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# Group Comparison and Single-Case Research Design Quality Indicator Matrix Using Council for Exceptional Children 2014 Standards: Standards Overview and Walk- Through Guide

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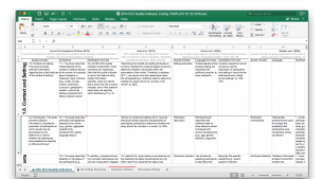
## References:

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## Quality Indicator Standards Overview

The *Council for Exceptional Children Standards for Evidence-Based Practices in Special Education* (hereafter referred to as *Standards for EBP*; CEC, 2014) is a quality appraisal tool to support the categorization of evidence-based practices in special education (Wendt & Miller, 2012).

The intent of identifying quality indicators essential for methodologically sound, trustworthy intervention studies in special education is not to prescribe all the desirable elements of an ideal study, but to enable special education researchers to determine which studies have the minimal methodological features to merit confidence in their findings. (CEC, 2014, p. 2)

Quality appraisal tools, such as the *Standards for EBP* are applied to studies examining an operationally-defined shared practice or program. The *Standards for EBP* includes eight quality indicators (QI): (a) context and setting, (b) participants, (c) intervention agent, (d) description of practice, (e) implementation fidelity, (f) internal validity, (g) outcome measures/dependent variables, and (h) data analysis. Included within the eight QIs are 28 components, with 24 pertaining to group design studies and 22 pertaining to single-case research design (SCRD) studies. Individual studies are coded against these components to quality appraise the methodological soundness of a study using an absolute or weighted coding scheme. With absolute QI coding, each QI receives either a 1 for present or 0 for absent, with present meaning all components within a particular QI were met (e.g., QIs 2.1 and 2.2 were met to indicate QI 2.0 was present) and absent meaning at least one component of the QI was not met. Whereas with weighted QI coding, “partial credit” is given to each QI if a subset of its components is present (e.g., QIs 2.1 was met and 2.2 was not met to indicate QI 2.0 was 50% met; see Lane, Kalberg, & Shepcaro, 2009 for addition information). Each study is deemed methodologically sound if all eight QIs (absolute coding) or 80% of all eight QIs are met (weighted coding). Next, methodologically sound studies are classified as having positive, neutral/mixed, or negative effects following the *Standards for EBP*.

The next step is to evaluate the entire body of evidence using *Standards for EBP* (CEC, 2014). An evidence-based classification is assigned according to the extent to which the body of evidence suggests the strategy, practice, or program meets criteria to be deemed an EBP – a highly rigorous standard when employing absolute coding. Classifications include: EBP, potentially EBP, mixed evidence, insufficient evidence, and negative effects. Refer to the *Standards for EBP* to learn about these distinctions, with attention to the type of methodology employed (group design and SCRDR). Also see Wendt and Miller (2012) for an overview and preliminary comparison of different appraisal instruments.

Lane, Common, Royer, and Muller (2014) developed the “Group comparison and single-case research design quality indicator matrix” (available at [ci3t.org](http://ci3t.org)) to support the coding and categorizing of the literature using the *Standards for EBP*. In addition to language from the *Standards for EBP*, clarifying sources were also

included (i.e., Cook et al., 2015; Gast & Ledford, 2014; Gersten et al., 2015; Kennedy, 2005; Kratochwill et al., 2010; Kratochwill et al., 2013; Lane, Bruhn, Crnobori & Sewell, 2009; Lane, Wolery, Reichow, & Rogers, 2007; Mongaue & Diez, 2009; O’Keefe et al., 2012; Sreckovic, Common, Knowles, & Lane, 2014; Tankersley, Cook, & Cook, 2008; Wong et al., 2014). This matrix allows for the scoring of both absolute and weighted coding criteria as described previously.

We encourage the interested reader to consider potential benefits of using the weighted coding criterion. For example, using weighted criteria coding it may be possible to avoid excluding studies of merit. Relatedly, it may reduce the likelihood of imposing too rigorous criteria that results in offering insufficient recommendations to inform practice (see article by Bryan Cook and colleagues in *Remedial and Special Education*, volume 36 issue 4, 2015). Namely, with too strict criteria, systematic reviews may indicate there are few to no EBPs for “what works” to teach a student to read, enjoy social interactions, increase engagement, and the like.

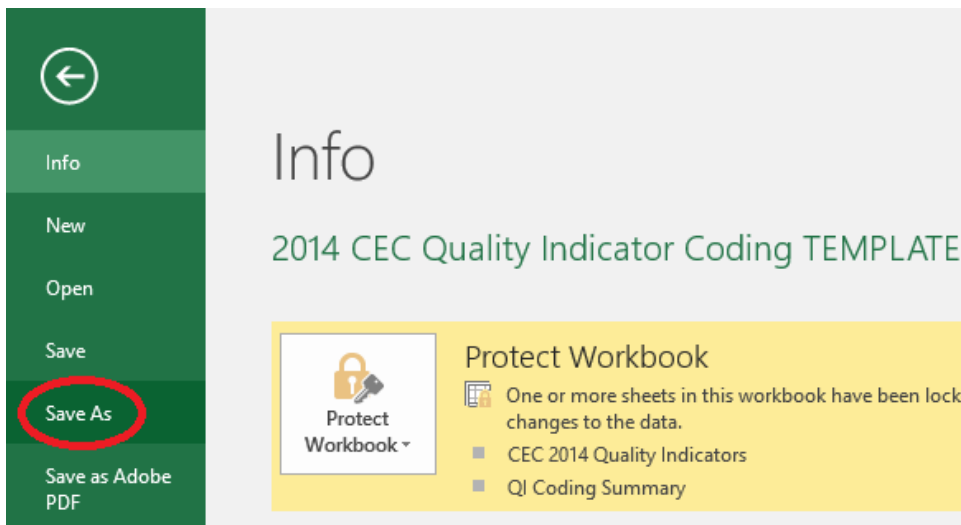
To illustrate, rather than evaluating only studies which met all QIs (absolute coding), Lane and colleagues proposed a modified approach in which studies meeting 80% or more of the QIs would be evaluated further (Lane, Bruhn, et al., 2009; Lane, Kalberg, et al., 2009). A weighted coding method allows each QI component met to contribute an equal proportion of “partial credit” or recognition for being addressed within each QI. A weighted coding method is advantageous in that it offers a more precise, detailed description of how much a QI is addressed in comparison to the more conservative met or not met approach to evaluate a QI in its entirety (Common, Lane, Pustejovsky, Johnson, & Johl, 2017). A weighted coding scheme may also be used as an alternative to absolute coding when evaluating a literature base spanning a period of time predating the introduction of core indicators such as treatment integrity (first introduced by Yeaton & Sechrest, 1981). This more liberal approach enables more studies to be included by offering partial credit in the evaluation process when answering the question: Is X (intervention) an evidence-based practice for Y (outcome variable) with P (participant descriptor) students? (Kettler & Lane, 2017).

In these materials, you will find resources to support QI coding and classifying the literature into an evidence-based category with the “Group comparison and single-case research design quality indicator matrix” (Lane, Common, Royer, & Muller, 2014). Below, you will find an instructional walk-through guide to support use of the MS-Excel template.

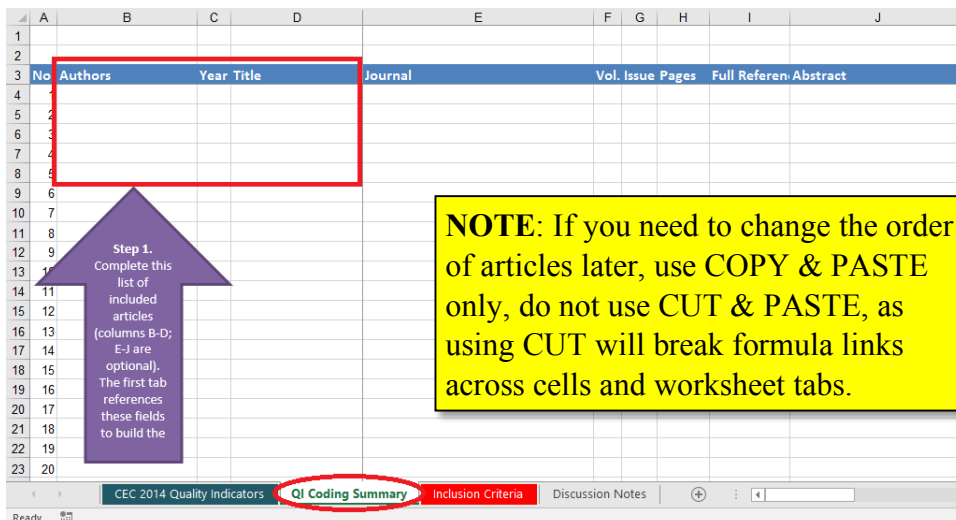
# Group Comparison and Single-Case Research Design Quality Indicator Matrix Using Council for Exceptional Children 2014 Standards: Walk-Through Guide

This walk-through guide illustrates how to use the quality indicator coding matrix created by Lane, Common, Royer, and Muller (2014). The matrix is for use in conjunction with procedures described in *Council for Exceptional Children Standards for Evidence-Based Practices in Special Education* (CEC, 2014) for evaluating the evidence base of an operationally defined practice or program on student outcomes.

## Getting Started



1. Open the MS-Excel file, *2014 CEC Quality Indicator Coding TEMPLATE.xlsx*.
2. Click FILE > SAVE AS and rename your file to include the start year and topic of your systematic literature review, followed by the current date. This will allow you to keep a history of files reflecting changes made by doing a SAVE AS each day you work in the file and moving old files to a PREVIOUS folder for safe keeping.  
Example: 2017 Precorrection QI Coding [date].xlsx



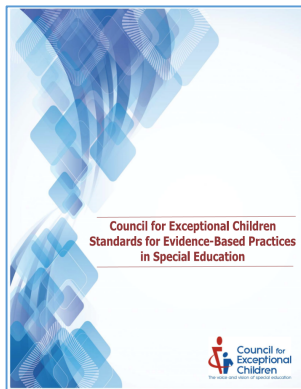
3. Start on the second tab titled *QI Coding Summary*. In columns B through J fill in information for the articles selected in your systematic literature review. Columns B-D are required (referenced in formulas in the first tab) and columns E-J are optional but helpful throughout the QI coding process.

	V	W	X	Y
1				Reference 1
2	R1	Justification from text	R2	Justification from text

Ready **CEC 2014 Quality Indicators** QI Coding Summary **Inclusion Criteria** Disc

- On the first tab titled *CEC 2014 Quality Indicators*, find cell V2 and replace “R1” with the initials of rater one, the primary coder for your review. Other cells in this tab and the second tab will automatically update with this new information.
- In cell X2 replace “R2” with the initials of rater two, the secondary coder for your review. Having two raters provides a reliability check, and later this guide will show how interrater agreement is automatically calculated.

## Become Familiar with the QI Coding Tab

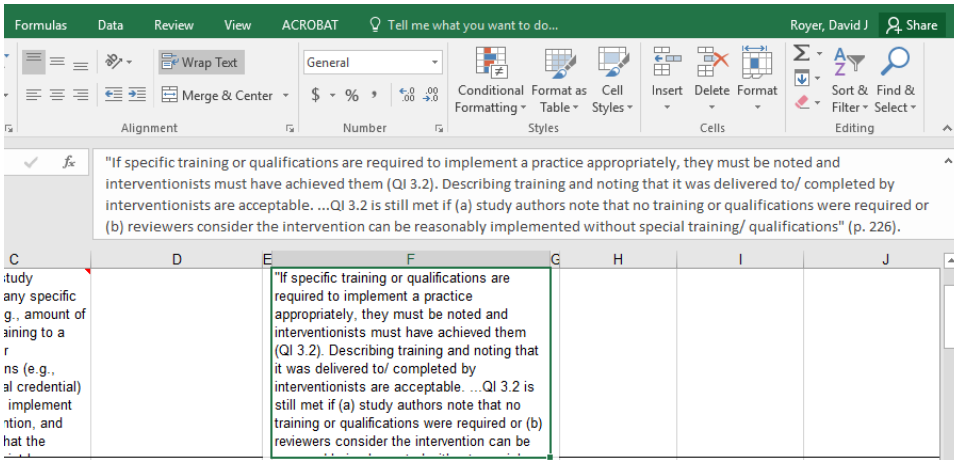
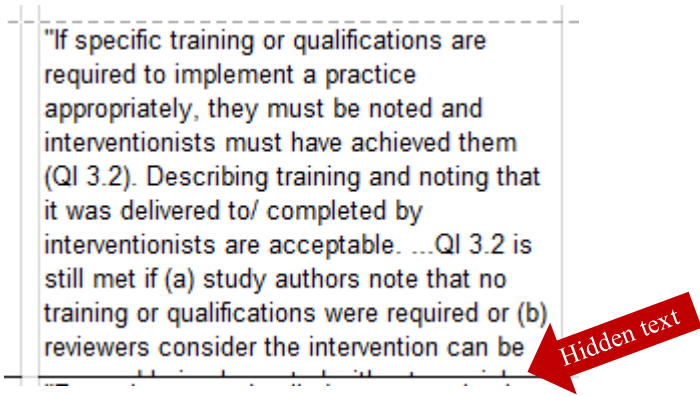


- Remember the *Council for Exceptional Children 2014 Group Comparison and Single-Case Research Design Standards Quality Indicator Matrix* (CEC, 2014) should be considered your primary source for QI coding, as well as clarifications and examples found in Cook et al. (2015). The Excel matrix is simply an aide to support QI coding.

	A	B	C	D	E	F	G	H	I	J	K
1		Council for Exceptional Children (2014) Council for Exceptional Children standards for evidence-based practices in special education. Arlington, VA: Council for Exceptional Children.				Cook et al. (2015) CEC's standards for classifying the evidence base of practices in special education. <i>Remedial and Special Education</i> , 36(2), 165-177.		Horner et al. (2005) The use of single-subject research to identify evidence-based practice in special education. <i>Exceptional Children</i> , 71(2), 165-177.			
2		Quality Indicator	Component	Clarification from text			Quality Indicator	Language from	Clarification from text		
3	1.0. Context and setting	"The study provides sufficient information regarding the critical features of the context or setting."	"1.1. The study describes critical features of the context or setting relevant to the review, for example, type of program or classroom, type of school (e.g., public, private, charter, preschool), curriculum, geographic location, community setting, socioeconomic status, physical layout."	"For all CEC 2014 quality indicator components: when reviewers can reasonably infer that the quality indicator is met on the basis of other, related information reported—they can decide that a study has met a quality indicator, even if the research report does not explicitly report addressing it" (p. 2).	"Describing the context and setting of studies is primarily important for evidence-based reviews to determine whether a study falls within the parameters of the review. Therefore, to address QI 1.1, we require only that researchers report the context/setting in sufficient detail to determine whether the study should be included in the review" (p. 223).		Setting description	Critical features of the physical setting are described with sufficient detail to allow replication	"Another researcher should be able to use the description of participants and setting to recruit similar participants who inhabit similar settings" (p. 166-167).		
4	2.0. Participants	"2.0. Participants: The study provides sufficient information to identify the population of participants to which results may be generalized and to determine or confirm whether the participants demonstrated the disability or difficulty of focus."	"2.1. The study describes participant demographics relevant to the review (e.g., gender, age/grade, race/ethnicity, socioeconomic status, language status)."	"In addition, reviewers should only consider participants who are part of the population targeted by their review. For example, for a review targeting learners categorized as having emotional or behavioral disorders (EBD), in an ASAB study involving three participants with EBD and two with	"Similar to context and setting, QI 2.1 requires that study authors describe characteristics of participants sufficiently to determine whether the study should be included in a review" (p. 223).		Participant description	Participants are described with sufficient detail to allow others to select individuals with similar characteristics (e.g., age, gender, disability, diagnosis).			
			"2.2. The study describes disability or risk status of the participants (e.g., specific learning disability, autism spectrum disorder, behavior problem, at risk for reading failure) and method for determining status (e.g., identified by		"To meet QI 2.2, study authors must describe (a) the disability/risk status of participants and (b) either report how disability/risk status was determined or provide information from which determination of disability/risk status can be inferred. Reporting that participants were identified as having a disability using state or district criteria meets QI 2.2. Reporting that participants have a disability specified by Individuals With Disabilities Education Improvement Act (IDEA) and are served in a		Participant selection	The process for selecting participants is described with replicable precision.	Requires "the specific disability (e.g., autism spectrum disorder, Williams syndrome) and the specific instrument and process used to determine their disability (e.g., the Autism Diagnostic Interview - Revised) be identified. Global definitions such as		

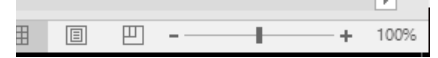
Ready **CEC 2014 Quality Indicators** QI Coding Summary **Inclusion Criteria** Discussion Notes

- Familiarize yourself with the various resources in the first tab. The first four columns present CEC (2014) QIs, followed by a column for Cook et al. (2015) clarifications for each QI, as available and applicable. These are followed by Horner et al. (2005) and Gersten et al. (2005) QIs, with efforts made to align them to the updated 2014 QIs. Additional columns present parallel information from the What Works Clearinghouse (Kratochwill et al., 2010, 2013), Kennedy (2005), Gast & Ledford (2014), and more.



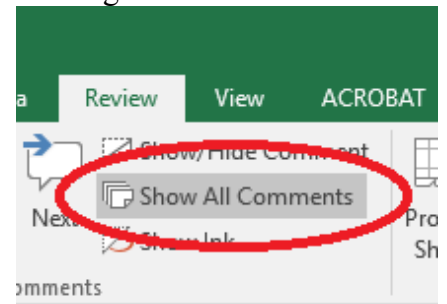
	A	B	C	D
		Council for Exceptional Children (2014)		
		Council for Exceptional Children standards for evidence-based practices in special education. Arlington, VA: Council for Exceptional Children.		
1				
2		Quality Indicator	Component	Clarification from text
	gent	3.0. Intervention agent: "The study provides sufficient information regarding the critical features of the intervention agent."	"3.1. The study describes the role of the intervention agent (e.g., teacher, researcher, paraprofessional, parent, volunteer, peer tutor, sibling, technological	David J Royer: One or more background variables (as relevant to the purpose of the review).

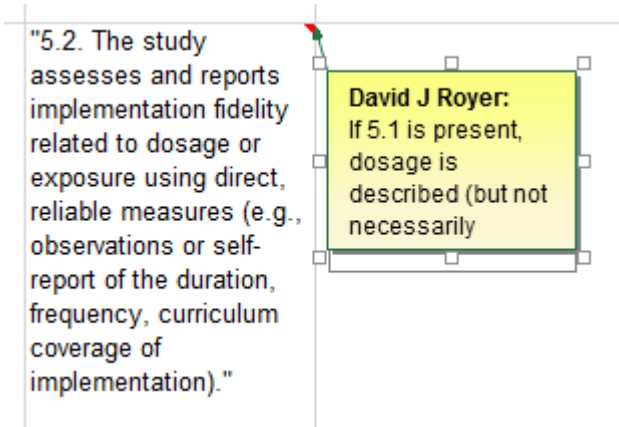
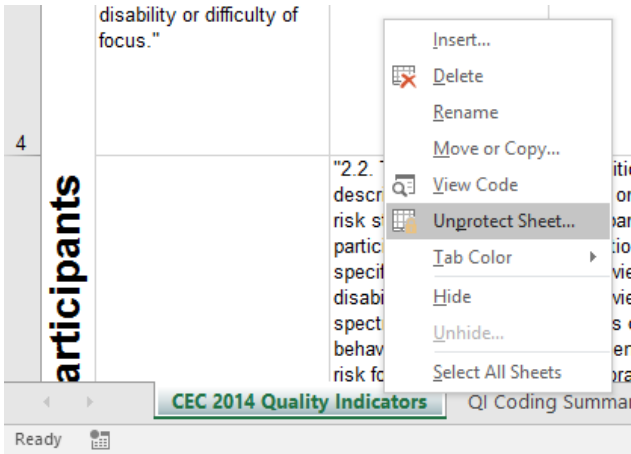
- Depending on your version of Excel, zoom level of the tab, operating system (e.g., Mac OS, Windows, Linux), monitor size, etc. it is possible some text may not be visible. When this is the case, first try setting your zoom level to 100%.



Next try reading the text in the formula bar at the top of the columns. You can make the formula bar larger to read all text by clicking its lower edge and dragging down.

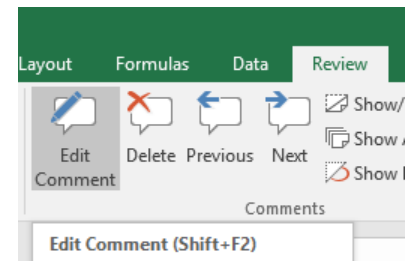
- Some cells have comments, indicated by small red triangles in the upper right corner of the cell. Comments can be read by hovering your mouse over the cell or clicking the REVIEW tab on the top menu bar, then clicking SHOW ALL COMMENTS.





- If the full text of the comment is not visible (caused by different versions of Excel and opening on different operating systems), you may need to unprotect the tab in order to make the comment box larger. To do so, right-click on the tab name and select UNPROTECT SHEET.

Then you can select EDIT COMMENT from the REVIEW tab on the menu bar, which will allow you to resize the comment box.



If you unprotect the tab, please reprotect it to ensure the security of the formulas and prevent accidental changes. Right-click on the tab name and select PROTECT SHEET, then click OK.

## Quality Indicator Coding

	A	B	C	D	U	V	W	X	Y
	Council for Exceptional Children (2014)				Reference 1				
1	Council for Exceptional Children standards for evidence-based practices in special education, Arlington, VA: Council for Exceptional Children								
2	Quality Indicator	Component	Clarification from text	R1	Justification from text	R2	Justification from text		
3	1.0. Context and setting: "The study provides sufficient information regarding the critical features of the context or setting."	"1.1. The study describes critical features of the context or setting relevant to the review, for example, type of program or classroom, type of school (e.g., public, private, charter, preschool), curriculum, geographic location, community setting, socioeconomic status, physical layout."	For all CEC 2014 quality indicator components: "when reviewers can reasonably infer that the quality indicator is met on the basis of other, related information reported—they can decide that a study has met a quality indicator, even if the research report does not explicitly report addressing it" (p. 2).		0				

- Begin entering your coding results for each QI component in column V for your first article. Each reference will automatically populate from where you entered information in the second tab earlier. Use a binary coding system where 0 = QI component not met and 1 = QI component met. The first rater will use the first two columns under each reference (e.g., V and W), adding comments and

	A	B	C	D
1	Council for Exceptional Children (2014) Council for Exceptional Children standards for evidence-based practices in special education. Arlington, VA: Council for Exceptional Children.			
2	Quality Indicator	Component	Clarification from text	
16		"6.4. The study clearly describes assignment to groups, which involves participants (or classrooms, schools, or other unit of analysis) being assigned to groups in one of the following ways: (a) randomly; (b) nonrandomly, but the comparison groups are matched very closely to the intervention group (e.g., matched on prior test scores, demographics, a propensity score; see Song & Herman, 2010); (c) nonrandomly, but techniques are used to measure differences and, if meaningful differences are identified—for example, statistically significant difference, difference greater than 5% of a standard deviation (What Works Clearinghouse, 2011)—to statistically control for any differences between groups on relevant pretest scores or demographic characteristics (e.g., statistically adjust for confounding variable through techniques such as ANCOVA or propensity score analysis); or (d) nonrandomly on the basis of a reasonable cutoff point	=Group (green = group)	
		"6.5. The design provides at least three demonstrations of experimental effects at three different times."	=Single Case (sapphire = single case)	

justification for each coding in the second column labeled JUSTIFICATION FROM TEXT. The second rater will use the next two columns (e.g., X and Y). Ideally the second rater will have his or her own file and will code each article independently, then copy codes and comments into the first rater's file.

12. *Note.* If a QI is not applicable, such as QI 5.3 when QI 5.1 and 5.2 are not met, enter **NA** (without a slash; not N/A). When the FINAL CODING column is NA, later formulas will automatically remove that QI from the weighted coding calculations.

C	D	V	W	X	Y	Z	AA
for Exceptional Children (2014) standards for evidence-based practices in special education. Arlington, VA: Council for Exceptional Children.							
Component	Clarification from text	R1	Justification from text	R2	Justification from text	R1+R2?	Final coding
"5.3. As appropriate, the study assesses and reports implementation fidelity (a) regularly throughout implementation of the intervention (e.g., beginning, middle, end of the intervention period), and (b) for each interventionist, each setting, and each participant or other unit of analysis. If either adherence or dosage is assessed and reported, this item applies to the type of fidelity assessed. If neither adherence nor dosage is assessed and reported, this item is not applicable."		NA		NA		TRUE	NA

Component	Clarification from text	DJR	Justification from text	KLL	Justification from text
"8.2. The study provides a single-subject graph clearly representing outcome data across all study phases for each unit of analysis (e.g., individual, classroom, other group of individuals) to enable determination of the effects of the practice. Regardless of whether the study reports intervals		1	greater % of task completion and intervals with task engagement during choice phases and lower % of disruptive behavior intervals	1	Studies 1 and 2: graphs of all DVs provided
"8.3. The study reports one or more appropriate effect size statistic (e.g., Cohen's d, Hedge's G, Glass's Δ, η <sup>2</sup> ) for all outcomes relevant to the review being conducted, even if the outcome is not statistically significant, or provides data from which appropriate effect sizes can be calculated."		NA		NA	

Some QIs are applicable only to **group** design studies (**green** shaded cells in column C) and some only to **single-case** design studies (**sapphire blue** shaded cells in column C). When coding group design studies, enter NA for single-case cells. When coding single-case studies, enter NA for group design study cells.



V	W	X	Y	Z	AA
Reference 1					
R1	Justification from text	R2	Justification from text	R1=R2?	Final coding
0		1		FALSE	Enter resolution

- After both raters' data are entered, the R1=R2? column will automatically populate with TRUE or FALSE to show agreement or disagreement between raters. If TRUE, the FINAL CODING column will automatically populate with the agreed coding. If FALSE, the FINAL CODING column will turn yellow to prompt raters to discuss the discrepancy and enter the resolved coding. Do not adjust either rater's original coding or the FALSE – these will be used later in formulas to calculate interrater agreement. The FINAL CODING column will be used in future steps.
- Continue scoring and discussing discrepancies until all articles have a FINAL CODING in each row. Double check to ensure there are no blank cells in a FINAL CODING column.

# Reporting Interrater Agreement

Interrater Agreement																												0 or 2 = agreement		1 = disagreement	
1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0																					% IRR by article			
1.1	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.1	7.2	7.3	7.4	7.5	7.6	8.1	8.2	8.3				
1	2	2	0	0	2	2	0	2	0	2	2	2	NA	NA	NA	2	2	2	2	2	2	2	1	2	2	NA	1	83.33%			
2	2	2	2	2	2	2	0	2	0	0	2	2	1	NA	NA	NA	0	0	2	2	2	1	2	0	2	2	NA	1	87.50%		
2	2	0	0	1	2	2	0	2	0	0	2	1	NA	0	2	0	NA	NA	2	2	2	2	1	NA	NA	2	NA	2	86.36%		
2	2	0	0	1	2	2	0	2	0	0	2	1	NA	2	2	0	NA	NA	2	2	2	2	1	NA	NA	2	NA	2	86.36%		
2	2	2	2	2	2	2	0	2	0	0	2	0	NA	2	2	0	NA	NA	2	2	2	2	2	0	NA	NA	2	NA	100.00%		
2	2	2	1	0	2	2	0	2	0	0	2	1	NA	2	2	0	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	90.91%		
2	2	2	1	0	2	2	0	1	1	0	2	2	NA	2	2	0	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	86.36%		
2	2	2	1	0	2	2	0	2	0	0	2	0	NA	2	2	0	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	95.45%		
2	2	1	2	0	2	2	0	2	0	0	2	1	NA	1	1	0	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	81.82%		
2	2	1	2	1	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	90.91%	
2	2	2	2	2	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	95.45%	
2	2	0	1	0	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	1	NA	NA	2	NA	90.91%	
2	2	2	0	0	2	2	0	0	0	0	2	2	NA	2	2	0	NA	NA	2	2	2	2	2	0	2	NA	NA	2	NA	100.00%	
2	2	2	2	2	2	2	2	2	2	2	2	2	2	NA	1	2	1	NA	NA	2	2	2	2	1	2	NA	NA	2	NA	86.36%	
2	2	2	0	0	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	100.00%	
2	2	2	0	0	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	100.00%	
2	2	2	0	0	2	2	2	2	2	2	2	2	2	NA	1	1	2	NA	NA	2	2	2	2	0	2	NA	NA	2	NA	90.91%	
2	2	0	1	1	2	2	0	2	0	0	0	2	0	NA	2	2	0	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	90.91%	
2	2	0	0	0	2	2	0	0	0	0	2	1	NA	2	2	0	NA	NA	2	2	2	2	2	2	2	NA	NA	2	NA	95.45%	
2	2	2	2	2	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	1	2	2	NA	2	NA	91.67%	
2	2	2	2	2	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	100.00%	
2	2	0	0	0	2	2	2	2	1	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	95.45%	
2	2	0	0	0	2	2	2	2	1	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	0	2	NA	NA	2	NA	95.45%	
2	2	1	0	0	2	2	0	0	0	0	2	0	NA	2	2	0	NA	NA	2	2	0	2	2	0	NA	NA	2	NA	95.45%		
2	2	2	2	2	2	2	2	2	2	2	2	2	2	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	100.00%	
2	2	2	1	1	0	1	2	2	2	2	2	2	1	NA	2	2	2	NA	NA	2	2	2	2	2	2	NA	NA	2	NA	81.82%	
96.15%	100.00%	94.62%	76.92%	94.62%	96.15%	100.00%	100.00%	96.15%	88.46%	92.31%	100.00%	73.08%	66.67%	86.96%	91.30%	95.65%	100.00%	100.00%	100.00%	100.00%	96.15%	96.15%	80.77%	100.00%	100.00%	100.00%	33.33%	90.55%			
																												Mean IRR by component			
																												<b>92.26%</b>			
																												Mean IRR by article			

Note. Column CS and row 56 (percentages of interrater reliability) automatically color code highest percentages as green to lowest scores as red. This is only to draw attention to your successes (high percentages of agreement) and to indicate any low scores that might need discussion or explanation in your manuscript. There are no cut scores where colors change, it is a conditional formatting feature in Excel that uses whatever range of scores are available.

Interrater Agreement																												0 or 2 = agreement		1 = disagreement	
1.0	2.0	3.0	4.0	5.0	6.0																					% IRR by article					
1.1	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9													
2	2	2	2	1	2	2	2	6	0	NA	2	1	0	NA	2	2	2	NA	NA												



15. On the QI CODING SUMMARY tab, scroll to the right past each rater's codings to column BQ. (Formulas in columns K-BO automatically pull each rater's coding from the first tab for use in calculations and formulas on the QI CODING SUMMARY tab.) Columns K-BO sum codings from the two raters, so 0 (0+0) and 2 (1+1) indicate agreement, while 1 (0+1 or 1+0) indicates disagreement and will be highlighted light red with red text.

Column CS reports percentage of interrater reliability (IRR; also referred to as interrater agreement; IRA) by article (each row). Row 56 reports percentage of interrater reliability by QI (each column). Scroll down past empty rows to get to row 56, there are many rows to accommodate large reviews. Cells coded NA are not included in calculations.

Cell CS56 reports mean IRR by component, and cell CS60 reports mean IRR by article. These two cells are shaded blue with bold white text.

16. Note. A cell will turn red in the interrater agreement table if a QI code is out of range (i.e., not 0, 1, or NA). For each red cell, note the article and QI, then go back to the first tab (CEC 2014 Quality Indicators) and troubleshoot the FINAL CODING column and determine if it should be 0, 1, or NA.



score of 0.5 for meeting QI 2.1, half of QI 2.0.

19. Columns EA through EK will help evaluate the evidence base for the operationally defined practice or program being reviewed. For studies not meeting at least 80% of QIs, columns EA through EK will automatically fill in with NA, as studies must be methodologically sound (by one method or the other) before they can be part of the evaluation of an evidence-based practice (EBP).

For studies meeting at least 80% of QIs, columns EA through EK will remain blank, ready for more information. Start with column EA (labeled *N* at the top) and enter the number of participants applicable to the review.

EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	
Evidence-Based Practice Categorization 0 = no, 1 = yes													
Participants and Effects*							Group Studies			Single-Case		N Counts	
N	Positive	Neutral/Mixed	Negative	Randomized	Non-Randomized	Design	Randomized	Non-Randomized	Design				
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
133	0	1	0	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
3	1	0	0	0	0	1	NA	NA	3				
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
3	1	0	0	0	0	1	NA	NA	3				
3	1	0	0	0	0	1	NA	NA	3				
3	1	0	0	0	0	1	NA	NA	3				
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
207	0	1	0	NA	NA	NA	NA	NA	NA	NA			
21	0	1	0	NA	NA	NA	NA	NA	NA	NA			
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
*group effect size (WVC: $d \geq 0.25 = \text{pos}$ , $-0.25 = \text{neg}$ , neutral/mix $-0.25 < d < 0.25$ ) or single-case (3+ cases: 75% therapeutic = pos, 75% countertherapeutic = neg, <75% = mix)				0	0	5	0	0	15				
				Sum	Sum	Sum	Sum	Sum	Sum				
				Evidence-Based Practice		NO	YES	Potentially Evidence-Based Practice					
				2 group randomized with 60+ participants?		FALSE	FALSE	One group randomized study?					
				4 group non-randomized with 120+ participants?		FALSE	FALSE	Two or three group non-randomized studies?					
				5 single-case with 20+ participants?		FALSE	TRUE	Two to four single-case studies?					
				1 group randomized with 30+ and 3 single-case with 10+ participants?		FALSE	FALSE	One group non-randomized and one single-case study?					
				2 group non-randomized with 60+ and 3 single-case with 10+ participants?		FALSE							
No studies can have negative effects and the ratio of positive to neutral/mixed effects must be 3:1 or greater.													

DX	DY	EA	EB	EC	ED	EE	EF	EG
Evidence-Based Practice Categorization 0 = no, 1 = yes								
No. of QIs Met by Coding Method		Participants and Effects*			Group Studies		Single-Case	
Absolute	80% Weighted	N	Positive	Neutral/Mixed	Negative	Randomized	Non-Randomized	Design
7.0	7.50	2	NA	NA	NA	NA	NA	NA
8.0	8.00	2	NA	NA	NA	NA	NA	NA
5.0	6.80	NA	NA	NA	NA	NA	NA	NA
3.0	4.97	NA	NA	NA	NA	NA	NA	NA

If a study had less than three participants, columns EB through EK will automatically fill in with NA as at least three participants are necessary for further evaluation of the evidence base.

DX	DY	EA	EB	EC	ED	EE	EF	EG
Evidence-Based Practice Categorization 0 = no, 1 = yes								
No. of QIs Met by Coding Method		Participants and Effects*			Group Studies		Single-Case	
Absolute	80% Weighted	N	Positive	Neutral/Mixed	Negative	Randomized	Non-Randomized	Design
7.0	7.50	3	1	0	0	0	0	1
8.0	8.00	2	NA	NA	NA	NA	NA	NA
5.0	6.80	2	NA	NA	NA	NA	NA	NA
3.0	4.97	NA	NA	NA	NA	NA	NA	NA

20. Next, for studies with three or more participants, enter either 0 (*no*) or 1 (*yes*) for columns EB-ED to indicate if the study met CEC (2014) standards for having *positive*, *neutral/mixed*, or *negative* effects. For example, if a study had *positive* effects enter a 1 in column EB, and a 0 in columns EC and ED.

DX	DY	EA	EB	EC	ED	EE	EF	EG
Evidence-Based Practice Categorization 0 = no, 1 = yes								
No. of QIs Met by Coding Method		Participants and Effects*			Group Studies			Single-Case Design
Absolute	80% Weighted	N	Positive	Neutral/Mixed	Negative	Randomized	Non-Randomized	
4.0	5.00	NA	NA	NA	NA	NA	NA	NA
4.0	6.50	207	0	1	0	NA	NA	NA
8.0	8.00	21	0	1	0	NA	NA	NA
6.0	6.50	2	NA	NA	NA	NA	NA	NA

EA	EB	EC	ED	EE	EF	EG	EI	EJ	EK
Evidence-Based Practice Categorization 0 = no, 1 = yes									
Participants and Effects*				Group Studies		Single-Case Design	Group Studies		Single-Case Design
N	Positive	Neutral/Mixed	Negative	Randomized	Non-Randomized		Randomized	Non-Randomized	
3	1	0	0	0	0	1	NA	NA	3
3	1	0	0	0	0	1	NA	NA	3
3	1	0	0	0	0	1	NA	NA	3
3	1	0	0	0	0	1	NA	NA	3
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
207	0	1	0	NA	NA	NA	NA	NA	NA
21	0	1	0	NA	NA	NA	NA	NA	NA

	Evidence-Based Practice	NO	YES	Potentially Evidence-Based Practice
2 group randomized with 60+ participants?	FALSE	FALSE	FALSE	One group randomized study?
4 group non-randomized with 120+ participants?	FALSE	FALSE	FALSE	Two or three group non-randomized studies?
5 single-case with 20+ participants?	FALSE	TRUE	TRUE	Two to four single-case studies?
1 group randomized with 30+ and 3 single-case with 10+ participants?	FALSE	FALSE	FALSE	One group non-randomized and one single-case study?
2 group non-randomized with 60+ and 3 single-case with 10+ participants?	FALSE	FALSE	FALSE	
No studies can have negative effects and the ratio of positive to neutral/mixed effects must be 3:1 or greater.				

If a study had either *neutral/mixed*, or *negative* results based on CEC (2014) standards, columns EE through EK will automatically fill in with NA, as *positive* results are needed for further evaluation of the evidence base.

- Next, for studies with *positive* effects, enter a 0 (*no*) or 1 (*yes*) for columns EE through EG to indicate if the study was a randomized group design, non-randomized group design, or single-case design. Columns EI through EK are formulas and will automatically complete.

- When columns EA through EK are completed for all studies, examine rows 58-64 below for the determination of evidence-based practice category. If any criterion for either the *evidence-based practice* or *potentially evidence-based practice* category is met, the corresponding cells will become green.

*Note.* Be cautious interpreting these results. Use of the Excel file is only a guide and can only calculate so many scenarios. Other data need to be considered with human judgement. For example, a practice may seem to be evidence based (cells turn green) because of multiple studies with *positive* effects and sufficient participants, but if any study had *negative* effects or the ratio of *positive* to *neutral/mixed* studies is less than 3:1 then the practice can not yet be considered evidence based.

Also consider essential QIs.

DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DX	DY	EA		
not present													1 = QI met					
6.0					7.0					8.0			No. of QIs Met by Coding Method					
6.5	6.6	6.7	6.8	6.9	7.1	7.2	7.3	7.4	7.5	7.6	8.1	8.2	8.3	Absolute	80% Weighted	N		
0	1	1	NA	NA	1	1	1	1	1	NA	NA	1	NA	8.0	8.00	21		
1	1	0	NA	NA	1	1	1	1	1	NA	NA	1	NA	7.0	7.67	NA		
1	1	1	NA	NA	1	1	1	1	0	NA	NA	1	NA	5.0	6.30	NA		
1	1	0	NA	NA	1	0	1	1	0	NA	NA	1	NA	3.0	5.00	NA		
1	1	1	NA	NA	1	1	1	1	1	NA	NA	1	NA	8.0	8.00	NA		
1	1	1	NA	NA	1	1	1	1	1	NA	NA	1	NA	5.0	6.33	NA		

A study may meet 80% of QIs by the weighted coding method, but if a functional relation is not established between the independent variable and dependent variables (e.g., QI 6.5 = 0 for single-case designs), then that study should not be considered when evaluating the evidence base (i.e., enter NA in column EA for the N count of participants, causing the remaining columns to fill in with NA).

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