in teacher perception data from 127 teachers in 18 schools. Chi-square tests indicate no differences in trial, school level, gender, age, race, or career stage between teachers who did and did not submit the alliance measure. Coach-reported data were available for all 147 coached teachers. Two coaches provided support to the teachers in the first trial; the same two and two additional coaches provided support to the teachers in the second trial. All coaches were women; two were White and two were Black. Two coaches had a master's in education degree and the other two had a doctorate in school psychology. All coaches

had at least two years of prior coaching experience and received training for the current project, including didactic instruction, role play, and viewing of videos, as well as ongoing supervision.

Overview of the Coaching Intervention

As noted above, Double Check implementation was supported by Classroom Check-Up coaching model (Reinke et al., 2008), which incorporates motivational interviewing to promote and sustain effective classroom management practices (Reinke, Herman, & Sprick, 2011). Each coach served all teachers in three schools. The coaching process includes: (a) an assessment of the teacher's classroom practices through an interview with the teacher, direct observations in the classroom, and a classroom ecology checklist completed by the teacher; (b) a feedback session using information gathered during the assessment step; (c) the collaborative development of a menu of options for intervention; (d) the dyad selecting a target skill/outcome and creating an action plan; and (e) ongoing support and performance feedback from the coach to ensure progress toward the selected goal. On average, coaches completed 3.52 hours of face-to-face coaching with teachers and dedicated 8.61 hours to each coaching case.

Measures

Teacher demographics. Teachers provided information regarding their demographic characteristics, including gender, age, race, and years teaching at the start of the school year.

Coach-teacher alliance measures. At the conclusion of the coaching process (i.e., spring of the school year), both the teacher and coach completed parallel versions of a coach-teacher alliance measure called the *Measure of Coach and Teacher Alliance – Teacher Report* (Bradshaw et al., 2009a) and the *Measure of Coach and Teacher Alliance – Coach Report* (Bradshaw et al., 2009b), respectively. Both versions included 30 items, which assessed the same dimensions of the coach-teacher alliance from each person's perspective. The coach version

included an additional 12 items, most of which pertained to the coach's perception of teacher

barriers and emotional response to the process, discussed below. All items were rated on a 5-

point Likert scale ranging from *Never* to *Always*. The core content of the measures was jointly

developed and based in part on prior work by Domitrovich et al. (2008) and Wehby et al. (2012).

The Wehby et al. (2012) scale was a teacher self-report measure that assessed teachers'

perceptions of teacher-coach relationship quality and also included items assessing teacher

perceptions of effectiveness, fit, and burden of an intervention (referred to by Wehby et al. as

social validity; Cronbach alpha = .94). The Double Check project investigators, with input from

key consultants (i.e., Domitrovich, Reinke, Herman, and Poduska), adapted the Wehby et al.

measure by adding items and creating a parallel coach-completed measure; this expanded set of

measures had not been previously psychometrically examined. The items were hypothesized to

assess four areas of coach-teacher alliance: working relationship, competent implementation of

the coaching process, teacher investment in the process, and the benefits of coaching. As noted

earlier, there were 12 additional items included on the coach rating form, which were selected

based on prior literature (e.g., Becker, Darney, Domitrovich, Keperling, & Ialongo, 2013;

Domitrovich et al., 2015; Rhodes & Beneicke, 2002) and focus interviews, through which

coaches described challenges (e.g., strong emotions; problems with teachers' supervisor) that

may impede coaching success. See Table 1 for a listing of items on the measures.

Analyses

Our first aim was to evaluate the factor structure of the coach-teacher alliance for each

informant. Using Mplus 7.1, we conducted a separate confirmatory factor analysis (CFA) for

each informant's rating of the coach-teacher alliance using the four a priori dimensions. All

alliance items had ordinal response categories and therefore we used weighted least squares

mean- and variance- adjusted estimation. Factors were allowed to co-vary. All analyses

accounted for the clustering of teachers within schools using the Huber-White adjustment of the

standard errors (Muthén & Muthén, 1998-2014); because there were just four coaches assigned

to three schools each, clustering by coach was not accounted for. Model fit was assessed utilizing

the comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean-square error of

approximation (RMSEA). A value of 0.90 or higher on the CFI or TLI is considered acceptable

fit (Bentler & Bonett, 1980), with values closer to 0.95 considered to indicate a well-fitting

model (Hu & Bentler, 1999). Values of less than 0.06 on the RMSEA indicate a good fit (Hu &

Bentler, 1999). While there were no missing data for coach-reported alliance, teacher-reported

alliance data were missing for 13.6% of the sample. All teachers who submitted the alliance

measure were included in the analyses and full information maximum likelihood was used to

account for any missing data within these teachers (93% had complete data).

Using each factor's items, scale scores were calculated by averaging the response value

for each item. A Cronbach alpha (α) was calculated for each scale. We then conducted

descriptive analyses of the dimensions, including examining mean differences for teacher

characteristics and coach assignment as well as cross-informant correlations. Lastly, the

intraclass correlation coefficients (ICC) and Kuder-Richardson 20 (KR-20) were examined for

each scale to assess inter-rater reliability between coach and teacher ratings.

Results

Examining Factor Structure

CFAs were performed to evaluate the four (teacher) and five (coach) factor solutions

developed a priori for the perceptions of alliance. Table 1 presents the items included for each

factor. On the teacher form, two items were excluded, whereas four items were excluded on the

coach form; these items were excluded because of poor conceptual and statistical fit with the

model (e.g., item about need for additional follow-up and the process being stressful). For the

teacher report on coach-teacher alliance, the CFA confirmed the four factors, with all fit indices

indicating a well-fitting model (CFI=.994, TLI = .993, RMSEA = .035). All factor loadings were

above .50 (see Table 1). The working relationship and benefits of coaching factors each had 6

items; there were 9 items on the competent process factor; and 7 items on the investment factor.

Cronbach α = .84 for relationship, .89 for benefits, .94 for process, and .87 for investment.

For the coach report on coach-teacher alliance, the CFA confirmed the five factors, with

all fit indices indicating a well-fitting model (CFI = .969, TLI = .967, RMSEA = .046). All factor

loadings were again above .50. The working relationship and competent process factors each

included 8 items; the benefits of coaching and barriers to coaching factors each had 6 items; and

10 items were on the investment factor. Cronbach α = .88 for relationship, .84 for process, .89 for

investment, .92 for benefits, and .67 for barriers to coaching.

Descriptive Analyses

Descriptive and correlational data on the final scales are presented in Table 2. Both

teachers and coaches, on average, rated the four overlapping alliance scales positively and in the

often to *always* range (i.e., teacher Ms = 3.40-3.81; coach Ms = 3.00-3.70). Additionally, coaches

rated that barriers were present *never* to *seldom* (i.e., M = 0.43; range = 0 to 2.67). All of the

scales rated by teachers were highly correlated with one another (rs .64 to .87). Likewise, all of

the coach scales were highly correlated with another (rs .64 to .86), with the exception of the

barriers to coaching scale. The barriers scale was only weakly correlated scale with the other

scales (rs -.26 to -.35), such that more frequently observed barriers was related to less positive

views of the other dimensions.

Independent samples t-tests evaluated whether perceptions on the various alliance scales were different based on the school level (elementary vs. middle) as well as teacher characteristics. Middle school teachers perceived fewer benefits to coaching as compared to elementary school teachers (Ms = 3.29 and 3.58, respectively, $t(125) = 2.68$, $p < .01$) and reported lower levels of investment (Ms = 3.34 and 3.63, respectively, $t(125) = 2.84$, $p < .01$). Coaches did not report differences for middle versus elementary school teachers but did perceive significantly fewer barriers to coaching for younger teachers as compared to older teachers ($M =$ 0.29 versus 0.50, $t(139) = 2.47$, $p < .05$). No differences were found for trial, gender, race, or career stage in either rating. Post-hoc ANOVAs indicated that teachers did not significantly vary in their ratings based on the coach they worked with; one coach tended to provide more conservative ratings than other coaches (see Table 2).

Inter-rater Analyses

Cross-informant correlations were in the low to moderate range (i.e., rs -.18 to .42). Examining the correlations between the informants on the same dimension, coaches and teachers displayed moderate agreement across the four overlapping dimensions (relationship: $r = .41$; process: $r = .20$; investment: $r = .39$; benefits: $r = .34$). When either the teacher or coach rated the working relationship more positively, the other rater similarly rated the process as more competent (rs = .24 and .42), perceived greater investment (rs = .36 and .39), and saw greater benefits (rs = .28 and .32). When teachers viewed the process as more competently implemented and said they were more invested, coaches also viewed the process, investment, and benefits more positively (see Table 2). Coaches reported fewer barriers for teachers who rated the relationship and the process more positively (rs = -.24 and -.21, respectively).

A series of analyses further examined rater differences. Paired t-tests revealed that teachers viewed the coaching relationship more positively than coaches, $t(126) = -4.35$, $p < .01$, and teachers perceived greater benefits than the coaches, $t(125) = -4.64$, $p < .01$. Both ICCs and KR-20 coefficients were calculated for each of the four overlapping dimensions. ICCs examined the similarity between how the coaches and teachers perceived the dimensions of alliance, providing insight into the degree to which coaches and teachers provided consistent and reliable information. The ICCs were weak to moderate (i.e., relationship = .38; process = .20; investment = .30; benefits = .33). This indicated that there was moderate overlap in the reports provided by the raters. The KR-20 (Kuder & Richardson, 1937) examined the reliability of items within a dimension, by assessing the extent to which teachers and coaches consistently agreed or disagreed with one another on their item responses. Therefore, a high score is possible when a teacher-coach pair disagreed about the ratings of a scale, as long as they consistently disagreed on each item. All dimensions showed an acceptable to high level of consistency and thus reliability between the raters (i.e., relationship = .75; process = .85; investment = .73; benefits = .66). Thus, the two raters provided unique information about alliance (i.e., per the ICC findings); however, the KR-20 demonstrated that teachers and coaches responded relatively consistently across items on the four overlapping dimensions.

Discussion

There has been relatively limited attention to understanding and measuring the core attributes of coaching (Becker et al., 2013), making it a bit of a 'black box'. This article aimed to fill gaps in the literature regarding the conceptualization and measurement of the coach-teacher alliance through the perspective of both coaches and teachers. Although there is a rich body of literature focused on the alliance between a therapist and client, there has been limited

application of this work to school-based coaching as an implementation support. Our CFA

results indicated support for the existence and interrelatedness of the following dimensions:

working relationship, competent implementation of the coaching process, teacher investment,

benefits of coaching, and barriers to coaching. Specifically, the items assessing the *working*

relationship reflected the quality of the collaborative relationship between the teacher and coach

as evidenced by trust, approachability, and an understanding of the teacher's goals and views.

The *competent process* dimension included indicators of the perception that the coaching process

was delivered (e.g., providing feedback in a way that was well-received) and tailored (e.g.,

matching recommendations to the teacher and classroom) appropriately for the specific teacher.

These relationship and process dimensions are based on counseling and consultation research,

which suggests that the relationship formed and agreement upon the tasks of working together

are important components of alliance (Bordin, 1979; Martin et al., 2000; Wehby et al., 2012).

Investment in the coaching process comprised perceptions of support, cooperation, and

involvement in the intervention demonstrated by prioritizing and engaging with the coaching.

Implementation research suggests that investment in coaching may be a necessary counterpart to

the relationship and process dimensions of alliance (Power et al., 2009; Reinke et al., 2013).

Additionally, the *perceived benefits* dimension reflected perceptions of change in the desired

direction due to the intervention (e.g., increased teacher knowledge, improved student

outcomes). The *barriers to coaching* encompassed several emotional and structural problems

that may have impeded coaching. As hypothesized, perceived benefits and barriers emerged as

robust scales, which is consistent with prior work on fidelity and effectiveness of coaching to

support interventions (e.g., Han & Weiss, 2005; Ross et al., 2011; Wehby et al., 2012).

An additional contribution of this study was to preliminarily examine these dimensions by assessing the degree to which they relate to one another, as well as to teacher characteristics and coach assignment. Within each informant, the four dimensions were interrelated, lending initial support for the broad conceptual model of coach-teacher alliance. There were, however, some differences based on teacher characteristics, which should be considered when implementing coaching. Specifically, coaches perceived that older teachers had more barriers to coaching. Interestingly, coaches did not have differential reports on the other dimensions, nor did older teachers themselves. Research using a different coaching model similarly showed that older teachers were more likely to receive a high number of coaching contacts (Pas et al., 2015); perhaps this was because more time and contacts were needed to overcome similar barriers as those perceived in this study. In addition, middle school teachers rated that they were less invested in the coaching and saw fewer benefits; perhaps this setting difference could be attributed to contact with a greater number of students, resulting in inconsistent classroom dynamics and increased burden. This implies that the formation of coach-teacher alliance may be context-specific and tailoring of the process may be needed for teachers within different settings to form a successful alliance; however, additional context-specific research is needed.

Similar to work comparing ratings of parents, teachers, and students (e.g., Mascendaro, Herman, & Webster-Stratton, 2012; Renk & Phares, 2004), coach and teacher ratings of alliance in the current study showed moderate correlations with one another. Interestingly, all of the alliance dimensions were rated highly by both teachers and coaches, and coaches perceived minimal barriers. However, teachers provided significantly higher ratings regarding the coaching relationship and perceived benefits. Teachers may be more apt to respond with socially desirable ratings, or have less coaching experience upon which to contrast the current relationship.

Although there appears to be a relatively high level of convergence in the coach and teacher ratings, there may also be some areas of divergence, suggesting the value of assessing both coach and teacher perspectives when examining alliance.

Limitations and Future Directions

Although the current sample of 147 teachers and four coaches is relatively small for factor analytic and psychometric work, there are few large scale studies of coaching and the dynamic coach-teacher relationship (Becker et al., 2013). Nevertheless, the relatively small sample may limit the interpretation and generalizability of the findings. Notably, while teachers did not significantly vary in their ratings based on the coach they worked with, there was some evidence that one coach was more conservative than the other coaches. A larger sample of teachers and coaches would allow for further validation of this factor solution, as well as a more sophisticated examination of the relationships between factors and potential variation based on teacher and coach characteristics. All of the teachers volunteered to be in the coaching intervention and therefore they may differ from those who did not volunteer. This study was also conducted specifically with the Classroom Check-Up coaching model. Although this model is similar in structure to other collaborative and problem-solving coaching models, future research should be conducted using the coach-teacher alliance measures following other coaching models. Further, research examining the alliance measure in relation to other implementation outcomes is needed to establish predictive validity, and perhaps inform whether one rater is more valid. Lastly, extant literature supports the importance of the five dimensions measured; it is possible that other dimensions should be considered as additional research is conducted in this area.

Conclusions and Implications

This study was intended to test the coach-teacher alliance measures with the overarching goal of informing our understanding of the conceptualization and measurement of alliance in the context of a coaching implementation support model. The current coach-teacher alliance measures reflected multiple dimensions including working relationship, perceptions of a competently implemented coaching process, teacher investment, perceived benefits, and barriers to coaching. Each of these dimensions may differentially associate with the teacher and student outcomes targeted by coaching models; this is an area for further research. Importantly, assessing alliance from both the perspective of coaches and teachers may contribute unique information that is relevant to the shaping and improvement of coaching being delivered, teacher goal attainment, and ultimately teacher and student outcomes. While coaches bring greater experience with the coaching process, and therefore may have a broader perspective on how well the coaching proceeded, coaches may also struggle to objectively assess how well they delivered the model. Thus, alliance data could be shared with either coaches or teachers (although they were not in the current study). In doing so, future studies may investigate the extent to which this information can improve coaching. Both perspectives may provide helpful information in evaluating and improving the coaching process, including self-reflection on one's own engagement in the process and the identification of areas of strength and weakness. Taken together, these findings suggest that the coach-teacher alliance measures hold promise for use in future studies, and in turn may inform efforts our understanding of the 'black box' of coaching implementation supports.

<center>**Compliance with Ethical Standards**</center>

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Table 1

Item Loadings by Alliance Factor for Teacher and Coach Ratings CFA

Teacher Perspective				Coach Perspective			
Factor	**Loading**	*SE*	*R²*	**Factor**	**Loading**	*SE*	*R²*
Working Relationship				**Working Relationship**			
1. The coach and I agreed on what the most important goals for intervention were.	.719	.047	.517	1. The teacher and I agreed on what the most important goals for intervention were.	.866	.028	.750
2. The coach and I trust one another.	.840	.061	.705	2. The teacher and I trust one another.	.906	.017	.821
3. The coach was approachable.	.882	.047	.779	3. The teacher was approachable.	.879	.025	.772
4. The coach and I worked together collaboratively.	.903	.040	.815	4. The teacher and I worked together collaboratively.	.936	.028	.877
5. Overall, the coach showed a sincere desire to understand and improve my classroom.	.824	.072	.679	5. Overall, the teacher showed a sincere desire to improve his/her classroom.	.871	.023	.758
6. The coach incorporated my views into the services provided.	.956	.018	.915	6. The services I provided incorporated the teacher's view.	.857	.053	.735
				7. The teacher easily shared his/her concerns with me.	.758	.039	.575
				8. I was able to empower the teacher to try new strategies.	.824	.053	.678
Coaching Process				**Coaching Process**			
1. The coach was knowledgeable.	.844	.050	.712	1. I felt that I was knowledgeable when it came to working with this teacher.	.544	.069	.296
2. The coach communicated effectively.	.867	.038	.751	2. I was able to communicate effectively with this teacher.	.912	.034	.832
3. The coach delivered support, recommendations, and technical assistance in a clear and concise manner.	.933	.027	.870	3. I was able to deliver support, recommendations, and technical assistance in a clear and concise manner to this teacher.	.782	.059	.612
4. The coach made suggestions that were appropriate for my classroom culture.	.957	.015	.916	4. I was able to provide suggestions that were appropriate for this teacher's classroom culture.	.906	.037	.822

5. The coach provided support that matched the needs of me and my classroom.	.946	.009	.894
6. I received an appropriate amount of feedback from the coach.	.925	.025	.856
7. The coach provided me with practical and useful feedback and strategies.	.973	.012	.946
8. The coach provided helpful information.	.917	.029	.841
9. The coach was accessible.	.769	.048	.591

Investment

1. The time spent working with the coach was effective and productive.	.919	.036	.845
2. I had enough time available to participate in the coaching process.	.769	.035	.591
3. The work I did with the coach was important.	.894	.036	.800
4. The coaching took too much of my time.	.525	.061	.276
5. I will be able to effectively implement the strategies recommended by the Coach in the future.	.906	.021	.821
6. I would recommend the coaching to another teacher.	.917	.032	.842
7. My overall reaction to the coaching was positive.	.951	.032	.905

5. I was able to provide support that matched the needs of this teacher .and his/her classroom.	.868	.049	.753
6. I felt I was able to provide the appropriate amount of feedback to this teacher.	.860	.056	.740
7. The feedback I gave the teacher was practical and useful.	.969	.030	.940
8. The teacher agreed with the data presented and the weaknesses highlighted as areas to work on.	.868	.060	.753

Investment

1. The time spent working with the teacher was effective and productive.	.913	.016	.833
2. There was enough time available for this teacher to participate in the coaching process.	.704	.045	.496
3. The work I did with the teacher was important.	.638	.066	.407
4. The coaching took too much time with this teacher.	.619	.029	.384
5. The teacher will be able to effectively implement the strategies recommended in the future.	.805	.039	.648
6. I think this teacher would recommend the coaching to another teacher.	.891	.018	.793
7. The teacher's overall reaction to the coaching was positive.	.833	.022	.693
8. The teacher was accessible.	.723	.047	.523
9. The teacher found the information I provided to be helpful.	.763	.040	.583
10. The teacher was able to use the coaching as a way to answer his/her own questions.	.850	.026	.723

Benefits of Coaching

#	Item	Loading	SE	
1.	My students benefitted from my work with the coach.	.875	.024	.765
2.	The coach helped build my capacity to implement evidence-based strategies.	.889	.022	.790
3.	The coach had a positive impact on my classroom.	.962	.025	.925
4.	The coaching increased my knowledge of strategies to promote student engagement.	.912	.025	.831
5.	The coach increased my knowledge of classroom management strategies.	.789	.043	.622
6.	The coach increased my knowledge of cultural proficiency.	.801	.044	.641

Benefits of Coaching

#	Item	Loading	SE	
1.	The students benefitted from my work with the teacher.	.945	.020	.892
2.	The teacher showed increased capacity to implement evidence-based strategies.	.868	.037	.753
3.	The coaching had a positive impact on the teacher's classroom.	.952	.029	.905
4.	The coaching increased the teacher's knowledge of strategies to promote student engagement.	.809	.033	.655
5.	The teacher's knowledge of classroom management strategies increased as a result of the coaching.	.832	.027	.692
6.	The teacher's knowledge of cultural proficiency was increased because of the coaching.	.851	.029	.725

Barriers to Coaching

#	Item	Loading	SE	
1.	Displayed anger or hostility.	.866	.141	.750
2.	Displayed sadness or depression.	.824	.065	.679
3.	Reported a health or mental health problem.	.626	.127	.392
4.	Reported other personal problem (e.g., financial, family).	.489	.141	.239
5.	Reported other work related problem (e.g., problems with boss).	.635	.104	.403
6.	Cried or became emotional during the session(s).	.340	.104	.116

Note. CFA= confirmatory factor analyses; Loading= standardized factor loading; *SE*= standard error.

Table 2

Correlations among the Teacher and Coach Alliance Factors

Teacher Factors	M (SD)	M Range by Coach	Relationship	Process	Investment	Benefits	
Relationship	3.81 (.36)	3.75-3.88	(.84)				
Process	3.69 (.47)	3.59-3.81	.80**	(.94)			
Investment	3.45 (.57)	3.23-3.64	.64**	.81**	(.87)		
Benefits	3.40 (.61)	3.33-3.54	.69**	.87**	.77**	(.89)	
Coach Factors	**M (SD)**	**M Range by Coach**	**Relationship**	**Process**	**Investment**	**Benefits**	**Barriers**
Relationship	3.57 (.54)	3.06-3.74	(.88)				
Process	3.70 (.40)	3.45-3.76	.64**	(.84)			
Investment	3.37 (.59)	2.77-3.49	.86**	.75**	(.89)		
Benefits	3.00 (.79)	2.16-3.25	.78**	.65**	.85**	(.92)	
Barriers to Coaching	0.43 (.51)	.21-.62	-.26**	-.35**	-.28**	-.27**	(.67)
Cross-Informant Correlations					**Coach Rating**		
Teacher Rating			**Relationship**	**Process**	**Investment**	**Benefits**	**Barriers**
Relationship			.41**	.24**	.36**	.28**	-.24**
Process			.42**	.20*	.39**	.36**	-.21**
Investment			.39**	.18*	.39**	.35**	-.18
Benefits			.32**	.15	.33**	.34**	-.14

Note. Coach-Teacher Alliance coded on a scale of 0 (never) to 4 (always). Values in parentheses across the diagonal are coefficients of

internal consistency (Cronbach alpha [α]) for each subscale). *p < .05, ** p < .01