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Article

Latent profile analysis of parent-child triangulation: unveiling the behavioral nexus in adolescents' internalized and externalized problem behaviors

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Abstract: Parent-child triangulation is a pattern of negative parent-child relationships in which children are passively or actively involved in family conflict, which may lead to behavioral problems in adolescents. Latent profile analysis was used to explore the relationship between potential categories of parent-child triangulation and internalized and externalized problem behaviors in a sample of 1361 middle school students. The results showed that: (1) parent-child triangulation can be divided into four potential types according to the extent to which adolescents perceive it: low-profile equilibrium (26.89%), high parentification profile (28.07%), medium-profile difference (30.64%), and high-profile difference (14.40%); (2) adolescents with a low-profile equilibrium and high parentification profile have the lowest level of internalized problem behaviors, but the externalized problem behaviors of the high parentification profile were significantly higher than those of the low profile; the adolescents with a medium profile had a high level of both internalized and externalized problem behaviors, and the adolescents with a high profile had the highest level of both internalized and externalized problem behaviors; (3) the younger the age and the younger the adolescents living in towns, the less likely they were to perceive parent-child triangulation, and the highest level of parentification was found among boarding school students. Moreover, this research extends its scope by considering the biomechanical aspects. This holistic approach may provide new insights into the underlying mechanisms and potentially inform more effective intervention strategies.

Keywords: parent-child triangulation; latent profile analysis; internalized behavior problem; externalized behavior problem; adolescent; biomechanical

1. Introduction

Parent-child or family triangulation is a negative parent-child relationship pattern between 'father-child-mother' formed when children are passively or actively involved in the conflict between their parents. According to family systems theory, when a husband and wife are at odds, they are likely to involve their kids in the dispute to defuse the tension. This creates a parent-child triangulation and makes the kids the victims of their parents' bad marriage [1]. Parent-child triangulation is generally divided into three dimensions and six types of performance, according to previous research [2]. These include parentification (including emotional and functional parentification), cross-generational coalition (including stable and unstable coercive coalitions), and scapegoating (including detouring-attacking and detouring-supportive). Scapegoating refers to parents using their children as an excuse to avoid dealing with their problems, such as jointly disciplining a misbehaving child

(detouring-attacking) or jointly caring for a weak or sick child (detouring-supportive). In cross-generational coalitions, one parent enlists the child's help to fight the other. The youngster may ally with the father first, then with the mother (unstable coercive coalition), or they may support one parent for an extended time (stable coercive coalition). Parentification is when a kid suppresses their wants and assumes the duties that parents should perform, such as taking on household work (functional parentification) and tending to and soothing family members' feelings (emotional parentification).

Scapegoating and Cross generational coalition were two types identified early in the practice of psychological counselling [3], whereas the inclusion and definition of Parentification have gradually become clear through ongoing discussions among scholars [4]. Previous research has primarily examined the parent-child triangulation variable as a whole, using a total score, and has discussed its relationship with factors such as parental marital status and children's emotional and behavioral problems [5,6]. Some scholars have also investigated how the characteristics of parent-child triangulation affect individuals. Existing research has shown that parental disagreement might indirectly influence teenagers' problematic behaviors via "scapegoating" and "cross-generational coalition" in parent-child triangulation. The research on parentalisation is somewhat controversial. Most research in Western cultures has suggested that parentalisation can be considered a form of emotional abuse and neglect [7,8]. However, in recent years, some studies have pointed out that the experience of parentalisation is not all bad for adolescents [9]. A study employed a narrative technique to critically assess 61 studies, explaining the two-way influence of parenting styles on individual development [4]. According to a study on parent-child triangulation, most studies focus on a single dimension or its total score, with few specifically addressing the potential impact of individuals' varied performances on each dimension [10]. In truth, many children are silently or inadvertently involved in family conflict. The impact of parent-child triangulation on individual development may be underestimated if it is only classified based on specific criteria.

According to several theoretical and empirical studies, adolescent development can be significantly impacted by parent-child triangulation. An individual's concept of self rapidly develops during adolescence. Their parents' orthodox educational views clash with adolescents' new ideas, potentially resulting in a variety of internal family disputes [11]. Furthermore, some parents are going through a midlife crisis and readily disregard or even include their children in marital disputes [12]. Family systems theory states that while children's engagement can momentarily reduce marital conflict, it will eventually cause the children to experience unpleasant emotions, which could lead to several issues for them in the future [13]. Empirical studies also support this view. On the one hand, emotional issues, including anxiety and sadness, are impacted by parent-child triangulation [5,14]. On the other hand, it also significantly affects adolescents' externalized difficulties [15]. The study's findings, however, vary between Eastern and Western civilizations. For instance, a longitudinal study of 135 family groups of children revealed a common rise in the children's self-reported externalized issues but no correlation between the degree of triangulation and the children's internalized problems [6]. Researchers discovered a strong positive association between externalized difficulties and melancholy and anxious moods in

adolescents and parent-child triangulation in a study involving 238 Brazilian adolescents [16]. Nonetheless, a Chinese study discovered that the parent-child triangulation's Parentification component can lower adolescents' despair levels [10]. The association between various forms of parent-child triangulation in Chinese households and adolescents' internalized and externalized problem behaviors makes this research topic deserving more investigation.

An individual-centred approach to model fitting has been used in numerous studies in recent years to identify several possible subtypes. This method can better explain the relationship between categories and outcome variables [17]. Latent profile analysis (LPA) is a popular individual-focused analysis technique. Furthermore, western family culture discourages children from participating in parental connections and encourages the development of children's sense of independence, self-reliance, and the capacity to leave the family early. In contrast, Confucianism strongly influences Chinese family dynamics, emphasizing harmonious family principles like 'filial piety' and 'family harmony brings success in all pursuits'. The influence of cultural background differences should also be considered when exploring parent-child triangulation [18]. As a result, by adopting an individual-centred approach, this study was able to more effectively conduct a localized study to explore the subtypes of the Chinese parent-child triangulation and the impact on internalized and externalized problem behaviors.

2. Methods

2.1. Participants and procedure

The research protocol was reviewed and approved by the Medical Ethics Committee of the First Affiliated Hospital of the Medical College of Shihezi University (KJ2023-476-01) before the study commenced. This study adopts a longitudinal design. Students from 3 junior high schools and 1 senior high school in Northwest China were selected for two formal surveys. After obtaining the consent of the school administrations, invitation letters were sent to students, 4–6 non-graduating classes were selected from each school to conduct a paper questionnaire by professionally trained psychology postgraduate students. A total of 1387 valid questionnaires were collected in the questionnaire survey. The participants were 12–16 years old (average age = 13.25; SD = 0.95). During the surveys, the postgraduate students explained the questionnaires and answering methods to the participants in detail and emphasized the anonymity and the research purposes to dispel the participants' concerns. After the questionnaires had been answered completely, they were collected.

2.2. Measures

2.2.1. Parent-child triangulation

The Parent-Child Triangulation Scale revised by W.M. and W.Z. [19] was used. The scale consists of 45 items and includes three dimensions: Scapegoating, parentification and cross generational coalition. For example, 'I feel that it is my fault when my parents argue' and 'When my parents argue, I have to speak up for one of

them.' A 3-point Likert scale was used, with 'never', 'sometimes' and 'often' scoring 1, 2 and 3 points respectively. The higher the subject's score, the more pronounced the tendency towards parent-child triangulation. A second-order confirmatory factor analysis of the scale was performed, and six items with factor loadings less than 0.4 were deleted. The final model fit well (χ^2 = 1900.83, df = 678, CFI (comparative fit index) = 0.92, TLI (Tucker–Lewis index) = 0.91, RMSEA (Root Mean Square Error of Approximation) = 0.04, SRMR (Standardized Root Mean Square Residual) = 0.05). In this study, the Cronbach's α of the parent-child attachment questionnaire is 0.89, and the Cronbach's α of the sub-questionnaires are in the range of 0.80–0.90.

2.2.2. Internalized and externalized problem behaviors

The Strength and Difficulties Questionnaire (SDQ) developed by Goodman [20] was used. The scale consists of 25 items, including emotional, conduct, hyperactivity, peer, and prosocial factors, such as 'I try to be kind to others, I care about other people's feelings' and 'I often fidget or feel impatient'. A 3-point Likert scale was used, with 1 point for 'not applicable', 2 for 'somewhat applicable' and 3 for 'fully applicable'. According to existing research, the questionnaire's emotional and peer factors indicated internalized problem behavior. In contrast, the conduct and hyperactivity factors were used as indicators of externalized problem behavior. The total score for internalized and externalized problem behavior ranges from 0 to 20, with a higher score indicating more serious internalized/externalized problems. A confirmatory factor analysis was performed on the scale, and four items with factor loadings less than 0.4 were deleted. The final model fitted well (χ^2 = 764.09, *df* = 281, CFI = 0.91, TLI = 0.90, RMSEA = 0.04, SRMR = 0.05). In this study, the Cronbach's α of the parent-child attachment questionnaire is 0.83, and the Cronbach's α of the sub-questionnaires is 0.71 and 0.85.

2.3. Statistical analysis

The collected data was stored and processed using SPSS 26.0 software. The data were then further analyzed using Mplus 8.3. First, we conducted LPA to explore the different characteristics of parent-child triangulation. Starting with the initial model, the number of profiles in the model was gradually increased until the model that fit the data best was found. Model fit indices included the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Adjusted BIC (aBIC), Entropy, Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT), and Bootstrapped likelihood ratio test (BLRT). Smaller values of AIC, BIC, and aBIC indicate better model fit [21]. Entropy is a measure of classification accuracy, with higher values indicating better classification quality [22]. The LMRT and BLRT are tests of significance between two models with k classes against k-1 classes; a significant p-value indicates that the k-1 class is better [23]. On this basis, Analysis of Variance (ANOVA) and Multiple Comparison Tests were used to test whether there were significant differences in depression and anxiety across attachment subtypes. Finally, Logistic regression analysis was performed on the results of the latent profile analysis to verify the relationship between gender, age, urban and rural residence, and boarding school status and the latent categories of parent-child triangulation.

3. Results

3.1. Common method bias control and test

In view of the common method bias and need for social approval that may be caused by self-report scales, some inverse scoring questions are introduced into the questionnaire to enhance the authenticity and reliability of the data. Postgraduate students majoring in psychology are the examiners to ensure that the questionnaire surveys are carried out under a unified and standardized guidance, to reduce the influence of external factors on the results. The Harman's single-factor test is used to analyze each variable. The results show that there are 15 factors with eigenvalues greater than 1, and the variance variation explanation rate of the first factor is 15.99%, which is lower than the critical value of 40%. This indicates that there is no significant common method bias.

3.2. Descriptive analysis results

Table 1 displays the means, standard deviations, and Pearson's correlation coefficients for each of the primary variables. The correlation analysis's findings indicate that each parent-child triangulation dimension and overall score increase with age ($p < 0.05$). There is a substantial positive correlation ($p < 0.001$) between the overall scores of parent-child triangulation, scapegoating, parentification, and cross-generational coalition, and between internalization and externalization. The parent-child triangulation total score was significantly positively correlated with both internalized and externalized challenges, while the scapegoating and cross-generational coalition components were significantly positively correlated with both internalized and externalized problems. Parentification did not significantly connect with internalized difficulties, but it did have a significant negative correlation with externalized problems.

Table 1. Descriptive statistics and correlation analysis of main variables.

	Mean	**Standard deviation**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1.Age	13.24	1.01	1						
2.Parent-Child Triangulation	1.63	0.27	0.10***	1					
3.Scapegoating	1.54	0.37	0.07***	0.87***	1				
4.Parentification	2.03	0.41	0.06*	0.51***	0.12***	1			
5.Cross Generational Coalition	1.38	0.32	0.10***	0.76***	0.61***	0.10***	1		
6.Internalized problem	1.67	0.43	0.02	0.36***	0.39***	0.01	0.33***	1	
7.Externalized problem	1.66	0.39	0.03	0.32***	0.40**	-0.09***	0.33***	0.69***	1

Notes: *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

3.3. Latent profile analysis

This study extracted models of class 1 through 5 to compare the possible categories of parent-child triangulation among adolescents. **Table 2** displays the goodness-of-fit indices for the latent profile models with varying numbers of categories. Qiu [24] states that the BIC index should be used as the criterion for model fit judgments when the sample size is large (more than 1000). According to **Table 2**'s

data, all models have entropy values greater than 0.8, which suggests they are all accurate. A model with five categories is not substantially superior to a model with four categories, as the LMR value for five categories is no longer significant. From class 1 to class 5, the AIC, BIC and aBIC gradually decrease. Combining various indicators and theoretical justifications, a four-category model is ultimately selected as the best model.

Table 2. Fit indices and class proportions for 1- to 5-profile models.

Class	AIC	BIC	aBIC	Entropy	LMR-LRT	BLRT	Proportion (%) Smallest Class
1	101436.42	101843.27	101595.50				
2	93745.19	94360.68	93985.84	0.94	<0.001	<0.001	69.36/30.64
3	91596.25	92420.38	91918.48	0.89	<0.001	<0.001	33.58/43.20/23.22
4	90191.73	91224.49	90595.53	0.88	<0.001	<0.001	26.89/28.07/30.64/14.40
5	89360.43	90601.83	89845.80	0.89	0.137	<0.001	27.19/28.36/26.82/7.79/9.85

An ANOVA was used to test the differences in the four subcategories of each dimension of parent-child triangulation. **Table 3** displays the findings. The first subtype of parent-child triangulation included 366 individuals or 26.89% of the total participants. This group was dubbed the "low profile" since it scored lowest on all three parent-child triangulation variables. 382 individuals, or 28.07% of all subjects, belonged to the parent-child triangulation subtype 2. This group was dubbed the "high parentification profile" because it scored highly on the parentification dimension but poorly on the scapegoating and cross generational coalition dimensions of parent-child triangulation. The parent-child triangulation subtype 3 comprised 417 individuals or 30.64% of the total subjects. This group scored moderately on the Scapegoating and Cross Generational Coalition dimensions and scored high on the Parentification dimension, so it was named the 'Medium Profile'. The parent-child triangulation latent class 4 had 196 people, accounting for 14.40% of all subjects. This group scored highest on the Scapegoating and Cross Generational Coalition dimensions and medium on Parentification, hence the name 'High Profile'. See **Figure 1** for specific score differences.

Table 3. Comparisons of of parent-child triangulation subtypes (M ± SD).

	Class1 (n = 366)	Class2 (n = 382)	Class3 (n = 417)	Class4 (n = 196)	F	Multiple Comparison
Scapegoating	1.24 ± 0.17	1.31 ± 0.15	1.74 ± 0.17	2.15 ± 0.27	1397.48^{***}	4 > 3 > 2 > 1
Parentification	1.62 ± 0.28	2.34 ± 0.27	2.12 ± 0.31	2.01 ± 0.36	373.70^{***}	2 > 3 > 4 > 1
Cross Generational Coalition	1.21 ± 0.20	1.23 ± 0.18	1.44 ± 0.24	1.88 ± 0.32	442.94^{***}	4 > 3 > 2 > 1

Notes: *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

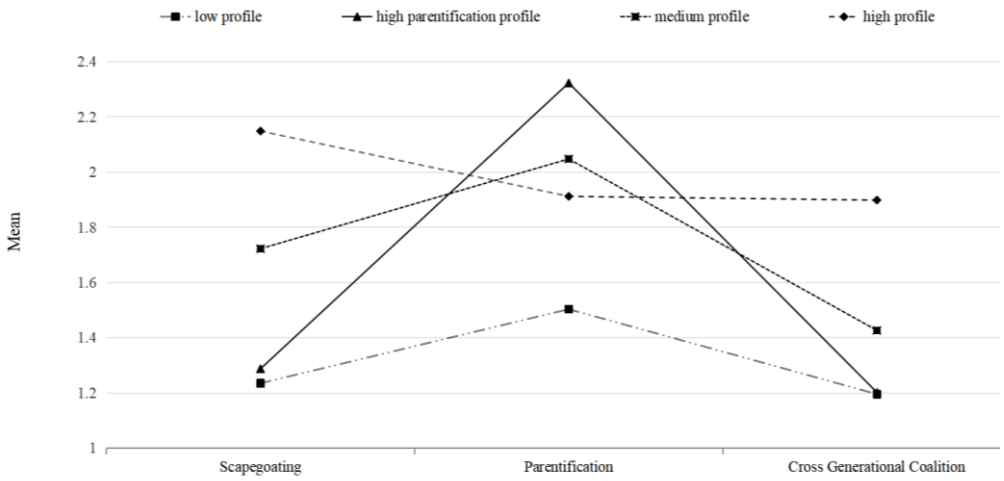

Figure 1. The sample means of latent profiles for parent-child triangulation.

Note: The y-axis represents the mean score of parent-child triangulation. All the dimensions of each scale are listed on the x-axis.

3.4. Impact of latent profiles of parent-child triangulation

In order to examine the impact of parent-child triangulation subtypes on internalized and externalized problem behaviors among adolescents, an analysis of variance was used to test whether there were significant differences in internalized and externalized problem behaviors between different attachment subtypes. The results are shown in **Table 4**. The results showed that the latent class of parent-child triangulation significantly differed in terms of the scores of internalized problem behavior and externalized problem behavior (F = 69.012, p < 0.001, η^2 = 0.132; F = 80.820, p < 0.001, η^2 = 0.152). Multiple comparisons found that in terms of the level of internalized problem behavior in adolescents, the low profile (M = 1.56) and the high parentification profile (M = 1.55) were the lowest, and there was no significant difference between the two (p = 0.723); followed by a difference of internalized problem behavior level, the low profile (M = 1.56) and the high parentification profile (M = 1.55) were the lowest, and there was no significant difference between the two (p = 0.723); followed by the medium profile (M = 1.71); and finally the high profile (M = 2.1), which had the highest level of internalized problem behavior. In terms of adolescents' levels of externalized problem behavior, significant differences were found across the four profiles, with the high parentification profile having the lowest level (M = 1.51); followed by the low profile (M = 1.58); then the medium profile (M = 1.71); and finally the high profile (M = 1.97), which had the highest level of externalized problem behavior. The differences in scores are shown in **Figure 2**.

Table 4. Comparisons of outcomes across latent profile membership (M ± SD).

	1 L low profile	2 High parentification profile	3 Medium profile	4 High profile	F	η^2	Multiple Comparison
Internalized problem	1.56 ± 0.41	1.55 ± 0.38	1.71 ± 0.40	2.01 ± 0.43	69.01***	0.13	4 > 3 > 1, 2
Externalized problem	1.58 ± 0.38	1.51 ± 0.35	1.71 ± 0.35	1.97 ± 0.37	80.82***	0.15	4 > 3 > 1 > 2

Notes: *, p < 0.05; **, p < 0.01; ***, p < 0.001.

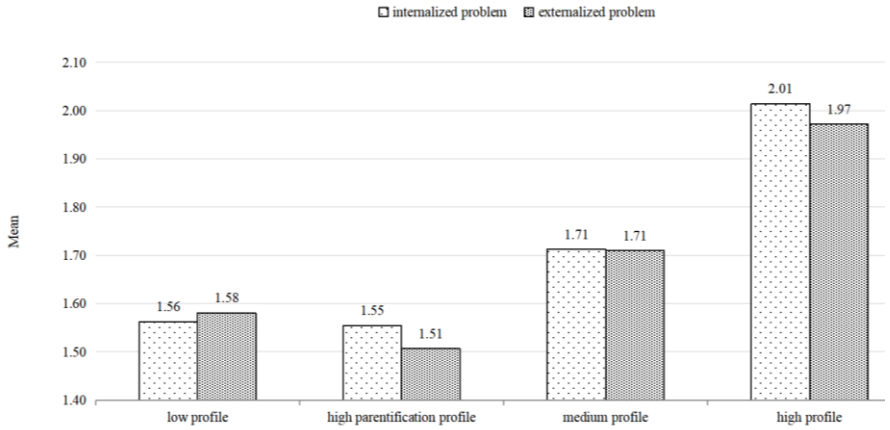

Figure 2. Scores for different subtypes of internalized and externalized problem behavior.

3.5. The predictive role of gender, age, residence and boarding school status of adolescents on parent-child triangulation subtypes

Table 5. Logistic analysis of demographic variables on parent-child triangulation subtypes.

	Low profileVS High parentification profile(ref.)				**Low profileVS Medium profile(ref.)**			
	***b*(SE)**	**OR**	**95%Confidence Interval**	***p***	***b* (SE)**	**OR**	**95%Confidence Interval**	***p***
Age	−0.18(0.15)	0.84	[0.62, 1.13]	0.245	−0.16(0.15)	0.85	[0.64, 1.14]	0.286
Gender	−0.16(0.08)	0.86	[0.73, 1.00]	0.054	−0.30(0.08)	0.74	[0.64, 0.86]	<0.001
Residence	0.34(0.16)	1.40	[1.03, 1.91]	0.034	0.35(0.16)	1.41	[1.04, 1.92]	0.027
Boarding school	−0.65(0.16)	0.52	[0.38, 0.71]	<0.001	−0.01(0.16)	0.99	[0.72, 1.36]	0.941
	Low profileVS High profile(ref.)				High parentification profileVS Medium profile(ref.)			
	b(SE)	OR	95%Confidence Interval	*p*	*b*(SE)	OR	95%Confidence Interval	*p*
Age	0.04(0.18)	1.04	[0.73, 1.49]	0.819	0.02(0.15)	1.02	[0.76, 1.36]	0.912
Gender	−0.23(0.10)	0.80	[0.66, 0.96]	0.018	−0.14(0.08)	0.87	[0.74, 1.01]	0.061
Residence	0.08(0.20)	1.08	[0.74, 1.58]	0.702	0.01(0.15)	1.01	[0.75, 1.36]	0.943
Boarding school	0.26(0.21)	1.30	[0.86, 1.96]	0.214	0.64(0.15)	1.90	[1.41, 2.57]	<0.001
	High parentification profileVS High profile(ref.)				Medium profileVS High profile(ref.)			
	b(SE)	OR	95%Confidence Interval	*p*	*b*(SE)	OR	95%Confidence Interval	*p*
Age	0.22(0.18)	1.24	[0.87, 1.78]	0.235	0.20(0.18)	1.22	[0.86, 1.74]	0.265
Gender	−0.07(0.10)	0.93	[0.77, 1.12]	0.457	0.07(0.09)	1.08	[0.90, 1.29]	0.425
Residence	−0.26(0.19)	0.77	[0.53, 1.12]	0.176	−0.27(0.19)	0.76	[0.53, 1.11]	0.154
Boarding school	0.92(0.20)	2.50	[1.68, 3.71]	<0.001	0.27(0.21)	1.31	[0.88, 1.97]	0.187

Notes: Gender: Female students are the reference group; Residence: rural or regimented field is the reference group; Boarding school: boarding school is the reference group; the group after 'VS' is the reference group for logistic regression analysis.

In order to explore the extent to which the latent profiles of parent-child triangulation are predicted by factors such as gender, age, and family status, this study uses the results of latent profile analysis as the dependent variable and, through chi-square testing, selects gender (X^2 = 21.55, p = 0.043), age (X^2 = 25.15, p = 0.014), urban/rural residence (X^2 = 36.85, p < 0.001) and boarding school (X^2 = 35.77, p <

0.001) as independent variables for multiple logistic regression analysis, and the Odd Ratio (OR) coefficient was obtained from the analysis. This coefficient reflects the proportion of different genders, ages, urban/rural residence and boarding school in the four parent-child triangulation categories. In addition, this study used the 'high parentification profile', 'medium profile with differences' and 'high profile with differences' as reference groups for multiple logistic regression analysis to include all comparison results, as shown in **Table 5**.

The results show that age, urban-rural residence and boarding school status affect the distribution of potential parent-child triangulation categories, but gender does not affect the distribution of potential parent-child triangulation categories. The age difference test found that compared to the low profile, the older the adolescents, the more likely they are to be classified as the medium profile (OR = 0.74, 95%CI [0.64, 0.86]) and the high profile (OR = 0.80, 95%C [0.66, 0.96]). The urban-rural residence difference test found that compared to the low profile, adolescents living in cities or towns were less likely to be classified as having the high parentification profile (OR = 1.40, 95%CI [0.38, 0.71]) and the medium profile (OR = 1.41, 95%CI [1.04, 1.92]). The test for differences in boarding school status found that adolescents who boarded were less likely to be classified as having the low profile (OR = 0.52, 95%CI [0.38, 0.71]) and more likely to be classified as having the medium profile (OR = 1.90, 95%CI [1.41, 2.57]) and high profile (OR = 2.50, 95%CI [1.68, 3.71]).

4. Discussion

4.1. Subtypes of parent-child triangulation and their characteristics

This study identified four kinds of parent-child triangulation in adolescents: low profile, medium profile, high profile, and high parentification profile. The four subtypes' proportions are comparatively equal. The largest percentage of them fall into the medium profile, with roughly 30% (30.64%) of adolescents periodically feeling that they are the object of their parents' arguments, being asked to choose a side in the dispute, and frequently having to shoulder the emotional or practical responsibilities that their parents should be carrying out. Conversely, parents in the high profile, which is the smallest (14.40%), frequently involve their children in family disputes, view their children as possible allies, and hold them accountable for starting the argument. Children in these households, however, hardly ever assume adult responsibilities. These two subtypes align with existing studies [25]. The scores on the scapegoating and cross-generational coalition dimensions are lower than those on the parentification dimension, suggesting that most household children can see and participate in their parents' infrequent arguments. However, teenagers in families that are frequently at odds are viewed in the opposite way. One possible explanation is that children will always be drawn into choosing sides or becoming scapegoats in their parents' arguments. Participating adolescents are more likely to take on more home duties or act as mediators in sporadic parent disputes that may be resolved, giving parents emotional support. On the other hand, teenagers can only be coerced into taking part in the argument in families prone to disagreements. On the one hand, they struggle to resolve disputes between parents with strong opinions. However, when confronted with intense family conflicts, individuals are more prone to withdraw

emotionally, flee, and experience overwhelming feelings of rage, discontent, uncertainty, or melancholy [26]. They are indifferent to their parents' emotions or their attitude towards family obligations.

Furthermore, this study expanded on previous investigations by identifying several classifications that had not received enough attention in other studies. The low profile category includes 26.89% of adolescents. This class of adolescents has the lowest scores on all three parent-child triangulation parameters. These families' parents are less likely to quarrel in front of children, let alone involve them in arguments. Therefore, their kids' perceptions of parent-child triangulation are poor on all fronts. Over 25% of the adolescents perceived a low-profile, balanced parent-child triangulation, which is also a relatively common parent-child triangulation model. A strong parentification profile, which has not been identified in prior research, was present in 28.07% of the adolescents, consistent with the low-profile, balanced parent-child triangulation. Their level of parentification is the highest of the four possible categories. However, the low-profile, balanced parent-child triangulation and the high parentification profile are extremely similar regarding the scapegoating and cross generational coalition aspects. In other words, when their parents disagree, adolescents in this category are rarely asked to take sides or become the scapegoat. Still, they always take the initiative, either actively or passively, to comfort the injured parent or take on additional household chores. The prevalence of this category may be linked to the Chinese emphasis on family care and filial piety [27], where children are expected to prioritize the family's overall growth and possess the spirit of "self-sacrifice" and "small family for the greater good." According to a study on second-generation American immigrants, second-generation Asian immigrants are more eager and willing to support their families than European immigrants [28]. The pressure of traditional family values and parental expectations can inspire young people in Asian families to persevere through challenges. Instead of viewing becoming a caretaker as an extra burden, children view it as a new and fascinating experience. However, the effects of the public health emergency might be to blame. Numerous research has demonstrated that the economic downturn and numerous health policy issues during the new coronavirus pneumonia outbreak have resulted in a significant rise in psychological pressure on family members [29], and parental stress is also on the rise [30]. In the home, children invariably participate in adult roles.

Our study used an individual-centered approach and identified four subtypes of parent-child triangulation, covering a more comprehensive model of parent-child triangulation in Chinese families. The parent-child triangulation scoring system is not strict enough to analyze the degree of individual parent-child triangulation by only calculating the total score or looking at the score of a particular dimension. Under the impact of triangulation, it is important to consider how people see the situation. However, the relationship between the aspects of scapegoating, parentification, and cross-generational coalition is not set in stone when considering the many aspects of parent-child triangulation. They may be the same or different, or they may be high or low. Parent-child triangulation patterns in different cultural contexts are not the same, which is also worth considering.

4.2. Effects of parent-child triangulation subtypes on internalized and externalized problem behaviors of adolescents

According to this study, there are four genuine subtypes, as evidenced by the considerable differences in internalized and externalized problem behavior between the parent-child triangulation of the various subtypes. In terms of adolescent development and adaptation, parent-child triangulation of various subtypes reveals distinct traits, which aligns with the family systems theory's assertion that the family, as a complex system, is essential to adolescents' personal growth [31].

First, the highest levels of internalized and externalized problem behavior were observed in teenagers with a high profile. This implies that adolescents are more prone to exhibit behavioral and psychological issues if they believe that their parent-child triangulation is high overall. This finding is consistent with earlier research [32]. According to family systems theory, parent-child interactions may suffer due to marital stress [3]. Long-term conflictual relationships will require adolescents to choose between their parents, and both parents will blame them more. They might blame their failings for the family's strife, and their internal suffering will be more severe and challenging to manage, leading to internalized problem behaviors like anxiety and depression. Adolescents' social adaption and interpersonal interactions will be negatively impacted by parental blame and neglect in an unfavorable family environment, and they will display various externalized problem behaviors [6]. Furthermore, compared to adolescents with a high profile, those with a medium profile have somewhat lower internalized and externalized problem behavior levels. This may be because adolescents who are caught in parent-child triangulation are not yet as deeply involved, are not affected by parental conflict as much, and can still take a breather under the pressure of family conflicts. As a result, individuals can control their mental state and lessen the anguish brought on by family issues. However, it's also possible that these teenagers continue to attempt to resolve family disputes. Family members can recognize and applaud this demonstration of "understanding," which boosts their sense of self-efficacy and lowers the incidence of internalized and externalized problem behaviors [33]. Nonetheless, there is no doubting the detrimental effects of parent-child triangulation on the development of adolescents. As a result, adolescents with a medium profile only exhibit less internalized and externalized problem behaviors than those with a high profile. At the same time, they are still not insignificant overall.

Second, the low profile has less internalized and externalized problem behavior. In actuality, these teenagers believe that there is less parent-child triangulation overall, which means that their parents quarrel less in front of them, are not frequently involved in family disputes, and are not expected to shoulder more emotional or home responsibilities. Teenagers can grow up in a secure and caring environment and experience better physical and psychological development if their parents maintain a more stable marriage and play adult roles in the family. As a result, individuals are less likely to engage in problem behaviors that are internalized and externalized. Lastly, in contrast to previous Western studies, the high parentification profile showed the lowest levels of internalized and externalized problem behavior [34]. Additionally, previous studies have identified variations in the processes and outcomes of

parentification across cultural contexts [35]. Western education emphasizes the value of a free personality and promotes the development of children's sense of freedom [36]. Thus, in Western culture, overbearing parenting is a denial of nature. But according to Chinese educational theory, a child is virtuous and "caring" if they assist and show consideration for their parents. Children will receive enough affirmation, regardless of whether they assume emotional or functional parentification, which also makes them feel pleased. They also try to uphold the reputation of a "good child" and abstain from misbehavior at school to win over their peers and teachers. To win their parents' approval and improve their ability to control their everyday behavior, adolescents with a high parentification profile try to reassure and please them by providing comfort or completing duties. Problem behaviors that are externalized or internalized are less prevalent.

4.3. The predictive role of residential status on parent-child triangulation subtypes

The latent profile of parent-child triangulation was found to be predicted by age, whether a person lives in an urban or rural area, and whether they attend boarding school. However, the distribution of parent-child triangulation latent categories was unaffected by gender, which may be because gender differences in parent-child triangulation are developmenta [37]. It was challenging to reflect the predictive function of gender in this investigation since the respondents were comparatively concentrated in age.

First, young people are more likely to be classed as medium or high profile as they age, as opposed to low profile. This outcome holds for all regions. The researchers observed that older teenagers in the United States feel a stronger sense of being sandwiched between their parents than younger adolescents [38]. On the one hand, this might be because parents are more inclined to want to avoid involving younger children in arguments. After all, they are worried about the psychological harm that disputes might do to them. In order to preserve an illusion of family unity, parents are more likely to include older children in the triangular connection and offer them some family voice as disputes become inevitable [39]. Younger children, on the other hand, are less informed and less likely to notice the underlying dynamics in the household. Children who have been through triangulation are more sensitive to future parental problems and develop the perception that they are responsible for reconciling their parents' relationships and resolving conflicts and disagreements [40]. Once they perceive an atmosphere of disharmony between their parents, they will actively mediate and get involved in the triangle. Second, when it comes to urban-rural disparities, adolescents who live in rural camps are more likely to be classified as having a high or medium parentification profile than those who have a low profile. Adolescents in urban regions perceive a lower overall degree of parent-child triangulation, consistent with earlier studies [41]. In contrast, adolescents in rural locations may perceive more parent-child triangulation or accept greater family duties. This could be because children in low-socioeconomic rural families must deal with various issues at home and perform some household tasks due to the frequent absence of parents [42]. Simultaneously, a few children will use a communication style of

"reporting the good news but not the bad" to reassure their parents, which emotionally reassures them. Notably, pupils who attend boarding schools are more likely to have a high parentification profile. In contrast, children who do not are more likely to be categorized as having a low, medium, or high profile. Prior studies on parent-child triangulation in China have not addressed this particular element. Overall, boarding school children exhibited very high levels of parentification but modest levels of parent-child triangulation.

This may be due to the fact that boarding schools give teenagers the time and space they need to maintain emotional distance from their families, which can lessen the negative effects of family conflicts on people [43]. Furthermore, kids at boarding schools gain self-management and life skills, have more chances to build social relationships on their own, and foster socio-emotional growth [44]. As a result, they are more eager to help out around the house and can support their parents emotionally when they get back home.

4.4. Strengths and limitations

Our study considers individual differences, classifies parent-child triangulations using an individual-centered approach, and analyzes the features of various parent-child triangulation types in terms of adolescents' internalized and externalized problem behaviors and demographic variables. Our study suggests that addressing the parent-child triangulation of teenagers can reduce internalized and externalized problem behaviors in practice. Parents should be reminded to minimize disagreement in front of their children to lower the degree of parent-child triangulation in teenagers. Teenagers can also be encouraged to help out around the house as much as possible to get recognition and lessen the likelihood that their internalized and externalized problem behaviors will occur.

Our study still has some shortcomings. The self-report scale utilized in this study makes it challenging to prevent societal approbation from influencing the findings. Future studies could measure and assess from various angles, including by using parent and teacher reports, self-evaluation, and other forms of assessment. Additionally, this research is cross-sectional. This study did not perform a follow-up study of each category to examine their future changes in internalized problem behaviors and externalized problem behaviors, even though it discovered that adolescents in various latent categories of parent-child triangulation have differences in these behaviors. Follow-up surveys can be used in future studies to investigate this further, particularly if the high parentification profile group can sustain beneficial impacts on the long-term development of teenagers. Moreover, this study has a limited reach because it picked adolescents from two regions for inquiry using convenient sampling. The sample size can be increased in subsequent studies to better validate the findings of this investigation. Lastly, Our research has not been adequate on the biomechanical aspects of the problem. In the context of parent - child triangulation, the stress and emotional turmoil experienced by adolescents can trigger corresponding biomechanical changes in their bodies. For instance, increased muscle tension, altered postural biomechanics, and changes in neuromuscular control may occur. These biomechanical alterations are hypothesized to be intertwined with the internalized and

externalized problem behaviors. Future research could integrate biomechanical measurements, such as surface electromyography to assess muscle tension or motion - capture systems to analyze postural changes, to further understand the complex relationship between parent - child triangulation, biomechanical responses, and adolescent problem behaviors.

5. Conclusion

This study used latent profile analysis to explore the parent-child triangulation of Chinese adolescents, and analyzed the relationship between the latent categories of parent-child triangulation and adolescents' internalized problem behavior and externalized problem behavior, with the following conclusions:

(1) There are four potential categories of parent-child triangulation among adolescents: the low-profile balanced type (26.89%), the high parentification type (28.07%), the medium-profile difference type (30.64%), and the high-profile difference type (14.40%).

(2) Adolescents in low profile and high parentification profile have the lowest level of internalized problem behavior, but the externalized problem behavior of the low profile is significantly lower than that of the high parentification type.

(3) Adolescents in medium profile have a high level of both internalized and externalized problem behaviors, while adolescents in high profile have the highest level of both.

(4) Compared to the low profile, the older the adolescents, the more likely they are to be classified as medium or high profile. Adolescents living in cities or towns are less likely to be classified as high parentification profile. Adolescents living in boarding schools are less likely to be classified as low profile, medium profile or high profile than those with a high parentification profile.

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