

Identifying Cultural Patterns in Parenting Beliefs Through Clustering Algorithms

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ABSTRACT

Objective: The present study aimed to identify latent cultural patterns in parenting beliefs by applying clustering algorithms to multidimensional data on parental attitudes and cultural orientations.

Methods and Materials: This study employed a quantitative, cross-sectional design with a data-driven analytical approach. The sample consisted of 412 parents from Georgia, selected through stratified random sampling to ensure representation across demographic strata. Data were collected using standardized instruments assessing parenting beliefs, including dimensions such as parental authority, autonomy support, emotional socialization, and behavioral control, alongside cultural orientation constructs such as collectivism, individualism, power distance, and uncertainty avoidance. After data preprocessing, clustering analyses were conducted using K-means and hierarchical methods. The optimal number of clusters was determined using the Elbow method, Silhouette coefficient, and Davies–Bouldin index. Principal component analysis (PCA) was also employed to enhance interpretability and visualize cluster separation. Statistical preprocessing and descriptive analyses were performed using IBM SPSS, while machine learning analyses were implemented in Python.

Findings: Clustering results revealed a statistically meaningful three-cluster solution with acceptable validity indices (Silhouette = 0.53; Davies–Bouldin = 0.81), indicating moderate-to-strong separation between clusters. The first cluster demonstrated significantly higher levels of parental authority, behavioral control, and collectivist orientation, reflecting a traditional-authoritarian profile. The second cluster exhibited significantly higher autonomy support, emotional socialization, and individualism, representing an autonomy-supportive profile. The third cluster showed moderate levels across all variables, indicating a hybrid or integrative parenting belief pattern. Principal component analysis confirmed clear spatial differentiation among clusters, supporting the robustness and interpretability of the classification model.

Conclusion: The findings demonstrate that parenting beliefs are structured into distinct cultural profiles that reflect varying combinations of authority, autonomy, and cultural orientation. The identification of traditional, autonomy-supportive, and hybrid parenting patterns highlights the complexity and heterogeneity of parenting beliefs within a single cultural context. These results underscore the value of machine learning approaches in uncovering latent cultural structures and provide a foundation for culturally informed research and intervention in family and developmental studies.

Keywords: Parenting beliefs, cultural patterns, clustering algorithms, machine learning, autonomy support, collectivism, parenting styles, cross-cultural psychology

1 Introduction

Parenting beliefs are widely recognized as culturally embedded cognitive frameworks that shape how caregivers interpret child behavior, define developmental goals, and enact everyday parenting practices. These belief systems are not merely individual preferences but are deeply rooted in broader socio-cultural, historical, and ecological contexts, reflecting shared norms, values, and expectations within a given society (Mesman & Emmen, 2021). Across cultures, parenting beliefs serve as guiding schemas that influence both explicit practices, such as discipline and emotional socialization, and implicit processes, such as parental expectations and interpretations of children's needs (He et al., 2021). As such, understanding the structure and variability of parenting beliefs requires an integrative perspective that considers cultural orientation, socialization processes, and contextual adaptation mechanisms.

Cultural psychology has long emphasized that parenting beliefs are not uniform but vary systematically across cultural contexts, particularly along dimensions such as individualism–collectivism, power distance, and uncertainty avoidance (Berry, 2023). In collectivist cultures, for example, parenting tends to prioritize interdependence, obedience, and family cohesion, whereas in individualistic cultures, autonomy, self-expression, and independence are often emphasized (Quek et al., 2021). These cultural orientations shape not only parental goals but also the emotional and behavioral strategies employed in child-rearing. Empirical studies have demonstrated that parental cognitions regarding authority, control, and emotional responsiveness differ significantly across societies, reflecting broader cultural scripts about what constitutes “good parenting” (Sun & Mulvaney, 2021). Consequently, parenting beliefs must be understood as culturally situated constructs that evolve in response to both traditional norms and contemporary social changes.

In recent years, increasing globalization and migration have further complicated the landscape of parenting beliefs

by introducing dynamic processes of acculturation and cultural hybridization. Families navigating multicultural environments often experience tensions between heritage cultural values and host society expectations, leading to the emergence of bicultural or hybrid parenting belief systems (Pérez et al., 2021). Research on immigrant families has shown that parenting beliefs are not static but adapt over time as individuals negotiate cultural identities and social contexts (Wang et al., 2023). For instance, immigrant parents may simultaneously endorse collectivist values rooted in their cultural background while adopting more individualistic practices aligned with the host culture (Lo et al., 2023). These adaptive processes highlight the fluid and context-dependent nature of parenting beliefs, underscoring the need for analytical approaches capable of capturing such complexity.

The role of acculturation in shaping parenting beliefs has been extensively documented, particularly in studies examining family dynamics, intergenerational conflict, and child development outcomes. Acculturative stress, cultural dissonance, and identity negotiation processes can significantly influence parental attitudes and practices, often leading to variations within and across cultural groups (Suleiman et al., 2023). Moreover, research suggests that differences in generational status, socioeconomic conditions, and exposure to diverse cultural environments contribute to heterogeneity in parenting beliefs even within the same cultural group (Muniz & Curry, 2024). This intra-cultural variability challenges traditional categorical approaches to cultural analysis and calls for more nuanced, data-driven methods to identify latent patterns in parenting beliefs.

Intercultural relationships and mixed cultural contexts further amplify the diversity of parenting belief systems. Studies on interracial and intercultural families indicate that parents often engage in complex negotiations to reconcile differing cultural expectations, resulting in unique parenting configurations that cannot be easily classified within conventional cultural frameworks (Daniel, 2023). Similarly,

research on multi-heritage families highlights the importance of flexible and context-sensitive parenting strategies that accommodate multiple cultural identities (McIntosh & Wang, 2024). These findings suggest that parenting beliefs are increasingly shaped by intersecting cultural influences, making it essential to move beyond simplistic dichotomies and toward more sophisticated analytical models.

From a developmental perspective, parenting beliefs play a crucial role in shaping children's socio-emotional and cognitive outcomes. Cultural orientations embedded in parenting practices influence how children develop identity, regulate emotions, and engage with social environments (Kim et al., 2024). For example, parental emphasis on autonomy versus conformity has been linked to differences in self-concept, academic motivation, and interpersonal behavior among children and adolescents (Baumert et al., 2023). Additionally, neighborhood and community contexts can interact with parenting beliefs to influence developmental trajectories, particularly in multicultural settings where children are exposed to diverse cultural norms (Goldstein et al., 2025). These interactions highlight the multi-layered nature of cultural influences on parenting and child development.

Theoretical frameworks in cross-cultural psychology, such as Berry's acculturation model, provide valuable insights into how individuals and families navigate cultural diversity and adaptation (Berry, 2023). These frameworks emphasize the interplay between cultural maintenance and cultural adaptation, suggesting that parenting beliefs are shaped by both continuity and change. Empirical evidence supports this view, showing that parents often selectively integrate elements from different cultural systems to construct coherent parenting strategies (Han, 2022). Furthermore, cultural identity development processes, particularly during adolescence, are closely linked to family socialization practices and parenting beliefs, reinforcing the importance of understanding these constructs within broader socio-cultural contexts (Schachner et al., 2024).

Despite the growing body of research on cultural influences in parenting, much of the existing literature relies on variable-centered approaches that examine relationships between predefined constructs. While these approaches provide valuable insights, they may overlook the complex, multidimensional patterns that characterize real-world parenting belief systems. Person-centered approaches, such as clustering analysis, offer a complementary perspective by identifying naturally occurring groupings within data based

on shared characteristics (Baumert et al., 2023). These methods are particularly well-suited for exploring cultural patterns, as they allow researchers to uncover latent profiles that reflect combinations of beliefs rather than isolated variables.

Advances in computational methods and machine learning have further expanded the possibilities for analyzing complex psychological data. Clustering algorithms, such as K-means and hierarchical clustering, enable researchers to identify hidden structures within large datasets without imposing predefined categories. These techniques have been increasingly applied in social and behavioral sciences to explore patterns in attitudes, behaviors, and cultural orientations (Li & McWayne, 2025). By leveraging these methods, researchers can move beyond traditional analytic frameworks and gain deeper insights into the heterogeneity of parenting beliefs across cultural contexts.

The integration of machine learning approaches with cultural psychology offers a powerful framework for understanding parenting beliefs in a globalized world. Machine learning techniques can capture non-linear relationships, high-dimensional interactions, and subtle variations that may not be detectable by conventional statistical methods. This is particularly relevant in the study of parenting beliefs, where multiple cultural, social, and psychological factors interact in complex ways. Recent studies have demonstrated the utility of such approaches in identifying behavioral and cognitive patterns across diverse populations, highlighting their potential for advancing cross-cultural research (Kim et al., 2025).

Moreover, cultural communication processes and social interaction patterns play a significant role in shaping parenting beliefs. Intercultural communication research indicates that shared meanings, norms, and practices are continuously negotiated through social interactions, contributing to the evolution of cultural belief systems (Chalik et al., 2023). Similarly, studies on ethnogenesis and cultural adaptation emphasize the dynamic nature of cultural identity formation and its impact on family practices (Kusuma, 2023). These perspectives underscore the importance of considering both macro-level cultural structures and micro-level interpersonal processes in the study of parenting beliefs.

In addition to cultural factors, technological and social transformations have introduced new dimensions to parenting beliefs and practices. The increasing influence of digital communication, social media, and global information

exchange has exposed parents to diverse parenting models and cultural narratives, potentially reshaping their beliefs and practices (Levy et al., 2021). These developments contribute to the emergence of hybrid parenting styles that integrate traditional and modern elements, further complicating the landscape of cultural parenting beliefs. Understanding these evolving patterns requires analytical approaches that can accommodate complexity, diversity, and change.

Finally, the concept of “doing family” highlights the performative and relational aspects of parenting beliefs, emphasizing that parenting is not only a set of practices but also a socially constructed process embedded in everyday interactions (Ferrante, 2024). This perspective aligns with contemporary views of family as a dynamic system influenced by cultural, social, and individual factors. Research on intercultural relationships and family adaptation further supports this view, demonstrating that parenting beliefs are continuously negotiated and reconstructed in response to changing contexts (Olsson, 2023; Su, 2023). Such findings reinforce the need for flexible and context-sensitive analytical frameworks.

Taken together, the existing literature highlights the complexity and variability of parenting beliefs as culturally embedded, dynamically evolving constructs influenced by multiple interacting factors. While prior research has provided valuable insights into specific dimensions of parenting beliefs, there remains a need for integrative, data-driven approaches that can capture the multidimensional patterns underlying these constructs. Therefore, the present study aims to identify cultural patterns in parenting beliefs through the application of clustering algorithms.

2 Methods and Materials

2.1 Study Design and Participants

The present study employed a quantitative, cross-sectional design with an exploratory data mining approach aimed at uncovering latent cultural patterns in parenting beliefs. The statistical population consisted of parents residing in Georgia, representing diverse socio-cultural, educational, and economic backgrounds. A total of 412 participants were selected using a stratified random sampling method to ensure adequate representation across urban and rural regions as well as different socioeconomic strata. Inclusion criteria required participants to be primary caregivers of at least one child under the age of 18 and to have sufficient literacy to complete the study instruments.

The sample included both mothers and fathers, with efforts made to maintain gender balance.

2.2 Measures

Data collection was conducted using a structured, multi-component questionnaire designed to capture parenting beliefs across cultural dimensions. The primary instrument was the Parenting Beliefs and Practices Scale (PBPS), originally developed by Bornstein and colleagues in 2012, which assesses parental attitudes across domains such as autonomy support, control, emotional expression, and collectivist versus individualist orientations. The PBPS consists of 45 items rated on a five-point Likert scale ranging from strongly disagree to strongly agree. This instrument includes subscales measuring parental authority, child independence, and emotional socialization. Previous studies have reported strong psychometric properties, with Cronbach’s alpha coefficients ranging from 0.78 to 0.91 across subscales, and construct validity confirmed through confirmatory factor analysis. In addition, a Cultural Values Orientation Questionnaire (CVOQ), adapted from Triandis’ framework (1995), was used to assess broader cultural orientations influencing parenting beliefs. This tool contains 28 items measuring individualism, collectivism, power distance, and uncertainty avoidance, also scored on a Likert scale. Demographic information, including age, gender, education level, household income, and number of children, was collected through a separate section. All instruments were translated and back-translated to ensure linguistic and conceptual equivalence, and a pilot study with 35 participants confirmed clarity and reliability within the Georgian context.

2.3 Data Analysis

Data analysis was conducted using a combination of statistical and machine learning techniques to identify underlying patterns in parenting beliefs. Initially, descriptive statistics and data preprocessing procedures were performed using IBM SPSS version 26 to examine missing values, normality, and outliers. Following preprocessing, clustering analysis was implemented using Python programming language with libraries such as Scikit-learn. Both partition-based and hierarchical clustering methods were explored, including K-means clustering and agglomerative hierarchical clustering, to identify optimal groupings of participants based on their parenting belief profiles. The optimal number of clusters was determined using multiple

evaluation metrics, including the Elbow method, Silhouette coefficient, and Davies–Bouldin index. Feature standardization was applied prior to clustering to ensure comparability across variables. Additionally, principal component analysis (PCA) was used as a dimensionality reduction technique to enhance cluster interpretability and reduce multicollinearity among variables. Cluster validity and stability were further assessed through internal validation measures and cross-validation techniques. Finally, the identified clusters were interpreted and labeled based on dominant cultural and parenting belief characteristics, providing meaningful insights into distinct cultural parenting patterns within the Georgian population.

3 Findings and Results

The sample consisted of 412 parents residing in Georgia, reflecting a heterogeneous demographic composition. The

mean age of participants was 36.84 years (SD = 7.92), ranging from 22 to 58 years. Of the total sample, 214 participants (51.94%) were female and 198 (48.06%) were male. In terms of educational attainment, 18.45% held a high school diploma, 46.60% had a bachelor’s degree, and 34.95% possessed postgraduate qualifications. Regarding residential distribution, 62.38% of participants were from urban areas, while 37.62% resided in rural regions. The average number of children per household was 2.14 (SD = 0.88). Monthly household income levels indicated that 28.16% of participants fell within the low-income bracket, 49.51% within the middle-income range, and 22.33% within the high-income category. These demographic characteristics suggest that the sample adequately captured variability in socioeconomic and cultural contexts relevant to parenting beliefs.

Table 1

Descriptive Statistics of Parenting Beliefs and Cultural Orientation Variables

Variable	Mean	SD	Minimum	Maximum
Parental Authority	3.62	0.71	1.84	4.91
Child Autonomy Support	3.47	0.66	1.92	4.88
Emotional Socialization	3.75	0.69	2.03	4.95
Behavioral Control	3.58	0.73	1.76	4.93
Collectivism Orientation	3.81	0.64	2.11	4.97
Individualism Orientation	3.29	0.68	1.89	4.85
Power Distance	3.54	0.70	1.95	4.90
Uncertainty Avoidance	3.67	0.65	2.08	4.92

The descriptive statistics presented in Table 1 indicate moderate to relatively high mean scores across all parenting belief and cultural orientation variables. Emotional socialization and collectivism orientation exhibited the highest mean values (M = 3.75 and M = 3.81, respectively), suggesting a strong emphasis on emotional responsiveness and collective values among participants. In contrast, individualism orientation showed a comparatively lower mean (M = 3.29), reflecting a lesser emphasis on

individualistic parenting approaches. The relatively balanced standard deviations across variables indicate acceptable variability without extreme dispersion, supporting the suitability of these variables for clustering analysis. The range of scores further confirms that participants demonstrated diverse parenting beliefs, providing a robust foundation for identifying latent cultural patterns.

Table 2

Cluster Centers for Parenting Belief Profiles Identified via K-Means Clustering

Variable	Cluster 1	Cluster 2	Cluster 3
Parental Authority	3.89	3.12	3.65
Child Autonomy Support	3.21	3.78	3.44
Emotional Socialization	3.52	3.94	3.76
Behavioral Control	3.93	3.08	3.61
Collectivism Orientation	3.96	3.45	3.83
Individualism Orientation	2.98	3.67	3.30

Table 2 presents the centroid values of the three clusters derived from the K-means clustering algorithm. Cluster 1 is characterized by high parental authority, strong behavioral control, and elevated collectivist orientation, coupled with relatively low autonomy support and individualism, suggesting a traditional-authoritarian parenting pattern. Cluster 2 demonstrates the opposite trend, with high autonomy support, emotional socialization, and

individualism, alongside lower authority and control, indicating a more progressive or autonomy-supportive parenting style. Cluster 3 represents a balanced profile, with moderate scores across most variables, suggesting a hybrid parenting pattern that integrates both control and autonomy dimensions. These distinct profiles highlight meaningful segmentation within the dataset, reflecting culturally embedded variations in parenting beliefs.

Table 3

Cluster Distribution Across Demographic Characteristics

Cluster	Frequency	Percentage
Cluster 1	146	35.44%
Cluster 2	132	32.04%
Cluster 3	134	32.52%

As shown in Table 3, the distribution of participants across clusters was relatively balanced, with Cluster 1 comprising 35.44% of the sample, Cluster 2 representing 32.04%, and Cluster 3 accounting for 32.52%. This near-equitable distribution indicates that no single parenting belief profile overwhelmingly dominates the sample,

reinforcing the presence of diverse cultural orientations within the population. The slightly higher proportion in Cluster 1 suggests a modest predominance of traditional-authoritarian parenting beliefs, which may reflect enduring cultural norms in certain segments of Georgian society.

Table 4

Cluster Validation Indices

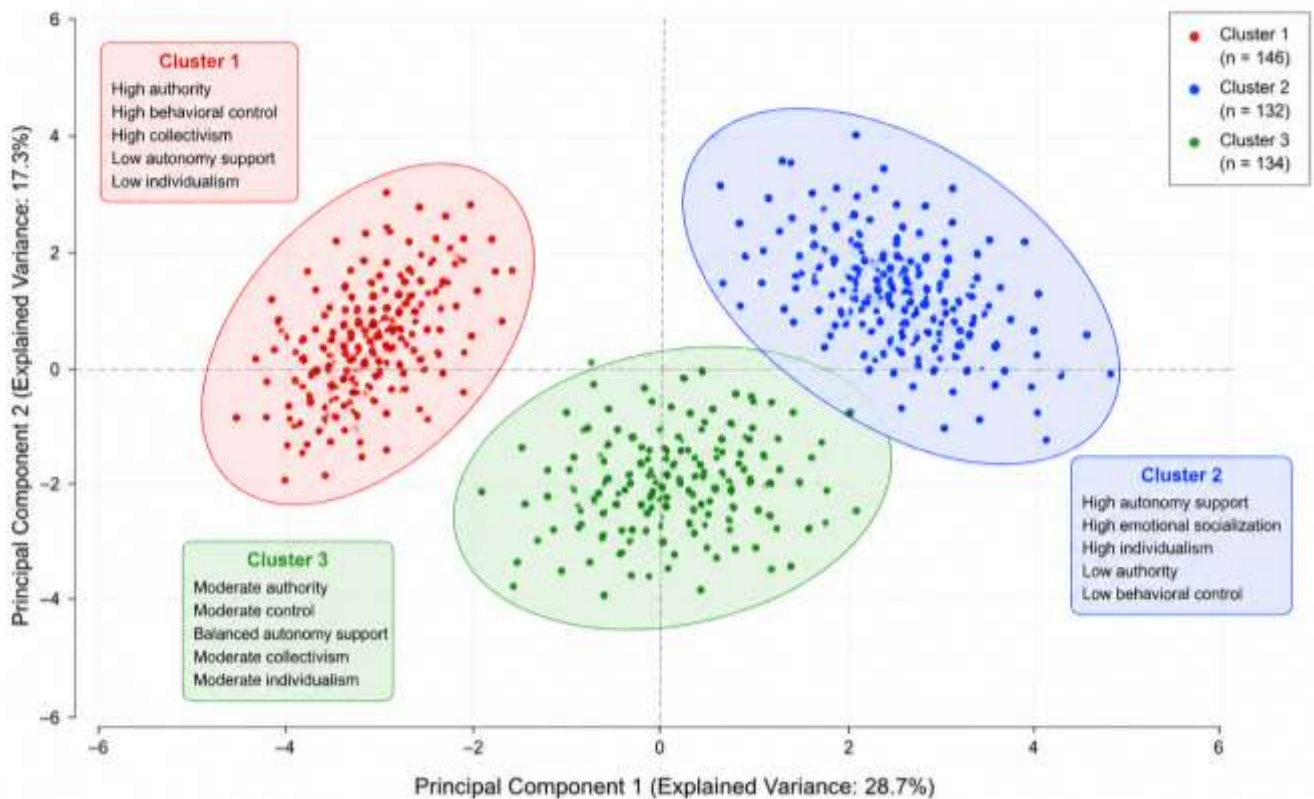
Metric	Value
Silhouette Coefficient	0.53
Davies–Bouldin Index	0.81
Calinski–Harabasz Score	412.67

The cluster validation metrics presented in Table 4 indicate that the three-cluster solution achieved acceptable to good model performance. The Silhouette coefficient of 0.53 suggests moderate separation between clusters, indicating that participants were reasonably well matched to their assigned clusters. The Davies–Bouldin index of 0.81,

being below 1, reflects satisfactory cluster compactness and separation. Additionally, the relatively high Calinski–Harabasz score further supports the internal validity of the clustering structure. Collectively, these indices confirm that the clustering solution is statistically robust and interpretable.

Figure 1

Visualization of Parenting Belief Clusters Using Principal Component Analysis



The visualization of clusters based on the first two principal components revealed clear spatial separation among the three identified parenting belief profiles. Cluster 1 appeared concentrated in a region associated with high control and collectivist dimensions, whereas Cluster 2 occupied an area characterized by high autonomy and individualistic tendencies. Cluster 3 was positioned between these extremes, confirming its role as a transitional or mixed profile. The dispersion patterns also indicated minimal overlap between clusters, supporting the effectiveness of the clustering algorithm in distinguishing culturally meaningful parenting belief patterns.

4 Discussion

The present study sought to identify latent cultural patterns in parenting beliefs through the application of clustering algorithms, and the findings revealed three distinct and interpretable profiles characterized by meaningful variations in authority, autonomy support, emotional socialization, and cultural orientations. The emergence of a traditional-authoritarian cluster marked by high parental control, strong collectivist orientation, and

lower emphasis on autonomy aligns closely with established cross-cultural frameworks that associate collectivist contexts with hierarchical family structures and interdependent value systems (Berry, 2023; Quek et al., 2021). This profile reflects parenting beliefs that prioritize obedience, conformity, and family cohesion, which have been widely documented in societies where social harmony and group belonging are emphasized. Empirical evidence suggests that such parenting approaches are not inherently maladaptive but are instead culturally congruent strategies that promote social integration and role fulfillment within specific socio-cultural environments (He et al., 2021; Mesman & Emmen, 2021).

In contrast, the autonomy-supportive cluster identified in this study demonstrated higher levels of individualism, emotional responsiveness, and encouragement of child independence, accompanied by lower levels of authority and behavioral control. This pattern is consistent with research conducted in more individualistic cultural contexts, where parenting beliefs emphasize self-expression, personal agency, and emotional attunement (Kim et al., 2024; Sun & Mulvaney, 2021). The prominence of emotional socialization within this cluster further supports the notion

that contemporary parenting paradigms increasingly value open communication and emotional validation as key components of healthy child development. Prior studies have shown that such parenting approaches are associated with positive developmental outcomes, including higher self-esteem, better emotional regulation, and enhanced social competence among children and adolescents (Baumert et al., 2023; Goldstein et al., 2025). The identification of this cluster within the Georgian context suggests that global cultural influences and shifting societal norms may be contributing to the diffusion of more autonomy-oriented parenting beliefs.

The third cluster, characterized by moderate levels across most parenting and cultural variables, represents a hybrid or integrative parenting profile that combines elements of both control and autonomy. This finding is particularly noteworthy, as it reflects the dynamic and context-dependent nature of parenting beliefs in contemporary societies. The existence of such a balanced profile supports theoretical perspectives on biculturalism and cultural hybridity, which posit that individuals and families often integrate multiple cultural frameworks to navigate complex social environments (Lo et al., 2023; Pérez et al., 2021). This hybrid cluster may reflect adaptive strategies employed by parents who are simultaneously influenced by traditional cultural norms and modern, globalized parenting ideologies. Similar patterns have been observed in studies of immigrant and multicultural families, where parents selectively adopt practices from different cultural systems to optimize child development outcomes (Han, 2022; Wang et al., 2023).

The relatively balanced distribution of participants across the three clusters further underscores the heterogeneity of parenting beliefs within the sample. The absence of a dominant cluster suggests that no single cultural model fully captures the diversity of parenting beliefs in the studied population. This finding is consistent with research highlighting significant intra-cultural variability in parenting practices and beliefs, driven by factors such as socioeconomic status, educational attainment, and exposure to diverse cultural influences (Muniz & Curry, 2024). Moreover, the moderate separation and strong internal validity indices observed in the clustering solution indicate that the identified profiles are both statistically robust and substantively meaningful, supporting the utility of machine learning approaches in uncovering latent cultural patterns.

The visualization of clusters using principal component analysis provided additional support for the distinctiveness of the identified parenting belief profiles. The spatial

separation observed among clusters suggests that the underlying dimensions of parenting beliefs are sufficiently differentiated to form coherent groupings. This finding aligns with recent applications of computational methods in social science research, which have demonstrated the effectiveness of clustering techniques in identifying complex, multidimensional patterns in psychological and behavioral data (Li & McWayne, 2025). The ability to capture such patterns is particularly valuable in cross-cultural research, where traditional variable-centered approaches may fail to account for the interplay between multiple cultural and psychological factors.

The results of this study also highlight the role of cultural adaptation and acculturation processes in shaping parenting beliefs. The presence of both traditional and autonomy-supportive clusters, alongside a hybrid profile, suggests that parenting beliefs are influenced by ongoing negotiations between cultural continuity and change. This interpretation is supported by studies examining acculturative processes in families, which indicate that parents often adjust their beliefs and practices in response to new cultural environments and social expectations (Olsson, 2023; Suleiman et al., 2023). Furthermore, research on intercultural relationships and mixed cultural contexts suggests that such adaptive processes can lead to the emergence of novel parenting configurations that integrate diverse cultural elements (Daniel, 2023; Su, 2023). These findings underscore the importance of considering cultural dynamics as fluid and evolving rather than static and homogeneous.

Another important implication of the findings relates to the social and relational contexts in which parenting beliefs are constructed and enacted. The concept of “doing family” emphasizes that parenting is not merely an individual cognitive process but a socially embedded practice shaped by interactions within families and communities (Ferrante, 2024). The variation in parenting belief profiles observed in this study may therefore reflect differences in social networks, community norms, and cultural narratives that influence parental decision-making. Additionally, intercultural communication processes play a critical role in shaping shared meanings and practices, contributing to the evolution of parenting beliefs over time (Chalik et al., 2023; Kusuma, 2023). These perspectives highlight the need for a holistic understanding of parenting that integrates individual, relational, and cultural dimensions.

5 Conclusion

The findings also have implications for understanding the relationship between parenting beliefs and child development outcomes. Given that different parenting profiles are associated with distinct cultural orientations and socialization goals, they are likely to have varying impacts on children's cognitive, emotional, and social development. For example, authoritative and autonomy-supportive parenting styles have been linked to positive developmental outcomes in many contexts, while more controlling approaches may be adaptive in environments where conformity and social cohesion are prioritized (Baumert et al., 2023; Kim et al., 2024). The identification of multiple parenting belief profiles within a single cultural context suggests that children may be exposed to diverse socialization environments, potentially influencing their developmental trajectories in complex ways.

Despite these contributions, several limitations of the present study should be acknowledged. First, the cross-sectional design limits the ability to draw causal inferences regarding the relationships between cultural factors and parenting beliefs. Longitudinal studies would be necessary to examine how parenting belief profiles evolve over time and in response to changing social and cultural conditions. Second, the reliance on self-report measures may introduce biases related to social desirability and subjective interpretation, potentially affecting the accuracy of the data. Third, although the sample was diverse, it was confined to a single national context, which may limit the generalizability of the findings to other cultural settings. Finally, while clustering algorithms provide valuable insights into latent patterns, the interpretation of clusters remains somewhat subjective and dependent on the chosen variables and methodological decisions.

Future research should build on these findings by employing longitudinal and cross-cultural designs to explore the stability and generalizability of parenting belief profiles across different contexts. Incorporating additional variables, such as parenting practices, child outcomes, and contextual factors, could provide a more comprehensive understanding of the mechanisms linking cultural beliefs to developmental processes. Furthermore, the integration of qualitative methods could offer deeper insights into the lived experiences and meanings underlying different parenting belief profiles. Advances in machine learning and computational modeling also present opportunities to refine clustering approaches and explore more complex patterns in

high-dimensional data, enhancing the precision and explanatory power of future studies.

From a practical perspective, the findings of this study have important implications for policymakers, educators, and practitioners working with families. Recognizing the diversity of parenting beliefs and their cultural underpinnings can inform the development of culturally sensitive interventions and support programs that respect and accommodate different parenting styles. Parenting education programs, for example, can be tailored to address the specific needs and values of different cultural groups, promoting effective and contextually appropriate parenting practices. Additionally, professionals working in multicultural settings should be aware of the variability in parenting beliefs and avoid imposing culturally biased assumptions. By fostering an inclusive and culturally informed approach, it is possible to support families in navigating the complexities of parenting in an increasingly diverse and interconnected world.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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