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MEASUREMENT INVARIANCE OF THE COPARENTING RELATIONSHIP SCALE (CRS) ACROSS TEN COUNTRIES

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ABSTRACT

Objective

The purpose of this study was to assess the factor structure and the measurement invariance of the Coparenting Relationship Scale (CRS) across 10 countries based on the seven-factor coparenting model (i.e., Coparenting Agreement, Coparenting Closeness, Exposure to Conflict, Coparenting Support, Endorsement of Partner's Parenting; Division of Labor) proposed by Feinberg (2003).

Background

The results of research on coparenting from numerous countries has documented its foundational importance for parent mental health, family relationship quality, child development, and psychopathology. Yet, a cross-country perspective is still lacking. Such a perspective can provide insight into which dimensions of coparenting are universally recognized and which are especially prone to variation.

Methods

A unique multinational dataset, comprised of 15 individual studies collected across 10 countries (Belgium, Brazil, China, Israel, Italy, Japan, Portugal, Switzerland, Turkey, USA) in nine languages was established (*N*= 9,292; 51.1% mothers). Measurement invariance analyses were conducted.

Results

A six-factor structure (original 7 factors minus Division of Labor) of the measure was consistent across the different contexts and measurement invariance was achieved at the configural level.

Conclusion

These findings provide a basis for the CRS to be used across countries.

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MEASUREMENT INVARIANCE OF THE COPARENTING RELATIONSHIP SCALE (CRS) ACROSS TEN COUNTRIES

Background

Coparenting refers to the degree of collaboration between individuals in rearing one or more children (Feinberg, 2003; Feinberg et al., 2012). The coparenting relationship is distinct from other marital/familial relationships (Minuchin, 1974), where the romantic relationship focuses on adult-adult dyads, whereas the coparenting relationship focuses on the triadic relationship between the two parents and child (McHale & Fivaz-Depeursinge, 1999). The coparenting relationship provides important support and emotional security for caregivers in their parenting role, and also serves to meet the needs of children by facilitating more positive parenting (Weissman & Cohen, 1985). Three decades of research have shown that coparenting is one of the central relational process at work within families. Early studies found that the parenting alliance (i.e. coparenting), in comparison with the quality of the couple's romantic relationship, shows stronger associations with parenting practices, as well as child outcomes (Abidin & Brunner, 1995; Brestan & Eyberg, 1998). The spillover hypothesis suggests that conflict in the collaboration between two parents regarding rearing their child (i.e., coparenting) will not only have a negative impact on their marital relationship, but will also negatively impact other subsystems in the family, such as the parent-child relationship (Katz & Gottman, 1996). Following these early studies, later studies confirmed that coparenting plays a unique role in predicting child and parent outcomes. For example, in a five-wave study of over 500 German families examining within-family change, coparenting was found to be the "nexus" between couple conflict, child behavior problems, and parenting (Zemp et al., (2018). A meta-analysis by Teubert and Pinquart (2010) found that coparenting quality, even after controlling for parenting quality, predicts child adjustment (i.e., internalizing and externalizing problem behavior). Moreover, since the quality of the coparenting relationship has unique predictive power, it can be an important target for intervention. A line of preventive intervention studies with universal and high-risk samples has demonstrated that even modest intervention dosage (e.g. less than ten group sessions) can help couples develop positive coparenting relationships, with a broad range of durable downstream impacts on parent mental and physical health, parenting quality, family violence, and children's mental and behavioral health from infancy through at least ten years of age (Ammerman et al., 2022; Feinberg et al., 2021; Feinberg et al., 2014; Moran et al., 2021).

Feinberg' Ecological Model of Coparenting

Feinberg (2002, 2003) proposed a theoretical framework to understand the coparenting relationship as five overlapping subdomains, namely childrearing agreement, division of labor, joint management of family dynamics, coparental support/undermining, and coparenting-based closeness. The first subdomain, childrearing agreement, captures the extent that parents agree on their attitudes and beliefs regarding child rearing. The second subdomain, division of labor, refers to how parents come to share and coordinate childrearing related tasks and their feelings about the fairness of the division. The third subdomain, joint management of family dynamics, captures how parents shape the rules and expectations for behavior within the family and how parents manage these dynamics. The fourth subdomain, coparental support/undermining, includes the affirmation of the other parent's skills in childrearing, respecting the other parent's contributions and decisions within the family vs. undermining the other parent's authority as a parent. After analyzing interviews with new parents, Feinberg (2002) the fifth domain was termed parenting-based closeness. This subdomain includes sharing the joys of parenthood, for example celebrating a child's milestones and achievements, and is different from coparental support, which refers to respecting and upholding the other parent's decisions. These are the domains central to

Feinberg's (2003) proposed ecological model of parenting that describes how coparenting influences parental adjustment, parenting, and child adjustment. In developing a theory-based self-report measure of coparenting (Feinberg et al., 2012) with U.S. samples, the authors worked from the five-factor conceptual model and created a 35-item instrument (the Coparenting Rating Scale or CRS) with seven subscales. Two scales were developed to represent the conceptually complex domain of joint management of family dynamics (i.e., exposure of the child to conflict, and endorsement of the coparent's parenting). The authors also created separate coparenting support and undermining scales to allow a separate measurement of these aspects, rather than forcing support and undermining to be two ends of a single continuum. Indeed, whereas a high degree of conflict might be associated with a low support, a low support might occur even when conflict is low.

Assessing Coparenting in Different Countries

Feinberg's ecological model of coparenting (2003) demonstrates that extrafamilial factors such as economic stress and social support play an important role in the development and evolution of coparenting relationships. These factors can obviously vary at the individual/family level, but can also vary due to macro contextual factors. Furthermore, cultural gender norms and the ways in which government policies support parental involvement equality through, for example, parental leave and income support, can also influence the way parents organize and cooperate in parenting. Feinberg's conceptualization of coparenting and the ecological model has raised research interest around the globe with replications in numerous countries.

The CRS has been translated, validated and utilized in a number of countries across continents. Besides the original study in the United States of America (Feinberg, 2012), there have been validation studies in South America (i.e., Brazil), Europe (i.e., Belgium, Italy, Portugal, Switzerland, and Turkey), the Middle East (i.e., Israel), and Asia (i.e., China and

Japan). Citations and more information is provided in the Methods section of the present paper. Such international research opens the possibility of examining societal-level influences on coparenting relations and dynamics, thus linking social, economic, and policy factors with the core dynamics of families and children's well-being. To facilitate cross-country research on coparenting relations, a first step is to examine the psychometric properties of measures of coparenting across countries. Such cross-country psychometric research itself can shed light on differences in the coparenting relationship. For instance, it can indicate which aspects of coparenting are universally recognized and which are especially prone to cultural variation. A crucial first step is to examine the extent that coparenting shows invariance across different contexts. Measurement invariance analysis usually implies a comparison of a factor structure across different groups or populations to assess its robustness. Three levels of invariance are tested in successive steps: At the level of configural invariance, one examines if the factor structure of a measure is similar in the different groups. At the level of metric invariance, one examines if the strength of the associations between the items and the factors are similar (i.e. equal factor loadings) across groups. Establishing metric invariance would mean that the relative importance of each item for each factor is consistent across groups. At the level of scalar invariance, one examines if the item scores are consistent (i.e. equal intercepts) across groups. Establishing scalar invariance would mean that the mean scores on the items are consistent across groups. In this study, establishing measurement invariance for the CRS is an essential condition to compare coparenting relationships across different countries.

The Present Study

The present study uses a unique dataset which is comprised of parent data from 15 studies collected across 10 countries (i.e., Belgium, Brazil, China, Israel, Italy, Japan, Portugal, Switzerland, Turkey, USA) from five regions (i.e., North America, South America, Europe, Asia, and the Middle East) in nine languages (i.e., Chinese, Dutch, English, French, Hebrew, Italian, Japanese, Portuguese, Turkish). Each study utilized the CRS with parents. Using a wide variety of datasets, this study aims to establish measurement invariance of the CRS across ten countries. Given the nature of the data and potential cross-country differences, we expect the 7-factor empirical model (i.e., Coparenting Agreement, Coparenting Closeness, Exposure to Conflict, Coparenting Support, Coparenting Undermining, Endorsement of Partner's Parenting, Division of Labor) to show invariance at the configural level, while finding metric and scalar invariance are less probable. Indeed, it is highly probable that items may be of different importance (preventing metric invariance from being achieved) or that the mean scores on various items vary across different countries (preventing scalar invariance from being achieved). This goal is innovative in that it builds on studies of the validation of the Coparenting Relationship Scale (CRS) at the country level (Calders, 2021 ; Carvalho et al., unpublished; Çetin & Demircan, 2022; Pinto & Figueiredo, 2022; Luo, 2022; Camisasca et al., unpublished; Shai, 2019; Favez et al., 2021; Galdiolo & Roskam, 2016; Feinberg et al., 2012; 2016; Takeishi et al., 2017; Soma et al., 2021; Nakamura et al., 2021; Mosmann et al. 2018) by focusing on the cross-country aspect, which is the first step to adequately compare coparenting relationships across these different contexts. In the present study we use the full, not the brief, version of the Coparenting Relationship Scale.

Method

Population

Data used in this study have been collected in 15 separate studies (see Table 1 for a summary of their characteristics; the ID number attributed to each study will be used in the rest of the manuscript to refer to each study). Data were collected in 10 countries and 9 different languages. In total, the studies included 10,526 individuals coming from 7,726 families. Among them, 10 studies included dyadic data, that is data collected from two parents in a family (*n* = 3,066 families). As our analyses only included the CRS data, and that the CRS data were sometimes completely missing for some individuals or families (due to study design or missing data), the total sample size used for the analyses of the present study was of 9,290 individuals coming from 7,159 different families (*n*=2133 families with data collected from both parents).

Most studies included a balanced number of mothers and fathers (51.1% of mothers, in total). The majority (n = 11 of datasets included parents with children in early to middle childhood, where four datasets included parents with infants under one year; 9 included children up to 13 years; one dataset included parents with children from 4 to 18 years; and one dataset had parents with children from 0 to 33. Ten out of the 15 studies were cross-sectional, whereas five studies were longitudinal, including up to five waves of data collection. The complexity of the data, due to the design of the studies including longitudinal and couple data, would have required multilevel analyses with three levels (repeated measures nested in individuals nested in families). However, the statistical procedures planned to analyze the data (i.e. measurement invariance analyses; see "statistical analyses" section) would only allow two- but not three-level data. Consequently, we reduced the complexity of the data by excluding multiple waves in longitudinal datasets, and only using the first wave of data collected in the five longitudinal studies.

Procedure

Specific details about protocols can be found in respective publications for all studies (See Table 1), except studies #2 and #6, which have not yet been published.

Measures

Coparenting relationship scale (CRS). The CRS contains 35 items assessed on a 7-point Likert scale, either assessing the likelihood (ranging from 0 = *not true of us* to 6 = *very true of us*) or the frequency (ranging from 0 = *never* to 6 = *very often – several times a day*) of specific behaviors, thoughts, and feelings of the subject and his/her partner. Scoresfor each subscale are computed by averaging the respective items. Thirteen items that are negatively worded are reverse scored. A total score can also be computed as the mean of scores on the 35 items (α_{total} =.787; α's across the 15 data sets ranging from .569 to .851). A higher score indicates a more positive coparenting relationship.

The seven scales are: Coparenting Agreement (four items; α_{total} = .706; α's across the 15 studies ranging from .555 to .833); Coparenting Closeness (five items; α_{total} = .738; α's across the 15 studies ranging from .480 to .842); Exposure to Conflict (five items; α_{total} = .891; α's across the 15 studies ranging from .781 to .901); Coparenting Support (six items; α_{total} = .898; α's across the 15 studies ranging from .814 to .941); Coparenting Undermining (six items; α_{total} = .805; α's across the 15 studies ranging from .623 to .887); Endorsement of Partner's Parenting (seven items; α_{total} = .824; α's across the 15 studies ranging from .669 to .900); Division of Labor (two items; $r = .218$, $p < .001$; Pearson's correlation coefficients ranging from .107 to .559).

Statistical analyses

The first step of the statistical analyses consisted in computing descriptive analyses on the dimensions of the CRS, separately for each dataset, as well as on the total sample to gain an insight in the datasets.

The second step consisted of conducting a confirmatory factor analysis (CFA) on the overall sample, to test the factor structure of the scale to this large and multi-country dataset. However, diverging from the original 7-factor structure, we decided to exclude the "Division of Labor" factor (and its related items) for two reasons. First, this factor showed a questionable internal consistency, as the correlation between the two items composing the scale only showed a small to medium effect size for the total sample (r = .218) and a small effect size in some of the datasets. In addition, many authors have recommended to avoid models containing factors with only two indicators (e.g., Kline, 2005; Worthington & Whittaker, 2006). Thus, we decided to retain a six-factor structure, including 33 items. The six-factor model was specified as follows: Items 6, 9, 11, and 15 loaded on the “Coparenting Agreement” factor; items 2, 17, 24, 28, and 30 loaded on the “Coparenting Closeness” factor; items 31 to 35 loaded on the “Exposure to Conflict” factor; items 3, 10, 19, and 25 to 27 loaded on the “Coparenting Support” factor; items 8, 12, 13, 16, 21, and 22 loaded on the “Coparenting Undermining” factor; and finally, items 1, 4, 7, 14, 18, 23, and 29 load on the “Endorsement of Partner's Parenting” factor (See Figure 1)

Factors were allowed to covary. In following the analytic structure of the French validation of the CRS (Favez et al., 2021), we further included a seventh factor (a “method” factor) that accounted for the potential influence of reverse worded (RW) items on the adjustment of the model. Adding a method factor is an appropriate way to account for this potential bias, as previous research has shown that RW items may have harmful effects on covariance structures of factor models (e.g. Zhang et al., 2016). Practically, this method factor is specified as being orthogonal to the other factors in the model and having all the RW items loading on it. Among the 33 items included in the analysis, 17 were RW regarding the general construct of coparenting: the five items of the “Exposure to Conflict” scale (31–35), the six items of the “Coparenting Undermining” factor (8, 12, 13, 16, 21, 22), and six items related to the positive dimensions of coparenting (7, 9, 11, 15, 28, 29). It is important to note however that since this seventh factor had no substantive meaning in the model, we refer to our model as a six-factor model, although it technically contains seven factors. The third step consisted of conducting separate confirmatory factor analyses (CFA) to test the six-factor model by country.

Finally, the fourth step consisted of conducting measurement invariance (MI) analyses to test the level of equivalence of the CRS factor structure in the 15 datasets included in this study. We tested for configural, metric, and scalar invariance of the six-factor CFA model between the datasets (for more details, see Millsap, 2012; Vandenberg & Lance, 2000).

We conducted descriptive analyses in IBM SPSS Statistics (version 27), whereas CFAs and MI analyses were conducted in Mplus (version 8.3). In CFAs, given that the items were scored on a 7-point scale, we treated variables as continuous, and we used a maximum likelihood estimator with robust standard errors (MLR). Configural, metric, and scalar invariance was assessed by using the Mplus standard convenience feature ("MODEL = CONFIGURAL METRIC SCALAR"). In all CFA models, we took the non-independence of the data into account by using the "TYPE=COMPLEX" feature of Mplus, which allowed us to compute standard errors and estimation of model fits taking into account the non-independence in the data when both parents within families were participating in the study.

We refer to comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) tests to evaluate model adjustment, using standard cutoffs defined by Kline (2005). First, a non-significant chi square indicates a good fit of the model, although a significant chi square does not necessarily indicate a poor model fit, especially when estimating complex models or large samples. Concerning CFI, values above .95 indicate excellent fit, while values above .90 are deemed acceptable. Concerning RMSEA, values below .06 indicate a good fit, while values below .08 indicate an acceptable fit. Finally, SRMR values below .08 are indicative of a good fit of the model. In MI analyses, the level of invariance was determined by examining the magnitude and significance of differences in chi square, CFI and RMSEA between models of configural, metric, and scalar invariance, as well as by the examination of absolute adjustment of the models. Following Chen's (2007) recommendations, in order to accept a higher level of invariance over a lower level (metric over configural or scalar over metric), the chi square difference between the two models should be nonsignificant, and the CFI should not decrease by more than .10, while the RMSEA should not increase by more than .15.

Materials and analysis code for this study are not available.

Results

Descriptive statistics

Descriptive statistics for the six factors constituting the empirical coparenting model in the present study are presented in Table 2.

Confirmatory Factor Analyses

The results of the CFAs conducted on the overall sample, as well as separately on each of the fifteen datasets, can be found in Table 3. Of note, the Mplus outputs for all the models are available in supplemental material.

CFA in the overall sample. The results of the estimation of the six-factor model in the overall sample showed that the model fit the data well. Although the chi square was significantthe RMSEA (and its upper limit) was below .06, and the SRMR was smaller than .05 indicating excellent model fit. The CFI was below the commonly used cutoff of .95 indicating excellent fit, but was above the cutoff of .90 for acceptable fit.

CFA on separate samples. The results of the separate CFAs conducted with the fifteen datasets showed contrasting results (see Table 3). As a preliminary note, the results of the estimation of three models (#4, #9, and #15) were untrustworthy due to non-positive definite matrices. This might be due to the small sample size of the respective datasets preventing the correct estimation of such a complex model (131 parameters to estimate). The results of these three CFAs will thus have to be cautiously interpreted.

In all datasets, the results showed a significant chi square. In four datasets (#1, #3, #6, and #8), all the fit indices indicated a good fit of the model with an RMSEA below .06, an

SRMR smaller than .05 and a CFI indicating acceptable rather than excellent fit. In six datasets (#2, #5, #7, #10, #11, #15), the RMSEA and the SRMR showed values below the standard cutoffs indicating good fit, whereas the CFI was slightly below the .90 cutoff for acceptable fit. In two datasets (#13 and #14), the value of the SRMR indicated good fit, whereas the value of the RMSEA indicated an acceptable rather than a good fit. In addition, the CFI was slightly below the cutoff for acceptable fit. Finally, in the last three datasets (#4, #9, and #12), most fit indices indicated a questionable fit. The results of the estimation of the model in dataset #12 showed an RMSEA just below .08, which suggested an acceptable fit, while values of the SRMR and CFI were respectively slightly above and slightly below the cutoff for acceptable fit. The fit of the model was especially poor in datasets #4 and #9. In both datasets, the estimation of the model showed problems related to a non-positive first-order derivative product matrix. Of note, the sample size in all three datasets was small. In general, apart from datasets #4, #9, and #12, the fit of the separate models was deemed acceptable by two out of three fit indices.

Measurement Invariance Analyses

Measurement invariance analysis of the six-factor model. The results of the MI analyses conducted on the six-factor model across the 15 datasets showed that configural invariance, but not metric nor scalar, was achieved (see Table 4). Indeed, the configural invariance model showed an acceptable fit with an RMSEA below .06 and an SRMR below .08, although the CFI was slightly under the .90 cutoff. Both the metric and the scalar models overall showed poorer fit, although the estimated RMSEA still indicated good and acceptable fits. The chi square difference tests were all significant, indicating that the configural invariance model should be preferred. Of note, the analyses showed problems in the estimation of the latent variable covariance matrix (Psi) in the three models (the matrix was non positive definite). The problems involved samples in total #4 and #15 (both datasets in the configural and scalar invariance models and #4 only in the metric invariance model), leading to untrustworthy solutions. We attempted to identify a few potential causes for these problems, among those described in the literature (e.g., Wothke, 1993). Basically, this type of problem may occur in case of a negative variance or residual variance of a latent variable, a correlation equal or greater than 1 or equal or lower than -1 between two latent variables, or a linear dependency among more than two latent variables. Concerning dataset #4, the correlation between the undermining and support factors and between the undermining and closeness factors were below -1 in the configural model. Concerning dataset #15, the correlation between the support and the undermining factors again was below -1 in the configural model.

In order to make sure that these estimation problems did not influence the results of the MI analyses, in particular the estimation of the fit of the configural, metric, and scalar invariance models, we decided to run a replication of these analyses excluding the two datasets (#4 and #15) that showed estimation problems. The results of these analyses on these 13 datasets were consistent with the results of the analyses on the 15 datasets. These analyses, in addition, showed no particular problems related to the estimation of the latent variable covariance matrix (Psi; see supplemental material for complete results).

Discussion

The present study investigated the factor structure of the Coparenting Relationship Scale (CRS) and assessed measurement invariance (MI) across 15 studies from 10 countries (i.e., Belgium, Brazil, China, Israel, Italy, Japan, Portugal, Switzerland, Turkey, USA). We hypothesized that the original factor structure of the scale would be confirmed and that measurement invariance should be achieved at least at the configural level. Our results mostly confirmed our hypotheses.

Factor Structure of the CRS

The results of the CFAs tended to confirm the validity of the factor structure of the CRS. Indeed, the test of a six-factor model in the overall sample (15 samples combined, n = 9292), as well as in most (12 out of 15) of the separate samples, showed adequate model fit to the data. These analyses tended to confirm the 6-scale factor structure (i.e., Coparenting Agreement, Coparenting Closeness, Exposure to Conflict, Coparenting Support, Endorsement of Partner's Parenting) of the instrument that was in line with Feinberg's Multidimensional model of coparenting (Feinberg, 2003).

In the present study, we omitted the Division of Labor scale. Indeed, this scale showed questionable internal consistency in the descriptive analyses. Moreover, this scale consisted of only two items, which constitute a problem for the local identification of the factor. Many scholars have shown that this situation needs to be avoided, because the estimation of this under-identified part of the model would need to "borrow" information from other parts of the model to be identified (Kline, 2005; Worthington & Whittaker, 2006). It is also important to note that this factor was not discarded because we believed that division of labor is irrelevant in a coparenting relationship, but rather that a two-item conceptualization leaves room for improvement for adequately and comprehensively representing this construct—which we leave for future research.

In assessing factor structure in the separate datasets, the majority of problematic model-fit issues we encountered concerned the estimation of the model in 3 of the 15 samples (i.e., #4, #9, #15). In these three samples the estimation of the six-factor model led to a questionable model fit, especially in two of them (#4 and #9). We considered different potential explanations for these results by looking at their common characteristics: First, these three samples were among the smallest that were included in the present study, which could give rise to issues with model identification. Despite the relatively small sample sizes, the Cronbach's alpha's of the six factors in these three datasets were at least acceptable and mostly good. A second explanation, maybe linked to the sample size issue, concerned the two samples in which the model showed the worst fit. Both of these samples, in addition to being small, comprised dyadic data collected in both parents within families. A greater complexity in the data in a small sample might have led to model identification issues. Third, another common characteristic shared by these three samples is that they focus on parents with very young children (i.e., two weeks, 4-11 months, 0-11 months). The fact that data were collected from relatively 'new' parents who are still in the process of forming (co)parenting practices might (partly) explain why the theoretically inspired six-factor structure did not fit the data well. The coparenting questionnaire was implemented with a broad array of parents (age, number of children), but perhaps specifications or additions for certain groups, such as first-time parents of infants, can make the questionnaire even more relevant. Although all of these explanations might be true, none of them could be identified as the single cause for the adjustment problems. Indeed, other samples included in this study shared the characteristics of being small, including dyadic data, and/or collected in families with infants and did not show similar problems. It is likely that the model fit problems encountered in these three samples were due to a conjunction of the aforementioned factors. Finally, considering the focus of this paper, we also considered the cultural background of the three countries in which data were collected (Portugal, Brazil, and (French speaking) Belgium) as a potential common cause for the weak adjustment of the model in these samples. This potential explanation did not seem plausible for two reasons. First the three samples did not share the same cultural background. Second, whereas the datasets from Portugal (#4) and Brazil (#15 shared the same language, another sample (#2) from Brazil did not show similar problems.

Measurement Invariance of the CRS

To investigate measurement invariance, we conducted MI analyses on the six-factor model across the 15 samples, which consisted in running a series of analyses to estimate nested models assessing whether the factor structure of the model is identical across groups (i.e., configural invariance), whether factor loadings are identical across groups (i.e., metric invariance), and whether item intercepts are identical across groups (i.e., scalar invariance). Results showed support for configural invariance, although the fit of the configural model was deemed acceptable rather than excellent, which was likely due to the complexity of the data and the differences between the contexts in which the data were collected. Nevertheless, results indicated that an identical factor structure for the scale was reliably replicated across the 15 samples from 10 countries, which tends to confirm the usability of the CRS across countries. When taking into account the complexity of these analyses (15 datasets, 10 countries, dyadic data, broad child and parents' age range), the failure to meet the criterion for metric, and subsequently scalar, invariance should not necessarily be seen as a limitation of the CRS. Indeed, the hypothesis of achieving configural rather than metric or scalar invariance was reasonable: First, we expected that the structure of the scale, that is the item partition in the different factors, would be consistent across countries, which was confirmed by the acceptable fit of the configural model. Then, we expected that reaching metric and, therefore, scalar invariance would not be reasonable. Indeed, given the differences between the countries, it seemed highly probable that specific expressions of the constructs measured by the CRS might lead to differences in the importance of each item for each factor (i.e. differences in factor loadings), which would lead to a failure to achieve metric invariance. It seemed even more likely that we would observe differences on average scores on the different items across countries, which would lead to a failure to achieve scalar invariance.

Various phenomena could have played a role and explain these results. For example, as gender roles may vary between traditional (i.e. mothers more involved in the family life) and "modern" (i.e. family/work involvement more balanced between mothers and fathers) models of family in different countries, we may imagine that support may be expressed differently in different countries or that support will simply be higher in some countries. Moreover, countries may have different "rules" or allowable modes of expression in general across affect, verbal communication, and behavior. Such differences may affect responses to items that differentially sample across these domains. It is also possible that items may be interpreted in a slightly different way in different countries (Chen, 2008), leading to differences in factor loadings that will make metric invariance unachievable. Thus, allowing different countries to express relational dynamics in different ways—implying configural but not metric nor scalar invariance—may not necessarily be seen as a weakness of the measure in the framework of a consistent factor structure, but rather as a consequence of the specific features of the groups that were compared. Similarly, levels of coparenting harmony and conflict, coordination and tension, are likely different across countries with varying socioeconomic levels, gender roles, and values. Again, allowing for different levels of mean factors in the framework of a consistent factor structure then would facilitate future quantitative research examining the factors related to such mean differences across factors.

In sum, our results showed reasonable empirical evidence in favor of the equivalence in the factor structure across samples of the CRS and the underlying multidimensional model of coparenting (Feinberg et al., 2012). We found support for the structural validity of a model with six, theoretically inspired, factors of coparenting in countries with very different characteristics. The findings of the present study provide the essential groundwork to base future studies examining coparenting relationships across countries worldwide—while noting the need for further measure development in the area of division of labor. Finally, future studies should also examine the cross-country measurement invariance of the Brief Coparenting Relationship Scale (B-CRS), given that this short version is also widely used in coparenting research.

Limitations

This study contains a few limitations. A first set of limitations is related to statistical issues encountered in the estimation of the CFA models. First, in the separate estimation of our 6-factor model in the 15 datasets, the adjustment of the model to the data was weak in three samples (i.e., #4, #9, #15), while we faced problems in the estimation of covariance matrices in three datasets, which may have led to untrustworthy solutions for the estimation of the model. These problems involved four datasets in total, as two of them showed both types of problems. These problems might have a common cause, since the four samples involved were all small. Indeed, when investigating a 6-factor (7 if we include the Method factor) structure with 33 indicators, small samples may show a lack of statistical power, since the ratio between available information to estimate the model and the number of parameters to estimate (131 in our case) becomes critically small. Thus, whereas the complexity of the CRS and the underlying multidimensional model of coparenting (Feinberg et al., 2012) are proportional to the complexity of the relational processes at stake in coparenting, our results would suggest that the investigation of CRS raw data (i.e. without using factor scores) is only suitable in large samples, preferably over n = 300. Whereas we also encountered problems in the estimation of covariance matrices in the MI analyses, post hoc analyses revealed that these estimation problems did not seem to have influenced the adjustment of the MI models.

Another limitation of this study was the need to simplify the original factor structure of the scale, omitting the Division of Labor factor and its related items, in order to avoid the situation of having a factor containing only two indicators. While our decision to omit this factor was based on statistical reasons, we still believe that satisfaction with division of labor is a crucial component of coparenting. Further work on the CRS may include a revision of the scale by adding a few items assessing division of labor, in order to strengthen the assessment of this dimension and get a better identification of the Division of labor factor on a statistical level.

Finally, this study is limited by the nature of the specific countries represented. We had little representation of Africa, central Asia, Pacific islands, and Latin America. Moreover, there is considerable cultural variation within countries. However, the current study is the largest of its kind, representing 10 countries and over 10,000 families Thus, establishing the validity of the CRS is an important step to take in all countries where coparenting research occurs, especially in countries most different from those represented in this study.

Conclusion

The present study used a unique dataset consisting of 15 datasets collected across 10 countries from five continents in nine languages. The main aim was to examine MI of a six-factor coparenting relationship model (i.e., Coparenting Agreement, Coparenting Closeness, Exposure to Conflict, Coparenting Support, Endorsement of Partner's Parenting) across these 15 datasets. MI analyses showed support for configural invariance, meaning that the factor structure (i.e., the factor with the specific set of underlying items) was valid across the datasets. Although there was no support for metric or scalar invariance, the findings of the present study provide a basis for the CRS to be used across countries. This should inspire future quantitative and qualitative research in cross-country coparenting research to understand what aspects are universal, and what aspects of coparenting are linked to specific material, relational, or ideational conditions that underlie high-quality coparenting. Such work would facilitate the promotion of more positive family relationships, and consequently parent and child mental and physical health in all societies.

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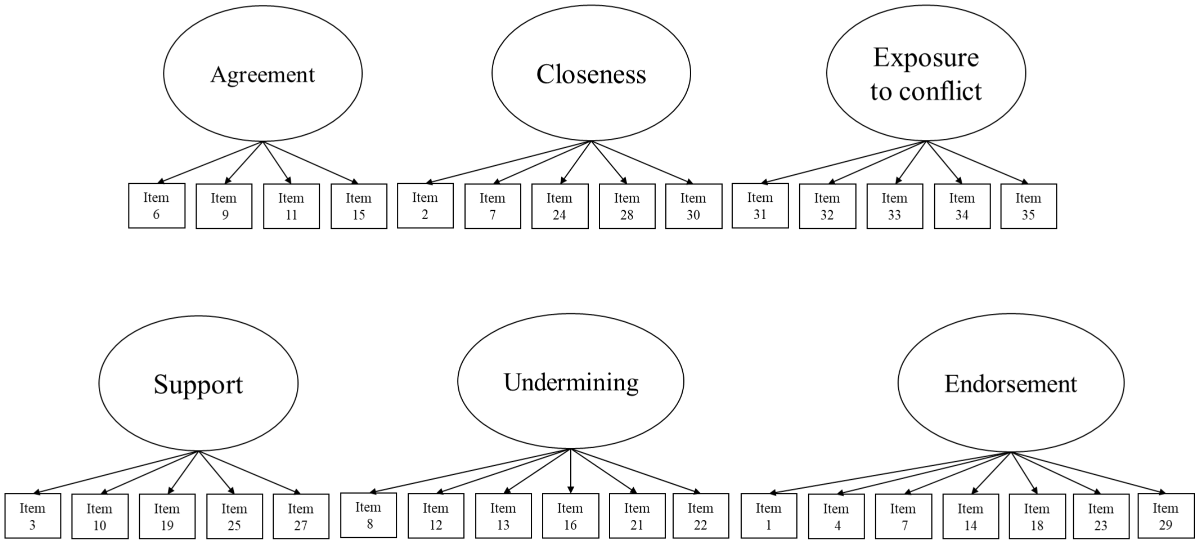
Figure 1

Visual Representation of Six Factors and Respective Items



Note: This figure is not intended as an accurate representation of the statistical model used in the present study.

https://doi.org/10.1037/fam0001228

Table 1

Characteristics of the 15 datasets included in the present study

ID	Authors	Country	CRS language	# waves	N subjects	Dyadic data?	N families	% women	Child age range
#1	Calders (2021)	Belgium	Dutch	3[a]	501	yes	302	55.9	10 - 13 yrs
#2	Carvalho et al.	Brazil	Portuguese	1	433	no	433	55.0	6 mo - 6 yrs
#3	Çetin and Demircan (2022)	Turkey	Turkish	1	1683	no	1683	50.0	3-6 yrs
#4	Pinto and Figueiredo (2022)	Portugal	Portuguese	5[b]	220	yes	110	50.0	2 wks
#5	Luo (2022)	China	Chinese	1	1860	yes	1117	53.6	9-13 yrs
#6	Camisasca et al.	Italy	Italian	1	784	yes	392	49.9	1-13 yrs
#7	Shai (2019)	Israel	Hebrew	5[c]	195	yes	100	51.3	18 mo
#8	Favez et al. (2021)	Switzerland	French	1	399	no	399	63.4	0-33 yrs
#9	Galdiolo and Roskam (2016)	Belgium	French	1	109	yes	62	55.0	4-10 mo
#10	Feinberg et al. (2012)	USA	English	4[d]	303	yes	152	50.2	7 yrs
#11	Feinberg et al. (2016)	USA	English	5[e]	605	yes	309	51.1	8 yrs
#12	Takeishi et al. (2017)	Japan	Japanese	1	200	no	200	50.0	0-11 mo
#13	Soma et al. (2021)	Japan	Japanese	1	600	no	600	50.0	4-7 mo
#14	Nakamura et al. (2021)	Japan	Japanese	1	1200	no	1200	50.0	0-6 yrs
#15	Mosmann et al. (2018)	Brazil	Portuguese	1	200	yes	100	51.0	4-18 yrs

Note. Entries with years in parentheses are published studies; otherwise the study is not yet published. [a] 3 waves (11, 12, 13 years old). [b] 5 waves (1st and 3rd semester of pregnancy, 2 weeks, 3 and 6 months old). [c] 5 waves (3, 9, 18, 24 months old). [d] 4 waves (pregnancy, 1, 5, 7 years old); [e] 5 waves (pregnancy, 1, 2, 7, 8 years old).

Table 2

Descriptive Statistics of the Six Factor Coparenting Model in the 15 datasets

#	Author(s)	Agreement				Closeness				*Exposure to conflict*			
		α	*Mean*	*SD*	*Range*	*α*	*Mean*	*SD*	*Range*	*α*	*Mean*	*SD*	*Range*
#1	Calders (2021)	.760	4.99	1.08	[1-6]	.723	4.50	1.13	[0-6]	.853	0.83	0.66	[0-4]
#2	Carvalho et al.	.713	4.66	1.43	[0-6]	.596	4.87	1.10	[0-6]	.880	0.90	1.08	[0-6]
#3	Çetin and Demircan (2022)	.675	4.10	1.43	[0-6]	.579	4.94	1.01	[0-6]	.852	0.98	0.98	[0-6]
#4	Pinto & Figueiredo, (2022)	.833	5.46	0.89	[0-6]	.750	5.32	0.83	[1-6]	.887	0.27	0.70	[0-6]
#5	Luo (2022)	.555	3.85	1.20	[0-6]	.653	4.83	1.00	[0-6]	.809	0.71	0.77	[0-6]
#6	Camisasca et al.	.710	5.11	1.00	[1-6]	.708	5.02	0.90	[0-6]	.820	0.75	0.79	[0-6]
#7	Shai (2019)	.788	4.61	1.07	[1-6]	.823	4.56	1.10	[1-6]	.899	1.23	0.98	[0-5]
#8	Favez et al. (2021)	.808	4.33	1.35	[0-6]	.790	3.52	1.45	[0-6]	.901	1.54	1.20	[0-6]
#9	Galdiolo and Roskam (2016)	.691	4.82	1.02	[1-6]	.607	4.51	0.94	[2-6]	.871	5.23	0.72	[2-6]
#10	Feinberg et al. (2012)	.694	4.84	1.03	[1-6]	.798	4.82	1.05	[1-6]	.858	0.88	0.88	[0-5]
#11	Feinberg et al. (2016)	.717	4.99	1.04	[0-6]	.842	4.76	1.26	[0-6]	.818	0.64	0.65	[0-5]
#12	Takeishi et al. (2017)	.748	4.33	1.16	[1-6]	.731	3.97	1.18	[1-6]	.883	1.01	1.07	[0-6]
#13	Soma et al. (2021)	.783	3.87	1.12	[0-6]	.760	3.84	1.09	[0-6]	.889	1.64	1.15	[0-6]
#14	Nakamura et al. (2021)	.790	4.09	1.22	[0-6]	.749	3.95	1.17	[0-6]	.901	1.21	1.09	[0-6]
#15	Mosmann et al. (2018)	.681	4.43	1.36	[2-6]	.480	4.94	0.91	[2-6]	.781	1.21	1.09	[0-6]
	Total sample	.706	4.35	1.31	[0-6]	.738	4.58	1.19	[0-7]	.891	1.00	1.08	[0-6]

#	Author(s)	Support				Undermining				Endorsement			
		α	*Mean*	*SD*	*Range*	*α*	*Mean*	*SD*	*Range*	*α*	*Mean*	*SD*	*Range*
#1	Calders (2021)	.886	4.60	1.21	[0-6]	.708	0.54	0.73	[0-4]	.818	4.94	.950	[1-6]
#2	Carvalho et al.	.865	4.56	1.45	[0-6]	.789	0.66	1.08	[0-6]	.788	5.07	1.07	[1-6]
#3	Çetin and Demircan (2022)	.862	4.99	1.18	[0-6]	.623	1.36	1.10	[0-6]	.746	5.04	0.97	[0-6]
#4	Pinto & Figueiredo (2022)	.941	5.52	0.88	[0-6]	.759	0.27	0.60	[0-5]	.874	5.73	0.65	[0-6]
#5	Luo (2022)	.818	4.80	1.10	[1-6]	.711	1.64	1.17	[0-6]	.696	4.27	1.04	[0-6]
#6	Camisasca et al.	.833	4.05	1.23	[0-6]	.847	0.81	1.16	[0-6]	.730	5.21	0.79	[1-6]
#7	Shai (2019)	.847	4.79	1.07	[1-6]	.790	0.91	0.91	[0-5]	.811	5.29	0.77	[2-6]
#8	Favez et al. (2021)	.929	4.84	0.99	[1-6]	.836	0.91	1.10	[0-6]	.900	4.19	1.42	[0-6]
#9	Galdiolo and Roskam (2016)	.884	4.60	1.26	[0-6]	.824	5.31	0.92	[2-6]	.840	4.94	0.99	[1-6]

#10	Feinberg et al. (2012)	.874	4.66	1.23 [1-6]	.789	0.66	0.80 [0-5]	.827 5.15	0.94 [1-6]
#11	Feinberg et al. (2016)	.902	4.54	1.36 [0-6]	.791	0.69	0.89 [0-5]	.790 5.15	0.91 [1-6]
#12	Takeishi et al. (2017)	.912	4.54	1.36 [0-6]	.887	1.42	1.30 [0-6]	.835 3.87	1.25 [0-6]
#13	Soma et al. (2021)	.900	3.43	1.48 [0-6]	.840	1.69	1.14 [0-6]	.820 3.72	1.12 [0-6]
#14	Nakamura et al. (2021)	.909	3.29	1.33 [0-6]	.865	1.42	1.23 [0-6]	.839 3.77	1.25 [0-6]
#15	Mosmann et al. (2018)	.814	3.25	1.47 [0-6]	.853	0.97	1.32 [0-6]	.669 5.06	0.84 [1-6]
	Total sample	.898	4.27	1.45 [0-6]	.805	1.24	1.25 [0-6]	.824 4.61	1.20 [0-6]

Note. Entries with years in parentheses are published studies; otherwise the study is not yet published.

Table 3

Model Fit Indices for the six-factor CFA model conducted on the overall sample. and separately in the 15 datasets.

Sample	*n*	χ^2	CFI	RMSEA		SRMR
				Value	95% CI	
Total sample	9290	8194.219	.928	.042	.042 .043	.041
Separate samples						
#1 Calders	501	1009.735	.902	.049	.044 .046	.052
#2 Carvalho et al.	433	966.535	.886	.050	.046 .055	.062
#3 Çetin & Demircan	1683	1895.787	.900	.043	.041 .045	.046
#4 Pinto & Figueiredo[a, b]	220	1179.611	.769	.084	.078 .090	.073
#5 Luo	1860	2278.966	.876	.046	.044 .048	.051
#6 Camisasca et al.	784	953.172	.916	.037	.033 .040	.046
#7 Shai	195	762.914	.892	.058	.050 .065	.063
#8 Favez et al.	399	1079.529	.915	.058	.053 .062	.054
#9 Galdiolo & Roskam [a]	109	861.044	.776	.089	.080 .098	.078
#10 Feinberg et al.	301	797.814	.896	.049	.043 .055	.066
#11 Feinberg et al.	605	1167.883	.899	.050	.047 .054	.061
#12 Takeishi et al.	200	991.869	.860	.076	.069 .082	.083
#13 Soma et al.	600	1478.867	.889	.060	.057 .064	.064
#14 Nakamura et al.	1200	2607.151	.892	.062	.060 .064	.066
#15 Mosmann et al. [a, b]	200	683.170	.869	.049	.041 .056	.065

Note. Estimation of the same model with 463 df and 131 free parameters estimated in all the samples. CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence intervals; SRMR = standardized root mean square residual.

[a] The estimation of the model may be untrustworthy due to a non-positive first-order derivative product matrix.

[b] The estimation of the model may be untrustworthy due to a non-positive definite covariance matrix.

Table 4

Measurement invariance analyses for the 6-factor model conducted on the overall dataset

Model	χ^2	*df*	CFI	RMSEA		SRMR	$\Delta\chi^2$	ΔCFI
				Value	95% CI			
Configural	19017.521	6945	.884	.053	[.052. .054]	.058	-	-
Metric	21366.080	7547	.867	.054	[.054. .055]	.082	2101.797	.017
Scalar	30212.348	7911	.786	.067	[.067. .068]	.098	9122.742	.081

Note. All χ^2 and $\Delta\chi^2$ were significant at $p < .001$ level. $\Delta\chi^2$: the values express the differences in chi square between each level of invariance and the immediate lower level of invariance. i.e. metric vs. configural and scalar vs. metric.