



A Structural Model of Self-Concept among Children and Adolescents from Multicultural Families Based on the Ecological Systems Model

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다문화가정 아동·청소년 자아개념의 구조모형: 생태체계모형을 기반으로

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Purpose: The study aimed to validate a structural model of self-concept among children and adolescents from multicultural families. **Methods:** Data were collected from 325 mothers of multicultural families and their 417 children. Confirmatory factor analysis, path analysis and multiple mediation analysis with a phantom variable approach were used to assess construct validity and relations between model variables. **Results:** Goodness of fit indices of the modified theoretical model, the standardized χ^2 (2.75), RMR (.02), RMSEA (.07), NFI (.90), TLI (.92), CFI (.94), GFI (.89), and AGFI (.87), met criteria. Social support and mental health problem had significant direct effects on self-concept, whereas residential environment and school adjustment had significant indirect effects, accounting in combination for 53% of the variance in self-concept. **Conclusion:** Based on the results, mental health problem mediated the relationships of self-concept and parenting stress.

Key Words: Cultural Diversity, Child, Adolescent, Self-Concept, Mental Health

Introduction

As the number of foreigners entering the country has increased abruptly, Korea has recently started to become a multi-ethnic country. Cases of international marriage between foreign Asian women and low-income Korean men from city and rural areas, having difficulty marrying due to the population concentration in the big cities, have

greatly increased, especially since the mid-1990s [1]. And the number of children born to married Korean men and immigrant women has also increased [2]. Currently, the number of children from multicultural families attending middle and high school has increased more than doubled, from 55,780 in 2013 to 99,186 in 2016, and the school-age population is also increasing rapidly [3]. Accordingly, as the number of multicultural families increase, their children are becoming a new

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subject of interest in our community [1].

Children and adolescents develop a self-concept through relationships with their family members or peers, as well as through academic achievements on the developmental process [4]. The self-concept developed at this stage influences the development of self-confidence and self-esteem. In the long-term, it plays a crucial role in personality development, mental health problem, and career development, affecting one's life path in general [5,6]. The self-concept created during childhood and adolescence will have influence until one's adulthood; therefore, it is most important to form a positive self-concept [7]. Previous studies suggest that children and adolescents from multicultural families have difficulty adjusting to school due to lack of learning ability, and experience depression and anger in response, with some experiencing severe mental health problems [8,9]. They may experience a lack of communication with a foreign mother, decline in attachment development, bullying due to their different appearance, and school maladjustment that can develop into a negative self-concept, which may become the cause of mental health problems in the future [8-11]. Accordingly, it is necessary to help children and adolescents from multicultural families to overcome various difficulties with positive self-concept and to encourage normal psychological and social development. In order to study the self-concept of children and adolescents, there is a need to include the complicated environmental factors relevant to children from multicultural families and their relatives along with individual characteristics. Therefore, the present study attempts to explicate the variables influencing the self-concept of children and adolescents from multicultural families based on Bronfenbrenner's theory [12], which characterizes humans as open systems that continuously interact with the ecosystem and develop within a multidimensional framework. In Bronfenbrenner's ecological context, children and adolescents' self-concept is influenced by both intraindividual factors and the multidimensional ecosystem surrounding the individual, which is divided into microsystem, mesosystem, exosystem, and macrosystem according to the level of influence. This model can be used to identify variables directly and indirectly influencing children and adolescents' self-concept development. However, most studies related to children and adolescents' ecosystems include only some variables from the microsystem or mesosystem levels and fail to fully reflect the complexity of the phenomena. Therefore, the present study aims to systematically investigate variables according to the ecological system model in order to most realistically describe

children and adolescent's self-concept. Such an effort may lead to the development of nursing intervention strategies to assist children and adolescents from multicultural families in Korea to develop a positive self-concept and foster healthy development.

The purpose of this study is to construct a structural model explaining the self-concept of children and adolescents from multicultural families by systematically scrutinizing previous studies and Bronfenbrenner's ecological systems model [12], introducing a hypothetical model, evaluating the model's suitability, and identifying variables that influence self-concept.

1. Hypothetical Model

The model is based on Bronfenbrenner's ecological systems theory and related literatures [12], which argue that self-concept is influenced by the surrounding multidimensional environment (microsystem, mesosystem, exosystem, and macrosystem). First, the intraindividual factor of self-concept is developed through experience and influenced by the surrounding environment and interpersonal relationships [7]. Second, the microsystem is most closely related to self-concept, including relational factors such as parents, siblings, and friends. Thus, the direct influences of parental attachment and mental health can be included in the microsystem. According to previous studies, parental attachment has a positive influence on self-concept, and mental health problem has a negative influence on self-concept [11]. Third, the mesosystem connects microsystems; that is, it consists of interactions between environmental conditions or microsystems, such that events in one microsystem influence children's behavior and development within another microsystem. In the present study, social support, parenting stress, and school adjustment were included as mesosystem variables. Social support from friends, parents and teachers, as well as parenting stress and school adjustment, affect self [1,6,13,14]. Fourth, the exosystem refers to larger social structures influencing but not directly related to the individual. Children and adolescents do not directly participate in the exosystem, but decisions made within the exosystem directly and indirectly influence self-concept through mesosystem and microsystem factors [12]. In this study, exosystem factors related to the self-concept of children and adolescents from multicultural families included the parents' neighborhood relationships (closeness with neighbors) and living environment (subjective evaluation of residence safety). A study investigating the relationship between living environment and self-concept found higher body ego among children

residing in villages rather than those in cities [10].

In this study, self-concept is set as an explanatory variable based on the ecological theory of Bronfenbrenner [12] and we verify its influence in microsystem and mesosystem step by step. The study assesses the mediating effects of microsystem variables. Multiple mediating effects of how much of an influence does the exosystem have on the effects of self-concept in mesosystem through microsystem by using phantom variable multiple. It can verify mediating effects including individual indirect effects among multiple variables.

Methods

1. Study Design

The study used path analysis to validate a hypothetical model of variables hypothesized to influence self-concept in children and adolescents that were identified through literature review.

2. Participants

This study was approved by the Research Ethics Board of G University (IRB No. GIRB-G14-Y-0004). The target groups were Asian immigrant women married to Korean men, and their primary school children (grades 4 to 6) and middle school adolescents (grades 7 to 9). Convenience sampling was used to recruit participants from four multicultural community centers. All participants were informed that they would be asked to answer some questions, and consent forms, including a description of the study purpose, permission to withdraw from the study at any time, and information about the researcher. For ethical issue, all participants gave informed consent and their confidentiality and anonymity were protected.

The participants were immigrant mothers and their children, of which 325 mothers and 417 children completed the questionnaires, while 35 mothers and 43 children dropped out (9.5%). It needs at least two hundred samples for obtaining the correct answer of the Goodness of fit indices for structural model [15].

3. Measurements

All questionnaires were translated into Vietnamese, Filipino, and Khmer language by bilingual persons. To maximize equivalence and minimize translation errors, two bilingual persons translated the original version into each language, and another bilingual person translated these back into Korean. The translated versions were field-tested with

five women randomly.

The researchers, research assistants, and two bilingual teachers for each language, explained the purpose of the study to the participants and obtained informed consent.

1) Self-Concept

A self-report self-concept scale developed by Sung [16] was used to measure the self-concept of children and adolescents from fourth grade to ninth grade. This scale includes 80 items on four sub-scales: emotional, physical, social, and academic self-concept. Participants choose the most accurate of 3 statements and score the extent to which is expresses themselves on a 3-point Likert-type scale, with a total of 240 possible points. Higher scores indicate a more positive self-concept. Cronbach's α coefficient was .97 in Sung's [16] study and .97 in the present study.

2) Parental Attachment

To measure children and adolescents' perceptions of parental attachment, a 25-item measure translated and used by Ok [17], based on the Revised Inventory of Parent and Peer Attachment that was developed with adolescent students [18], was employed. This measure includes three sub-scales: confidence, communication, and a sense of alienation. Items are rated based on a 5-point Likert-type scale with a total possible score of 125 points. Higher scores on parental attachment measure indicate a stronger attachment to parents. Cronbach's α was .92 in Ok's study [17] and .91 in the present study.

3) Mental Health Problem

Shin's Korean General Health Questionnaire (KGHQ-20) was used to measure mental health problem [19]. The scale included 19 items across three sub-scales: anxiety, depression, and social maladjustment. Items are answered on a 4-point scale ranging and summed for a maximum possible score of 57 points, with higher scores signifying poorer mental health status. Cronbach's α was .87~.89 in Shin's study [19] and .90 in this study.

4) Social Support

Kim's social support scale was used to measure children's perceptions of social support [20]. It includes a total of 23 items across 3 subcategories, including friend support, family support, and teacher support, and measured with a 5-point Likert scale with a total possible

score of 115 points. Higher scores indicate recognition that social support is stronger. Cronbach's α was .84 in Kim's [20] study, and the present study's Cronbach's α was .94.

5) Parenting Stress

Sung's parenting stress measure developed by Sung was used [21]. A total of 51 items are divided into 3 sub-categories, including parent's evaluation of a child, evaluating the parents themselves and the relationship between the parent and child. Each item is rated using a 4-point Likert scale with a total score of 204 points. Higher scores indicate worse parenting stress. In the initial development study, Cronbach's α was .89 and Cronbach's α was .92 in this study.

6) School Adjustment

The school life scale developed by Min [22] was modified according to the purpose of the study and used. It was measured with 25 questions divided into 5 sub-categories and answered on a 4-point scale: adjusting to homeroom teacher, school friends, school life, school study, and school events. Higher scores indicate better adjustment to the school. Cronbach's α was .84 in Min's study [22] and .92 in the present study.

7) Neighborhood Relationships

Parents' perceptions of neighborhood relationships were measured using a single item developed by the researcher. Parents rated "the extent that [the parents] share a good relationship with the neighbor" using a 0 to 10 scale, where higher scores indicate better perceived neighborhood relationships with a total possible score of 10.

8) Residential Environment

Parents' perceptions of residential environment were measured using two items developed by the researcher. Parents rated the 'safety level of current residence for raising children' and 'appropriate distance from children's school' using a 0 to 10 scale with a total score of 20. Higher scores indicate better perceived environment. Cronbach's α was .81.

4. Data analysis

SPSS version 21.0 and AMOS version 18.0 were used. Descriptive statistics were used to evaluate general characteristics of the subjects. confirmatory factor analysis (CFA) was used to assess construct validity. Measures used in the path analysis were examined for convergent and

discriminant validity. Multicollinearity between the variables was assessed using tolerance and variance inflation factor (VIF) values with multiple regression analysis. Relationships between measured variables were assessed with Pearson's correlation coefficients. Covariance structure analysis was conducted for the structural model. Fit of the model was assessed with χ^2 , standardized χ^2 (χ^2/df), GFI (goodness-of-fit index), AGFI (adjusted goodness-of-fit index), CFI (comparative fit index), TLI (Tucker-Lewis index), RMR (root mean square residual), and RMSEA (root mean square error of approximation). The significance probability p , CR value, and standardized path coefficients were calculated in path analysis. The fit of the corrected model was analyzed with χ^2 , χ^2/df , GFI, AGFI, CFI, TLI, RMR, RMSEA. Path coefficients, direct and indirect effects, and the total effect were analyzed. Multiple mediation analysis was performed with bootstrapping with phantom variables [23].

Results

1. Characteristics of the participants

The children and adolescents from multicultural families comprised 48.2% boys and 51.8% girls, of whom the largest group (28.8%) was in the fourth grade. The majority were living within nuclear families (79.1%). Average monthly household income was 294.07 (± 112.41). Mothers of multicultural families in Korea had lived an average of 13.76 years (± 3.91) in the country. The average age of the mothers was 40.54 (± 5.68). The majority of mothers (54.2%) reported an education level equal to or lower than a high school graduate. A total of 64.2% reported current employment. The majority of mothers (88.6%) spoke only Korean with their children, 6.8% spoke only their mother language, and 4.6% spoke both. A large proportion (56.0%) reported difficulty in using Korean with their children.

2. Descriptive statistics of research variables, normality tests, multicollinearity analysis and correlations

The study variables appeared to be normally distributed (skewness $r = -.51 \sim .16$, kurtosis $r = -.40 \sim .52$), and had no multicollinearity. The average child and adolescent self-concept score was 189.04 (± 24.45), parental attachment 95.31 (± 14.54), mental health problem 21.45 (± 8.06), school adjustment 73.29 (± 9.77), and the average social support 89.94 points (± 13.71). Mother's parenting stress scores averaged 105.26 (± 14.64), neighbor relationships averaged 6.01 (± 2.02), and the average

living condition score was 12.86 points (± 3.52). Tolerance limit values were .39-.85 and VIFs were all within the range of 1.17-2.55; therefore, no evidence of multicollinearity was observed (Table 1).

3. Verification of the hypothetical model

1) Confirmatory factor analysis of the measured variables: CFA was

Table 1. General Characteristics of the Subjects (N=742)

Subjects	Variables	Categories	n	%	M \pm SD
Children (n=417)	Gender	Male	201	48.2	
		Female	216	51.8	
	Grade	Fourth	120	28.8	
		Fifth	89	21.3	
		Sixth	76	18.2	
		Seventh	37	8.9	
		Eighth	49	11.8	
		Ninth	46	11.0	
	Family structure	Nuclear family	330	79.1	
		Extended family	87	20.9	
Mothers (n=325)	Monthly income (KRW)	<2 million	45	13.9	294.07 \pm 112.41
		2~ <3 million	108	33.2	
		3~ <4 million	106	32.6	
		\geq 4 million	66	20.3	
	Residence period in Korea (yr)	<10	43	13.2	13.76 \pm 3.91
	10-15	147	45.2		
	15-19	116	35.7		
	\geq 20	19	5.9		
Mother's age (yr)	<35	48	14.8	40.54 \pm 5.68	
	35~39	97	29.8		
	40~44	90	27.7		
	\geq 45	90	27.7		
Education level	Elementary school	6	1.8		
	Middle school	37	11.4		
	High school	176	54.2		
	University	106	32.6		
Having an occupation	Yes	208	64.2		
	No	116	35.8		
Mostly used language when talking to your children	Korean	288	88.6		
	Mother's native language	22	6.8		
	Both	15	4.6		
Difficulty in using Korean with your children	Low	143	44.0		
	Moderate	147	45.2		
	High	35	10.8		

M=mean; SD=standard deviation

employed to assess convergent validity, using Factor Loadings, average variance extracted (AVE), and construct reliability to assess the extent of construct overlap. Standard cut-off values used to determine convergent validity were factor loadings of .50 or more (optimally, greater than .70), with a significance level (α) of .50 or more, a construct reliability value of .70 or more, and an AVE value of .50 or more, which were met in the present analysis. Exosystem variables (parents' neighborhood relationships and residential environment) were assessed with two items written by the researcher, underwent validity analysis from 2 experts, and were excluded from the CFA, as they do not include latent variables.

2) Validation of the model fit: Goodness of fit indices for the hypothetical model were as follows: $\chi^2=1163.95$, $p<.001$, standardized $\chi^2=5.44$, GFI=.81, AGFI=.76, RMSEA=.10, NFI=.80, TLI=.80, CFI=.83, and RMR=.05, which did not meet suggested levels of fit with the exception of RMR. The resultant corrected model showed poor fit on one index, $\chi^2=567.04$, $p<.001$. However, when sample size grows, the χ^2 value increases. Therefore, determining the goodness of fit with other indicators was necessary. The standardized χ^2 (2.75), RMR (.02), RMSEA (.07), NFI (.90), TLI (.92), CFI (.94), GFI (.89), and AGFI (.87) were all satisfactory. Accordingly, the corrected model was verified to be a more suitable model compared to the hypothetical model, and was selected to be the final model for the study.

3) Effects of correction model: In the analysed results of the corrected model, Variables with direct influences on self-concept were social support and mental health problem (Table 2, Figure 1). Variables that indirectly influenced self-concept were residential environment and school adjustment. The explanatory power of the variables on self-concept was 53%. Parental attachment was influenced directly by parenting stress, social support directly and indirectly, and residential environment indirectly, with an explanatory power of 63%. Mental health problem was directly influenced by school life adjustment and social support, and was influenced indirectly by residential environment ($\beta=-.13$, $p=.011$), with 65% explanatory power. Social support was directly influenced by residential environment, but the explanatory power was trivial (3%). Parenting stress was influenced directly and indirectly by residential environment ($\beta=-.25$, $p<.001$), directly by neighborhood relationships ($\beta=-.31$, $p<.001$), and directly by social support ($\beta=-.34$, $p<.001$), with 37% explanatory power. School

Table 2. Standardized Direct, Indirect, and Total Effects for the Final Model

(N=742)

Endogenous variables	Exogenous variables	CR (ρ)	R ²	Direct effect	Indirect effect	Total effect
				β (ρ)	β (ρ)	β (ρ)
School adjustment	Residential environment	2.85 (.004)	.03	.18 (.009)	–	.18 (.009)
	Neighborhood relationships	-0.22 (.830)		-.01 (.837)	–	-.01 (.837)
Parenting stress	Residential environment	-3.64 (<.001)	.37	-.21 (<.001)	-.04 (.034)	-.25 (<.001)
	Neighborhood relationships	-5.46 (<.001)		-.31 (<.001)	-.02 (.341)	-.33 (<.001)
	Social support*	-5.91 (<.001)		-.34 (<.001)	–	-.34 (<.001)
Social support	Residential environment	2.09 (.037)	.03	.13 (.045)	–	.13 (.045)
	Neighborhood relationships	0.99 (.323)		.06 (.367)	–	.06 (.367)
Mental health problem	Residential environment	–	.65	–	-.13 (.011)	-.13 (.011)
	Neighborhood relationships	–		–	-.05 (.404)	-.05 (.404)
	School adjustment	-3.17 (.002)		-.23 (.012)	–	-.23 (.012)
	Parenting stress	0.87 (.382)		.04 (.442)	–	.04 (.442)
	Social support	-7.23 (<.001)		-.60 (<.001)	-.01 (.402)	-.61 (<.001)
Parental attachment	Residential environment	–	.63	–	.12 (.018)	.12 (.018)
	Neighborhood relationships	–		–	.08 (.109)	.08 (.109)
	School adjustment	-0.25 (.805)		-.02 (.851)	–	-.02 (.851)
	Parenting stress	-2.17 (.030)		-.11 (.036)	–	-.11 (.036)
	Social support	8.46 (<.001)		.76 (<.001)	.04 (.024)	.80 (<.001)
Self-concept	Residential environment	–	.53	–	.11 (.016)	.11 (.016)
	Neighborhood relationships	–		–	.07 (.157)	.07 (.157)
	School adjustment	-0.15 (.884)		-.01 (.899)	.05 (.020)	.04 (.626)
	Parenting stress	-1.70 (.090)		-.08 (.104)	-.01 (.686)	-.09 (.090)
	Social support	3.76 (<.001)		.53 (<.001)	.14 (.194)	.67 (<.001)
	Mental health problem	2.81 (.005)		-.23 (.009)	–	-.23 (.009)
	Parental attachment	-0.42 (.672)		-.04 (.717)	–	-.04 (.717)

*Added path; β =standardized estimates; CR=critical ratio; R²=squared multiple correlation

adjustment was directly influenced by residential environment, the explanatory power was trivial (3%).

4) Verification of multiple mediating effects: The phantom model approach was employed in a multiple mediation analysis to assess indirect mediating effects (Table 3 and Figure 2). As a result, social support's (mesosystem) influence on mental health (microsystem) mediated the relationship between residential environment (exosystem) and self-concept. Further, school adjustment's (mesosystem) influence on mental health problem (microsystem) mediated the relationship between residential environment (exosystem) and self-concept; mental health problem (microsystem) mediated the relationship between parenting stress (mesosystem) and self-concept, and mental health problem (microsystem) mediated the relationship between school

adjustment (mesosystem) and self-concept.

Discussion

The purpose of this study was to develop and validate a structural model of self-concept in children and adolescents from multicultural families. A hypothetical model was constructed through comprehensive review of the literature, including Bronfenbrenner's ecological systems theory [12]. The direct, indirect, and total effects of the identified variables were verified, and multiple mediation analysis was conducted to more clearly define the relationships between the variables suggested in hypothetical model.

Observed fit of the present structural model exceeded suggested cut-offs, with the included variables accounting for greater than 50%

Table 3. Multiple Mediation Analysis (N=742)

Endogenous variables	Exogenous variables	Mediating variable	Indirect effect <i>p</i>
Self-concept	Neighborhood relationships	Social support → Parental attachment	.475
		Social support → Mental health problem	.244
		Parenting stress → Parental attachment	.528
		Parenting stress → Mental health problem	.306
		School adjustment → Parental attachment	.796
		School adjustment → Mental health problem	.683
		Residential environment	Social support → Parental attachment
	Social support → Mental health problem		.025
	Parenting stress → Parental attachment		.505
	Parenting stress → Mental health problem		.278
	School adjustment → Parental attachment		.725
	School adjustment → Mental health problem		.010
	Social support	Parental attachment	.550
		Mental health problem	.325
	Parenting stress	Parental attachment	.702
		Mental health problem	.006
	School adjustment	Parental attachment	.781
		Mental health problem	.011

of the variance in self-concept, indicating that the corrected model in the present study was suitable for explicating self-concept among children and adolescents from multicultural families. Microsystem-level mental health problem, mesosystem-level social support, and exosystem-level residential environment were identified as predictors of self-concept. Among these, mesosystem-level social support exhibited the largest influence. In particular, teacher’s support has been shown to be closely related to children’s self-concept, and previous studies have shown that teacher’s support has a positive influence on appearance self-concept, fitness self-concept, and academic self-concept [13]. Accordingly, social support plays an important role in developing children and adolescents’ self-concept. Conversely, microsystem-level mental health problems negatively affect self-concept. This is consistent

with Jeon’s study [10], which found that self-concept negatively influenced emotion and behaviour, and with Nam and Lee’s study [11], which observed a correlation between mental health and self-concept. Additionally, children and adolescents from multicultural families in this study reported the lowest level of self-concept in academic self-concept. This finding is similar to Park’s study [24], which revealed a negative correlation between depression and academic level, with increased possibility for students with low academic grades to have experienced depression. Therefore, it is helpful to manage mental health problems such as depression to prevent the formation of a negative self-concept. The exosystem variable of residential environment also affected self-concept. The closer the study participants were to their school and the safer they felt in their residential environment, the more positive was their self-concept. In Jeon’s study [10], a static relationship between residential area and physical self-concept was reported. Among ecosystem variables related to the self-concept of the study participants, mesosystem-level social support and microsystem-level mental health problem exhibited direct effects on self-concept, and exosystem-level residential environment was revealed to have indirect effects on self-concept. As suggested in the ecological systems model, microsystem or mesosystem factors that interact closely with children and adolescents have direct effects, whereas relatively distant exosystem factors can be expected to have indirect effects. Furthermore, analyses revealed that social support, school adjustment, and residential environment influenced mental health problem. This is consistent with An’s study [8] that found a negative correlation between the mental health of elementary students from multicultural families and school adjustment, as well as Zhang et al’s study [25] conducted with children from unicultural families that found that social support influenced children’s depression and anxiety. There is a need to identify methods to assist children from multicultural families in building social support from parents, peers, and teachers for improved mental health problem and the development of a positive self-concept. It is also important to investigate methods to improve school adjustment, because the participants spend the majority of their time in school. Exosystem-level residential environment and mesosystem-level parenting stress and social support influenced microsystem-level parental attachment as well as mental health problem. This result is similar to Newland and Crnic’s finding that parenting stress negatively impacts the parent-children attachment relationship [26]. Residential environment, parents’ neighborhood relationships, and social support were observed to

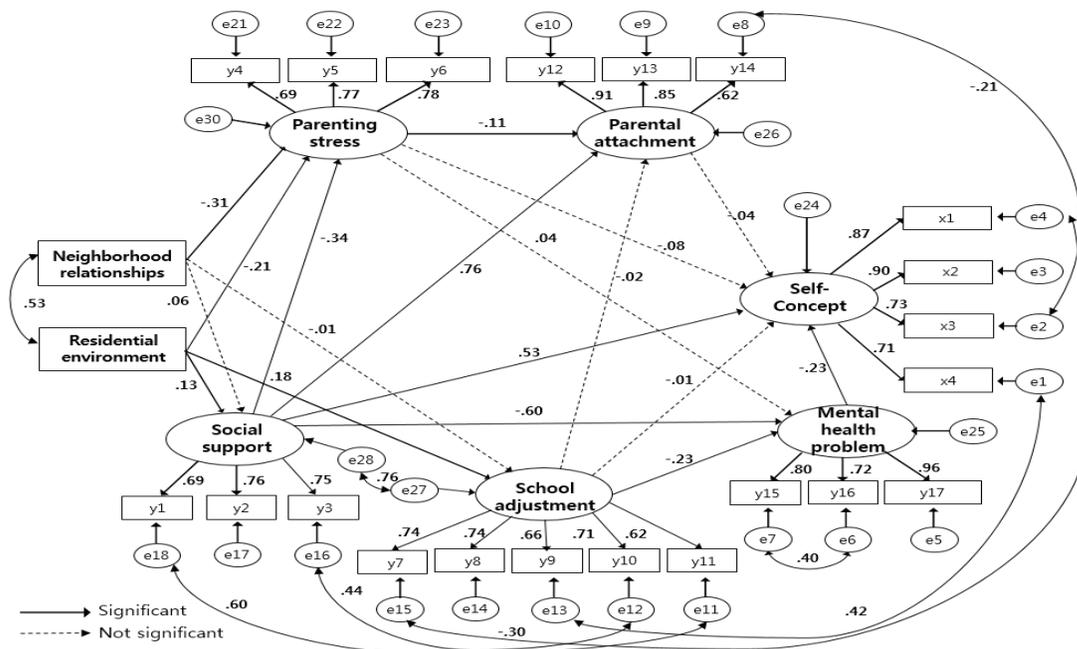


Figure 1. Path diagram of the modified model.

x1=Emotional self-concept; x2=Social self-concept; x3=Physical self-concept; x4=Academic self-concept; y1=Teacher support; y2=Family support; y3=Friend support; y4=Adolescent; y5=Parent; y6=Adolescent-Parent relationship; y7=School events; y8=Compliance; y9=Learning activities; y10=Companionship; y11=Homeroom teacher; y12=Credibility; y13=Communication; y14=Alienated; y15=Anxiety factor; y16=Depression factors; y17=Social maladjustment

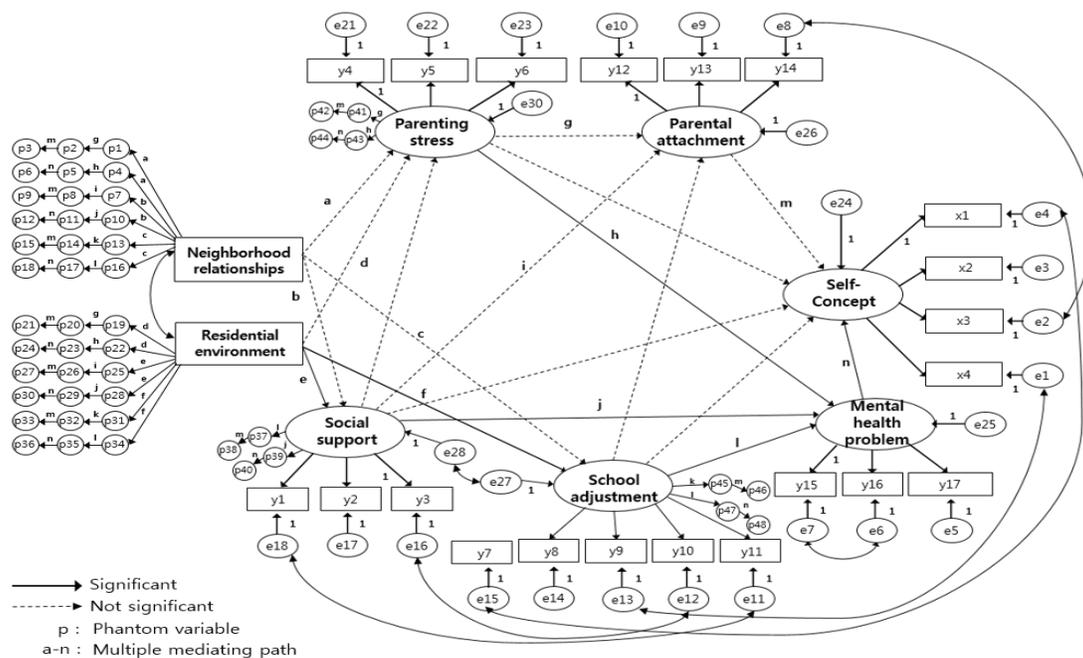


Figure 2. Path diagram of the multiple mediation model.

x1=Emotional self-concept; x2=Social self-concept; x3=Physical self-concept; x4=Academic self-concept; y1=Teacher support; y2=Family support; y3=Friend support; y4=Adolescent; y5=Parent; y6=Adolescent-Parent relationship; y7=School events; y8=Compliance; y9=Learning activities; y10=Companionship; y11=Homeroom teacher; y12=Credibility; y13=Communication; y14=Alienated; y15=Anxiety factor; y16=Depression factors; y17=Social maladjustment

influence mesosystem-level parenting stress. This result is in partial accordance with previous studies reporting positive effects of parents' neighborhood relationships on parenting behavior [27]. Further, residential environment affected mesosystem-level school adjustment. Similarly, Lee's study found that rural regions report more academic problems and a sense of alienation as compared to cities [28]. Therefore, residential environment plays a crucial role in the school adjustment of children from multicultural families. Examination of the mediating effects of ecosystem variables in regards to self-concept revealed that mental health problem was the sole microsystem-level mediating variable, mediating the relationship between mesosystem-level parenting stress and self-concept. This result is partially in accordance to Park and Lee's finding of a negative correlation between self-concept and parenting stress [29]. Furthermore, microsystem-level mental health problem played a mediating role between mesosystem-level school adjustment and self-concept. Therefore, mental health problem is confirmed to be a protective factor for the self-concept of children from multicultural families. The present study employed a multiple mediation analysis to examine interrelations between mesosystem-, microsystem-, and exosystem-level factors and self-concept. Results indicated that mesosystem-level social support and microsystem-level mental health problem have multiple mediating effects on exosystem-level residential environment and self-concept. Similarly, Grant et al [30] reported that of the various types of social support, parental support has significant mediating effects on adolescent's stress and problematic behaviors. This study confirmed that social support influences mental health problem and mediates the relationship between residential environment and self-concept. Moreover, Lee [28] has argued that positive family or friend relationships can act as protective factors for the psychosocial adjustment of children from multicultural families, and that a systematic effort to provide social support and reducing mental health problem is needed in order to improve the self-concept of children and adolescents from multicultural families living in poor residential environments. Furthermore, microsystem-level mental health problem demonstrated multiple mediating effects on the relationships between self-concept and exosystem-level residential environment and mesosystem-level school adjustment. This is partially in accordance with An's finding of negative correlations between school adjustment and self-concept, and indicates that improving the mental health problem of children and adolescents from multicultural families by improving their school adjustment can

be an effective method for ultimately improving self-concept [8].

Results highlight the importance of strengthening social support for mental health problem, which directly affects self-concept, in order to assist the healthy self-concept development of children and adolescents from multicultural families. Additionally, mesosystem variables indirectly influencing self-concept and exosystem-level environmental factors need to be considered when interventions to improve self-concept among children and adolescents from multicultural families are conducted. To extend the study results in the future, a self-concept explanatory model should be constructed using subjects from the general population, and the applicability of the model should be improved by comparing and contrasting the differences between children and adolescents from multicultural families and the general population.

Conclusion

The present study showed that self-concept is significantly influenced by social support, mental health problem, residential environment, and school adjustment, which account for more than half of the variance in self-concept. Investigation of multiple mediating effects revealed effects across ecological levels. Bootstrapping is performed after modifying the model by generating phantom variables to verify which specific variable mediated each of the indirect effects, when there are two or more mediating variables. A multiple mediation model can specifically explain an actual phenomenon because it can identify which mediation path is significant to the indirect effects. The multiple mediation model in this study can verify whether or not there are indirect effects between neighborhood relationships and self-concept without using phantom variables. However, the model cannot specifically verify some mediation paths. Therefore, multiple mediation analysis (i.e., phantom variables) was used to verify the significance of various mediation paths (individual indirect effects) within one multiple mediation model. Based on the results of the present study, we suggest the following for future studies. First, a future attempt to replicate the study using measures developed for children and adolescents of multicultural families should be conducted, since the study only used existing measurement tools. Second, research using randomized sampling methods is needed, as this study used convenience sampling of multicultural families in certain small- and medium-sized cities. Lastly, the study's dependent variable, self-concept, is the result of a

long-term developmental process. Therefore, a longitudinal study to compare and evaluate changing patterns is suggested.

The path analysis of the present study provides a valid model of self-concept in children and adolescents from multicultural families that suggest variables that may be targeted when developing intervention programs for self-concept development in the future. A general and systematic approach needs to be designed and employed to help develop positive self-concept, given the influence of multiple environmental system variables. In particular, a strategy for strengthening the social support and mental health problem of children and adolescents from multicultural families is most critical, given confirmation of multiple mediating effects.

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