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Measuring Professionals' Perceptions about Collaborative Consultation in Early Childhood Intervention

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Professionals' perceptions about collaborative consultation in early childhood intervention.

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In Memoriam, Dr. Tânia Boavida (1975-2020)

Dr Tânia Boavida was a researcher at CIS-IUL, Instituto Universitário de Lisboa (ISCTE-IUL). With a background in physiotherapy and educational psychology, she supported professionals in delivering high-quality, evidence-based, and family-centered practices in early childhood intervention. Tânia Boavida died in February 2020, prior to the publication of this work. Her untimely death is a great loss to the field of early childhood intervention. She was a wonderful friend and colleague and will be greatly missed.

Abstract

We investigated the reliability and construct validity of the Professionals' Perceptions about Collaborative Consultation in Early Childhood Intervention Scale (ProPerCECIS), a rating scale developed to measure collaborative consultation in early childhood intervention (ECI). ProPerCECIS was completed by 427 professionals from 78 ECI teams. The full sample was randomized into sample A, 170 participants, for conducting an exploratory factor analysis (EFA) - and sample B, 257 participants, for performing confirmatory factor analysis (CFA). Multiple-group analysis, with the overall sample, was conducted. The EFA final solution comprised three correlated factors, with acceptable to very good internal consistency: Intervention, Context, and Planning. The CFA supported the three-factor structure. Results supported configural invariance and partial metric invariance, but partial scalar invariance did not hold. Results supported the conceptual framework of collaborative consultation in ECI and suggest that ProPerCECIS can be a useful measure of professionals' perceptions about collaborative consultation practices in ECI. ProPerCECIS seems to be particularly suited to assess collaborative practices within services providing routines-based family-centered interventions. Importantly, because the factor structure for ProPerCECIS holds up for different professional groups, it might be used by transdisciplinary ECI teams.

Keywords: collaborative consultation, early childhood intervention, rating scale, reliability, construct validity

Measuring Professionals' Perceptions about Collaborative Consultation in Early

Childhood Intervention

Recommended practices in early childhood intervention (ECI) target embedded

interventions that are family centered, routines based, and focused on functionality (e.g.,

Division for Early Childhood, 2014; Sandall, McLean, & Smith, 2000). These practices

require considerable efforts from ECI professionals, whose role has progressed from

providing direct (i.e., one-on-one) therapy and instruction to indirect services in the form of

collaborative partnerships with parents and teachers (Buysse & Wesley, 2005). Understanding

how ECI collaborative consultation practices are currently perceived by professionals is

essential to understanding and meeting professionals' needs. Therefore, we developed and

investigated the construct validity of the Professionals' Perceptions about Collaborative

Consultation in Early Childhood Intervention Scale (ProPerCECIS).

Collaborative Consultation in ECI

ECI was defined by Dunst (2007) as

the experiences and opportunities afforded infants and toddlers with disabilities by

children's parents and other primary caregivers that are intended to promote

children's acquisition and use of behavioral competencies to shape and influence

their prosocial interactions with people and objects (p. 162).

This definition embodies the triadic nature of the collaborative consultation approach to

intervention, which consists of ECI professionals (consultants), family members, and

classroom teachers (consultees) working together as equal partners through joint planning,

observation, action/practice, reflection, and feedback, to meet common goals regarding the

child's (client's) development and functioning (McWilliam, 2010). Collaborative-consultation

practices are consistent with research findings on the benefits of distributed instruction

(Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006) and reflect the acknowledgement that adults

who spend time with children daily and across routines (at home or in early childhood

education and care [ECEC] settings) are more likely to influence their learning and

development (Dinnebeil & McInerney, 2011; Kashinath, Woods, & Goldstein, 2006).

Through collaborative consultation practices, ECI professionals are more likely to promote

the skills and self-efficacy that primary caregivers (i.e., family members and ECEC teachers)

need to support the development of young children with disabilities in natural environments

(Woods, Wilcox, Friedman, & Murch, 2011). Importantly, by adopting collaborative-

consultation practices, ECI professionals can actively partner with families in all stages of

decision-making in ECI, and, therefore, deliver family-centered interventions.

Several observation measures assess family-centered interventions in natural

environments, focusing mainly on the frequency of collaborative-consultation behaviors

during home visits (Campbell & Sawyer, 2007; Peterson et al., 2007). Measures of parent-

professional interactions during intervention sessions are also available (Basu, Salisbury, &

Thorkildsen, 2010). Collaborative consultation, however, goes beyond the observed behaviors

between ECI professionals and other professionals or parents in a single session and depends

on caregivers' roles in the entire process, including the initial phases of assessment and

selection of goals and objectives. Further, self-report measures of family-centered practices

(e.g., Almeida, 2011; King, King, & Rosenbaum, 2004; Pereira & Serrano, 2014; Pimentel,

2005; Rantala, Uotinen, & McWilliam, 2009; Woodside, Rosenbaum, King, & King, 2001) or

of center-based practices (e.g., Anonymous, 1991a-d) measure the typical practices of ECI

services but they focus on variables independent of, or not directly connected to collaborative

consultation.

Although available measures do not capture the triadic nature of collaborative

consultation entirely, they evaluate the quality of ECI practices related to collaborative

consultation, and reveal (a) the prevalence of one-on-one intervention with the child by ECI

professionals (e.g., Campbell & Sawyer, 2007; McWilliam & Bailey, 1994; Peterson et al., 2007); (b) the lack of family participation in decision making regarding assessment, planning, and implementation (e.g., Almeida, 2011; McWilliam et al., 2000; Pimentel, 2005); and (c) the infrequent use of routines-based interventions in natural settings (McWilliam & Bailey, 1994). Some studies also point to differing perceptions of ECI professionals by discipline. Bailey, Palsha, and Simeonsson (1991) analyzed the extent to which early interventionists felt competent in working with families and valued family roles and found that, in both cases, nurses and social workers scored higher than educators and therapists. Pereira (2009) found that educators reported using more family-centered practices than other professionals (i.e., psychologists, social workers, therapists, nurses, etc.). In turn, McWilliam and Bailey (1994) found that special educators, followed by occupational therapists, speech-language pathologists, and physical therapists were most likely to use and favor the integration of special services into regular classrooms.

Buysse and Wesley (2005) proposed a collaborative-consultation model for ECEC and ECI involving various stages "such as establishing a consulting relationship, jointly assessing needs, collaboratively identifying priorities and strategies for change, implementing those strategies, and evaluating outcomes" (p. 16). Previous research on professional development programs, including a consultation component based on this model has yielded positive results (Buysse, Castro, & Peisner-Feinberg, 2010; Helmerhorst, Fukkink, Riksen-Walraven, Gevers Deynoot-Schaub, & Tavecchio, 2017). In turn, McWilliam (2010) developed the routines-based ECI (RBEI) model, composed of five components that operationalize recommended practices and various stages of collaborative consultation. This model has also shown promising results in improving functional outcomes for children, when compared to traditional home-visiting programs (Hwang, Chao, & Liu, 2013). As shown in Figure 1, these two models were the basis for the measure of collaborative consultation studied here.

The first two components of the RBEI model consisted of Understanding the Family Ecology and Functional- and Family-Centered Assessment. These components were aligned with the first four stages of collaborative consultation that include Gaining Entry, Building the Relationship, Gathering Information Through Assessment, and Setting Goals. We present these components and phases together because they correspond to the planning phase of collaborative consultation. The role of the family and caregivers in assessment and goal setting depends on how effective professionals are in including them in the process. Collaborative consultation in this phase consists of clarification of expectations, construction of a relationship through collaboration, open communication, and an atmosphere of trust and acceptance that allows parents to define their areas of concern (child and family needs) and the consequent definition of concrete and meaningful goals.

The remaining components of the RBEI model were Transdisciplinary Services, Supports-Based Home Visits/Collaborative Consultation and Collaborative Consultation in ECEC settings, and were aligned with the remaining four stages of collaborative consultation that consist of Selecting Strategies, Implementing the Plan, Evaluating the Plan, and Holding a Summary Conference. These different components and phases are presented together because they correspond to the implementation of collaborative consultation. Most of the collaborative work is done during the Selecting Strategies stage, both during home visits and visits to ECEC settings. In these visits, ECI professionals, parents, or ECEC professionals work together to decide on strategies that parents or ECEC professionals will implement between visits (Implementing the Plan). They also work together to evaluate the implemented strategies (Evaluating the Plan). ECI is a circular process, based on periodic (quarterly or semiannually) meetings between all participants in the process, to decide on the efficacy of the intervention and next steps (Holding a Summary Conference).

ECI in Portugal

The Portuguese National ECI System (Sistema Nacional de Intervenção Precoce na Infância [SNIPI]) was established in 2009, based on the coordinated action of the Ministries of Labor and Social Solidarity, Health, and Education and the involvement of families and the community. SNIPI involves the three ministries at three levels: one national coordination committee, five regional coordination subcommittees, and 144 local intervention teams (LITs) that provide "integrated support centered in the child and in the family" (Decree-Law No. 281/2009, Art. 3) to children from birth to 6 years with "changes in body functions or structures that limit participation in activities typical for their age and social context or with a serious risk of developmental delay, as well as their families" (Art. 2).

ECI in Portugal relies on geographically-based local teams of professionals placed in the system by the different ministries (and, therefore, with different career prospects, perks, and schedules), operating since 2011 (meaning their processes are likely stabilized), and with a mandate to deliver ECI "in all the natural life contexts of children and families," mostly at home and at ECEC settings (Carvalho et al., 2016, p. 81). The evaluation of current collaborative consultation practices by ECI teams has the potential to contribute not only to the knowledge of the current state of collaborative consultation practices in Portugal, but also to the improvement of these practices.

This Study

To evaluate the process of collaborative consultation in ECI, we designed ProPerCECIS, a rating scale to capture the different components of the process within the model presented in Figure 1. The aim of this work was to study the reliability and construct validity of ProPerCECIS. This study focuses on Portugal, a southern European country, thus adding to strengthen international evidence within a field built mostly on USA children and

families. Importantly, because the models that informed the development of ProPerCECIS were developed in the USA, this work should be tested for a broader international audience.

Method

Participants and Procedure

As part of a larger study, participants were recruited through an invitation to all 144 LITs established by Decree-Law No. 281/2009. After approval from the Coordination Committee of SNIPI and from the Ethics Committee of [omitted university], an email was sent to each of the five subcommittees of SNIPI and, subsequently, each of the LITs. The invitation was addressed to all team members. Seventy-eight LITs (54%) responded positively and met with the first author during a team meeting between April and July 2016. During these meetings, 600 professionals responded to the survey. Of these, 427 reported providing ECI services at home and at the children's ECEC settings and completed ProPerCECIS. These 427 respondents were the participants in this study (see Table 1 for demographics).

All five sub-regions of SNIPI were represented in the sample. Eighty participants (18.7%) worked in the North Region, 99 (23.2%) worked in the Central Region, 170 (39.8%) worked in the Region of Lisbon and Tagus Valley, 70 (16.4%) worked in the Alentejo Region, and 8 (1.9%) in the Algarve Region.

Participants filled in a survey that took 1.5 hours (the section analyzed in this study took 15-30 minutes). The questionnaire was anonymous, and the researcher was available to answer questions.

Measure

ProPerCECIS was developed to assess ECI professionals' perceptions about collaborative consultation. It was based on two different scales: [details omitted for double-blind reviewing]. After selecting and adapting the different items of these scales to the collaborative-consultation framework, three specialists in ECI (including one author of the

original scales) reviewed it, and their suggestions informed the formulation of the items. Finally, a team of ECI professionals piloted the survey, and the first author recorded the time spent completing it. She also documented suggestions regarding clarity and used them to develop the final version.

ProPerCECIS consists of 17 items (see Figure 1 and Table 2). The first seven items refer to practices independent of the setting, the following six items refer to practices relevant within ECEC settings, and the last four items refer to practices relevant within home visits. Each item is scored on a nine-point scale with descriptors at odd-number points. Table 2 displays a summary of the descriptors at the lowest and highest scale points for each item. The lowest point describes a professional-centered practice and the highest point describes a collaborative consultation practice, emphasizing, whenever possible, the triadic nature of professional, parent, and child relationships. Each item is scored twice: first, rating "typical practice" (i.e., what the professional usually does), and second, rating "ideal practices" (i.e., what the professional considers to be the best practice). In this study, we used data for typical practices only.

Data Analysis

First, descriptive analysis of all 17 items were conducted to identify missing cases. No item had more than 0.7% of missing cases and thus these were imputed with the item mean (Kline, 2011). Then, construct validity was tested with a holdout method. The full sample was randomized into two sub-samples: (1) Sample A, used in an exploratory factor analysis (EFA), was composed of 170 cases, randomly selected from the whole sample, so that the 10:1 subject-to-item ratio could be met (Everitt, 1975); (2) Sample B, used in a subsequent confirmatory factor analysis (CFA), was composed of the remaining 257 participants. The EFA was conducted using principal axis factoring. The decision regarding the number of factors to retain was based on parallel analysis with a 95% confidence interval (Horn, 1965;

O'Connor, 2000) and theoretical interpretability. Then, a CFA was performed with AMOS

23.0 (Arbuckle, 2014) using maximum likelihood estimation. This procedure is robust to non-

extreme deviations from normality of the variables (i.e., absolute values of skewness and

kurtosis higher than 2-3 and 7-10, respectively). Reliability was checked by calculating

Cronbach's alpha for the EFA solution and by calculating the composite reliability for the

CFA solution (Peterson & Kim, 2013; Raykov, 2004).

To test the measurement invariance of the ProPerCECIS, configural, metric, and scalar

invariance tests were performed (Hong, Malik, & Lee, 2003; Van de Schoot, Lugtig, & Hox,

2012). The first step to establish measurement invariance is to determine configural

invariance, which is attained if the basic model structure is invariant across groups--that is, if

the factor structure presents a good model fit for each group independently. Once configural

invariance is established, the next step is to assess metric invariance, which indicates if

different groups respond to the items in the same way--that is, if the participants across groups

gave the same meaning to the latent factor under study. Therefore, if metric invariance is

satisfied, ratings can be compared across groups and observed item differences will indicate

group differences on the underlying latent construct. Finally, scalar invariance is required to

compare latent means, that is, to compare groups on their scores on the latent variable. It can

be tested by constraining both loadings and intercepts of items to be equal across groups.

Scalar invariance indicates that individuals who have the same value on the construct would

obtain the same value on the observed variable regardless of their group membership (Hong et

al., 2003; Van de Schoot et al., 2012; Steenkamp & Baumgartner, 1998).

Results

Descriptive Analyses

Descriptive analyses of the 17 items were performed to obtain information about their

distributions. As shown in Table 3, for some items (e.g., *6. Team work*; *7. Location of*

support), the ratio of skewness to standard error of skewness was not very close to the |2|

range, and the absolute values of *skewness* for all the 17 items were lower than 3, which can

be considered non-problematic in terms of distribution (Kline, 2011). Therefore, all 17 items

were included in the subsequent EFA.

Exploratory Factor Analysis (EFA)

To identify the factor structure of the 17 items, an EFA was conducted with Sample A

(N = 170), using the principal-axis factoring-extraction method. The factor model adequacy

was checked by the statistical-significant value of Bartlett's Test of Sphericity (x^2(136) =

1110.058, p < .001) and the medium Kaiser-Meyer-Olkin (KMO = .84). An oblique rotation

was applied to the solution because some correlation among factors was expected (Costello &

Osborne, 2005). Parallel analysis suggested the extraction of three factors. Following

recommendations from Tabachnick and Fidell (2013), Items 7 (location of support), 6 (team

work), and 4 (child-level goals and objectives) were removed from subsequent analysis

because of very low communalities (i.e., < .20). The EFA on the remaining 14 items showed

that all items had communalities over .20 (mostly > .40), had significant factor loadings of

over .30 (mostly > .40), and were aligned with specific factors. Only one item presented

cross-loadings (i.e., loadings >.30 in factors one and three), but was retained for substantive

reasons, because it was considered an important indicator of intervention. All 14 items had

good conceptual interpretability within the factor in which they presented the highest loading.

Therefore, the final solution was comprised of 14 items organized in three factors

explaining 48.3% of variance. Table 4 presents the factor loadings from the EFA, as well the

variance explained by each factor. The first factor (eight items), named Intervention, included

items describing professionals' roles, intervention strategy identification, strategy

implementation, location of support and family presence during the intervention, and goal

selection. We labeled the second factor (three items) Context, and it included items describing

session location, presence of other children, and intervention within routines at the ECEC

setting. We labeled the third factor (three items) Planning. It included items describing child

and family needs assessment, and goal selection. As shown in Table 4, Cronbach's alpha

revealed acceptable to very good internal consistency (Kline, 2000). As expected, the three

factors were correlated, with Pearson correlation coefficients of .50 between Intervention and

Context, of .43 between Intervention and Planning, and of .32 between Context and Planning.

Confirmatory Factor Analysis (CFA)

     To test the three-factor structure obtained in the previous EFA, a CFA was conducted in

Sample B ($N = 257$). The CFA was performed with AMOS 23 (Arbuckle, 2014), using

maximum likelihood estimation. The goodness of fit was assessed with the following fit

indices and respective criteria as indicative of a good model fit: the ratio of the chi-square

statistic to the degrees of freedom (x^2/df) < 2 (Arbuckle, 2014); the comparative fit index

(CFI) $\geq$ .90; and the root mean square error of approximation (RMSEA) and standardized root

mean square residual (SRMR) $\leq$ .08 (Hu & Bentler, 1999; Schreiber, Nora, Stage, Barlow, &

King, 2006).

     The three-factor model revealed a good model fit, x^2 (73) = 150.86, $p < .001$, $x^2/df =$

2.07, CFI = .93, RMSEA = .07, SRMR = .06. Error terms between two items, 12 (ECEC –

Intervention strategies definition) and 14 (HV – Location of support and presence of the

family), of the Intervention factor were allowed to correlate, based on modification indices

and theoretical interpretability. Figure 2 displays the unstandardized CFA solution for the

ProPerCECIS, with the factor loadings of the items of each factor, and the correlations

between factors. Almost all factor loadings coefficients were higher than .50, suggesting good

convergent validity within factors (Brown, 2006). Correlations among the factors were, as

expected, moderate, which suggests acceptable discriminant validity between the factors

(Brown, 2006). Composite reliability of the Intervention, Context, and Planning factors was, respectively, .83, .85, and .53.

The fit of this model (Model 1) was compared with the fit of an alternative model consisting of a one-factor model (Model 2), using the chi-square difference test. Results revealed that the original model, χ^2 (73) = 150.86, p < .001, χ^2/df = 2.07, CFI = .93, RMSEA = .07, SRMR = .06, AIC = 214.86, BIC = 328.43, was significantly better fitting than the alternative model, χ^2 (76) = 388.14, p < .001, χ^2/df = 5.12, CFI = .72, RMSEA = .13, SRMR = .09, AIC = 446.14, BIC = 549.07; $\Delta \chi^2$ = 237.28, p < .001, Δdf = 3 .

Invariance Analysis

We conducted a set of multiple-group analyses to evaluate whether the factor structure of the model would be invariant across different professional groups. Participants were distributed in three groups: (1) education, comprising school and ECEC teachers (n = 122); (2) therapy, including physical therapists, occupational therapists, speech and language therapists (n = 72); and (3) psychosocial, including psychologists, social workers, and others (n = 48). All three sample sizes allowed an acceptable sample/variable ratio of at least 5:1 (e.g., MacCallum, Widaman, Zhang, & Hong, 1999).

First, configural invariance was tested by fitting the collaborative-consultation measurement model for each group separately. The good model fit indices obtained in each group support configural invariance (Table 5). Next, we tested for measurement invariance (see Table 6 for the fit indices). The factor loadings were then constrained to be equal across the three groups to test for metric invariance (Model 1). This model also had good fit indices and the AIC value decreased, but the fit for this model was not as good as for the baseline model ($\Delta\chi^2$ = 42.94, p < .05), indicating that metric invariance did not hold. Metric noninvariance can be due to noninvariant construct(s) or noninvariant item(s) within construct(s) (Kline, 2011).

These possibilities were checked using the Cheung and Rensvold's (1999) factor-ratio test. First, three models (Model 1.1, 1.2, and 1.3) were estimated and tested against the baseline model to identify the noninvariant construct. The χ^2 difference test was statistically significant for the Context factor, indicating that this factor was the noninvariant construct ($\Delta\chi^2 = 25.59$, $p < .001$). Therefore, the factor loadings of the items of the Context factor were allowed to be freely estimated. A Z test of the equality of the factor loadings revealed that the factor loadings of Items 9 and 10 of the Context factor were significantly different between the Educators and Therapists groups (respectively, $Z = 2.63$, $p = .008$ and $Z = 4.29$, $p < .001$), and the factor loadings of Items 8 and 10 of the Context factor were statistically significantly different between the therapists and psychosocial groups (respectively, $Z = -2.45$, $p = .014$ and $Z = -3.21$, $p = .001$). Descriptive statistics for the Context factor showed that therapists ($M = 6.32$, $SD = 2.02$) scored lower than educators ($M = 7.32$, $SD = 1.49$) and the psychosocial professional group ($M = 7.40$, $SD = 1.50$), with similar trends observed in Items 8, 9, and 10.

Since item 10 presented the largest unstandardized difference between groups, this item was released while Items 8 and 9 were constrained to be equal across groups, so that partial metric invariance could be tested (Model 2). The $\chi2$ difference test for Model 2 was not statistically significant when compared to the baseline, supporting the partial metric invariance. Since this model was supported, scalar invariance could be tested (Model 3). Allowing the intercept of Item 10 to vary, the χ^2 difference test was significant ($\Delta\chi^2 = 105.67$, $p < .001$), indicating that scalar invariance was not supported. A Z test to the equality of the intercepts revealed that the intercepts of most items were significantly different between the groups. Given that at least two loadings and intercepts must be constrained equal across groups to allow us to make valid inferences about the differences between latent factor means in the model (Byrne, Shavelson, & Muthén, 1989), we could not release another intercept of

the Context factor. Thus, following the recommendations of Van de Shoot and colleagues (2012), we successively released the intercept with the largest significant unstandardized difference while partial scalar invariance was not met, until at least two intercepts in each factor were constrained to be equal. Hence, in addition to the intercept of Item 10, the intercepts of Items 14, 15, 11, 16, 5, and 12 were successively released. Still, the χ^2 difference test was significant ($\Delta\chi^2 = 56.78$, $p < .05$), indicating that partial scalar invariance did not hold (Model 4).

Discussion

The aim of this study was to develop and validate a rating scale to assess ECI professionals' perceptions about collaborative consultation practices in ECI. This scale was based on the collaborative consultation model developed by Buysse and Wesley (2005), the RBEI model developed by McWilliam (2010), and on two broader questionnaires on family-centered and center-based practices in ECI (Anonymous, 1991a-d; Anonymous, 2012). The structure of this rating scale was analyzed through an EFA and a CFA.

The EFA showed that, of the 17 items included in ProPerCECIS, 14 met the criteria to be retained. The items removed because of a low communality also presented other limitations: Item 7 (location of support) was more specifically addressed in Item 8 (ECEC–session location), regarding ECEC settings, and in Item 14 (HV–session location and family presence) regarding home-visiting; Item 6 (team work) was probably misinterpreted, with several professionals reporting a high score (between 7 and 9) because they used a primary service provider, but then reporting that several professionals from the team would work with the child or the family at different times (corresponding to a score of 3); and Item 4 (child level goals and objectives) was the only item that did not refer to the role of the family or to the ECEC context. Only Item 5 (goal evaluation) had cross-loadings, which was understandable because collaborative consultation is a circular process with intervention

evaluation informing the planning of next steps for intervention. Therefore, the final solution was comprised of three factors with acceptable to high reliability levels and moderately correlated: Intervention, Context, and Planning.

Although the final model (Figure 2) is not the model we had hypothesized (Figure 1), it supports the conceptual framework of collaborative consultation in ECI. The CFA supported the three-factor structure found in the EFA as the most parsimonious model, providing a good model fit. As in the EFA, the Planning factor was the one with the lowest reliability: .53, which, according to George and Mallery (2003), although poor, is acceptable, and according to Hinton et al. (2004) indicates moderate reliability. Finally, to evaluate whether the factor structure of the model would be invariant across different professional groups (education, therapy, and psychosocial), a set of multiple-group analyses, with the whole sample, was conducted. The results supported configural invariance, meaning that participants from different groups conceptualize the construct in the same way, and partial metric invariance, meaning that, except for Item 10 (ECEC - intervention and routines), ranging from 1 (All intervention is provided apart from ongoing classroom routines and activities) to 9 (All intervention is provided as part of ongoing classroom routines and activities occurring), the strength of the relations between specific scale items and their respective underlying construct was the same across the groups. On the other hand, partial scalar invariance did not hold, meaning that the relation of the score on the latent construct and the score on the observed variables depended on participants' group membership. Therefore, professional group membership should be considered carefully in interpreting findings on collaborative consultation and family-centered practices, as measured with the ProPerCECIS. Further, other self-report measures of family-centered practices and collaborative consultation in ECI may also fail to ensure scalar invariance, as these analyses are not common in the ECI field. This finding may partially explain the inconsistent findings previously reported on mean

differences by professional groups (Bailey, Palsha, & Simeonsson, 1991; McWilliam &

Bailey, 1994; Pereira, 2009). In the case of ProPerCECIS, although therapists report that

interventions in natural environments are less typical, statistically significant differences in

group means across professional groups, for the Context factor, might be related to

measurement issues.

Overall, when compared with the two conceptual models that informed its development,

the final model of ProPerCECIS is rather parsimonious, suggesting that, from the perspectives

of ECI professionals, typical practices in collaborative consultation in ECI seem to have three

distinct but interrelated stages involving planning, decisions on the context of intervention,

and a series of intervention-related interdependent decisions and processes. The associations

among these internally consistent factors suggest that the extent to which professionals

included families in the beginning of the collaborative-consultation process and focused on

natural environments and routines set the stage for the remaining phases of collaborative

consultation.

Importantly, our findings suggest that the ProPerCECIS final model is likely consistent

with the RBEI model (McWilliam, 2010), which is not surprising because this model is

specifically tailored to ECI family-centered practices, incorporating collaborative consultation

in decision-making processes aiming to ensure routines-based interventions in natural

settings. This measure adds to the field by providing a means to examine professionals'

reports of collaborative consultation as well as family-centered and routine-based practices,

by considering constructs that professionals from various professional groups involved in ECI

(educators, therapists, psychologists, social workers, etc.) conceptualize similarly.

Limitations

Several limitations of this study should be noted. First, the reliability of the Planning

factor was acceptable in EFA and poor in CFA. Second, future researchers needs to

investigate whether the factor structure holds for perceived ideal practices. This analysis was

not developed in this study for parsimony and should be done in the future. Third, neither

convergent nor concurrent validity were assessed.

Implications and Conclusion

Findings of this study suggested that ProPerCECIS can be a useful tool for assessing

professionals' perceptions about ECI collaborative consultation practices, with the potential to

help researchers, practitioners, and policymakers understand and improve these practices in

ECI teams, aiming to work with a transdisciplinary structure, and responding to family needs

in natural contexts. ProPerCECIS seems to be particularly suited to assess collaborative

practices within services designed to provide routines-based family-centered interventions

(McWilliam 2010). Importantly, because its factor structure holds for different professional

groups (i.e., educators, therapists, psychologists and social workers), it could be used by

transdisciplinary ECI teams. Finally, because routines-based and family-centered

interventions constitute recommended practices across several countries (e.g., Hwang et al,

2013; Pereira & Serrano 2014; Woods et al., 2011), ProPerCECIS may be useful for a broad

international audience.

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Table 1

Characteristics of the Participants

	M	*DP*	Min.	Max.
Age	41.44	8.95	23	65
Working Experience (years)	17.59	8.95	1	39
Experience in ECI (years)	6.74	5.43	0	28
	n		**%**	
Sex (Female)	408		95.8	
Formal Education				
Licentiate (3 years)	14		3.3	
Pre-Bologna Licentiate (5 years)	152		35.7	
Post-Bologna Master (3+2 years)	11		2.6	
Post-graduation (+1 year)	152		35.7	
Pre-Bologna Master (+2 years)	95		22.3	
Doctorate	2		0.5	
Professional Group				
Education	206		48.4	
School Teachers	57		13.4	
ECEC Teachers	149		35.0	
Therapy	115		27.0	
Physical Therapists	28		6.6	
Occupational Therapists	26		6.1	
Speech and Language Therapists	54		12.7	
Others	7		1.6	
Psychosocial	86		20.2	
Psychology	50		11.7	
Social Worker	31		7.3	
Others	5		1.2	
Health	19		4.5	
Nurses	18		4.2	
Physicians	1		0.3	

Note. ECI=Early childhood intervention; ECEC=Early Childhood Education and Care.

Table 2

Lowest and Highest Score Descriptors for Each Item

Item	
Lowest descriptor (1)	**Highest descriptor (9)**
1. Child Needs Assessment	
Hardly any needs assessment is conducted. Mostly testing results are used to plan interventions.	Needs assessment is conducted through interviews with parents and teachers and observation and is based on child participation in routines and everyday activities…
2. Family Needs Assessment	
Family needs, other than child level needs, are not taken into consideration to plan interventions.	Family-level needs are identified through a specific instrument/tool that includes direct questions about their needs and desires for any change in their lives and these are taken into consideration to plan intervention.
3. Goal Selection	
Goals and objectives are chosen by professionals who will provide support to the child, based on the child's characteristics or development level.	Goals and objectives are chosen by the family based on an interview about their child and family needs in everyday routines.
4. Child-level Goals	
All child-level goals address developmental prerequisites that may not be immediately useful for child	All child-level goals address behaviors that are immediately useful for child's participation in his/her everyday routines.
5. Goal's Evaluation	
Goals and objectives are evaluated by professionals, at least every three months, and a report is prepared.	Goals and objectives are evaluated together, in every session, and the family decides when to consider they are achieved and what to do next.
6. Team Work	
Two or more professionals of the ECI team work with the family (including the child or only with the child) in separate sessions and with poor communication between them.	A primary service provider works with the family, having, whenever necessary, the support of professionals from other disciplines, including joint visits.
7. Location of Support	
Support is carried out with the child in a health center, institution, or clinic, and the family is not present.	Support is carried out at home, an inclusive setting, or at another place at the community, according to the family's needs.
8. ECEC – Location of Support	
Support is always carried out in a room separate from the child's classroom.	Support is always carried out in the child's classroom.
9. ECEC – Presence of Other Children During Intervention	
Other children are never present during service delivery.	Other children are always present during service delivery.
10. ECEC – Intervention and Routines	
All services are provided apart from ongoing classroom routines and activities.	All services are provided as part of ongoing classroom routines and activities.

	11. ECEC - Professionals' Role
The role of the professionals is to provide direct intervention for the child.	The sole role of professionals is to consult with the child's regular teacher, only working directly with the child for assessment or modeling/demonstration.
	12. ECEC – Choice of Intervention Strategies
Strategies are prepared by the professional before the session, according to the goals.	Strategies are decided in the session in dialogue with the educator (or other professional in the room) and are written and given to classroom staff.
	13. ECEC – Strategies Implementation
Strategies are implemented by the professional in the session.	Strategies are implemented by the classroom staff during the week and revised and adjusted together with the professional.
	14. HV – Location of Support and Presence of the Family During Intervention
Support may be carried out at home or at the professional's agency, and only the child is needed.	The support site (home or community) is decided by the family, according to their needs, and the child need not be present.
	15. HV - Professionals' Role
The role of professionals is to provide direct intervention for the child.	The only role of professionals is to consult with/coach the family regarding functional skills of the child and family-level needs.
	16. HV – Choice of Intervention Strategies
Strategies are prepared by the professional before the session, according to the goals.	Strategies are decided, session by session, mainly through questions to the family, to reach joint solutions. These are written and given to the family.
	17. HV – Implementation of Strategies
Strategies are implemented by the professional, during the session.	Strategies are implemented by the family, during the week and revised and adjusted together during the session.

Note. ECI=Early childhood intervention; ECEC=Early Childhood Education and Care.

HV=Home-visit.

Table 3

Descriptive Statistics for the Items

Items	*M*	*SD*	*Sk*	*Sk/SE$_{Sk}$*	*Ku*	*Ku/SE$_{ku}$*
1. Child needs assessment	7.25	1.49	-0.47	-3.95	-0.43	-1.84
2. Family needs assessment	7.32	2.00	-0.83	-7.01	-0.86	-3.66
3. Goals selection	6.81	2.12	-1.12	-9.45	0.71	3.01
4. Child-level goals	7.56	1.39	-1.23	-9.54	2.21	9.37
5. Goal evaluation	6.58	1.60	-0.17	-1.45	0.42	-1.77
6. Team work	7.74	1.89	-1.52	-12.84	1.26	5.34
7. Location of support	8.29	1.30	-2.33	-19.69	6.86	28.27
8. ECEC – Location of support	7.11	1.76	-0.74	-6.28	0.05	0.21
9. ECEC – Presence of other children	6.91	2.14	-0.95	-8.03	-0.19	-0.82
10. ECEC – Intervention and routines	7.09	1.76	-1.06	-8.98	0.92	3.92
11. ECEC – Professional's role	5.76	1.72	0.00	0.00	-0.57	-2.42
12. ECEC – Choice of intervention strategies	6.67	1.83	-0.26	-2.16	-0.54	-2.27
13. ECEC – Implementation of strategies	6.43	2.28	-0.43	-3.66	-0.92	-3.87
14. HV – Location of support abd presence of the family	7.28	1.78	-1.45	-12.28	2.64	11.20
15. HV – Professional's role	6.84	2.36	-0.63	-5.32	-1.17	-4.98
16. HV – Choice of intervention strategies	6.65	1.66	-0.09	-0.73	-1.16	-4.93
17. HV – Implementation of strategies	6.63	1.97	-0.25	-2.10	-1.00	-4.24

Note. ECEC=Early Childhood Education and Care; HV=Home-Visit; *Sk*=Skewness; *SE$_{Sk}$*=Standard Error of Skewness=.12; *Ku*=Kurtosis; *SE$_{ku}$*=Standard Error of Kurtosis=.24.

Table 4

Factor Pattern Matrix Factor Loadings from the Exploratory Factor Analysis of the ProPerCECIS and Internal Reliability of the Factors

Items	Factor		
	Intervention	Context	Planning
15. HV – Professional's role	**.77**	.01	-.07
17. HV – Implementation of strategies	**.65**	.07	.12
11. ECEC – Professional's role	**.65**	-.17	-.07
13. ECEC – Implementation of strategies	**.63**	-.07	.07
14. HV – Location of support and presence of the family	**.61**	-.14	-.17
16. HV – Choice of intervention strategies	**.48**	.18	.25
12. ECEC – Choice of intervention strategies	**.39**	-.09	.14
5. Goal evaluation	**.31**	-.07	.31
8. ECEC – Location of support	.03	**-.93**	.01
9. ECEC – Presence of other children	.06	**-.86**	.08
10. ECEC – Intervention and routines	.09	**-.74**	.11
1. Child needs assessment	-.06	-.18	**.58**
3. Goal selection	.11	-.08	**.57**
2. Family needs assessment	.01	.04	**.54**
Cronbach's alpha	.83	.92	.62

Note. ECEC=Early Childhood Education and Care. HV=Home-visit.

Table 5

Fit Indices for each Professional Group Model

Model	χ^2	df	χ^2/df	CFI	RMSEA	SRMR	AIC	BIC
Education	138.43***	73	1.90	.92	.07	.06	202.43	340.92
Therapy	120.89***	73	1.66	.92	.08	.08	184.89	272.73
Psychosocial	107.79**	73	1.48	.92	.08	.09	171.77	282.31

Note. χ2/df=ratio of chi-square to degree of freedom; CFI=Comparative Fit Index; RMSEA=Root Mean Square Error of Approximation;
SRMR=Standardized Root Mean Square Residual; AIC=Akaike information criterion; BIC=Bayes information criterion.
**$p < .01$. ***$p < .001$.

Table 6

Fit Indices for Invariance Tests and Results of χ^2 Difference Tests

Model	χ^2	f	χ^2/df	CFI	AIC	RMSEA	SRMR	$\Delta\chi^2$	Δdf	Result
Baseline model (test of configural invariance)	367.36	19	1.68	.92	643.36	.04	.06	----	----	------
Model 1: factor loadings constrained (test of full metric invariance)	410.30	247	1.66	.91	630.30	.04	.06	42.94*	28	Reject
Model 1.1: Loadings on *Intervention* constrained	375.23	235	1.60	.92	619.23	.04	.06	7.87	16	Accept
Model 1.2: Loadings on *Context* constrained	392.94	225	1.75	.91	656.94	.04	.06	25.59***	6	Reject
Model 1.3: Loadings on *Planning* constrained	373.03	225	1.66	.92	637.03	.04	.06	5.67	6	Accept
Model 2: Loading of item 10 allow to be freely estimated (test of partial metric invariance)	394.81	245	1.68	.92	643.36	.04	.06	27.45	26	Accept
Model 3: loading and intercept of item 10 allow to be freely estimated (test of scalar invariance)	473.03	271	1.75	.89	645.03	.04	.06	105.67***	52	Reject
Model 4: loading of item 10, and intercepts of items 10, 14, 15, 11, 16, 5, and 12 allowed to be freely estimated (test of partial scalar invariance)	424.13	259	1.64	.91	620.13	.04	.06	56.78*	40	Reject

Note: $\chi2/df$= ratio of chi-square to degree of freedom; $\Delta\chi2$ (Δdf) - chi-square difference test; CFI=Comparative Fit Index; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual; AIC=Akaike information criterion; BIC=Bayes information criterion.

*p < .05. **p < .01. ***p < .001.

COLLABORATIVE CONSULTATION		
8 Stages (goals) Buysse & Wesley, 2005	**RBEI** (goals & practices) McWilliam 2010	**ProPerCECIS**
Stage 1. Gaining entrance	Understanding the Family Ecology - Ecomap	Item 1. Child needs assessment
Stage 2. Building the Relationship	Functional and Family Centered Assessment - Routines-Based Interview	Item 2. Family needs assessment
Stage 3. Gathering Information Through Assessment		Item 3. Goals and objectives definition
Stage 4. Setting Goals		Item 4. Child level goals and objectives
Stage 5. Selecting Strategies	Transdisciplinary Services	Item 6. Team work Item 7. Clinical vs natural settings
		HV / ECEC
Stage 6. Implementing the Plan	Support-Based Home Visits (HV) /CC — CC in Early Childhood Education and Care (ECEC)	Item 14. Session location and family presence during intervention / Item 8. Session localization; Item 9. Presence of other children during intervention; Item 10. Intervention and routines
Stage 7. Evaluating the Plan		Item 15. Professional's role / Item 11. Professional's role; Item 16. Intervention strategies definition / Item 12. Intervention strategies definition
Stage 8. Holding a Summary Conference		Item 17. Strategies' implementation / Item 13. strategies' Implementation; Item 5. Goals and objectives evaluation

Figure 1. Collaborative Consultation process – alignment of Buysse and Wesley's 8 Steps, the Routines-Based Early Intervention and the Professional Perceptions of Collaborative Consultation in Early Childhood Intervention Scale (ProPerCECIS) items
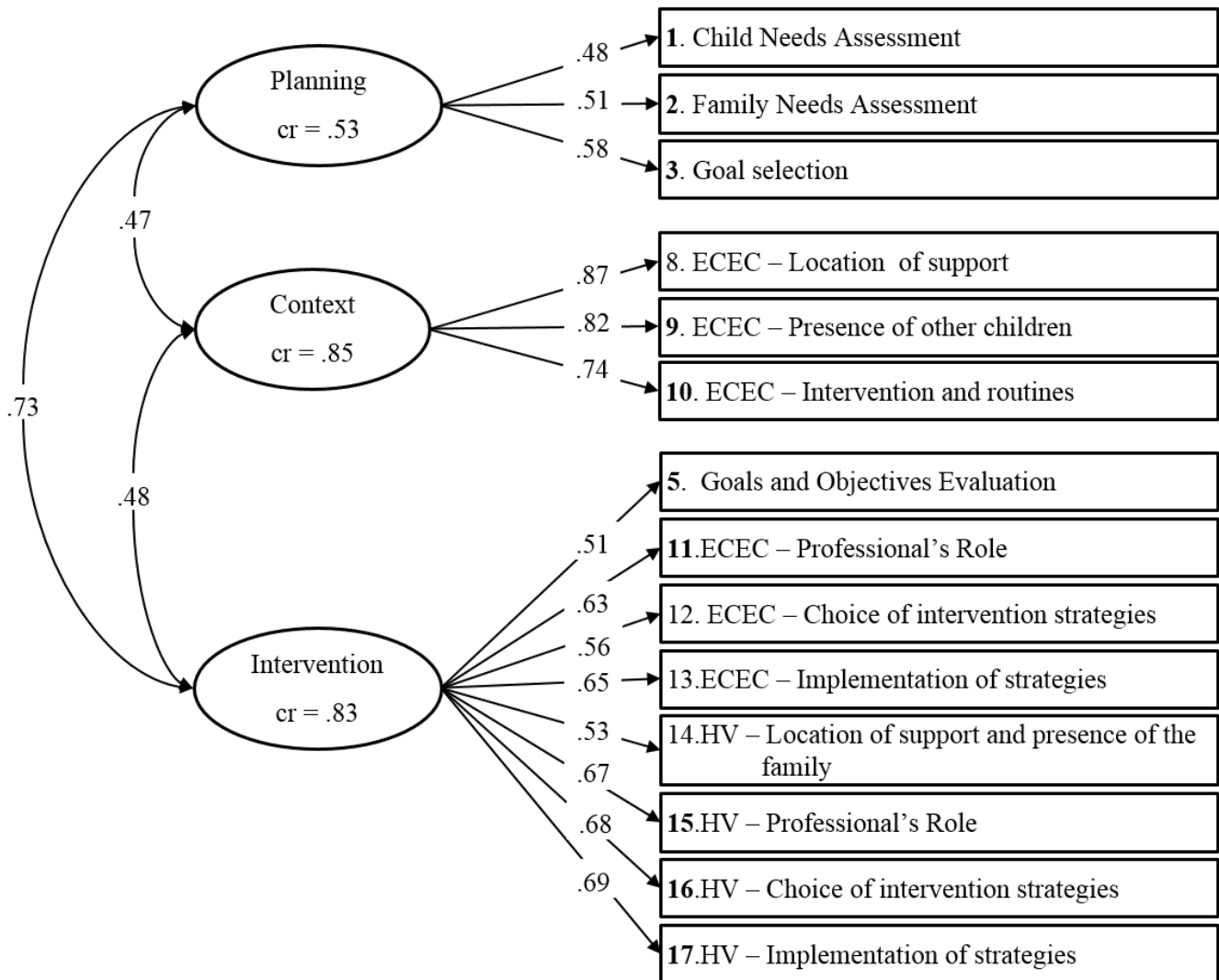
Figure 2. Unstandardized CFA solution for the ProPerCECIS, with factor loadings of the items of each

factor and the correlation between factors.