

# Measuring Collaboration Across Children’s Behavioral Health and Child Welfare Systems

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A commonly emphasized component of trauma-informed care is the practice of building cross-system collaboration (CSC). While existing research on CSC states numerous benefits and barriers associated with increasing collaboration between systems, there is limited empirical understanding on how to define and measure collaboration between county systems of care. The current study presents the psychometric evaluation of scores from the Perceptions of Overarching Cross-System Collaboration–Child Welfare and Behavioral Health Systems (POCSC-CW/BH), a 6-item self-report instrument completed by system administrative leadership and direct service providers, administered within child welfare and children’s behavioral health systems in 6 California counties. Psychometric analysis demonstrated good support of internal consistency, as well as the factorial, convergent, and discriminant validity of scores produced by the tool. There was also evidence for content validity. System-level analyses showed within-county child welfare, and children’s behavioral health system staff reported similar perceptions of CSC in 5 of 6 counties, whereas POCSC-CW/BH scores across counties showed variability. Exploratory results revealed CSC scores varied by staff role in each system. In general, the POCSC-CW/BH is a promising instrument that adds to a limited array of practical empirically supported measurement tools for measuring CSC between child welfare and children’s behavior health systems. The study limitations and implications for CSC measurement and trauma-informed practice are discussed.

**Keywords:** cross-system collaboration, children’s behavioral health, child welfare, trauma-informed care, measurement

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Many children and youth served by child welfare or children’s mental health and behavioral health systems are served across multiple systems (Horwitz et al., 2012). In public children’s mental health and alcohol/drug sectors, Miller, Green, Fettes, and Aarons (2011) found high occurrence of maltreatment (75.1% and 86.3%, respectively). In the child welfare population, Bronsard et al. (2016) found nearly 50% met criteria for a behavioral health disorder, a rate far exceeding the 20% rate in the general population for ages 9–17 (U.S. Department of Health and Human Ser-

vices, 1999) and rates in other public service sectors for children (Burns et al., 2004; Hurlburt et al., 2004). However, Burns et al. (2004) found that only 11.7% of children and youth with significant symptomology used behavioral health services, and Hurlburt et al. (2004) reported that, among children with clinically elevated impairment, only 28.3% had received specialty behavioral health treatment.

This wide need but narrow behavioral health service utilization for child welfare-involved youth has been well documented and is

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particularly critical for children and youth of color (Garcia, Palinkas, Snowden, & Landsverk, 2013; Garland et al., 2000; Garland, Landsverk, & Lau, 2003; Horwitz et al., 2012; Kim & Garcia, 2016). Based on these service access and utilization gaps, cross-system collaboration (CSC) has advanced as an integral element of trauma-informed care (TIC). In their 2016 examination of TIC, Hanson and Lang operationalized CSC as “collaboration, service coordination, and information sharing among professionals *with other agencies* related to trauma-informed services” (p. 98) and found CSC ranked as the seventh most important TIC component based on a survey of over 400 trauma-focused researchers, practitioners, and intermediaries.

Research on CSC between child welfare and behavioral health has revealed multiple relationships between collaboration and consumer-level outcomes for child welfare-involved children and youth, such as increased behavioral health service utilization, reduced symptomology, and greater placement stability (Bai, Wells, & Hillemeier, 2009; Chuang & Lucio, 2011; Hurlburt et al., 2004; Wells & Chuang, 2012). CSC has also been found to be associated with organizational-level outcomes for child welfare, behavioral health, and other agencies serving child welfare populations, such as greater agency goal attainment, sustained resources linkages, and more effective and higher quality services (Green, Rockhill, & Burrus, 2008; Rivard & Morrissey, 2003). Organizational climate factors in child welfare and behavioral health systems, such as employee satisfaction and perceived job security, have also been related to system-level capacity for CSC (Jolink & Dankbaar, 2010; Wichinsky, Thomlison, & Pennell, 2012). Developing collaboration between human service agencies is a complicated process, and several CSC barriers have been identified, including, for example, differences in values, lack of consensus, poor communication, lack of resources, and ambiguous jurisdiction (Gazley, 2017; Herlihy, 2016).

Although the importance of CSC to provide responsive and supportive trauma-informed services has been well established in the research literature and integrated into professional consensus, there is a need for measurement tools providing reliable and valid information about CSC to better understand TIC and overcome the barriers to fostering collaborative practices between systems. A synthesis of interorganizational collaboration studies in human service systems found that only 22% of studies used a quantitative measurement instrument (Gazley & Chao, 2015). There are several tools available for examining collaborative efforts between multiple agencies; however, most of these tools have not been evaluated for psychometric performance (Granner & Sharpe, 2004). Among the measurement tools with published psychometric data, the majority are not designed for measuring collaboration specifically between child welfare and community behavioral health systems (Dedrick & Greenbaum, 2011; Fletcher et al., 2009; Granner & Sharpe, 2004; Smith & Mogro-Wilson, 2007).

After a literature review of peer-reviewed published research on CSC within child welfare and behavioral health systems, we identified nine novel quantitative measurement approaches that have been utilized to examine CSC (Bai et al., 2009; Chuang & Lucio, 2011; Darlington, Feeney, & Rixon, 2004; Friedman et al., 2007; Hurlburt et al., 2004; Rivard, Johnsen, Morrissey, & Starrett, 1999; Rivard & Morrissey, 2003; Rosas, Behar, & Hydaker, 2016; Wells & Chuang, 2012). These approaches vary in their defined targeted

constructs, respondents, and measurement content and have included dividing interagency collaboration into three dimensions—extent, impact of uncertainty, and positive experience and difficulty (Darlington et al., 2004)—or measuring the number of referrals and degree of information exchanged between systems (Rivard et al., 1999; Rivard & Morrissey, 2003). Only one had acceptable reliability and validity reported (Rosas et al., 2016). Others focused on the count and frequency of professional linkages, ties, or contacts (Hurlburt et al., 2004) or have analyzed the density, closeness of relationships, or points of entry to services within social networks (Friedman et al., 2007). Respondents have included key informants (Chuang & Lucio, 2011; Hurlburt et al., 2004; Rivard et al., 1999; Rivard & Morrissey, 2003), agency directors (Wells & Chuang, 2012), or self-report surveys with direct service staff (Darlington et al., 2004). In Supplemental Table S1, available in the online supplemental materials, we provide further comparison of these different CSC measurement approaches.

As part of the California Screening, Assessment, and Treatment (CASAT) Initiative, funded by the Children’s Bureau, Administration of Children, Youth, and Families (grant 90C01101), the authors prepared a county-level TIC evaluation for child welfare and behavioral health systems in California; however, the authors were unable to identify an existing tool that was brief, quantitative, and had been evaluated for psychometric performance based on leadership and direct service staff global perceptions of CSC. As child welfare and behavioral health systems move forward with TIC and CSC change efforts, the further understanding of CSC requires the availability of suitable CSC measurement tools.

This study evaluates the psychometric performance of the Perceptions of Overarching Cross-System Collaboration–Child Welfare and Behavioral Health Systems (POCSC-CW/BH), designed to provide reliable and meaningful indices of perceptions of overarching CSC between child welfare and behavioral health systems of care. We hypothesized POCSC-CW/BH scores would demonstrate a high level of internal consistency, that item content would align with existing themes associated with CSC in social service settings, and that the internal structure of the six-item scale would represent a single construct. In addition, we hypothesized POCSC-CW/BH scores would correlate significantly with scores from an established measurement instrument assessing organizational climate. Specifically, higher levels of CSC would be positively associated with higher levels of the organizational climate scales of mission, cohesion, autonomy, communication, and change, whereas higher organizational climate stress would be associated with lower levels of CSC. We further anticipated POCSC-CW/BH data would offer information that is meaningful at a system-level, as evidenced by moderate to high consistency among within-county child welfare and behavioral health scores (i.e., all respondents would perceive moderately similar levels of CSC within the same county), but moderate to high variation from scores between counties (i.e., all respondent’s perceptions of CSC in a given county would have little relationship with scores from another county). Finally, we explored how perceptions of overarching CSC scores varied based on respondent role in their system or system affiliation.

## Method

### POCSC-CW/BH

From colleagues at North Carolina Department of Health and Human Services, Division of Social Services, the authors identified an unnamed CSC tool that was designed and used to evaluate direct service and leadership staff perceptions of collaboration between child welfare and behavioral health systems, although scores had not been evaluated for psychometric performance. Developed as part of Project Broadcast, funded by the Children's Bureau, Administration of Children, Youth, and Families (grant 90CO1058), the tool included five items adapted from two system-level collaboration and implementation tools, unpublished in peer-review literature (Wilder Collaboration Inventory; [Mattessich, Murray-Close, & Monsey, 2001](#); System of Care Readiness and Implementation Measurement Scale; [Behar & Hydaker, 2012](#)), and one new item. The Project Broadcast items had been utilized for an assessment in several North Carolina counties.

In the current study, these items include six items rated on a 5-point Likert scale (ranging from *strongly disagree* to *strongly agree*), querying staff perceptions of child welfare and behavioral health having a history of working well together, having a history of trusting each other, having a clear sense of roles and responsibilities, communicating openly, regularly sharing information on treatment and case plans, and regularly attending joint meetings to determine needs of families (POCSC-CW/BH items are provided in [Table S2](#) of the online supplemental materials). The six-item POCSC-CW/BH total score was used to provide an overall score to indicate degree of perceived collaboration, with higher scores suggesting greater collaboration.

### Participants and Procedures

Data were obtained as part of the CASAT Initiative from a broad system-level assessment process focused on domains relevant to TIC. Child welfare and behavioral health system leaders from eight California counties assisted in administration of an online survey within their child welfare and behavioral health service systems to evaluate practices, perceptions, and attitudes related to screening, assessment, treatment, and TIC. Participant involvement procedures were approved by the University of California, San Diego, Institutional Review Board.

Participating system leaders were asked to provide e-mail contact information for all staff in their systems involved in directly providing services for children, youth, and families and all leaders who oversee those staff or services. A survey invitation and link was sent to all identified staff via e-mail. After survey distribution, CASAT Initiative staff and system leadership provided reminder e-mails for staff to complete the surveys, along with feedback regarding the overall response rate. In some cases, leadership provided reminders at staff meetings. There were also periodic drawings for \$20 gift cards for participants who provided an e-mail address once they completed the survey. Survey participation was voluntary and system leadership received no specific information about staff that did not complete the survey. The average number of days between survey initial distribution and county system administration completion was 46 days (range = 28–55).

Of the eight initial counties, results from two counties were excluded from this study because of poor response rates (<50%).

Child welfare and behavioral health county system pairs from the remaining six counties that participated in the survey included 434 total participants (233, 53.7% from child welfare systems; 201, 46.3% from behavioral health systems). One respondent had missing data on all of the POCSC-CW/BH items and was excluded from the sample. See [Table 1](#) for information on participants by county and service system affiliation. Basic demographic characteristics of the survey respondents are provided in [Table 2](#). Additional information on the characteristics of the participating counties is reported in [Table S3](#) of the online supplemental materials.

Response rates were determined based on number of completed surveys divided by unique staff e-mails for survey distribution. The overall response rate for participants included in this study was 65.2% (434 participants/666 unique staff e-mails). By county, the unique staff e-mails provided by child welfare and behavioral health leadership and county-level response rate were as follows: County A, 53 (62.3%); County B, 120 (60.0%); County C, 30 (73.3%); County D, 155 (57.4%); County E, 278 (71.2%); County F, 30 (66.7%).

## Measurement

**Survey of Organizational Functioning (SOF).** The Organizational Climate scales of the SOF ([Institute of Behavioral Research, 2005](#)) were used to evaluate perceptions of the work environment for staff in each of the participating CW and BH systems. Acceptable internal consistency, dimensionality, interrater reliability, and preliminary evidence for construct validity have been reported for the SOF Organizational Climate scales with a sample of BH leadership and treatment staff ([Lehman, Greener, & Simpson, 2002](#)). In the current study, the six Organizational Climate scales include the domains of mission (5 items;  $\alpha = .78$ ), cohesion (6 items;  $\alpha = .86$ ), autonomy (5 items;  $\alpha = .56$ ), communication (5 items;  $\alpha = .85$ ), stress (4 items;  $\alpha = .82$ ), and change (5 items;  $\alpha = .63$ ).

**System affiliation.** Survey participants were asked to report the system of their primary affiliation with the prompt, "Are you currently involved in child welfare or mental/behavioral health services? [If more than 1, pick the option that best describes your current role]" and were given the option of child welfare, behavioral health, or neither. Participants who responded "neither" were excluded from this study. [Tables 1](#) and [2](#) provide the distribution of child welfare and behavioral health staff based on this item.

Table 1  
Participants by County and Service System Affiliation

County	Overall (n = 434)		Child welfare (n = 233)		Behavioral health (n = 201)	
	n	%	n	%	n	%
A	33	7.6	17	7.3	16	8.0
B	72	16.6	41	17.6	31	15.4
C	22	5.1	8	3.4	14	7.0
D	89	20.5	40	17.2	49	24.4
E	198	45.6	117	50.2	81	40.3
F	20	4.6	10	4.3	10	5.0
Total	434	100.0	233	100.0	201	100.0

Table 2  
*Participants' Demographic Characteristics, Service System Affiliation, and Direct–Nondirect Service Provider Classification*

Characteristics	Overall ( <i>n</i> = 434)		Child welfare ( <i>n</i> = 233)		Behavioral health ( <i>n</i> = 201)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender <sup>a</sup>						
Male	89	20.7	40	17.5	49	24.5
Female	340	79.3	189	82.5	151	75.5
Race/ethnicity <sup>b</sup>						
American Indian or Alaska Native	8	1.9	6	2.7	2	1.0
Asian/Pacific Islander	7	1.6	2	.9	5	2.5
Black or African American	6	1.4	5	2.2	1	.5
Hispanic/Latino	120	28.2	72	31.9	48	24.1
White	264	62.1	128	56.6	136	68.3
Multiracial/other	20	4.7	13	5.8	7	3.5
Highest level of education <sup>c</sup>						
No degree/Associate's degree or equivalent	65	15.0	29	12.6	36	17.9
Bachelor's degree	107	24.8	80	34.6	27	13.4
Master's or doctorate degree	260	60.2	122	52.8	138	68.7
Discipline of highest degree <sup>d</sup>						
Business/accounting	9	2.5	8	4.0	1	.6
Education	20	5.4	15	7.4	5	3.0
Law/criminal justice	8	2.2	7	3.5	1	.6
Marriage and family therapy	73	19.9	7	3.5	66	40.0
Psychology	55	15.0	17	8.4	38	23.0
Social work	161	43.9	117	57.9	44	26.7
Sociology	12	3.3	12	5.9	0	.0
Other	29	7.9	19	9.4	10	6.1
Type of staff						
Direct service provider	342	78.8	183	78.5	159	79.1
Nondirect service staff	92	21.2	50	21.5	42	20.9

<sup>a</sup> Data missing for five cases. <sup>b</sup> Data missing for nine cases. <sup>c</sup> Data missing for two cases. <sup>d</sup> Reported for participants with Bachelor's degree or higher.

**Leadership or direct services.** Based on the prompt, "Do you currently provide direct services to children, youth, and families?" and a yes/no response, survey participants were asked to report whether they are direct-service staff. Because administrative support staff were not included in the survey sample, "no" response or "no direct service staff" are expected to reflect administrative leadership staff. Table 2 provides the distribution of these two categories.

### Analytic Approach

Because the data set includes both participants nested by counties and systems (child welfare/behavioral health), we did not assume the sample data was independent. Using intraclass correlation analysis, we evaluated the degree of nontrivial nesting within the sample. Intraclass correlation coefficient (ICC) was obtained to examine the effect of county nesting. For the overall sample, the ICC was .06. While the ICC level was low, analyses with the overall sample included using multilevel modeling to take the study design and nested nature of the data into account. Multilevel analyses were conducted with Mplus (Version 8); all other analyses were conducted with IBM SPSS Statistics (Version 22).

To test hypotheses regarding the psychometric performance of the POCSC-CW/BH, Cronbach's alpha was calculated to evaluate the internal consistency of the measure, qualitative comparison was used to examine item themes and content validity, and a principal components analysis (PCA) was conducted to evaluate factorial validity by determining whether the POCSC-CW/BH items produced a score reflective of a unidimensional construct. Pearson product-moment correlation and multilevel modeling analyses were used to examine convergent and discriminant validity (i.e., POCSC-CW/BH scores will correlate significantly in expected directions with scores from an established measurement instrument assessing organizational climate). *T* tests were conducted to examine consistency among within-county child welfare and behavioral health scores, and one-way analysis of variance (ANOVA) with Hochberg's GT2 pairwise post hoc tests (because of differences in sample sizes across counties) were used to examine variation in scores between counties. Finally, a multilevel regression model was used to evaluate the exploratory hypothesis that perceptions of CSC would vary based on respondent role. The model examined the associations between service system affiliation (child welfare or behavioral health), provider type (direct service provider yes or no) and POCSC-CW/BH score. The model included a random intercept for county to account for the nesting of participants within counties.

## Results

### Psychometric Performance

**Reliability.** For the overall sample, Cronbach's alpha for the cross-system collaboration scale was .91. For child welfare and behavioral health participants, Cronbach's alpha was .92 and .90, respectively. Internal consistency for the six items appears to be high, with the items representing a generally cohesive construct.

**Content validity.** Because the POCSC-CW/BH was an existing tool with no previous evaluation, the initial item selection process was not accessible. To conduct a post hoc examination of item content overlap with conceptually salient CSC characteristics, we referred to Cooper, Evans, and Pybis's (2016) systematic review of outcomes, facilitating factors, and inhibiting factors for interagency collaboration in children and young people's mental health. In this review, the authors identified 33 articles that reported qualitative and quantitative data and focused, ". . . wholly or predominantly, on close working across at least two agencies, or professional groups, that were offering help for children and young people with emotional, behavioral or mental health difficulties" (Cooper et al., 2016, p. 327).

By cross-referencing POCSC-CW/BH item themes with the Cooper et al. (2016) review, we found good overlap with facilitators to CSC, including mutual valuing across agencies and good understandings across agencies (POCSC-CW/BH Item 3: clear sense of roles and responsibilities), good interagency communication (POCSC-CW/BH Item 4: communicate openly), and joint trainings (POCSC-CW/BH Item 6: regularly attend joint meetings). Similarly, the barriers from this review included good alignment such as lack of valuing across agencies, differing perspectives, and poor understandings across agencies (POCSC-CW/BH Item 1: history of working well together; POCSC-CW/BH Item 2: history of trusting each other), poor interagency communication

(POCSC-CW/BH Item 4: communicate openly), confidentiality issues (POCSC-CW/BH Item 5: regularly share information). While all POCSC-CW/BH items were related to one or more of the facilitators or barriers, the review identified facilitators (e.g., senior management support, protocols on interagency collaboration, a named link person) and barriers (e.g., inadequate resourcing) that are not captured by POCSC-CW/BH item content.

**Factorial validity.** The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .89 and Bartlett’s Test of Sphericity was significant ( $p < .001$ ), both suggesting the data were adequate for the PCA analysis. The results suggested a single factor extraction. Based on a single factor, 69.1% of the variance was explained by the model and the eigenvalue for the first component was 4.2. Each of the items correlated with the first component at  $r \geq .70$  (range = .70–.89). Therefore, the single factor solution was accepted without item pruning.

**Convergent and discriminant validity.** Pearson product-moment correlations between POCSC-CW/BH total scores and SOF Organizational Climate scales for the overall sample and for each individual county are reported in Table 3. The pattern of results for the overall sample and across counties indicates CSC was positively associated with the Organizational Climate mission, cohesion, autonomy, communication, and change scales and negatively associated with the SOF organizational climate stress scale. Using the convention of interpreting .10, .30, and .50 as small, medium, and large coefficients, most correlation coefficients represented a large effect.

Results from multilevel modeling showed that POCSC-CW/BH scores were positively associated with organizational climate mission ( $r = .41$ ), cohesion ( $r = .39$ ), autonomy ( $r = .32$ ), communication ( $r = .49$ ), and change ( $r = .40$ ) scales and negatively associated with the organizational climate stress scale ( $r = -.33$ ). All correlations were significant at  $p < .001$ .

**System-Level Results**

Descriptive statistics for POCSC-CW/BH scores by service system for the overall sample and by county are presented in Table 4. *T* tests indicated that child welfare and behavioral health participants differed on their perceptions of overarching CSC in only one of the six counties. None of the other *t* tests were significantly different, including the test for overall child welfare and behavioral health participants.

One-way analysis of variance,  $F(5, 428) = 6.84, p < .001$ , revealed a significant effect for county on POCSC-CW/BH scores. Results from Hochberg’s GT2 post hoc tests indicated that mean POCSC-CW/BH scores differed between A and E counties ( $p < .05$ ), B and D counties ( $p < .05$ ), B and F counties ( $p < .05$ ), and B and E counties ( $p < .001$ ).

**Exploratory Analysis**

Exploratory analyses were used to investigate statistically significant differences based on responder type or system affiliation. Results from multilevel regression analysis showed that there was a significant effect for service provider type and a significant interaction between service system and provider type (Table 5). Given the significant interaction, multilevel regression models were conducted to examine the association of provider type with POCSC-CW/BH scores separately for child welfare participants and behavioral health participants. In these analyses, service provider type was associated with CSC for child welfare participants, suggesting direct service providers had more positive perceptions of CSC than their leaders who were not involved in direct service provision. Service provider type was also associated with CSC for behavioral health participants with direct service providers having less favorable perceptions of CSC than leaders not involved in direct service provision.

**Discussion**

This study offers evidence that the POCSC-CW/BH provided reliable scores and valid information about CSC between child welfare and behavioral health systems. There was strong evidence for reliability (i.e., internal consistency), factorial validity, and construct (i.e., convergent and divergent) validity, and adequate evidence for content validity of POCSC-CW/BH scores. The strong relationship between CSC and organizational climate provides evidence of construct validity based on previous findings that agencies with a more positive climate are better able to collaborate with their partner agencies (Smith & Mogro-Wilson, 2007).

In terms of system-level results, we expected within county analyses to reveal moderately consistent perceptions of CSC and between county analyses to reveal inconsistent perceptions of CSC. In other words, child welfare and behavioral health staff in

Table 3  
Correlations of Survey of Organizational Funding (SOF) Organizational Climate and Perceptions of Overarching Cross-System Collaboration–Child Welfare and Behavioral Health Systems (POCSC-CW/BH Scores)

Variable	Overall	Individual county results					
		A	B	C	D	E	F
SOF Mission	.45**	.57**	.24*	.65**	.43**	.42**	.42
SOF Cohesion	.38**	.55**	.20	.63**	.20	.47**	.38
SOF Autonomy	.31**	.18	.33**	.61**	.08	.39**	.44
SOF Communication	.50**	.55**	.39**	.56**	.30**	.57**	.63**
SOF Change	.42**	.45**	.28*	.71**	.29**	.44**	.37
SOF Stress	-.35**	-.57**	-.16	-.23	-.36**	-.30**	-.53*

\* Significant at .05. \*\* Significant at .01.

Table 4

*Perceptions of Overarching Cross-System Collaboration–Child Welfare and Behavioral Health Systems (POCSC-CW/BH) Sum Scale by County and by Service System for Each County*

County	Overall		Child welfare		Behavioral health		<i>t</i>	<i>p</i>
	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>		
A	33	18.03 (5.67)	17	17.18 (4.63)	16	18.94 (6.64)	-.89	>.05
B	72	17.43 (4.85)	41	18.34 (4.42)	31	16.23 (5.19)	1.87	>.05
C	22	17.95 (5.11)	8	17.63 (7.17)	14	18.14 (3.80)	-.22	>.05
D	89	19.80 (4.84)	40	19.78 (5.77)	49	19.82 (4.00)	-.04	>.05
E	198	20.72 (4.45)	117	20.47 (4.60)	81	21.09 (4.23)	-.96	>.05
F	20	21.05 (4.86)	10	18.90 (4.61)	10	23.20 (4.29)	-2.16*	<.05
Total	434	19.66 (4.91)	233	19.57 (4.97)	201	19.76 (4.86)	-.39	>.05

the same county were expected to somewhat agree with each other in their perceptions of CSC, but the overall level of CSC from county to county was expected to significantly diverge because of the county-administered nature of the child welfare and behavioral health systems in California. We found agreement in perceptions of CSC between child welfare and behavioral health respondents within five of the six counties, suggesting agreement between most same-county child welfare and behavioral health staff in their perceptions of collaboration. Child welfare staff in County F perceived significantly lower collaboration than that reported by behavioral health staff in the same county (behavioral health staff in County F reported the highest level of collaboration from any of the 12 systems included in this study). We also found significantly different perceptions of CSC scores between four county system pairs, suggesting the tool detected differing degrees of CSC from county to county in some, but not all, county system pairs. Considered at a system-level, this finding provides evidence that the tool measures varying levels of CSC across systems.

There were exploratory findings of differing views of CSC for leadership and direct service staff, but those differing views alternated between behavioral health and child welfare. In behavioral health systems, leaders reported higher levels of CSC than direct service staff. This may indicate that CSC is occurring more strongly at the administrative level in behavioral health systems, with directors and managers collaborating with their child welfare counterparts more regularly than direct-care staff. Given the emphasis placed on protection of behavioral

health treatment information, even in cases when a release of information is obtained, one might expect more collaboration perceived by behavioral health leadership than clinicians or that CSC has not permeated the frontline levels to the same degree. Also, there may only be certain behavioral health clinicians who interact with child welfare staff based on their perceived roles and treatment populations, whereas most or all behavioral health system leaders would be likely to collaborate with child welfare systems.

As an alternative, child welfare direct service staff reported higher levels of CSC than child welfare leaders, which could possibly reflect statewide implementation of the California Core Practice Model, emphasizing a multidisciplinary team-based approach to some child welfare services. However, further analysis of CSC perceptions between leadership and direct-care staff in the same behavioral health and child welfare systems and with child welfare and behavioral health staff in the same counties are needed to replicate and further explore these findings.

### Limitations

We had assumed CSC measurement in child welfare and behavioral health would be distinct from collaboration that occurs between other systems and explored the possibility that perceptions of CSC will be influenced by a respondent's role in a system (e.g., administrators, supervisors, clinicians, front line workers, etc.). However, these topics require further investigation. The psychometric performance of the tool could be evaluated in other child-serving system contexts (e.g., child welfare or behavioral health systems collaborating with juvenile justice or education systems) to better understand CSC measurement across other settings. Also, while differences were seen in our data between leadership and direct service staff, the relationship of those differences varied by service setting. Future analyses examining performance on CSC items by staff group could begin to explore the varying perception of CSC based on setting or role.

Post hoc content validity analyses suggest additional topics strongly connected to CSC might not be represented in current POCSC-CW/BH items. Additional items might improve the breadth of POCSC-CW/BH measurement data and provide a more complete assessment of the construct. Those additional items might target topics such as leadership and management support of collaboration; the integration of CSC into system policies, practices, and protocols; the identification of key individuals with a

Table 5

*Multilevel Regression Analysis of the Association of Service System and Provider Type With Perceptions of Overarching Cross-System Collaboration–Child Welfare and Behavioral Health Systems (POCSC-CW/BH) Scores*

Variable	<i>b</i>	<i>SE</i>	<i>p</i>
Service system affiliation	-.32	.52	.53
Service provider type	-.64	.25	.010
Service system affiliation * Service provider type	2.97	.70	<.001
Child welfare only			
Service provider type (reference: direct service provider)	-.64	.26	.013
Behavioral health only			
Service provider type (reference: direct service provider)	2.27	.61	<.001

CSC-specific role; and other resources made available to support CSC within targeted systems. Additional items might increase variability of scores across systems so scores could be more easily used in applied settings. Establishing norms for the tool would also be useful to expand utility of the POCSC-CW/BH.

We obtained data from a small sample in half of the counties: Counties A, C, and F. These county sample sizes are consistent with the sizes of the systems within the county, based on the survey response rates but the small sample sizes in some counties could impact the accuracy and precision of the obtained estimates of model parameters. Also, the survey was disseminated by a link sent to staff via e-mail. While staff lists were provided by county leadership, we were not able to evaluate the accuracy of these staff lists or ensure the link was not shared with staff not listed on the roster. We used the staff lists to determine the anticipated number of responses to calculate the response rate. If the e-mailed link was forwarded to a staff member not on the staff list, the response rate could be inflated.

Finally, to group respondents based on their system affiliation (either behavioral health or child welfare) and role in the county (either direct or nondirect service provider) we relied on each respondent's self-report to single items for each grouping. While practical for the survey used in this study, single-item measurement is notoriously unreliable and there may be feasible but more reliable methods to determine a respondent's system affiliation and role within their system which would likely enhance the accuracy of these groupings.

### Implications for Advancing CSC and TIC

The development and initial evaluation of the POCSC-CW/BH underscores the prominence of CSC among the essential elements of TIC and offers several promising next steps. TIC is comprised of a collection of practices with a unifying goal of providing a safe, supportive environment while responding to the prevalence and effects of trauma exposure (Hanson & Lang, 2016). Advancing TIC will require expanding knowledge of the quality and quantity for each of the multiple elements of TIC, including CSC.

High levels of CSC have been empirically associated with increased behavioral health services uptake (Stiffman, Pescosolido, & Cabassa, 2004; Pescosolido, 1992), improved evidence-based program implementation (Hurlburt et al., 2014; Palinkas et al., 2014), increased equity for consumers/reducing racial disparities in service provision (Garcia et al., 2013), and improved consumer psychological functioning (Bai et al., 2009). Child welfare and behavioral health system administrators can expect the degree of collaboration under their leadership (i.e., working well together, increased trust, having a clear sense of roles and responsibilities, communicating openly, regularly sharing information, and regularly attending joint meetings) to connect with the organizational climate, and contribute to the quality of support provided to children, youth, and families who have been impacted by trauma.

This study further establishes CSC as a cogent and measurable system-level characteristic. Indeed, better understanding of the quantity and quality of CSC relies on its measurement (Thorndike, 1962). The POCSC-CW/BH adds to the underdeveloped array of empirically supported practical tools for measuring overall perceptions of CSC between behavioral health

and child welfare systems. As exploration of CSC expands in the context of TIC, researchers, policymakers, implementation intermediaries, system leaders, service providers, and service consumers will benefit from increased access to psychometrically sound, practical tools for measuring CSC among child welfare and behavioral health systems.

These future directions of exploration with the POCSC-CW/BH could include identifying systems in which staff perceive particularly high or low levels of collaboration or levels of collaboration that notably change between two time points, followed by qualitative evaluation to understand structures, processes and outcomes contributing to CSC. Researchers and implementation intermediaries might develop system-based interventions for improving collaboration and track the effectiveness of these interventions based on changes in CSC using tools such as the POCSC-CW/BH. System leaders committed to advancing TIC in their systems might benefit from ongoing CSC evaluation to determine baseline levels of perceived collaboration as well as perceived changes by staff and other administrative leaders. Leaders might also emphasize POCSC-CW/BH scores in their organizational goals, meetings, and communications to demonstrate that collaboration between systems is expected, supported, and rewarded (Aarons, Ehrhart, Farahnak, & Sklar, 2014). Ultimately, clearer measurement and understanding of CSC and the role of CSC as an element of TIC in child welfare and behavioral health will help to strengthen children, youth, and families served by these systems.

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