

RESEARCH ARTICLE

# Factor Structure and Internal Consistency Reliability of the Croatian Version of the Family Adaptability and Cohesion Evaluation Scale (FACES) IV Package: A Preliminary Study

Zlatka GREGOROVIĆ BELAIĆ <sup>1</sup> ✉, Nadja ČEKOLJ <sup>1</sup>, and Jasminka ZLOKOVIĆ <sup>1</sup>

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Affiliations

<sup>1</sup> University of Rijeka, Faculty of Humanities and Social Sciences, Rijeka, Croatia

✉ Correspondence

Zlatka Gregorović Belaić

University of Rijeka, Faculty of Humanities and Social Sciences,

Sveučilište u Rijeci

Filozofski fakultet

Sveučilišna avenija 4

51000 Rijeka, Croatia

Email: [zlatka.belaic@uniri.hr](mailto:zlatka.belaic@uniri.hr)

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**Introduction:** A family operates as a dynamic system comprising various subsystems and is continually interacting with its environment. Therefore, it is essential to comprehend the underlying principles of family functioning. One of the most commonly used models for describing family functioning is the Circumplex Model of Marital and Family Systems (Olson & Gorall, 2003).

**Aims:** In this study, we aimed at examining the factor structure and internal consistency reliability in the Croatian version of the Family Adaptability and Cohesion Evaluation Scale IV Package, which measures family functioning through family cohesion and flexibility at the balanced and unbalanced levels, as well as family communication and family satisfaction.

**Methods:** Confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) were performed using a convenient sample of 528 participants.

**Results:** CFA revealed that the Croatian version of the FACES IV Package does not fit the theoretical model of the original factor structure in this preliminary study. The exceptions were the Family Communication Scale and Family Satisfaction Scale, which showed satisfactory parameters. The results of the EFA of FACES IV showed a 5-factor model solution.

**Conclusions:** The Croatian version of the FACES IV Package is not completely suitable for use in the national context. Thus, given these preliminary findings, further testing on a more representative or clinical sample is recommended.

**Keywords:** confirmatory factor analysis (CFA), exploratory factor analysis (EFA), family functioning, FACES IV Package, family satisfaction

## Introduction

Family is a dynamic system that contains different subsystems (e.g., relationships between siblings, spouses, parents and children, etc.) and exists in constant interaction with the environment. The theoretical Circumplex Model of Marital and Family Systems is based on a systemic approach to the study of families (Olson & Gorall, 2003). The Circumplex Model enables the study of all the subsystems within the family as well as interactions between the family and the surrounding environment.

The Circumplex Model of Marital and Family Systems was first conceptualized in the late 1970s (Olson et al., 1979). This model, which integrates systemic theory and family development theory, led to the creation of the Family Adaptability and Cohesion Evaluation Scale (FACES), a prominent international tool for assessing family functioning, due to its robust theoretical foundation and clinical applicability (see Hamilton & Carr, 2016 for a review on self-reported measures to assess family functioning).

The Circumplex Model is one of the most respected and widely used approaches in family studies. It illustrates the changes that occur during the family life cycle and the family's ability to change and adapt, which is one of the characteristics of functional families, as opposed to dysfunctional families. The model describes family functioning through two central dimensions, cohesion and flexibility, and one facilitating dimension, communication. The central dimensions include five levels: three central (balanced) levels and two extreme (unbalanced) levels (Olson & Gorall, 2003).

Family cohesion, the model's first dimension (Olson et al., 2006), explores the emotional relations among family members. For example, family cohesion manifests through different aspects of family functioning, such as time spent together, the existence of common friends, activities, and interests, and the ability to make decisions together. Previous studies on family cohesion have focused on the ways in which family systems balance themselves (e.g., disengaged in comparison to enmeshed). On the one hand, families assessed as disengaged insufficiently support each other. On the other hand, families characterized as enmeshed contest the development of autonomy in family members (Alić, 2016). Olson et al. (2006) highlighted five levels of family cohesion: two extreme unbalanced (disengaged and enmeshed) and three mid-range balanced (somewhat connected, connected, and very connected). Mid-range cohesion is optimal because it balances the family system, which is especially important for a well-functioning family. Extreme or unbalanced levels lead to imbalance in the family system, fostering a lack of independence or the manifestation of overt alienation among family members, resulting in negative consequences (Olson, 2000; Olson et al., 2006).

The study of second dimension, namely family flexibility, evaluates the level of adaptability to changes in family leadership, family rules, and relationships with other individuals. Five levels of flexibility were distinguished: rigid, somewhat flexible, flexible, very flexible, and chaotic (Olson et al., 2006). The mid-range levels contribute to balanced functioning, which enables changes when they are indispensable for marital and family functioning, for example, when participation and leadership in activities are shared equally among all family members, a clear process of role division takes place, and discipline and mutual respect are implicit. An unbalanced and inflexible system is characterized by too few changes, a tendency towards stability at all costs, occasional role changes, and roles ruled by strict discipline. Rigid and chaotic levels, especially over an extended period, are considered risky (Olson et al., 2006).

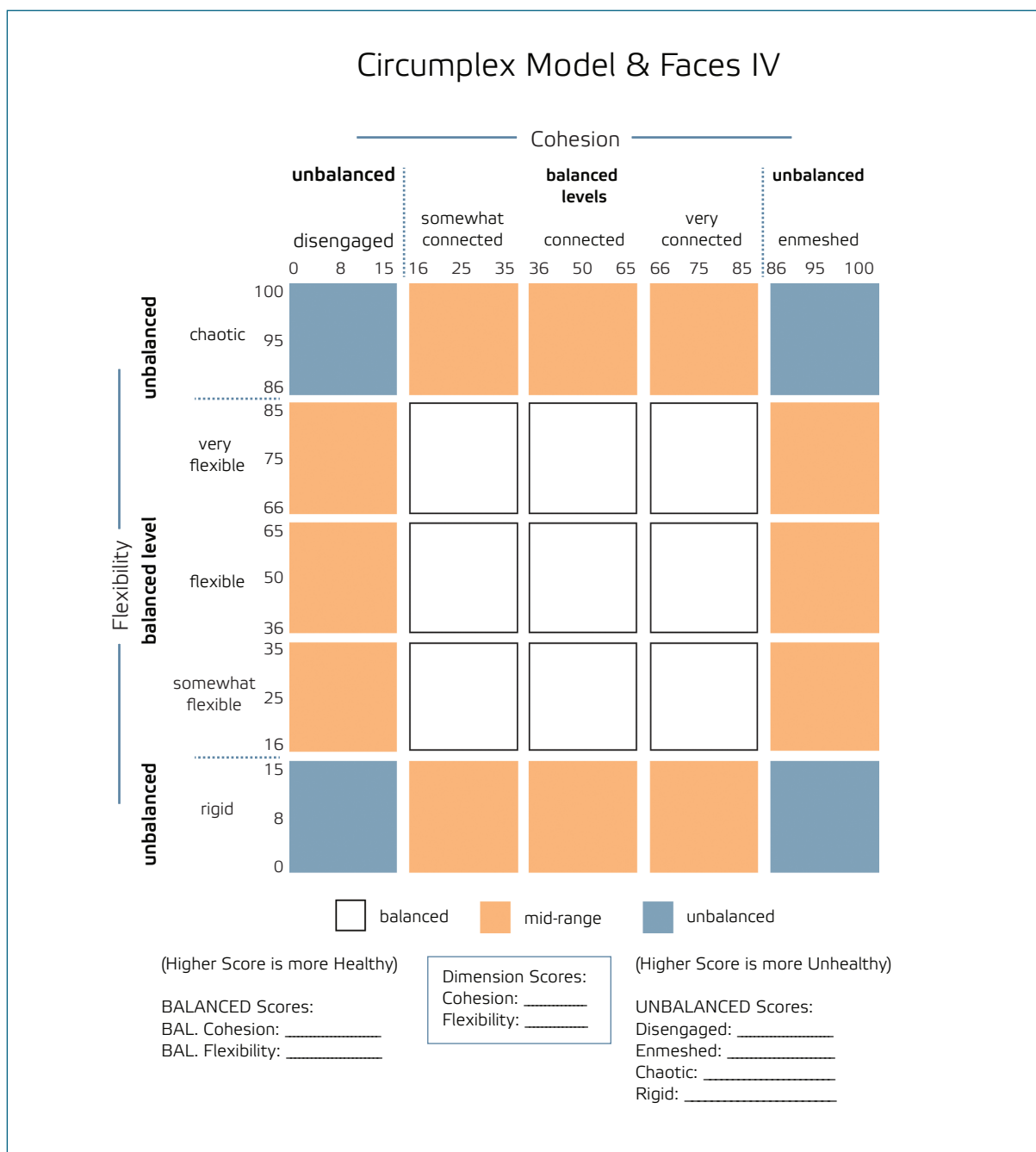
Family communication, as the model's facilitating dimension, allows cohesion and flexibility to be established within the family. Speech clarity, listening skills, continuity tracking, and mutual respect and regard are measured. When conflict arises, the partners or parents in chaotic families do not engage in conversation and refuse to accept any kind of change, while enmeshed families resolve conflict by negating the differences among the family members. Balanced family systems have very good communication in comparison to those systems that lack balance (Olson, 2000; Olson et al., 2006).

Family satisfaction is not explicitly included in the Circumplex model; however, the Family Satisfaction Scale was added to the FACES IV Package with items assessing satisfaction in the three measured dimensions (cohesion, flexibility and communication). Family satisfaction refers to how content and fulfilled family members feel with one another (Olson, 2010).

The changes that take place in families are graphically displayed in the Couple and Family Map presented in [Figure 1](#) (Olson, 2000, 2011). The map shows relations within two central dimensions: cohesion and flexibility. Balanced (functional) family systems are those positioned in the central part of the map, with balanced levels of cohesion and flexibility. In contrast, unbalanced (dysfunctional) family systems are positioned at the edges of the map; that is, at the extremes of both dimensions (cohesion and flexibility).

The measurement tool for operationalizing the changes within families caused by natural life cycles and reactions to stressors has been in development for more than 30 years across the Family Adaptability and Cohesion Evaluation Scale (FACES) series: FACES I, FACES II, FACES III, and the FACES IV Package. In FACES IV, six scales were developed with two balanced scales and four unbalanced scales designed to assess low and high cohesion (ranging from disengaged to enmeshed) and flexibility (ranging from rigid to chaotic).

Figure 1. Couple and Family Map (Source: Olson, 2011, pp. 75.)



High levels of construct and discriminant validity were established, along with providing a clinical example using the FACES IV results for assessing family dynamics, planning treatment, and determining the effectiveness of family therapy (Olson, 2011).

Clinicians and researchers have been using FACES III and the FACES IV Package for decades in clinical and developmental psychology to study family and marital systems (Lee, 2014). The instrument has been used in more than 1,200 dissertations and research papers across 70 countries (Sanderson et al., 2009). While numerous European validations of the instrument exist (Greek: Koutra et al., 2013; Hungarian: Mirnics et al., 2010; Italian: Baiocco et al., 2013; Everri et al., 2020; Portuguese: Gomes et al., 2019; Gouveia-Pereira et al., 2020; Sequeira et al., 2021; Romanian: Rada, 2018; Spanish: Rivero et al., 2010; Vegas et al., 2022), it is not sufficiently recognized in the study of family relations in the Republic of Croatia.

Despite the widespread use of the FACES IV instrument, several recently published adaptation studies failed to confirm its original six-factor structure using all 42 items (Everri et al., 2020; Gouveia-Pereira et

al., 2020; Koutra et al., 2013; Rivero et al., 2010; Sequeira et al., 2021; Vegas et al., 2022). Most previous validations were conducted by first performing confirmatory factor analysis (CFA), followed by exploratory factor analysis (EFA), and by testing intercorrelations among all scales. Additionally, some authors investigated correlations between FACES IV and the scales measuring communication and satisfaction (e.g., Vegas et al., 2022).

To address issues with confirming the original structure in the Spanish version of FACES IV scale, Vegas et al. (2022) revised the original 42-item scale and found good fit for a modified 34-item version. The CFA indicated that the model had acceptable reliability and good convergent and predictive validity after removing problematic items. The final structure retained six factors with good psychometric properties, ensuring their reliability and validity for assessing family adaptability and cohesion in adolescents. This study included participants between the ages of 14 and 18, some of whom came from child protection centers and centers for adolescents with family problems.

Gouveia-Pereira et al. (2020), Rivero et al. (2010), and Sequeira et al. (2021) also found that the original structure of the FACES IV did not confirm well in their studies. They conducted a systematic validation process that included EFAs, leading to an item reduction process. This resulted in a final model consisting of 24 items with four items per scale, providing a more balanced instrument for measuring family functioning. Specific differences among these studies can be found in the samples used. Gouveia-Pereira et al. (2020) conducted two studies where the age of participants ranged from 11 to 21 years. They also recruited a small clinical sample in addition to a community sample. The study conducted by Rivero et al. (2010) included a sample of 455 university students from Spain with an average age of 20.5 years. The study by Sequeira et al. (2021) involved a large sample of 1,083 individuals from 387 nuclear families, ensuring a diverse representation in different regions of Portugal. It is also worth noting that Sequeira et al. (2021) incorporated expert evaluations to assess the instrument's content validity.

Everri et al. (2020) first conducted an item selection based on psychometric properties using data from a larger sample. This involved using the Rasch analysis to identify the items that best measured the intended latent traits. After selecting the items, they validated the shortened version SAD\_FACES (Family Adaptability and Cohesion Evaluation Scale for adolescent) to confirm its factor structure and reliability. The authors conducted an Exploratory Structural Equation Modeling (ESEM) to analyze the factor structure of the SAD\_FACES scale. This analysis was used to evaluate the dimensionality and reliability of the scale. They found that the factor structure and reliability of the SAD\_FACES scale confirmed the original structure of the FACES IV as validated with Italian adolescent samples ( $N = 446$  adolescents aged 14 to 16 years). The study showed that the SAD\_FACES scale, a shortened version of FACES IV, had the same factor structure as the original when applied to Italian adolescents. This indicates that the organization of family functioning dimensions (cohesion and flexibility) is consistent with the original FACES IV. In addition, the SAD\_FACES scale showed satisfactory reliability and provided consistent results across administrations. This confirms that the shortened version is a valid instrument for measuring family functioning in adolescents and supports the applicability of the theoretical framework of the FACES IV with fewer items. To address potential discrepancies in confirming the original structure, the authors suggested that the SAD\_FACES scale allows for the measurement of family functioning with a limited number of items (24 items compared to 42 items in the original FACES IV). This streamlined approach could facilitate research and allow for a more flexible assessment of adolescents' perceptions regarding family functioning, improving the usability of the instrument in different contexts.

Finally, Koutra et al. (2013) were the only authors that confirmed a five-factor solution as more suitable. This solution indicated that the majority of items had higher loadings on two main factors that represented balanced scales, while the remaining factors contained fewer items. In addition, they decided to work separately on the extreme scales of cohesion and flexibility to achieve a better theoretical adaptation to the original model. The study included a large sample of participants ( $N = 620$ ), with socio-demographic characteristics provided to give context to the results. In addition, the sample consisted predominantly of young adults, a significant proportion of whom were students, and there was a notable lack of diversity in terms of employment and income level.

A common conclusion in most of the studies presented is the concern about the unbalanced scales, namely Rigid and Enmeshed (Everri et al., 2020; Gouveia-Pereira et al., 2020; Sequeira et al., 2021; Vegas et al., 2022),

as well as Disengaged (Koutra et al., 2013; Rivero et al., 2010) and Chaos (Vegas et al., 2022). It is evident that a persistent challenge exists in validating these constructs within the FACES IV framework both before and after the item reduction process (Rivero et al., 2010; Sequeira et al., 2021; Vegas et al., 2022). On the other hand, Gouveia-Pereira et al. (2020) and Koutra et al. (2013) found issues with the aforementioned constructs only before and Everri et al. (2020) after item reduction. The problems with the factor structure found in the study can be attributed to several causes, such as cultural differences, item interpretation, translation and adaptation issues and structural validity.

Understanding family functioning is important across various scientific fields and practical work to appropriately approach the prevention (primary, secondary, and tertiary) of unstable family relationships. Considering the importance of understanding family functioning, we believe that professional services in educational institutions must acquire competence in examining family relations and functioning, for which purpose instruments such as FACES IV Package can be useful tools to conduct high-quality educational and advisory work with parents, children, and families.

As a potential contribution to the study of families in the national context, the objective of this study was to examine the structure and internal consistency in the Croatian translation of the FACES IV Package (Olson, 2011; Olson & Gorall, 2003).

## Methods

This study was conducted within the research project “Empowering Families for the Development of Positive Relationships and Family Unity”. This project employed a battery of instruments, utilizing the Circumplex Model of Marital and Family Systems (Olson & Gorall, 2003) as the conceptual framework for assessing family system functioning. The primary objective was to investigate family cohesion, flexibility, and communication, as well as parenting practices and competencies, in a sample of parents, children, and older family members. The ultimate purpose was to develop a support program to strengthen families and enhance their quality of life. The project was funded by the University of Rijeka and ran from 2018 to 2023.

### Participants and Data Collection

A total of 528 participants were recruited for the study using a convenience sampling method. Data were collected in two waves during 2020 and 2022 through an online survey using the LimeSurvey platform. The participants were informed about the research subject and objectives, their right to anonymity, and the option to withdraw from participation in the research at any time. They were told that the research results would be used exclusively for scientific purposes. The participants' average age was 32.1 ( $SD = 16.1$ ) years, with the youngest participants being 13 years old and the oldest being 84 years old. Parental consents were obtained for the participants under the age of 14. According to the Ethical Code for Research with Children (National Ethics Committee for Research with Children, 2020), children aged 14 and older can give independent consent to participate in research. The research was approved by the Ethical Committee for Scientific Research at the University of Rijeka (CLASS: 640/01/17-01/80, REGISTRATION NUMBER: 2170-24-02-17-2).

A total of 348 female participants (65.9%) and 180 male participants (34.1%) took part in the research. In the context of family roles, most respondents were first-born (32.6%) or second-born children (23.3%). The majority of these individuals had completed high school education (47.9%) or a bachelor's degree (33.3%). Most were single, never married (44.1%), and lived with their parents (44.7%). In the “other” category for current relationship status, the respondents listed being in a relationship, engaged, and being in a post-divorce relationship. In the “other” category for current living arrangements, the respondents listed roommates and various family members. These results were expected, given that the participants were predominantly students. The data collection method explained the largest ratio in the sample being students. Specifically, the data were collected through an online survey published on the website of the Faculty of Humanities and Social Sciences of the University of Rijeka and on the faculty's social networks, and the research project's social networks. In addition, students were asked to disseminate the survey further. [Table 1](#) provides details of the sample structure.

Table 1. Sample Structure (N = 528)

Sample characteristics		n	%
Sex	Female	348	65.9
	Male	180	34.1
Age (years)	≤24	305	57.8
	25–34	45	8.5
	35–44	22	4.2
	45–54	107	20.3
	55–64	27	5.1
	65–74	12	2.3
	75+	10	1.8
Education	Some elementary school	7	1.3
	Elementary school	18	3.4
	High school	253	47.9
	Bachelor's degree	176	33.3
	Master's degree	62	11.7
	PhD or magister* degree	12	2.3
Current relationship status	Single, never married	233	44.1
	Single, divorced	11	2.1
	Single, widowed	17	3.2
	Married, first marriage	141	26.7
	Remarried	9	1.7
	Life partnership	28	5.3
	Cohabitation	19	3.6
	Divorced	4	0.8
	Other	66	12.5
Current living arrangements	Alone	34	6.4
	With parents	236	44.7
	With a partner	38	7.2
	With others (grandfather, grandmother)	3	0.6
	With children	17	3.2
	With partner and children	110	20.9
	With others	90	17.0
Family member	Mother	94	17.8
	Father	57	10.8
	First child	172	32.6
	Second child	123	23.3
	Third child	38	7.2
	Fourth or younger child	10	1.9
	Grandmother or grandfather	23	4.4
	Different family member	11	2.1

\*It refers to individuals who completed postgraduate studies before the Bologna education reform. After completing a four-year undergraduate program, individuals pursued and completed an additional two years of postgraduate master's studies.

## Instrument Description

The FACES IV Package was translated and adapted within the project “Empowering Families for the Development of Positive Relationships and Family Unity”. The Family Satisfaction and Family Communication Scales were translated and adapted by Ljubetić, Reić Ercegovac, and Mandarić Vukušić. The authors tested the internal consistency; both scales demonstrated a very high reliability (Cronbach's  $\alpha = .90$ ) (Ljubetić et al., 2020). Other tests or validations were not conducted. All instruments, including FACES IV, Family Satisfaction Scale and

Family Communication Scale, were translated using the double translation method, with the aim of determining the translation's credibility by first translating it from English into Croatian and subsequently translating it back from Croatian into English. The FACES IV Package was used with the original instrument author's approval for the purposes of this paper.

The FACES IV Package contains four parts: 1) background information (i.e., a sociodemographic questionnaire), 2) the Family Adaptability and Cohesion Evaluation Scale (FACES) IV, 3) the Family Communication Scale, and 4) the Family Satisfaction Scale (Olson, 2011).

The background information section includes questions about sex, age, education, current relationship status, current living arrangements, and family membership (i.e., the role in the family, such as mother, father, first child).

The FACES IV consists of 42 items distributed across 6 scales (each scale contains 7 items). It measures the dimensions of family cohesion and family flexibility at the balanced and unbalanced levels. The balanced scales measure the midranges of family cohesion (B\_COH), (e.g., "Family members are involved in each other's lives") and family flexibility (B\_FLEX) (e.g., "Discipline is fair in our family"), while the unbalanced scales measure the extremes. Two scales are used for unbalanced family cohesion – Enmeshed (ENMSH) (e.g., "We spend too much time together") and Disengaged (DISEN) (e.g., "We get along better with people outside our family than inside."). In addition, there are two scales for unbalanced family flexibility: Chaotic (CHAOT) (e.g., "Our family feels hectic and disorganized") and Rigid (RIG) (e.g., "Our family becomes frustrated when there is a change in our plans or routines") (see Figure 1). Regarding the scales in the original instrument, their reliability was excellent, with Cronbach's alpha coefficients ranging from .77 to .89 (Olson, 2011).

The FACES IV Package also includes two scales that measure family satisfaction and family communication. Both scales consist of 10 items. The Family Satisfaction Scale measures the levels of happiness and fulfilment that family members feel towards each other. The Family Communication Scale pertains to the sharing of information, ideas, thoughts and feelings among family members. The Family Communication (Cronbach's  $\alpha = .90$ ) and Satisfaction (Cronbach's  $\alpha = .92$ ) Scales in the original instrument both demonstrated a very high reliability.

The participants evaluated their family's cohesion, flexibility and communication using a 5-point rating scale (1 = Strongly disagree, 5 = Strongly agree). Family satisfaction was also measured on a 5-point scale, where 1 represented "Very Dissatisfied" and 5 "Extremely Satisfied".

## Data Analysis

To test the factor structure in the Croatian version of the FACES IV Package, a CFA was conducted, followed by an EFA. The analyses were conducted using the JASP 0.16.0.0 and SPSS 26 software programs.

Initially, we estimated missing values in the FACES IV Package. Only 2 (0.4%) missing values were identified in the dataset; these were not included in further analyzes. Prior to conducting the CFA and EFA, we assessed whether the necessary assumptions for statistical analyses were met, including the sample size and the normality of distribution. According to Kalkbrenner (2021), the recommended minimum sample size for factor analysis is either a subjects-to-variables ratio of 10:1 (i.e., at least 10 participants per test item) or 200 participants. In this study, the assumption of an adequate sample size was satisfied ( $N = 528$  and 62 items). Although the data were not found to be normally distributed, EFA is known to be resilient to moderate deviations from normality. Therefore, the decision was made to proceed with further factor analysis.

To evaluate the model fit in CFA, the normed chi-square indicator ( $\chi^2/df$ ), absolute fit indices (root mean square error of approximation [RMSEA], goodness of fit index [GFI]) and comparative fit indices (the comparative fit index [CFI], and the Tucker-Lewis index [TLI]) were used. For the normed chi-square indicator, a value lower than 3 or 5 (less strict criteria) was expected. According to Steiger (2007), the upper limit of the recommended RMSEA value is .08, the lenient criterion is from .05 to .08 (Hu & Bentler, 1999; Schumacker & Lomax, 2016). In addition, according to Bentler (1990), the values of the CFI, GFI, and TLI indicators that point to a satisfactory adjustment of the assumed model with the data should be  $\geq .80$ .

In order to explore the structure of the FACES IV in the present sample, an EFA was conducted within an oblique target rotation procedure. First, to distinguish between meaningful factors and those arising from random noise in the data, we conducted an EFA using the principal component method with parallel analysis. Initially, an EFA was conducted with all items, followed by a selective elimination based on specific criteria (negative saturation, cross-loadings and loading below .30). The item reduction process was subsequently con-

cluded by performing a second EFA on the remaining items.

The significance of the Kaiser–Meyer–Olkin (KMO) test and Bartlett’s test of sphericity was examined. The recommended KMO value is  $> 0.60$  (Kaiser, 1974). According to Comrey and Lee (2013), factor loadings of .71, .63, .55, .45, and .32 are categorized as excellent, very good, good, fair, and poor, respectively. To ensure internal validity, we evaluated the reliability of the dimensions using Cronbach’s alpha and examined zero-order correlations among the dimensions using Spearman’s rho. To consider convergent validity, we examined zero-order correlations between the FACES IV dimensions and family communication and satisfaction using Spearman’s rho. Finally, we investigated age and sex differences across the FACES IV dimensions also using Spearman’s rho. This exploration aimed to determine whether age and sex influenced the FACES IV scores.

## Results

### Factor Structure of the FACES IV Package

Because the construct validity of the FACES IV Package has not been verified in the Republic of Croatia until now, this study first presents the results of the CFAs based on the original factor structure (Olson, 2011).

#### *Confirmatory Factor Analysis of the FACES IV*

The CFA results indicated that the anticipated six-dimensional structure of the FACES IV did not demonstrate a good fit ( $\chi^2(804) = 3048.73$ ,  $p < .001$ ,  $\chi^2/df = 3.79$ , CFI = .738, GFI = .767, TLI = .719, RMSEA = .073). The only satisfactory criteria, considering a more lenient criterion, were  $\chi^2/df (< 5)$  and RMSEA.

#### *Confirmatory Factor Analyses of the Family Communication and Family Satisfaction Scales*

The CFAs of the Family Communication Scale ( $\chi^2(35) = 165.31$ ,  $p < .001$ ,  $\chi^2/df = 4.72$ , CFI = .963, GFI = .988, TLI = .925, RMSEA = .084) and Family Satisfaction Scale ( $\chi^2(35) = 274.43$ ,  $p < .001$ ,  $\chi^2/df = 7.84$ , CFI = .940, GFI = .985, TLI = .932, RMSEA = .114) supported the one-factor structure of each scale. Most of the indices showed a good fit, with the exception of the RMSEA and normed chi-square indicator for the Family Satisfaction Scale, whose values were .114 and 7.84, respectively.

The factor loadings for the Family Communication Scale and Family Satisfaction Scale are presented in Table 2. Factor loadings for both scales confirmed that the data fit well.

#### *Exploratory Factor Analysis of the FACES IV*

The CFA results indicated significant problems with the specification of the original model in terms of the six-factor structure in the FACES IV. To identify a smaller set of items that would result in a satisfactory factor

Table 2. Factor Structures of the Family Communication Scale and Family Satisfaction Scale

Item number	Factor loading	Std. Error	$p$	$R^2$
Family Communication Scale				
1	.85	.04	< .001	.58
2	.86	.04	< .001	.60
3	.73	.04	< .001	.52
4	.88	.04	< .001	.64
5	.88	.04	< .001	.73
6	.81	.04	< .001	.65
7	.79	.04	< .001	.62
8	.88	.04	< .001	.68
9	.63	.05	< .001	.28
10	.84	.04	< .001	.62
Cronbach’s $\alpha$	.93			
$M$	3.81			
$SD$	0.29			
Skewness	-0.09			
Kurtosis	0.04			
Min	1			
Max	5			
Family Satisfaction Scale				
1	.86	.04	< .001	.68
2	.87	.04	< .001	.64
3	.81	.04	< .001	.61
4	.79	.04	< .001	.64
5	.99	.04	< .001	.76
6	.99	.04	< .001	.76
7	.68	.04	< .001	.38
8	.68	.04	< .001	.76
9	.76	.04	< .001	.52
10	.61	.03	< .001	.48
Cronbach’s $\alpha$	.94			
$M$	3.67			
$SD$	0.35			
Skewness	-0.06			
Kurtosis	-0.01			
Min	1			
Max	5			

$R^2$  = Squared multiple correlation.



structure and form a scale for measuring family cohesion and flexibility with satisfactory internal consistency reliability, an EFA was conducted on the same dataset using a principal component model with parallel analysis.

The KMO test (.93,  $p < .001$ ) and Bartlett's test were statistically significant ( $\chi^2 = 9617.67$ ;  $df = 903$ ,  $N = 528$ ,  $p < .001$ ), which led to the conclusion that calculating the survey's factor structure was merited.

The first EFA resulted in the extraction of 5 factors (Table 3) that explained 47.9% of the variance. The EFA revealed ambiguous results that hindered the clear identification of the latent dimensions. In particular, the first factor included a wide range of items that belonged to distinct dimensions according to the original theoretical structure. This indicates that at least one item from each theoretical dimension was saturated on the first factor. Consequently, a refinement of the factor structure was deemed necessary. Criteria for eliminating items included: negative saturation on the factors, cross-loadings and saturations below a threshold of .30.

Due to the criteria for eliminating items, 10 items were removed (DISEN3, ENMSH4, DISEN9, CHAOT12, DISEN15, ENMSH16, DISEN21, DISEN27, RIG29, and B\_FLEX32). Since negative factor loadings have no theoretical basis and contradict the expectations of the model (Olson & Gorall, 2003), we decided to exclude items showing such saturations after the initial rotation. Furthermore, the presence of negative saturations complicates and confuses the interpretation of the factor structures and thus provides a justifiable basis for removing such items from the analysis (Watkins, 2018). Removing items with negative factor loadings can improve the quality of the measurement instrument, as it allows a focus on the items that are more relevant and useful for measuring the desired constructs (Watkins, 2018).

A second EFA was performed on the remaining items. Based on the presented analyses, the final factor structure was obtained, consisting of 32 items (Table 4) that explained 51.4% of the total variance.

The first factor contained 14 items, while Cronbach's alpha showed a very high reliability of the scale. Twelve items measured Balanced Cohesion and Balanced Flexibility, with one item belonging to the Rigid scale and one to the Enmeshed scale. The next factor included five items, all part of the Rigid scale.

Table 3. Initial Pattern Matrix After Oblique Rotation, Reliability, and Descriptive Indicators

A priori factor and item number	F1	F2	F3	F4	F5	Uniqueness
B_COH1	<b>.73</b>	.02	-.01	.10	-.09	.46
B_FLEX2	<b>.64</b>	-.02	.01	.16	.08	.58
DISEN3	<b>-.57</b>	.12	.16	.03	.11	.59
ENMSH4	.09	-.08	.01	<b>.30</b>	<b>-.35</b>	.77
RIG5	.09	<b>.79</b>	.04	-.02	.04	.36
CHAOT6	<b>-.43</b>	.09	<b>.42</b>	.02	-.14	.51
B_COH7	<b>.82</b>	.02	.11	.08	-.12	.35
B_FLEX8	<b>.56</b>	.06	-.04	.13	.14	.63
DISEN9	<b>-.68</b>	.10	.05	.17	.07	.47
ENMSH10	<b>-.31</b>	.07	.03	<b>.43</b>	-.11	.67
RIG11	.00	<b>.78</b>	.10	.00	.07	.41
CHAOT12	.21	<b>-.32</b>	.17	.29	.24	.71
B_COH13	<b>.82</b>	-.02	.04	.01	-.05	.35
B_FLEX14	<b>.51</b>	<b>.30</b>	-.11	-.02	.17	.53
DISEN15	<b>-.49</b>	.02	-.07	.23	.17	.68
ENMSH16	.15	-.03	.15	<b>.40</b>	<b>-.56</b>	.51
RIG17	.16	<b>.56</b>	.03	.26	.08	.58
CHAOT18	-.29	-.01	<b>.51</b>	-.02	-.16	.54
B_COH19	<b>.73</b>	.12	.16	-.04	-.06	.49
B_FLEX20	<b>.73</b>	.01	-.00	-.02	.18	.44
DISEN21	<b>-.63</b>	-.00	.07	.09	.20	.43
ENMSH22	-.09	-.08	-.08	<b>.42</b>	.02	.82
RIG23	<b>.63</b>	.11	-.25	.07	.10	.40
CHAOT24	-.01	-.11	<b>.69</b>	.05	.12	.46
B_COH25	<b>.75</b>	.07	-.04	.02	.04	.40
B_FLEX26	.00	.07	<b>.68</b>	-.20	-.07	.55
DISEN27	<b>-.62</b>	-.04	.26	.02	.17	.41
ENMSH28	<b>.45</b>	-.10	.09	<b>.30</b>	<b>-.34</b>	.62
RIG29	<b>-.38</b>	.23	.13	.24	-.21	.64
CHAOT30	.18	<b>-.48</b>	.17	<b>.31</b>	<b>.40</b>	.47
B_COH31	<b>.67</b>	.17	-.07	.04	.01	.45
B_FLEX32	.31	<b>.57</b>	-.18	.00	.06	.46
DISEN33	-.16	.05	-.01	-.00	<b>.68</b>	.52
ENMSH34	-.25	.04	-.10	<b>.61</b>	-.10	.56
RIG35	-.01	<b>.75</b>	-.06	.06	-.05	.41
CHAOT36	.04	.03	<b>.71</b>	.08	.06	.51
B_COH37	<b>.67</b>	.01	.03	-.17	.05	.51
B_FLEX38	<b>.75</b>	-.03	-.04	-.14	.12	.37
DISEN39	.02	.09	.17	.04	<b>.53</b>	.69
ENMSH40	-.03	.16	.02	<b>.64</b>	.04	.55
RIG41	<b>-.34</b>	<b>.41</b>	.08	.18	-.06	.68
CHAOT42	<b>-.54</b>	-.02	<b>.35</b>	.11	-.04	.41
Cronbach's $\alpha$	.39	.56	.76	.48	.20	
M	3.11	2.84	2.24	2.07	2.72	
SD	0.95	0.48	0.22	0.43	0.46	

Note. B\_COH = Balanced Cohesion, B\_FLEX = Balanced Flexibility; DISEN = Disengaged, ENMSH = Enmeshed, RIG = Rigid; CHAOT = Chaotic. Loadings  $\geq .30$  are highlighted in bold.

Table 4. Final Pattern Matrix After Oblique Rotation, Reliability, and Descriptive Indicators

A priori factor and item number	F1	F2	F3	F4	F5	Uniqueness
B_COH7	.83					.34
B_COH13	.81					.36
B_COH25	.75					.39
B_COH1	.73					.44
B_FLEX20	.73					.42
B_COH19	.72					.49
B_FLEX38	.72					.38
B_FLEX2	.69					.55
B_COH31	.67					.46
RIG23	.64					.40
B_COH37	.63					.45
B_FLEX8	.58					.64
B_FLEX14	.52					.51
ENMSH28	.49					.65
RIG5		.84				.28
RIG11		.82				.34
RIG35		.75				.40
RIG17		.54				.59
RIG41		.40				.66
CHAOT36			.71			.48
CHAOT24			.71			.44
B_FLEX26			.69			.53
CHAOT18			.53			.54
CHAOT6			.43			.52
CHAOT42			.36			.41
ENMSH40				.74		.44
ENMSH34				.66		.52
ENMSH22				.49		.76
ENMSH10				.47		.67
DISEN33					.76	.41
DISEN39					.70	.50
CHAOT30					.40	.57
Cronbach's $\alpha$	.90	.74	.76	.52	.37	
M	3.83	2.64	2.24	1.79	3.02	
SD	0.46	0.41	0.22	0.27	0.46	
Skewness	-0.10	-0.01	0.09	0.26	0.00	
Kurtosis	0.09	-0.12	-0.04	0.29	-0.04	
Min	1	1	1	1	1	
Max	5	4.6	4.7	4.3	5	

Note. B\_COH = Balanced Cohesion, B\_FLEX = Balanced Flexibility; DISEN = Disengaged, ENMSH = Enmeshed, RIG = Rigid; CHAOT = Chaotic; F1 = Balanced cohesion and flexibility; F2 = Rigid; F3 = Chaotic; F4 = Enmeshed; F5 = Disengaged. Loadings below .3 are not reported in this Table.

Of the six items belonging to the third factor, five measured Chaotic Flexibility, and one measured Balanced Flexibility. The fourth factor had four items, all of which belonged to the Enmeshed scale. Finally, the Cronbach's alpha of the last factor did not reach the acceptable range and had only three items: two that measured Disengaged and one belonging to the Chaotic scale.

These results show that the five-factor instrument structure was confirmed; that is, the proposed original instrument of FACES IV (Olson, 2011) was not verified.

## Internal Consistency and Aggregated Scores

The reliability analysis of FACES IV revealed varying levels of internal consistency (see Table 4). Balanced Cohesion and Flexibility (F1) demonstrated high internal consistency, with a Cronbach's  $\alpha$  coefficient of .90, indicating a very reliable measurement scale. Rigid (F2) and Chaotic (F3) also achieved satisfactory reliability levels, with Cronbach's  $\alpha$  values of .74 and .76, respectively, suggesting an acceptable internal consistency for these factors. On the other hand, Enmeshed (F4) showed a lower Cronbach's  $\alpha$  value of .52, indicating poor but still somewhat acceptable reliability. However, Disengaged (F5) yielded a very low Cronbach's  $\alpha$  value of .37, signaling insufficient internal consistency. Given the low Cronbach's  $\alpha$  for the Disengaged factor, this dimension demonstrates inadequate internal consistency and, therefore, cannot be reliably used in further analyses. As a result, the Disengaged factor was excluded from subsequent analyses. The reliability analysis for the Family Communication Scale ( $\alpha = .93$ ) and Family Satisfaction Scale ( $\alpha = .94$ ) demonstrated a strong reliability (Table 2).

The total score for each scale was calculated using the mean. The data showed slight deviations from the normal distribution based on skewness and kurtosis values (Table 2 and Table 4).

## Correlations Between Dimensions

Most of the correlations among the dimensions under consideration aligned with the anticipated direction (Table 5). Balanced Cohesion and Flexibility were negatively correlated with Chaotic and Enmeshed, while positively correlated with Rigid to a negligible extent. Rigid was positively correlated with Enmeshed, although to a negligible extent. Interestingly, the Unbalanced Cohesion scale of Enmeshed was positively and weakly correlated with the Unbalanced Flexibility scale of Chaotic.

## Correlation with Communication, Satisfaction and Demographics

As anticipated, communication and satisfaction showed a positive correlation with balanced levels of cohesion and flexibility, and a negative correlation with Chaotic and Enmeshed. A negative correlation between Communication, Satisfaction and Rigid was anticipated. However, no significant correlation was found between communication and unbalanced scales (Table 5).

Lastly, we examined the relationship between sociodemographic characteristics (age and sex) and the five dimensions of FACES IV. Regarding age, we examined its correlation with the latent dimensions. A statistically significant positive but negligible correlation was found between age and Balanced Cohesion and Flexibility ( $\rho = .14$ ;  $p = .001$ ). In other words, with increasing age came an increased assessment of family balance (cohesion and flexibility). Concerning sex, there were no correlations on any FACES IV scale ( $\rho_1 = .04$ ,  $p = .342$ ;  $\rho_2 = .08$ ,  $p = .702$ ;  $\rho_3 = .05$ ,  $p = .244$ ;  $\rho_4 = .05$ ,  $p = .232$ ;  $\rho_5 = .03$ ,  $p = .504$ ). The men and women equally assessed family functioning at balanced and unbalanced levels of cohesion and flexibility.

Table 5. Zero-Order Correlations Among Dimensions

Factor	1. Balanced Cohesion and Flexibility	2. Rigid	3. Chaotic	4. Enmeshed	5. Communication	6. Satisfaction
1. Balanced Cohesion and Flexibility	—					
2. Rigid	.14**	—				
3. Chaotic	-.55**	-.09	—			
4. Enmeshed	-.26**	.14**	.29**	—		
5. Communication	.81**	.02	-.50**	-.27**	—	
6. Satisfaction	.78**	.02	-.50**	-.29**	.86**	—

\* $p < .05$ ; \*\* $p < .01$ ;  $N = 528$ .

Note. The reported correlations correspond to Spearman's rho values.

## Discussion

The purpose of the current study was to validate the Croatian version of the FACES IV Package, an instrument designed to evaluate both adaptive and maladaptive family functioning. The CFA results revealed notable issues with the six-factor structure of the model of FACES IV compared to Olson (2011). The original instrument's metric characteristics showed a well-fitted model for six factors, whereas our validation did not show a good fit, even for five factors. The model fit was, however, acceptable for the Family Communication and Family Satisfaction Scales. Given the relatively small convenience sample in this study, its results are considered preliminary and require further investigation.

We conducted an EFA, aiming to find a reduced set of items that would provide a satisfactory factor structure and create a reliable scale for measuring family cohesion and flexibility, resulting in the extraction of five factors.

Compared to the original model, the Balanced Cohesion scale items were retained in full. In the Balanced Flexibility, Rigid, and Chaotic scales, six of the original seven items per scale were retained. Five items were retained for the Enmeshed scale; for the Disengaged scale, less than a third of the original items were retained.

The results of this validation indicated that the first factor comprised a combination of items that, in the original instrument, constitute two distinct dimensions: Balanced Cohesion and Balanced Flexibility. It is reasonable to conclude that merging these two dimensions into a single factor is appropriate, given that both dimensions represent the concept of balance. Koutra et al. (2013) found a similar result. In their validation, Balanced Cohesion and Balanced Flexibility merged, and two items from the Disengaged dimension migrated to this factor. The item that most accurately represented this factor, as indicated by the highest factor loading, is B\_COH7 (“Family members feel very close to each other”). The item ENMSH28 (“We feel too connected to each other”) did not align with the extracted first factor according to the original structure, in which it is part of the Enmeshed scale. It is noteworthy that this item's factor loading was the lowest within the first factor and was generally low. The specified item from the Enmeshed scale may not be perceived as negative within Mediterranean cultures, where the intertwining of family members is seen as culturally integral and desirable for family functioning. This underscores the necessity of considering cultural and social factors when interpreting family functioning outcomes. Enmeshed families, characterized by high emotional connectedness, may be viewed positively, as they highlight the importance of familial bonds and support (Vegas et al., 2022).

The second extracted factor, Rigid, comprised five of the seven items from the original model. One item from the Rigid scale migrated to the first factor (Balanced Cohesion and Flexibility), while another was excluded entirely during the final structure refinement due to insufficient loading. The two items that most accurately represented this factor in the final factor structure were RIG5 (“There are strict consequences for breaking the rules in our family”) and RIG11 (“There are clear consequences when a family member does something wrong”). The item contributing the least to this factor was RIG41 (“Once a decision is made, it is very difficult to modify that decision”).

Chaotic, identified as the third factor, comprised six of the seven original items. One item migrated to the fifth factor. Overall, the items exhibited high factor loadings, with the highest loading observed for CHAOT36, which states, “Our family has a hard time keeping track of who does various household tasks.” The item with the lowest representation of this factor was CHAOT42 (“Our family feels hectic and disorganized”). Surprisingly, this factor included an item that, both originally and contextually, did not belong. This item, B\_FLEX26 (“We shift household responsibilities from person to person”), exhibited a high loading. A potential explanation for the misclassification of this item within this factor may be attributed to its problematic translation. In Croatian, the item appears to align with the concept of Balanced Flexibility, since it can be interpreted as implying that household responsibilities are equitably distributed among family members.

The fourth factor represented the latent dimension of Enmeshed, with only four items retained from the original model. One item (ENMSH28) was moved to the first factor (Balanced Cohesion and Flexibility), and two items were excluded due to low loadings ( $< .30$ ). Furthermore, all the retained items had relatively low loadings, ranging from .47 to .74. The item that best represented this factor was ENMSH40 (“Family members feel guilty if they want to spend time away from the family”). It is also worth noting that the Cronbach's alpha for this factor was fair (.52). However, this factor was the only one that was “pure” in terms of content (i.e., it only consisted of items that originally belonged to this dimension and, unlike the other extracted factors, did not contain any items from other dimensions).

The fifth and final factor proved to be the most problematic due to the exceptionally low number of retained items (three), only two of which corresponded to the original model (DISEN33 and DISEN39). One item,

CHAOT30, belongs to the Chaotic dimension and contributed minimally to this factor. Items that were not retained in this factor, although they originally belonged to it, had exceptionally low loadings. Another indicator of this factor's problematic nature proved to be the poor Cronbach's alpha (.37), which is probably partly due to the small number of items in this factor (Siswaningsih et al., 2017). Therefore, this study's results suggest that the Croatian version of the FACES IV was not able to measure the disengaged dimension of unbalanced cohesion.

Regarding the correlation analysis between the dimensions, most of the correlations among the dimensions were statistically significant, although some showed a negligible correlation size. Balanced Cohesion and Flexibility were statistically negatively correlated with the Chaotic dimension, consistent with the findings from the Spanish (Vegas et al., 2022), Greek (Koutra et al., 2013), Italian (Everri et al., 2020), and Portuguese (Gouveia-Pereira et al., 2020) validations and partially consistent with the original validation (Olson, 2011). However, in this study, the Balanced dimensions converged, precluding a comprehensive comparison with previous validations of the model.

Concerning the correlation between Balanced Cohesion and Flexibility and Enmeshed, the results of this validation indicated a negative correlation. This finding is consistent with Olson's original model validation and Everri et al.'s (2020) study. However, it contrasts with the results of other validations, such as those by Vegas et al. (2022), Gouveia-Pereira (2020), and Koutra et al. (2013).

The most significant discrepancies in the results were observed in the correlations of the Unbalanced extreme scales. Previous studies have demonstrated a wide range of correlations between the Rigid and Chaotic scales, varying from negative to positive correlations and including instances of no correlation (e.g., Everri et al., 2020; Gouveia-Pereira et al., 2020; Koutra et al., 2013; Olson, 2011; Vegas et al., 2022). The most coherent results were obtained by the researchers who validated the Spanish version of the model. Specifically, the correlation between the Unbalanced scales was found to be negative (Vegas et al., 2022). This finding is logical when interpreted as follows: the more rigid the family is assessed to be, the less chaotic it is.

In the context of examining the relationship between communication, satisfaction and the other scales within the FACES IV model, the anticipated results were observed. Specifically, a positive correlation was identified between Communication and the Balanced scales, aligning with previous validations (Everri et al., 2020; Gouveia-Pereira et al., 2020; Koutra et al., 2013; Vegas et al., 2022). Notably, similar correlation results were found for the Satisfaction scale. These findings are coherent, as it suggests that improved communication among family members is associated with a higher perceived level of successful family functioning. Balanced family functioning, encompassing cohesion and flexibility, signifies a healthy family system. Balanced cohesion involves strong emotional bonds, while balanced flexibility denotes the family's adaptability. Harmony in these areas allows families to navigate challenges and resolve conflicts effectively. Effective communication, when positive and supportive, enhances family satisfaction and contributes to balanced family functioning. This leads to overall well-being and healthy dynamics within the family unit.

Simultaneously, the findings demonstrating a strong negative correlation between the Communication scale and the Chaotic factors are consistent with previous validations, and the same pattern is observed for the Satisfaction scale (Gouveia-Pereira et al., 2020; Vegas et al., 2022). This outcome was anticipated.

The negative correlation of family communication and satisfaction with Enmeshed can be explained within the conceptual framework of family dynamics and functionality. Enmeshed denotes a family state in which boundaries between members are blurred, leading to excessive emotional attachment, lack of individual autonomy, and difficulties in maintaining personal boundaries. In terms of communication, enmeshment is linked to patterns that encourage excessive emotional attachment and unclear boundaries. Enmeshed families often display communication patterns that foster excessive concern for other members, lack of privacy, and challenges in setting healthy boundaries (Gouveia-Pereira et al., 2020). Considering these characteristics, it is reasonable that they are also associated with lower satisfaction levels.

Although prior validations have identified correlations (both negative and positive) between Communication and Rigid, the present validation did not observe such relationships.

Furthermore, a strong positive correlation was observed between the Communication and Satisfaction scales. This finding is consistent with previous studies (Bandura et al., 2011; Ljubetić et al., 2020). The result can be interpreted as evidence that effective communication is a critical component of healthy family functioning. It is reasonable to hypothesize that families in which members rate their communication positively are more likely to demonstrate harmonious functioning, which in turn contributes to higher levels of satisfaction.

Finally, the validation process revealed certain difficulties, including the low reliability of some factors, a significant number of excluded items, and the interweaving of different dimensions, indicating potential issues with

the instrument. These difficulties are likely due to sociocultural characteristics distinct from those of the original American model.

Our contextual approach demonstrated that perceptions of family functioning are influenced by cultural norms, values, and expectations, underscoring the critical role of sociocultural context in evaluating family dynamics. Over the past 30 years, Croatian society has experienced significant changes, including the transition from a single-party socialist system to a multi-party democracy, war, and accession to the European Union. Croatia's current social landscape reflects a mix of traditional and modern elements, resulting in a complex societal structure. These factors have contributed to Croatia's evolution from a transitional society to a mixed one, blending traditional, modern, and globalized influences in its contemporary social fabric (Tomić-Koludrović & Petrić, 2007).

These societal elements are mirrored in family dynamics. Social changes and instabilities can significantly impact various aspects of family functioning and the division of family roles (individual needs versus family needs). Such profound changes in Croatian society directly affect family complexity. The sociocultural context specifically determines the roles and responsibilities of family members (Jokić & Ristić Dedić, 2023). Traditionally, Croatian society and families have been described as collectivist, similar to Latin American cultures, which are characterized by the open expression of emotions. Family members in these cultures may reveal love, joy, sadness, or anger very expressively, fostering a sense of closeness and connection, as emotions are freely shared and processed. However, as Croatian society transitions, some validation results indicated elements of an individualistic culture, such as a negative correlation between the Enmeshed factor and Communication. Family members may perceive communication as less effective if they feel overly intertwined with others due to a lack of autonomy and a desire for greater individuality. In individualistic cultures, family members have more freedom to express their opinions, desires, and interests, promoting the development of individual identities. Family relationships in these cultures are often less hierarchical and more focused on mutual respect and cooperation than on traditional roles and expectations (Cifrić et al., 2013).

Understanding the sociocultural context is therefore essential for interpreting family dynamics and gaining insights into various behavioral patterns within the family. Additionally, changes in sociocultural identity, such as globalization, migration, or social shifts, can influence traditional family relationships and practices (Cifrić et al., 2013).

## Strengths and Limitations

One of this study's strengths is that the sample represents the general population, rather than being restricted to young individuals or adolescents, as in previous validations (i.e., Everri et al., 2020; Gouveia-Pereira et al., 2020). The study's high participation rate of 99.6% indicates robust participant engagement and a high willingness to contribute to the research.

The research demonstrates methodological rigor throughout the validation and reliability testing of the assessment scales utilized. The instrument used in the study was translated and adapted in accordance with standardized procedures, thereby ensuring consistency and reliability in the adaptation process. Rigorous procedures were implemented at all stages of the analysis, including assessments of construct and convergent validity.

An additional strength of this research is the validation of an instrument that had already been used in the Croatian context, but not previously undergone a validation process. By validating the FACES IV Package within the national context, this research enriches the field of family psychology and pedagogy. The validation findings have practical implications for parents, educators, and mental health professionals working with families. This research significantly contributes to the existing literature on family dynamics. The findings offer new perspectives and insights that can inform future research and interventions.

The limitations of this study primarily apply to the sample. The sample was convenient and non-representative, with the participants predominantly being young and unmarried. This lack of representativeness may restrict the findings' generalizability to the broader Croatian population.

A significant methodological limitation of the study is its reliance on self-reported data without incorporating perspectives from other family members. This introduces the potential for bias, as the perceptions reported by one family member may be subjective and differ from those of other family members. Including multiple perspectives, such as those of parents or siblings, would provide a more comprehensive and balanced understanding of family functioning.

Another limitation concerning the sample is the lack of information on whether the participants came from clinical or non-clinical families. Furthermore, data on the participants' ethnic and national backgrounds is lacking. The question about the participants' ethnic background was not included in the questionnaire's Croatian version, as it was assumed that Croatian society is homogenous. However, it is recommended that this question be reinstated.

Additionally, another limitation of this study is the varying number of items in the FACES IV final structure, which complicates the calculation of ratio scores. This inconsistency in the number of items across the FACES IV impedes the ability to use ratio scores for comparative and analytical purposes across different scales or subscales. Thus, the accurate computation of ratio scores, which provide relative comparisons between variables, is rendered difficult. Consequently, this leads to challenges in interpreting and comparing results across the dimensions of family functioning assessed by the FACES IV Package.

Additionally, limitations can be found in the size of the instrument and the examination of numerous dimensions, as well as the collection of data on an online platform. A risk of a superficial approach to the instrument due to the large number of items and, consequently, a risk of respondent fatigue during the questionnaire completion is possible.

Finally, there are challenges related to translation and cultural adaptation that could introduce measurement errors or affect the validity of the instrument in accurately capturing family dynamics within the Croatian context.

## Conclusion, Implications and Future Directions

Based on the results gained from the CFA of the scales measuring family cohesion and flexibility, we conclude that the Croatian version of the FACES IV Package does not exhibit favorable measurement characteristics; that is, it lacks satisfactory fit parameters for the theoretical model. Even if more lenient criteria for instrument suitability were considered instead of the recommended ones, it cannot be confidently claimed that the instrument is completely suitable for implementation in the Croatian context. A potential reason can be found in the societal and cultural differences between the environment in which the instrument originated and the European (Rivero et al., 2010; Koutra et al., 2013) and Croatian contexts, as described in the discussion section.

Taking this into account, using the Croatian translation of the FACES IV instrument in its original structure without testing the model is not advised. Since the CFA showed satisfactory measurement characteristics for the Family Communication Scale and Family Satisfaction Scale, their use in the original form is recommended. For FACES IV the use of an abbreviated version could be considered, as implemented by Everri et al. (2020), who assumed that each item contributes equally to the content and face-value validity of the scales. The validation of the shortened instrument demonstrated a good fit in the validation of the model's Italian version.

In future research, it is recommended that the FACES IV Package be applied to both clinical and non-clinical samples of pairs and families to include a more diverse range of family issues (e.g., delinquency, violence, and different types of addiction) as well as individuals of diverse ethnicities and cultural backgrounds. Moreover, it is necessary to consider factors such as family size and structure, income, and the family members' level of education during sampling. Taking these factors into account, the results obtained in this research cannot be generalized to different types of families (clinical and non-clinical).

Given the lack of or very low magnitude of correlation between socio-demographic variables and the examined dimensions, conducting further comparisons among participants in different familial roles is recommended.

Additionally, we propose that multiple family members be included in studies to enable the use of polynomial regression, which can provide insights into how similarities and differences in one variable are related to another variable. For example, pairs can be used to examine how similarities and differences in the assessment of emotional connectedness between partners or siblings are related to family satisfaction.

In addition, it is advisable to include experts in the fields of psychology, pedagogy, psychotherapy, and family therapy to assess the content validity of the questionnaire, as demonstrated by Sequeira et al. (2021). Their expertise can be crucial in evaluating whether the items accurately represent the dimensions of family flexibility and cohesion being measured.

Finally, this study presents preliminary and exploratory results that suggest the FACES IV Package, in its original form, may not be suitable for the Croatian context. Given these findings and the previously mentioned limitations, it is advisable to test the FACES IV Package on a more representative or clinical sample.

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## Author contribution

Zlatka GREGOROVIĆ BELAIĆ: conceptualization, design, methodology, investigation, project administration, data management, formal analyses, interpretation, supervision, writing original draft, writing review and editing. Nadja ČEKOLJ: conceptualization, design, methodology, investigation, project administration, data management, formal analyses, interpretation, supervision, writing original draft, writing review and editing. Jasminka ZLOKOVIĆ: conceptualization, design, funding acquisition, investigation, project administration, interpretation, writing original draft, writing review and editing.

## Declaration of interest statement

The authors have no conflicts of interest to disclose.

## Ethical statement

This manuscript is the authors’ original work.

All participants engaged in the research voluntarily and anonymously.

Their data are stored in coded materials and databases without personal data.

The research was approved by the Ethical Committee for Scientific Research at the University of Rijeka (Class: 640/01/17-01/80, registration number: 2170-24-02-17-2).

## Data availability statement

Datasets presented in this article are available from the corresponding author upon reasonable request.

## ORCID

Zlatka GREGOROVIĆ BELAIĆ  <https://orcid.org/0000-0002-8815-0059>

Nadja ČEKOLJ  <https://orcid.org/0000-0003-4145-7341>

Jasminka ZLOKOVIĆ  <https://orcid.org/0000-0002-9593-0176>

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