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Participation in Everyday Routines: Examining the Latent Structure of the MEISR for Children Aged 3–5 Years

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ABSTRACT

Participation in everyday routines (e.g., mealtimes, bedtime, dressing) is a key context for early development and a central focus of early childhood intervention. This study examined the internal structure, reliability and construct validity of the Measure of Engagement, Independence and Social Relationships for children aged 3–5 years (MEISR 3–5) within home routines. The sample included 705 children aged 36 to 72 months ($M = 51.01$, $SD = 10.07$) receiving early childhood intervention services across Spain. A confirmatory factor analysis based on McWilliam's theoretical functional domains—engagement, independence and social relationships—showed acceptable global model fit and very high internal consistency. However, convergent validity was only partial, and discriminant validity was not supported, indicating substantial overlap amongst domains. To further examine the dimensionality of the instrument, parcel-based analyses were conducted in a subsample ($n = 553$) and compared correlated three-factor, two-factor, bifactor, second-order and unidimensional models. All models showed equivalent and excellent fit. Bifactor indices ($\omega_h \approx 0.98$; $ECV > 0.90$) indicated that most reliable and common variance was attributable to a dominant general participation factor, with minimal unique variance remaining for the specific domains. These findings suggest that the MEISR 3–5 functions as an essentially unidimensional measure at the psychometric level. The total score appears to provide the most robust quantitative indicator of children's participation in home routines, whereas domain-level scores are better interpreted as clinically descriptive dimensions that can inform goal setting, intervention planning, and progress monitoring in routine-based practise.

1 | Introduction

Participation in everyday activities is widely recognised as a fundamental component of children's development and well-being and a central outcome of early childhood intervention. Within the framework of the International Classification of Functioning, Disability and Health (ICF), participation is defined as involvement in life situations (World Health Organization 2001). For young children, participation occurs primarily within everyday

routines, where interactions with caregivers, peers and environmental contexts provide continuous opportunities for learning and development. Because participation is inherently contextual and relational, understanding how children function within routine activities is essential for evaluating meaningful participation in early childhood (Eyssen et al. 2011).

Family routines constitute a central context for children's participation in early childhood. Activities such as mealtimes,

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Key Points

- The MEISR 3–5 showed very high internal consistency in a large Spanish early childhood intervention sample.
- Engagement, independence and social relationships showed substantial empirical overlap when assessed within everyday routines.
- Alternative structural models provided equivalent global fit, but bifactor indices supported a dominant general participation factor.
- The MEISR 3–5 functions as an essentially unidimensional measure at the psychometric level.
- The total score is the most robust quantitative indicator, whilst domain-level information remains useful for clinical description and intervention planning.

dressing, play, bathing and bedtime create structured and predictable environments in which children repeatedly practise emerging skills. These recurring interactions support the development of cognitive, social and adaptive competencies by embedding learning opportunities within meaningful daily experiences (Dunst et al. 2002; Fiese and Everhart 2008; Romano et al. 2022). Family routines also provide consistency, behavioural guidance and emotional support, all of which contribute to children's development and participation in daily life (Spagnola and Fiese 2007; Selman and Dilworth-Bart 2024).

Ecological and developmental theories emphasise the importance of these everyday contexts for understanding children's functioning. Bronfenbrenner's bioecological theory conceptualises development as the result of proximal processes—reciprocal interactions between the child and the surrounding environment occurring within everyday contexts (Bronfenbrenner and Morris 1998). These processes unfold across interconnected systems that influence development over time (Navarro et al. 2020; Kaushik et al. 2023). Transactional perspectives similarly highlight the bidirectional nature of interactions between children and their social environments (Sameroff and Chandler 1975; Ashiabi and O'Neal 2015), whilst sociocultural theory emphasises the role of guided participation and scaffolding within the zone of proximal development (Vygotsky and Cole 1978). Collectively, these perspectives underscore the importance of evaluating children's functioning within natural routines rather than relying solely on decontextualized assessments. They also align with evidence showing that children's participation across home, school and community contexts contributes to broader developmental outcomes (Dunst 2000; Dunst et al. 2013).

Within early childhood intervention, McWilliam (2006, 2010) proposed that children's meaningful participation in everyday routines can be understood through three functional domains: engagement, independence and social relationships. Engagement can be defined as the level of a child's active participation in activities, ranging hierarchically from non-engagement to persistent, goal-directed behaviour, reflecting increasing complexity in attention, interaction and symbolic functioning (McWilliam and de Kruif 1998). Independence reflects the child's ability to perform actions and routines with

increasing autonomy (McWilliam 2010). Social relationships encompass interactions with others, including communication and cooperative behaviours that support participation in daily activities (Golubović et al. 2022; McWilliam 2010; Morales-Murillo et al. 2020). Together, these domains provide a useful conceptual framework for understanding how participation is expressed in everyday life.

Importantly, these functional domains typically occur simultaneously during routine activities. For example, during mealtime or play, children engage in tasks, act independently to varying degrees and interact socially with others. Because these domains are expressed concurrently within natural contexts, they may be conceptually distinguishable yet empirically interrelated when measured within everyday routines.

In line with this perspective, authentic assessment approaches emphasise evaluating children's functioning within natural contexts and everyday activities rather than through isolated performance tasks. Authentic assessment involves systematic observation or reporting of children's competencies during routine activities by individuals familiar with the child's daily functioning, typically caregivers or professionals working closely with the family (Bagnato et al. 2010). Such approaches are intended to capture meaningful aspects of children's participation in real-life contexts and to generate information that can directly inform intervention planning and monitoring (Bagnato et al. 2014; Macy and Bagnato 2010, 2024).

The Measure of Engagement, Independence and Social Relationships (MEISR; McWilliam and Younggren 2012, 2019) allows to assess children's functioning in everyday routines within the authentic assessment framework. The instrument evaluates behaviours that children demonstrate when participating in daily activities, allowing caregivers and professionals to identify strengths, emerging skills and challenges within natural contexts. Each MEISR item corresponds to one of the three functional domains described by McWilliam—engagement, independence and social relationships—and reflects behaviours that children may use to participate in routine activities. Two versions of the instrument are available for different developmental stages: MEISR 0–3 for infants and toddlers and MEISR 3–5 for preschool-aged children (McWilliam and Younggren 2019; McWilliam et al. 2019). The MEISR has been widely used in early childhood intervention settings because it aligns with recommended practises emphasising family-centred services and assessment in natural environments (Division for Early Childhood 2014).

In addition, MEISR items are linked to multiple developmental and functional frameworks. Specifically, items have been cross-walked with developmental domains, early childhood outcomes identified by the U.S. Office of Special Education Programmes (OSEP), and codes from the Activities and Participation component of the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY; World Health Organization 2007). Previous research conducted with Spanish samples demonstrated strong reliability of MEISR scores and supported their alignment with the ICF-CY framework when items were organised according to activities and participation domains (Morales-Murillo et al. 2025). However,

that line of work does not resolve the question of whether the latent structure of the instrument, when examined according to McWilliam's functional domains, is empirically multidimensional or primarily reflects a broader general participation construct.

Despite this growing body of research, an important psychometric question remains unresolved. Although engagement, independence and social relationships are theoretically described as distinct functional domains of participation, the extent to which these domains represent empirically separable constructs when assessed within everyday routines has not been thoroughly examined. Given that participation behaviours occur simultaneously in natural contexts, it is plausible that these domains may show substantial empirical overlap and reflect a broader underlying construct of participation.

Understanding the dimensional structure of the MEISR 3–5 is important for both research and practise. If the three domains represent empirically distinct constructs, domain-specific scores may provide unique information about different aspects of children's participation. Alternatively, if the domains are highly overlapping, the instrument may function as an essentially unidimensional measure in which a general participation factor captures most of the reliable variance. Clarifying this issue is critical for the interpretation of MEISR scores and for determining whether the instrument should be understood primarily as yielding distinct domain scores or as assessing a broader participation construct.

The present study examined the latent structure and reliability of the Measure of Engagement, Independence and Social Relationships for children aged 3–5 years (MEISR 3–5) within a large sample of children receiving early childhood intervention services in Spain. Building on McWilliam's theoretical framework, the study evaluated whether the proposed functional domains—engagement, independence and social relationships—represent empirically distinct constructs when measured within everyday routines. To address this question, the study compared the theoretically specified three-factor structure with alternative latent representations, including two-factor, bifactor, second-order and unidimensional models, in order to clarify whether children's participation in everyday routines is best represented as a multidimensional construct or as a predominantly general participation factor.

2 | Method

2.1 | Participants

The sample consisted of 705 children between 36 and 72 months of age ($M = 51.01$ months, $SD = 10.07$) who were receiving early childhood intervention (ECI) services in Spain. Eligibility criteria included (a) enrollment in an ECI programme, (b) being within the age range targeted by the MEISR 3–5 and (c) having a caregiver familiar with the child's daily routines who was willing to complete the study instruments.

Children were recruited from 47 ECI centres located across 15 provinces and nine autonomous communities in Spain. This

recruitment strategy allowed the study to capture children participating in diverse early intervention service contexts. Amongst the participating children, 55.3% ($n = 309$) were boys.

Regarding the respondent completing the MEISR, 66% of questionnaires were completed by mothers ($n = 466$), 4% by fathers ($n = 30$) and 30% by another family member or legal guardian familiar with the child's participation in daily routines. Information about living arrangements was available for a subset of participants: 28% of children lived with both parents, 2% lived with one parent and 1% alternated between parents due to shared custody. For the remaining participants, caregivers did not provide information regarding the child's living situation.

For the parcel-based analyses, a subsample of 553 cases was retained after excluding cases with more than 10% missing data. Sociodemographic characteristics of this subsample are presented in Table 1.

2.2 | Measures

The Measure of Engagement, Independence and Social Relationships for children aged 3–5 years (MEISR 3–5; McWilliam et al. 2019) is a caregiver-reported instrument designed to assess children's meaningful participation in everyday routines. The instrument evaluates behaviours children demonstrate whilst engaging in daily activities within natural home contexts.

The MEISR 3–5 consists of 184 items distributed across 14 common home routines (e.g., waking up, mealtimes, dressing, play, bathing, bedtime and transitions). Each item represents a functional behaviour that a child may demonstrate whilst participating in these routine activities. Items are conceptually linked to three functional domains proposed by McWilliam: engagement, independence and social relationships. Example

TABLE 1 | Sociodemographic characteristics of the subsample ($N = 553$).

Characteristic	<i>n</i> (%)
Child characteristics	
Sex	
Male	320 (57.9)
Female	108 (19.5)
Not reported	125 (22.6)
Age (months)	$M = 50.93$, $SD = 10.04$, range = 37–72
Respondent completing the MEISR	
Mother	418 (75.6)
Father	29 (5.2)
Other family member or legal guardian	107 (19.4)

Note: Percentages refer to the subsample included in parcel-level analyses.

items representing the three functional domains are provided in Table S1.

Each item is rated on a three-point Likert scale indicating the extent to which the behaviour is used during routines: 1 = not yet used/difficulties, 2 = sometimes used/learning opportunities and 3 = often used or beyond this/strengths. Higher scores therefore reflect greater meaningful participation in everyday routines.

Although the MEISR can be used clinically to summarise children's participation profiles across routines and domains, the present study focused on the item-level and routine-functional domain-combination-level mean responses for psychometric analyses.

In addition to the MEISR 3–5, caregivers completed a sociodemographic questionnaire collecting information on socioeconomic status, place of residence, the respondent's relationship to the child and the child's living arrangements.

2.3 | Procedure

Following approval from the institutional review board, early childhood intervention (ECI) centres across Spain were invited to participate in the study through a dedicated website, email invitations and social media outreach.

Prior to data collection, the MEISR 3–5 was translated into Spanish using a forward–backward translation procedure involving four independent reviewers to ensure linguistic accuracy and cultural appropriateness, following established cross-cultural adaptation guidelines (Borsa et al. 2012). The translated instrument was subsequently integrated into the digital data management platforms routinely used by participating ECI centres.

Data collection took place over a 2-year period (September 2020 to September 2022). The MEISR 3–5 was administered as part of families' ongoing early intervention processes. In most cases, caregivers completed the instrument following the Routines-Based Interview or prior to the 6-month or annual review of the Individualised Family Service Plan (IFSP), situating the assessment within routine service delivery. This procedure ensured that responses reflected children's participation within natural routines rather than isolated testing situations, thereby enhancing the ecological validity of the assessment.

ECI professionals activated the instrument through a secure online platform, allowing caregivers to complete the family-report version remotely. Consistent with the instrument developers' recommendations (McWilliam and Younggren 2019), families were given up to 1 month to complete the questionnaire and could request clarification from their intervention professional during regular visits.

Before accessing the instrument, caregivers received information about the study and provided informed consent for research

participation. Completion of the MEISR as part of routine clinical practise was independent of consent to participate in the research study, ensuring that access to services was not contingent upon research participation.

Responses were stored on encrypted servers compliant with General Data Protection Regulation (GDPR) standards. Data were anonymised prior to analysis, and only records from families who provided research consent were extracted and transferred to the research team for statistical analysis.

2.4 | Data Analysis

The original sample comprised 705 completed MEISR protocols for the first round of analyses, with a subsample of 553 retained for the second analytic phase after excluding cases with more than 10% missing data. Although the instrument contains 184 items, simulation studies indicate that sample sizes of approximately 500 or more generally provide stable parameter estimates for complex confirmatory factor analysis (CFA) models (Kline 2016).

Descriptive statistics and preliminary reliability analyses were conducted using SPSS and JASP. Internal consistency was evaluated using both Cronbach's alpha and McDonald's omega, with values above 0.90 interpreted as indicative of strong reliability (Lomax 2013).

Confirmatory factor analyses were conducted using R (Version 3.6.0+) with the lavaan package (Rosseele 2012). A model specifying three latent constructs—Engagement, Independence and Social Relationships—was tested, consistent with McWilliam's theoretical framework. Because MEISR items are rated on an ordinal scale, CFA models were estimated using diagonally weighted least squares (DWLS), an estimation method recommended for ordinal indicators.

Model fit was evaluated using multiple indices, including the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR). Values close to or above 0.95 for CFI and TLI and values below 0.08 for RMSEA and SRMR were interpreted as indicative of acceptable model fit.

Construct-level convergent validity was assessed using Average Variance Extracted (AVE) and Composite Reliability (CR), with $AVE \geq 0.50$ and $CR \geq 0.70$ considered acceptable. Discriminant validity was evaluated using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT), with HTMT values above 0.85–0.90 indicating potential discriminant validity concerns (Henseler et al. 2015). Because HTMT has been shown to be more sensitive than traditional approaches for detecting discriminant validity problems, it was treated as an important complementary diagnostic index (Henseler et al. 2015; Voorhees et al. 2016).

Because the MEISR includes a large number of indicators (184 items), a second analytic phase was conducted using item

parcelling to reduce model complexity and improve estimation stability (Bandalos 2002; Marsh et al. 1998). Item-level analyses were first conducted to evaluate factor loadings and construct validity before implementing parcelling. Parcels were then constructed using a domain-representative strategy, grouping conceptually similar items within routines and functional domains (Little et al. 2002; Matsunaga 2008). This approach allowed preservation of the theoretical structure whilst improving model parsimony and estimation efficiency.

The 184 items were aggregated into 36 parcels representing routine-by-domain combinations. A parcel-level CFA specifying three correlated factors was first estimated. Given the high inter-factor correlations observed in this model, additional theoretically informed alternative structures were evaluated to examine competing representations of the latent construct, including a two-factor model combining Engagement and Independence, a bifactor model including a general participation factor alongside three domain-specific factors, a second-order hierarchical model with Participation as a higher-order construct and a unidimensional model specifying a single participation factor. This model comparison strategy allowed evaluation of whether the theoretical domains functioned as empirically distinct constructs or as integrated manifestations of a broader participation construct.

Because global fit alone may not distinguish amongst highly similar structural solutions, model evaluation also considered discriminant validity, parameter interpretability, the presence of boundary estimates and model parsimony. For bifactor models, omega hierarchical (ω_h) and explained common variance (ECV) were calculated to evaluate the relative contribution of the general and specific factors (Reise 2012; Rodriguez et al. 2016a, 2016b). These indices provide information about the degree to which a scale functions as essentially unidimensional by estimating the proportion of reliable variance attributable to the general factor. In contrast, evaluation of the second-order model focused on higher-order loadings and residual variances of the first-order factors, as ω_h and ECV are specific to bifactor parameterizations and are not conceptually applicable to higher-order structures (Chen et al. 2006; Mansolf and Reise 2017).

3 | Results

3.1 | Item-Level Analyses

In the full sample ($N=705$), the MEISR 3–5 demonstrated very high internal consistency ($\alpha=0.991$ for the total scale; Engagement $\alpha=0.976$; Independence $\alpha=0.977$; Social Relationships $\alpha=0.978$). Such high reliability coefficients are expected given the large number of items included in the instrument and likely reflect substantial shared variance amongst items assessing participation behaviours across multiple routines.

The confirmatory factor analysis specifying three correlated factors showed acceptable global fit: $\chi^2(16,836)=84,124.36$, $p<0.001$, $\chi^2/df=4.9$, CFI=0.989, TLI=0.975, RMSEA=0.044 (90% CI [0.043, 0.045]), SRMR=0.061. Given the large number

TABLE 2 | Convergent validity and composite reliability of MEISR domains.

Domain	AVE	CR
Engagement	0.384	0.975
Independence	0.368	0.976
Social relationships	0.521	0.978

Note: AVE values below 0.50 indicate limited convergent validity. Abbreviations: AVE = average variance extracted; CR = composite reliability.

TABLE 3 | Discriminant validity assessment using the Fornell-Larcker criterion.

Domain	1	2	3
Engagement	0.620		
Independence	0.879	0.607	
Social relationships	0.744	0.763	0.722

Note: $N=705$. Values on the diagonal represent the square root of the Average Variance Extracted (\sqrt{AVE}). Values below the diagonal represent interfactor correlations. Discriminant validity is supported when \sqrt{AVE} exceeds inter-factor correlations.

of indicators included in the model, global fit indices should be interpreted with caution because complex models with many parameters can yield significant chi-squared statistics even when overall model fit is adequate.

All standardised factor loadings were statistically significant ($p<0.001$). Based on the classification proposed by Kang and Ahn (2021), six items loaded below 0.30, 26 between 0.30 and 0.50, 88 between 0.50 and 0.70 and 64 above 0.70. Although most items demonstrated moderate to strong loadings, a subset of items showed comparatively lower loadings (<0.50), suggesting that some indicators may contribute less strongly to the latent domains.

Convergent validity and composite reliability estimates for the three domains are presented in Table 2. Average Variance Extracted (AVE) ranged from 0.368 to 0.521. The Social Relationships factor met the recommended threshold for convergent validity (AVE=0.521), whereas Independence (AVE=0.368) and Engagement (AVE=0.384) fell below the 0.50 criterion. However, composite reliability values for all domains were high (CR > 0.95), indicating that the constructs were measured with strong internal consistency despite relatively modest AVE values. Lower AVE values in behavioural scales may occur when constructs encompass diverse observable behaviours that vary across contexts.

Discriminant validity was evaluated using the Fornell-Larcker criterion, and the results are presented in Table 3. The square roots of AVE were lower than the corresponding inter-factor correlations in all comparisons, suggesting substantial shared variance amongst the domains. Participation behaviours within everyday routines often involve simultaneous expressions of engagement, autonomy and social interaction, which may naturally produce high correlations amongst these domains.

Although the three-factor model adequately reproduced the covariance structure of the data, the lack of discriminant validity raised concerns regarding the empirical distinctiveness of the proposed domains. Taken together, the high interfactor correlations and lack of discriminant validity suggested that the functional domains of engagement, independence and social relationships may show substantial empirical overlap when assessed within everyday routines. These findings motivated further analyses to explore alternative latent structures that might better represent the dimensionality of participation in the MEISR 3–5.

3.2 | Parcel-Level Analyses

Given the lack of discriminant validity observed in the item-level analyses, additional models were estimated using item parcels to reduce model complexity and improve estimation stability. Cases with more than 10% missing data were excluded, resulting in a subsample of 553 participants. The 184 items were aggregated into 36 parcels organised by routine and functional domain.

3.3 | Three-Factor Parcel Model

A correlated three-factor parcel model representing Engagement, Independence and Social Relationships was first estimated. The model demonstrated excellent global fit: $\chi^2(591)=864.30$, $\chi^2/df=1.46$, CFI=0.998, TLI=0.998, RMSEA=0.029 (90% CI [0.025, 0.033]), SRMR=0.047. Standardised factor loadings ranged from 0.394 to 0.913, with only one parcel (Social Relationships within the Getting Dressed routine) loading below 0.50. Detailed standardised parcel loadings for this model are reported in Table S2.

Reliability estimates were strong across domains (Independence: $\omega=0.934$, $\alpha=0.938$; Engagement: $\omega=0.960$, $\alpha=0.960$; Social Relationships: $\omega=0.904$, $\alpha=0.905$), and high reliability was also observed for the total scale ($\omega=0.978$, $\alpha=0.975$; CR=0.939–0.962).

Convergent validity was adequate for Independence (AVE=0.577) and Engagement (AVE=0.648), whereas Social

Relationships showed lower AVE (AVE=0.453). Despite acceptable global fit and reliability, discriminant validity was not supported. The square roots of AVE (0.760, 0.805, 0.673) were lower than the corresponding inter-factor correlations (0.999–1.009), indicating substantial shared variance amongst domains.

The heterotrait–monotrait ratios were also extremely high (Independence–Engagement=1.006, 95% CI [0.998, 1.000]; Independence–Social Relationships=0.992, 95% CI [0.982, 0.998]; Engagement–Social Relationships=1.005, 95% CI [0.997, 1.000]). These values approached or slightly exceeded the upper boundary of the parameter space, suggesting that the proposed domains were empirically indistinguishable within the parcel-level model.

3.4 | Alternative Structural Models

Because the correlated three-factor solution demonstrated extremely high inter-factor correlations and lack of discriminant validity, several theoretically plausible alternative structures were examined. Global fit indices for all tested models are presented in Table 4. Detailed standardised parcel loadings for the second-order, bifactor and unidimensional models are reported in Table S2, whereas standardised parcel loadings for the two-factor CFA are reported separately in Table S3.

3.5 | Two-Factor Model

A two-factor model combining Engagement and Independence whilst retaining Social Relationships as a separate factor produced virtually identical fit to the three-factor solution: $\chi^2(593)=866.30$, $\chi^2/df=1.46$, CFI=0.998, TLI=0.998, RMSEA=0.029 (90% CI [0.025, 0.033]), SRMR=0.047. Reliability remained high (merged factor $\alpha=0.975$, $\omega=0.976$; Social Relationships $\alpha=0.905$, $\omega=0.904$; total $\alpha=0.979$, $\omega=0.979$) and AVE values were 0.621 for the merged factor and 0.499 for Social Relationships. However, the latent correlation between the two factors was 1.001 (95% CI [0.995, 1.007]), and the HTMT ratio was 0.996, indicating lack of discriminant validity and empirical indistinguishability between the constructs. Standardised parcel loadings for this model are reported in Table S3.

TABLE 4 | Model fit comparison across alternative structural models.

Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR
Three-factor CFA	864.30	591	1.46	0.998	0.998	0.029	0.047
Two-factor model (Engagement + independence)	866.30	593	1.46	0.998	0.998	0.029	0.047
Bifactor model (General participation + 3 specific factors)	864.30	591	1.46	0.998	0.998	0.029	0.047
Second-order model (Participation as higher-order factor)	864.30	591	1.46	0.998	0.998	0.029	0.047
Unidimensional model	866.40	594	1.46	0.998	0.998	0.029	0.047

Note: All models demonstrated equivalent global fit ($\Delta CFI=0.000$; $\Delta RMSEA=0.000$), indicating that multidimensional and unidimensional representations provide statistically indistinguishable fit to the data. Abbreviation: CFA = confirmatory factor analysis.

TABLE 5 | Bifactor model indices supporting a dominant general participation factor.

Index	Value
General factor reliability (ω)	0.980
Total reliability (ω)	0.978
Omega hierarchical (ω_h)	≈ 0.98
Explained common variance (ECV)	> 0.90
Composite reliability (CR)	≈ 0.981
Average variance extracted (AVE)	≈ 0.71

Note: High ω_h and ECV values indicate that most reliable and common variance is attributable to the general participation factor, supporting essential unidimensionality.

3.6 | Bifactor Model

A bifactor model specifying a general participation factor alongside three domain-specific factors also demonstrated equivalent global fit. Bifactor indices are presented in Table 5. The omega hierarchical coefficient ($\omega_h \approx 0.98$) and explained common variance (ECV > 0.90) indicated that the vast majority of reliable and common variance was attributable to the general participation factor, with minimal variance accounted for by the domain-specific factors. Detailed standardised parcel loadings for this model are reported in Table S2.

3.7 | Second-Order Model

A second-order model specifying Participation as a higher-order construct above the three domains also produced equivalent fit. Higher-order loadings approached unity (Engagement $\beta = 1.009$; Independence $\beta = 0.999$; Social Relationships $\beta = 1.000$; all $p < 0.001$), and residual variances for the first-order factors were negligible, with one small negative estimate observed for Engagement ($\beta = -0.018$, $p < 0.001$). These boundary estimates indicate that the first-order domains were almost completely explained by the higher-order participation construct. Detailed standardised parcel loadings for this model are reported in Table S2.

3.8 | Unidimensional Model

Finally, a unidimensional parcel model also produced equivalent global fit. Unlike the multidimensional solutions, this model did not produce boundary parameter estimates and therefore provided a more parsimonious and statistically stable representation of the data. Detailed standardised parcel loadings for this model are reported in Table S2.

As shown in Table 4, all tested models demonstrated virtually identical global fit ($\Delta CFI = 0.000$; $\Delta RMSEA = 0.000$), indicating that fit indices alone could not differentiate amongst alternative structural representations. However, multidimensional solutions showed extremely high inter-factor correlations, lack of discriminant validity and negligible domain-specific variance. Consistent with the bifactor indices reported in Table 5,

these findings indicate that the MEISR 3–5 functions as an essentially unidimensional measure, with a dominant general participation factor accounting for the majority of reliable variance.

4 | Discussion

The present study examined the latent structure and reliability of the MEISR 3–5 within a large sample of children receiving early childhood intervention services in Spain. Building on McWilliam's theoretical framework, the study evaluated whether the functional domains of engagement, independence and social relationships represent empirically distinct constructs when assessed within everyday routines.

Across item-level and parcel-level analyses, the results consistently indicated strong global model fit. However, fit indices alone were insufficient to distinguish amongst competing structural representations. More detailed psychometric analyses provided clearer evidence regarding the dimensionality of the MEISR 3–5.

At the item level, the theoretically specified three-domain structure showed acceptable model fit, but discriminant validity analyses indicated substantial shared variance amongst engagement, independence and social relationships. At the parcel level, the correlated three-factor model also demonstrated excellent fit, yet interfactor correlations approached or slightly exceeded unity and heterotrait–monotrait ratios were extremely high. Together, these findings suggest that the proposed domains do not function as empirically distinct latent constructs when participation is assessed within everyday routines.

The comparison of alternative parcel-level models further reinforced this conclusion. A two-factor solution combining engagement and independence whilst retaining social relationships as a separate factor produced virtually identical fit, but the latent correlation between the two resulting factors remained at the boundary of the parameter space, indicating that even this simplified structure did not resolve the problem of empirical indistinguishability. Similarly, the second-order model showed higher-order loadings approaching unity and negligible residual variance in the first-order factors, again suggesting that the proposed domains were almost entirely explained by a broader common construct.

Bifactor analyses provided the clearest evidence regarding the underlying structure of the instrument. The omega hierarchical coefficient ($\omega_h \approx 0.98$) and explained common variance (ECV > 0.90) indicated that the vast majority of reliable variance was attributable to a general participation factor rather than to domain-specific factors. Such patterns are commonly interpreted as evidence of essential unidimensionality when a dominant general factor accounts for most of the common variance in a multidimensional scale (Reise 2012; Rodriguez et al. 2016a, 2016b). In the present study, the bifactor results suggested that the MEISR 3–5 primarily measures a single overarching construct reflecting children's participation in everyday routines.

Importantly, this psychometric pattern does not contradict the theoretical framework proposed by McWilliam (2006, 2010). Rather, it reflects the integrated nature of participation in natural contexts. In everyday routines, engagement, independence and social relationships are typically expressed simultaneously as children interact with people, objects and activities. For example, during mealtime or play, children engage with tasks, act with varying degrees of autonomy and interact socially with caregivers or peers. Because these behaviours occur together within routine activities, high correlations amongst the domains are theoretically plausible when participation is assessed within ecologically valid contexts (Dunst et al. 2013; McWilliam 2010).

From this perspective, the MEISR domains may be best understood as conceptually meaningful descriptors of children's functioning rather than as statistically independent latent constructs. Engagement, independence and social relationships provide a useful framework for describing how participation unfolds within daily routines, even if the measurement structure is dominated by a general participation factor.

Reliability analyses further supported the robustness of the instrument. Cronbach's alpha and omega coefficients were extremely high across domains and for the total scale. Although very high reliability values may partly reflect the large number of items included in the MEISR, they also indicate strong internal consistency amongst participation-related behaviours observed across multiple routines. Similar patterns of strong reliability have been reported in previous research examining MEISR scores within the framework of activities and participation in the ICF-CY (Morales-Murillo et al. 2025).

Taken together, the findings suggest that the MEISR 3–5 captures a broad and highly integrated construct of participation in everyday routines. Whilst the domains of engagement, independence and social relationships remain theoretically meaningful, the total MEISR score appears to provide the most robust quantitative representation of children's participation when the instrument is used for psychometric purposes.

4.1 | Clinical and Practise Implications

The findings of this study have important implications for the interpretation and practical use of the MEISR 3–5 in early childhood intervention contexts. From a psychometric perspective, the results support prioritising the total MEISR score as the most robust quantitative indicator of children's participation in home routines. Because the general participation factor accounted for the vast majority of reliable variance, the total score appears to provide the most stable and interpretable summary of children's functioning when the instrument is used for research, programme evaluation or progress monitoring.

At the same time, the absence of statistical discriminant validity amongst engagement, independence and social relationships should not be interpreted as eliminating the practical usefulness of these domains. Rather, the findings suggest that the domains are better understood as clinically meaningful descriptive dimensions than as independent psychometric scores (McWilliam 2006, 2010). Within routine-based early childhood

intervention, these domains can still help professionals and families organise observations, describe how participation is expressed in everyday activities and identify strengths and support needs within specific routines (McWilliam 2010).

This distinction has direct practical implications. When quantitative interpretation is required, the total MEISR score is the most defensible indicator of children's overall participation. However, when the goal is individualised planning, item-level and domain-referenced information remains valuable for understanding how participation unfolds in context. For example, professionals may use the total score to monitor broad changes in participation over time whilst using domain- and item-level information to clarify whether support is primarily needed in engagement within routines, emerging autonomy or social interaction.

More broadly, the results reinforce the value of routine-based assessment approaches in early childhood intervention. Instruments such as the MEISR allow practitioners to examine children's functioning within natural environments rather than relying exclusively on isolated skill performance (Bagnato et al. 2010; Division for Early Childhood 2014). In this way, assessment results can be directly linked to intervention planning, family priorities, and participation-based goals embedded within everyday routines (McWilliam 2010; Macy and Bagnato 2010, 2024).

Taken together, these findings suggest that the MEISR 3–5 is best used as a psychometrically robust measure of general participation that also provides clinically informative descriptive information across engagement, independence, and social relationships. This dual interpretation strengthens its utility for both research and family-centred intervention practise.

4.2 | Limitations and Future Research

Several limitations should be considered when interpreting the findings of this study. First, the sample consisted exclusively of children receiving early childhood intervention (ECI) services in Spain. Although this population is highly relevant for routine-based assessment, the findings may not fully generalise to community samples or to children without identified developmental concerns. Replication in more diverse populations and cultural contexts would help clarify the broader applicability of the MEISR 3–5.

Second, the cross-sectional design limits conclusions regarding the stability of the MEISR 3–5 structure over time. Participation in everyday routines is a dynamic construct that evolves as children develop and as family contexts change. Future longitudinal studies are needed to examine the temporal stability of the instrument, as well as its sensitivity to developmental change.

Third, although the study included a large sample size and multiple confirmatory models, the instrument contains a substantial number of items (184), which may have contributed to the very high internal consistency estimates and to the strong correlations observed amongst domains. Future research could explore the development of shorter or adaptive versions of the

MEISR that preserve the conceptual coverage of everyday routines whilst improving efficiency for research and practise.

Fourth, the use of item parcelling in the second analytic phase reduced model complexity and improved estimation stability, but parcelling can also obscure potential item-level multidimensionality. To mitigate this concern, item-level analyses were conducted prior to parcel modelling; however, future studies could further examine the dimensionality of the MEISR 3–5 using alternative modelling approaches, including item-level bifactor models or item response theory methods.

Fifth, the study did not examine measurement invariance across relevant subgroups such as age, developmental profiles or gender. Because children's participation may vary across developmental trajectories and contextual factors, future research should evaluate whether the MEISR 3–5 operates equivalently across different populations.

Sixth, the MEISR is based on caregiver report, and responses may therefore reflect caregiver perceptions of children's functioning within routines. Although this is consistent with authentic, family-centred assessment practises (Bagnato et al. 2010; Macy and Bagnato 2024), future studies could complement caregiver reports with observational or multi-informant data.

Finally, although the present study focused on the internal structure of the MEISR 3–5, additional evidence of validity would strengthen the interpretation of scores. Future studies could examine associations between MEISR scores and other indicators of children's participation, developmental functioning or family routines, thereby further clarifying the construct validity and practical interpretation of the instrument. Integrating MEISR findings with qualitative tools such as the Routines-Based Interview may also help provide a more comprehensive understanding of family functioning and contextual influences (Boavida et al. 2014; McWilliam 2010).

5 | Conclusions

The present study provides new evidence regarding the internal structure and reliability of the MEISR 3–5 as a measure of children's participation in everyday routines. Across item-level and parcel-level analyses, the findings consistently indicated that the instrument is best understood as reflecting a dominant general participation factor.

Although the theoretical domains of engagement, independence and social relationships showed acceptable global fit, the lack of discriminant validity and the predominance of the general factor indicated that these domains are highly interrelated when participation is assessed within natural routines. From a psychometric perspective, these results support the interpretation of the MEISR 3–5 as an essentially unidimensional measure.

Importantly, this structural pattern does not undermine the conceptual relevance of McWilliam's functional domains. Rather, it highlights the integrated nature of participation in daily routines, where children simultaneously engage with activities, exercise emerging autonomy and interact socially with others.

Within this framework, the total MEISR score provides the most robust quantitative indicator of children's participation, whilst the domain structure continues to offer a meaningful basis for describing children's functioning and guiding routine-based intervention planning.

Overall, the study clarifies the dimensionality of the MEISR 3–5, strengthens the interpretation of its scores and provides relevant evidence supporting its use in both research and early childhood intervention practise.

Author Contributions

Irene León-Estrada: conceptualization, funding acquisition, investigation, writing – original draft, supervision, writing – review and editing, visualization, project administration, resources. **Catalina Morales-Murillo:** conceptualization, investigation, writing – original draft, methodology, validation, software, formal analysis, data curation, supervision, writing – review and editing, visualization, project administration, resources. **Manuel Pacheco-Molero:** writing – review and editing, writing – original draft, supervision, investigation, data curation, visualization, resources. **Roberto Hernández-Soto:** writing – review and editing, visualization, investigation, resources. **Mónica Gutiérrez-Ortega:** project administration, supervision, writing – review and editing, resources, visualization, funding acquisition, investigation, formal analysis, validation.

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Ethics Statement

The research project was approved by the Ethics Committee of the Universidad Internacional de La Rioja (PI:030/2020) and by the collaborating entities. All procedures complied with ethical standards in accordance with the Declaration of Helsinki and relevant national and institutional guidelines.

Consent

Informed consent was obtained from all families who participated in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Peer Review

For transparency, the peer review documents associated with this article are available at <https://doi.org/10.1002/icd.70111>.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Table S1:** Example MEISR items by functional domain. **Table S2:** Parcel-level standardised loadings across alternative structural models. **Table S3:** Standardised parcel loadings for the two-factor CFA.