A Longitudinal Study of Adolescents' Sense of Community over Three Years

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Abstract

This study investigated whether and how middle school adolescents' level of sense of community changes over three years. The middle school cohort data of the Korean Children-Youth Panel 2010 were used for analysis. The validity of using adolescents' sense of community as an outcome variable over three years was checked using multi-group confirmatory factor analysis. The sense of community items were interpreted in the same way by the adolescents at each point over three years. Using a two- level hierarchical linear growth model, this study assessed the pattern of change in adolescents' sense of community. The results of the basic growth model showed a positive linear trend in the level of sense of community. However, there was no statistically significant variation in the rate of change in the level of sense of community among adolescents. Adolescents' gender was not statistically significantly associated with the rate of change in their level of sense of community, either. Except for satisfaction with field study experience and time spent for reading, most variables used for level-1 predictors were statistically significant. Among the level 2 variables, female students, female school students compared to coed, and family annual income were positively associated with the adolescents' sense of community, but the hours spent for private education, the location of residence (city vs. others), and male only schools were not significant.

[**Key words**] sense of community, multiple group factor analysis, HLM growth model, field study experience, extracurricular activity)

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I. Purpose

Sense of community is a shared feeling or faith that members matter to one another and to the group and that members' needs will be met through their commitment to one another (McMillan and Chavis 1986). According to Ha (1995), due to urbanization and nuclear families via rapid industrialization in Korea, social cohesiveness in Korea was rapidly weakened and a trend of individualism appeared in Korean society.

At the local level, people who have a high sense of community have greater feelings of safety and security, participate more actively in community affairs. In addition they are more likely to participate in volunteer activities (Schweizer 1996). According to Bachrach and Zutra (1985), people with a stronger sense of community display problem-focused coping behaviors, behaviors that directly attempt to alter or counteract the threat, by displaying commitment to a neighborhood. The sense of community is also positively related to the individual's sense of well-being and self-efficacy, and negatively related to worrying (Davidson and Cotter et al. 1991). The Sewol ferry incident of 2014 demonstrates how a lack or absence of senses of community and of responsibility on the part of the captain and the owner of the ferry caused disaster to those people in the ship and to Korean society. Koreans have also experienced how the weakened sense of community endangered Korean society via the MERS outbreak.

With the advent of globalization due to the development of information technology and transportation, Korea became a multicultural society with the inflow of many people from diverse countries. Because of this, fostering a sense of community is felt to be more important in Korea than in previous eras. In the information era of the 21stcentury, in defining sense of community, people put more emphasis on social interaction, collegiality, and net working than on the shared proximity that was emphasized in the previous era (Kim and Ahn 2012). In this aspect, sense of community has emotional dimensions that take on belongingness, cohesiveness, mutual devotion, and commitment. At the same time, it is a practical concept that predicts the participation of members in the maintenance and development of the community (Park 2009).

Sense of community is also closely related to the concepts of citizenship and civic competency. Civic competency is one of the major competencies that many OECD countries advocate (Kim and Kim et al, 2003). Sense of community is considered one indicator of a country's development of civic engagement (Kim and Kim et al. 2003). Civic engagement can be summarized as a means of working together to make a difference in the civil life of one's communities and developing the combination of skills, knowledge, values, and motivation in order to make that difference. It means promoting the quality of life in a community, through both political and

non-political processes (APA 2012).

Although sense of community is considered one of the most important competencies for people living in the globalized society, Korean teachers and parents do not pay much attention to the building and fostering of Korean adolescents' citizenship and sense of community compared to their attention to academic achievement.

Adolescence is the period for acquiring/developing competencies for future life. During this period, adolescents also develop social identity via close ties to the society in which they belong (Kim 2012). In the Korean education system, the development of affective domain of Korean adolescents has not been emphasized. Relatively few research studies have investigated adolescents' sense of community, and even fewer have investigated whether or not their level of sense of community changes during adolescence. However, studies show that adolescents' level of sense of community is also associated with their level of social maturation (Kim and You 2009) and their participation in society (Park 2009). It also explains adolescents' level of isolation (Pretty and Andrewes et al. 1994). It is reported that young people with a higher sense of community have higher academic motivation and a low school absence rate. Sense of community is also related to college students' academic achievement (Pretty 1990). Studies also show that sense of community is associated with high level of adaptation to school life (Choo and Lim 2007) and with high levels of satisfaction with school (Ekstrom and Goertz 1986) and with life (Albanesi and Zani 2007).

This study investigates Korean middle school students' sense of community over three time points and aims to answer the following questions:

1. What is the level of middle school adolescents' sense of community?

2. Does students' sense of community change over time as they advance in years?

3. Are time varying variables, such as perception of neighborhood, satisfaction with extra-curricular activities, number of field study experiences, satisfaction with field study experience, observance of school regulation, relationships with teachers and peers, associated with the level of sense of community?

4. Are adolescents' gender, location of residence (urban vs. rural), type of school (male only, female only, or coed) and family income, hours spent for leisure reading, and hours spent for private education during the first year of middle school related to their sense of community?

II. Literature Review

1. Sense of Community and Civic Engagement

A Sense of community is an attitude which contributes to the benefit of the community

based on belongingness to and relationships among community membership (McMillan and Chavis 1986). It consists of elements including membership, influence, integration, fulfillment of needs, and shared emotional connection. Civic engagement is related to responsibilities, duties, and rights accompanying the position of citizenship or civic consciousness as well as the behavior accompanying it (Kim 2012). According to a list of core competencies established by the Organization for Economic Cooperation and Development (OECD) and accepted by the International Association for the Evaluation of Educational Achievement (IEA), civic engagement includes knowledge, conceptual understanding, communicative skills and problem solving skills, attitude, and behavior (www.oecd.org/edu/statistics/deseco;T. Kimetal 2010). A sense of community, along with participation in political activity, and observance of laws and regulation, is a subcomponent of citizenship. A feeling of citizenship is associated with parental socio-economic status and parental education (Bonnes and Ercolani 1991). Students with higher parental education also demonstrate higher levels of civic engagement (T.Kimetal 2010). However, others indicate that the less educated also show a higher sense of community (Buckner 1998). Positive relationship with peers is related to a positive relationship with citizenship. Positive interaction with peers promotes trust and sense of community in general social relations (Kim and Ahn 2012; Kim 2012). However, an appropriate and adequate establishment of civic education for young children is neither well structured nor heavily practiced in Korean society. Results have included the immaturity of the concept of citizenship in Korea and confusion of Koreans' value systems.

2. Extra-curricular activity, field study experience, and sense of community

In the seventh revised Korean national curriculum (2009), democratic citizenship, creativity and character development were emphasized. Participation in real life activities is emphasized for character development and enhancing problem solving skills and understanding the world of works. Extra-curricular or co-curricular activities are institutions organized and run by adolescents themselves. They are basically intended for youths to develop a desirable value system, open-mindedness, and self-actualization based on trust among the group members. As a leisure time activity which puts emphasis on autonomy, action, and creativeness, extra-curricular or co-curricular activities are valued. The seventh revised educational curriculum comprises self-governing activities, service learning activities and various event related-activities (Kim and Kim 2003). Extra-curricular or co-curricular activity has the characteristics of leisure time activity and connects adolescents to the local community. However, it was reported that the effect of high school students'

participation in extra-curricular activities on the sense of community is minimal (Cha 2006).

According to Park (2009) and Kim and Ahn (2012), quality of participation as reflected in satisfaction with the activity, rather than the frequency of participation in a volunteer activity, is more positively associated with the sense of community. This study investigates not only the frequency of participation, but also the effect of satisfaction with the participation in field-based learning activities of middle school students on their level of sense of community along with the satisfaction with participation in extra-curricular activities.

3. Relationship between peers, teachers, and observation of school regulation

Studies have shown that those who are satisfied with their peer relationships experience higher levels of happiness and life satisfaction (Ma and Hubner 2008). Those who quit school are more likely to have experienced isolation from peers, or associated with or influenced by other adolescents who have also dropped out from schools (Parker and Asher 1987). Cohesiveness with peers attending the same school enhances attachment to school, and satisfaction with school life would lower the possibility of leaving school early and getting involved in juvenile delinquency. In addition, depending on the characteristics of peers, the peer group can exert either positive or negative effects (Berndt 1992).

The peer group of adolescents provides unique satisfaction with life and support for their members, and it also reduces insecure feelings about themselves. In addition, through peer interactions adolescents learn about behavior regulation and values, which in turn influences their sense of identity. In addition, positive relationship with their teachers enhances emotional attachment and raises satisfaction with and attachment to school (Baker 1999; Hallinan 2008). Specifically the relations with teachers are more beneficial to those students who face problems with school adaptation and those from low socio-economic status (Stanton-Salaza 2001). With regard to high school students' school satisfaction, the effect of students' relationship with teachers is more beneficial than that of either their relationship with their parents or with their friends/peers. Kim and Kim (2011) found that when the level of sense of community is high, relationships with teachers or peers are also good, and students exert more effort and observe school regulations better.

4. The effects of reading and other variables

The amount of reading is also associated positively with world knowledge, academic achievement, participation in society, and employment status. Through reading, adolescents acquire knowledge about the

world and social values. Students learn not only about their own culture but also about other cultures. In addition, via reading, adolescents are able to take different perspectives and develop a capacity to understand others from different cultural backgrounds. Yokota (2008) suggests literature as a means to enhance children's capacity to understand others, take different perspectives, and develop sense of community.

According to Obst, Smith and Zinkiewicz (2002), sense of community is also associated with the characteristics of residential area, i.e., urban vs. rural area. In this study information of school locations is included to investigate whether it is related to middle school students' level of sense of community.

5. Gender difference

There exists gender difference in students' utilization of time (Hilbrecht and Zuzaneck 2008) and in the level of sense of community (Buckner 1988; Davidson and Cotter 1991). Female college students have been found to possess a higher level of sense of community than their male counterparts (Cha 2006). In this study, gender was investigated not only as an individual characteristic, but also as a group characteristic (male only school, female only school, coed schools).

6. Family income

Family economic status is related to educational inequality and reproduction of poverty, and it is considered as one of the most important variables related to social problems and social issues (Beblo and Lauer 2004). Parents' level of education and economic status were associated with types of leisure activities: It was negatively associated with higher levels of consumption and entertainment-oriented leisure activities (Seo 2007). Family economic assets impinge on students' learning opportunities such as learning materials, private education opportunities, and opportunities of moving to a better educational district, which in turn influence their cognitive, affective and academic achievement (Duncan and Brooks-Gunn 2000). Parents who have higher income provide more supportive academic environment and their expectation for their children is high, while those economically disadvantaged families are burdened with living expenses, and thus are not capable of supporting their children well enough (Choo & Lim 2007). Parental socio-economic status is also positively associated with their children's level of civic knowledge (Kim and Kim et al. 2010) and level of citizenship (Kim 2012). Parental socio-economic status not only influences directly their children's sense of community, but also affects their level of citizenship indirectly via their support for the adolescents' participation in cultural activities and other school activities that help raise their social efficacy.

In this study, family average annual

income was controlled because it may be associated with both adolescents' participation in private education and participation in extra-curricular and field study experience, which may also be related to their level of sense of community (Kim 2012).

III. Methods of Analysis

1. Subjects.

A middle school student cohort of the Korean Children and Youth Panel 2010 (henceforward KCYP) was used to investigate middle school students' level of sense of community over three years. Two thousand three hundred fifty one (2,351) students participated in the survey in 2010, evenly divided between male (1,176 students) and female (1,175).

2. Analysis

In this study both multiple group confirmatory factor analysis and a two level hierarchical linear modeling were used. In KCYP2010, there are four items related to sense of community – willingness to help friends facing difficulties, interest in volunteering for a community welfare center, willingness to donate money for people in economically disadvantaged countries, and interest in recycling and other "green" activities. In order to check whether these four items should be considered as a single umbrella factor representing sense of community, and whether they were interpreted in the same way by survey participants across the three time points, multiple group confirmatory factor analysis was used. For multiple group confirmatory factor analysis, at least configural and metric invariance assumptions should be satisfied for factor structure identification. In addition, scalar (intercept) invariance assumptions need to be satisfied for comparing the mean of the sense of community over three different occasions. After checking these assumptions, a two-level hierarchical linear model was utilized to investigate the pattern of change and determine how other variables are associated with the level of sense of community. In addition, internal consistency reliability (Cronbach's alpha) was checked when items were aggregated for the construction of new variables.

1) Multiple group confirmatory factor analysis.

In this study, as fit indices both TLI and RMSEA were checked because neither is sensitive to sample size and both take account of model complexity. A TLI of over 0.9 is considered as a good fit, and RMSEA of less than 0.05 is considered as a close approximated fit (Hong 2000).

2) Hierarchical (Multilevel) growth modeling

A two-level growth modeling was used. At level 1, time varying variables such as frequency of participation in field study, satisfaction with field study experience, satisfaction with extra-curricular activity,

relationship with teacher, relationship with peers, and observance of school regulation were used. At level 2, individual characteristics such as gender, type of school, first year family annual income during middle school, hours spent for private education, and hours spent for leisure reading were included as level 2 predictors. With this model, the correlation between intercept (the initial time point) and rate of growth was also investigated. In the final model, all variables were grand mean-centered except for gender and linear effect of time in order to make the interpretation of intercept meaningful and easy. Here, for example, the level 1 intercept is interpreted as the expected value of sense of community at the first year when the value of the rest variable in the level one is the same as the grand mean of each variable. In investigating school effect, the coed schools were used as a reference group.

To investigate the linear effect of time (rate of growth), the first year was coded as 0, and the second year as 1, the third year as 2. Missing data were imputed by using NORM Version 2.03 (Schafer 2000) to prevent the loss of cases, while the EM algorithm is used to find the maximum likelihood estimates for parametric models when the data are not fully observed (Schafer 1997).

Level-1 Model

$Y_{ti} = P0i + P1i*(time)ti + P2i*$ (hours spent for reading) $+ P3i*$(perception of neighborhood)ti $+ P4i*$(number of field study)ti $+ P5i*$(satisfaction with field study)ti $+ P6i*$(satisfaction with extracurricular activity)ti $+ P7i*$(school regulation)ti $+ P8i*$(relationship with teacher)ti $+ P9i*$(relationship with peers)ti $+ e_{ti}$

Level-2 Model

$P0i = B00 + B01*(city)i + B02*(gender)i + B03*(male\ only\ school)i +$ $B04*$(female only school)i $+ B05*$(sq_family income)i $+ B06*$(hrs spent for private education)i $+ \gamma 0i$

P1i = B10 +B11(gender))

;

P7i = B70 ,

$e_{ei} \sim N(0, \sigma^2)$

$\gamma 0 \sim N(0, \tau)$

Figure 1. A Two Level Growth Model

IV. Results

In order to satisfy normality assumption, family income was transformed by using the square root. All variables used in the model satisfied normality assumptions because the skewness of each variables were less than 2, and the Kurtosis also less than 7 (Curan and West 1996). Table 1 shows descriptive statistics before multiple imputations were conducted. Hence the result of the robust HLM outcome was the same as that of the regular fixed effect outcomes. Reliability reflected in Cronbach's alpha was within acceptable range, from 0.603 to 0.841 (See Table 2).

1. Multiple group confirmatory factor analysis of sense of community

Multiple group confirmatory factor analysis was conducted to check whether sense of community items were interpreted in the same way over three different time points. The four items related to sense of community were identified as one factor for each year respectively with exploratory factor analysis. Cronbach's alpha of the sense of community scale each year was 0.732, 0.774, 0.815, with each item factor loading is over 0.5 each year respectively. However, it was also possible to divide the four items into two factors consisting of two items: The first factor, with item ① If I have a friend who are in need, I will actively help him/her and item ② Even if I may sacrifice my holidays, I will volunteer to work at a community center. The other factor with item ③ I am able to willingly donate money for people in poor countries and item ④ I will willingly participate in saving resource and energy, separating garbage collection, and recycling projects in order to make our planet sustainable. In content aspect, the first two items can be considered as appealing to local level of sense of community and the last two items as championing a more global level of sense of community. Additionally, exploratory factor analysis shows that the factor loading of these two sets of items are greater than 0.5. For example, in the case of the first year, the factor loading of the two items are 0.64, 0.64 on the local aspect of sense of community, the 0.67, 0.67 respectively. However, one factor model consists of four items turned out to be a better model than two factor model with the confirmatory

factor analysis (see Table 3).

In conducting multiple group confirmatory factor analysis, configural invariance assumption (factor structure), metric invariance assumption, and scalar invariance assumptions were checked step by step as suggested by Hong, Hwang, and Lee (2005). After a one-factor model was adopted, a comparison was made between factor loading constrained and non-constrained alternatives. The results indicated that the constrained model fit statistics did not suffer in comparison. In fact, TLI and RMSEA improved. Thus metric invariance assumption was met (see Table 4). Then, scalar invariance assumption was checked by comparing the intercept unconstrained model (the factor loading constrained model) with the intercept and factor loading constrained model. Since the chi square test is sensitive to sample size, two indices, such as TLI are RMSEA were used. These fit statistics improved a little bit, thus satisfying scalar invariance assumption. See Table 4. Thus, the mean of the four items was used as a dependent variable.

2. Multilevel growth modeling

Since the mean of item scores and time varying child characteristics are nested within an individual child, time varying variables were used for level 1 and variables that reflect individual characteristics and variables obtained during the first year (y1) were used for the level 2 model.

The result of unconditional model shows that 69.5% of the total variance is at level 1, which indicates that much of the variance are due to the characteristics of time. The basic growth model shows positive linear effect. The change over time was consistently increasing (b=0.018), even though the year 2 average was lower than that of year 1. Middle school students' level of sense of community were 2.76, 2.72, and 2.83 respectively (see Table 2). However, in the rate of change, the random effect was not significant, which means that there do not exist any statistically significant individual differences in rate of change in the level of sense of community (Table 5). In addition, the correlation between the first time point and the rate of change was -0.37, which means that for students with a high sense of community, the rate of change is lower than for students

with a lower sense community at the first time point. It may be due to the ceiling effect at the first time point.

In the final model, except for the hours spent for reading and satisfaction with field studies, all the level 1 variables, such as perception of neighborhood, frequency of field study participation, satisfaction with extra-curricular activities, observance of school regulation, relationship with teachers, and relationship with peers were statistically significant. However, the effect of gender in predicting rate of growth was not statistically significant. Among the level 2 variables, the effect of sense of community was higher with females, female only school, time spent for leisure reading respectively, than that with male students, those in coed schools, and students from low income household. However, these effects were very small (see Table 6). The level 1 intercept random effect was statistically significant, which means that even after controlling for the effect of gender, types of schools, hours spent for leisure reading, and private education, there was a statistically significant individual difference (see Table 7).

Table 1. Descriptive Statistics

variable	N	Min	max	mean	SD	skew	kurtosis
Y1 readhrs	2322	0.00	840.00	86.23	87.52	1.98	6.90
Y2readhrs	2254	0.00	740.00	79.92	86.83	2.16	8.44
Y3readhrs	2216	0.00	780.00	65.45	82.88	2.45	10.15
Y1field study	2350	0.00	9.00	2.40	1.79	0.87	0.80
Y2field study	2278	0.00	9.00	1.60	1.72	1.55	2.88
Y3field study	2231	0.00	9.00	1.53	1.63	1.66	3.47
Y1satis field study	2028	1.00	4.00	3.12	0.57	−0.71	1.55
Y2satis field study	1578	1.00	4.00	3.16	0.56	−0.58	1.59
Y3satis field study	1554	1.00	4.00	1.82	0.57	0.54	1.08
Y1extra- satis	776	1.00	4.00	3.23	0.72	−0.81	0.71
Y2extra- satis	815	1.00	4.00	3.19	0.74	−0.79	0.66
Y3extra- satis	824	1.00	4.00	3.19	0.72	−0.79	0.79
Y1teach-rel	2350	1.00	4.00	2.71	0.67	−0.16	−0.12
Y2teach-rel	2280	1.00	4.00	2.87	0.65	−0.15	0.00
Y3teach-rel	2259	1.00	4.00	2.89	0.63	−0.13	0.06
Y1peer-rel	2350	1.00	4.00	2.99	0.41	−0.17	0.81
Y2peer-rel	2280	1.60	4.00	3.02	0.41	−0.11	0.31
Y3peer-rel	2259	1.40	4.00	3.07	0.39	−0.03	0.51
Y1regul	2351	1.00	4.00	2.76	0.49	−0.14	0.61
Y2regul	2280	1.00	4.00	2.79	0.56	−0.12	0.64
Y3regul	2259	1.00	4.00	2.86	0.54	−0.13	0.85
Y1percept	2348	1.00	4.00	2.83	0.57	−0.06	−0.07
Y2percept	2280	1.00	4.00	2.75	0.54	−0.04	0.05
Y3percept	2257	1.17	4.00	2.72	0.53	−0.01	0.38
Y1comm	2350	1.00	4.00	2.76	0.60	−0.09	0.24
Y2comm	2280	1.00	4.00	2.72	0.60	−0.15	0.53
Y3comm	2257	1.00	4.00	2.83	0.60	−0.16	0.50
Y1priv-ed	2318	0.00	840.00	168.92	150.75	1.03	1.20
Y2priv-ed	2248	0.00	900.00	145.82	132.72	1.10	1.86
Y3priv-ed	2233	0.00	960.00	121.65	128.12	1.41	2.94
Y1income	2219	0.00	173.21	62.90	20.20	0.52	1.82
Y1city	2351	0.00	1.00	0.86	0.35	−2.04	2.15
Gender(male)	2351	0.00	1.00	0.50	0.50	0.00	−2.00
Male sch	2351	0.00	1.00	0.10	0.31	2.59	4.69
Female sch	2351	0.00	1.00	0.12	0.33	2.29	3.26

Note. The figures are obtained before the multiple imputation. The variable names Y1, Y2, and Y3 stands for year 1, year 2, and year 3. In addition, ①readhrs, ②satis field study, ③extra-satis, ④teach-rel, ⑤peer-rel, ⑥regul, ⑦percept, ⑧comm, ⑨priv-ed, ⑩income, ⑪city, ⑫malesch, and ⑬female sch stand for ① hours spent for reading, ②satisfaction with field study, ③satisfaction with extracurricular activities, ④relation with teachers, ⑤relation with peers, ⑥observation of school regulation, ⑦perception of neighbors, ⑧sense of community, ⑨ hours spent for private education, ⑩ year 1 income, ⑪ residence in city in year 1, ⑫ male only school, and ⑬female only school,

respectively.

Table 2. Internal Consistency Reliability (Cronbach's Alpha)

Variables	n	yr1	yr 2	yr3
community	4	0.732	0.774	0.815
neighborhood	5	0.774	0.814	0.815
regulation	5	0.708	0.790	0.789
teach-rel	5	0.827	0.835	0.841
peer-rel	4	0.603	0.686	0.689

Note. Community, neighborhood, regulation, teacher-rel, and peer-rel stand for sense of community, perception of neighborhood, observation of school regulation, relation with teachers, and relation with peers, respectively.

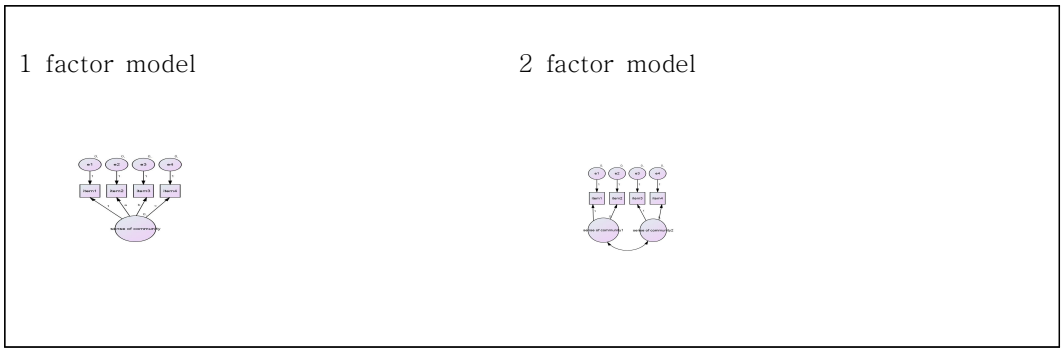

Figure 2. Configural Invariance: Model comparison

Table 3. Confirmatory Factor Analysis: Factor structure

2 factor model	χ^2	df	TLI	RMSEA
yr1	15.875	1	0.92	0.082
yr2	21.606	1	0.912	0.094
yr3	29.897	1	0.905	0.111
one factor model	χ^2	df	TLI	RMSEA
yr1	33.845	2	0.915	0.082
yr2	42.873	2	0.915	0.093
yr3	55.194	2	0.912	0.106

Table 4. Model Comparison: Multiple Group Confirmatory Factor Analysis

Model	χ2	df	TLI	90% CI	RMSEA
Configural invariance model	131.912	6	0.913	.047~.063	0.055
Metric invariance model	142.9	10	0.945	.037~.050	0.043
Intercept invariance	232.849	18	0.951	.037~.046	0.041

Table 5. Linear Effect

Fixed Effect	Variable	*b*	*SE*	*df*	*p*
	Level-1 intercept(B00)	2.862	0.013	2350	0.000
	Timelin(B10)	0.018	0.008	2350	0.024
Random Effect		SD	Variance	*df*	*p*
	Level intercept R0)	0.381	0.145	2350	0.000
	Timelin (R1)	0.007	0.006	2350	0.086
	L-1 random effect	0.533	0.285		

Table 6. HLM Final Model

Variable	*b*	*SE*	*df*	*p*	*β*
Intercept	2.864	0.027	2212	0.000	
city	0.012	0.024	2212	0.633	0.000
gender(ma;e)	−0.049	0.025	2212	0.046	−0.002
male sch	−0.033	0.030	2212	0.312	−0.001
female sch	0.109	0.025	2212	0.000	0.004
income	0.001	0.000	2212	0.002	0.000
priv−ed	0.000	0.000	2212	0.974	0.000
time linear	0.029	0.013	6641	0.022	0.001
reading time	−0.011	0.015	6641	0.492	0.000
percept	0.242	0.014	6641	0.000	0.005
field study	0.019	0.004	6641	0.000	0.000
Satisfield	0.018	0.011	6641	0.080	0.000
Extra−satis	0.053	0.009	6641	0.000	0.001
Regul	0.167	0.014	6641	0.000	0.004
Teach−rel	0.109	0.012	6641	0.009	0.002
Peer−rel	0.154	0.018	6641	0.000	0.004

Note. ①Male sch, ②female sch, ③priv-ed, ④ percept, ⑤field study, ⑥satisfield, ⑦extra-satis, ⑧regul, ⑨ teach-rel, and ⑩peer-rel stand for ①male only school, ②female only school, ③time spent for private education, ④perception of neighbors, ⑤number of field study, ⑥satisfaction with field study experience, ⑦ satisfaction of extracurricular activities, ⑧observation of school regulation, ⑨relation with teachers, and ⑩ relation with peers, respectively.

Table 7. Final Random Effect

	Variable	Variance	*df*	χ^2	*p*
Random Effect	Intercept(R0)	0.062	2212	3756.09	0.000
	L-1, e	0.264			

V. Summary and Discussion

Using the KCYPS2010 middle school student cohort, this study investigated whether and how middle school students' sense of community changes over three time points. If it changes, this study investigated what factors are associated with the change. Since the major dependent variable, sense of community was constructed using four items, in order to investigate whether the sense of community items were interpreted in the same way over three time points, a multiple group confirmatory factor analysis was conducted using the four items. The four items did turn out to represent a single sense-of-community factor, and also satisfied the configuration, metric, and scalar invariance assumptions. Thus, it is possible to consider that these items were interpreted in the same way over three different time points by the middle school students, and the mean of each item was used as an outcome variable.

Sense of community was considered as a time-varying individual characteristic along with other time-varying variables, which are nested within individuals (Level 1). They were used as level 1 predictors. Data obtained at a single time point (e.g., gender) were used at level 2 in the hierarchical (multilevel) growth model. The change in the sense of community over three years was small, but the basic growth model showed linear effect (consistent positive change) over three years, although the mean of year 2 is lower than that of year 1. This result may be partly caused by the artifact of growth modeling. Because only three time-specific data points are used in this study, no quadratic term is used in the model. There were no individual differences in the rate of change. The effect of gender in predicting rate of growth was not statistically significant, either. In predicting the mean of the first year of sense of community, except for the satisfaction with field studies, satisfaction with extra-curricular activities, observance of school regulation,

relationship with teachers, and relationship with peers (classmates) were statistically significant. Among the level 2 variables, the level of sense of community was higher with female, female only schools, students with higher leisure reading time, students from higher family income respectively than that of male students, coed schools, and students from low income family. However, these effects were very small. Location of residence, i.e., city versus others and hours spent for private education were not statistically significant.

It is not immediately obvious why the female only schools and females are higher in the level of sense of community. However, it is likely that females put more emphasis on human relationship. Because of this, a female's level of sense of community might be higher than the male's. Participation in different types of field studies may broaden students' perspectives and raise their level of sense of community. However, the effect size of each coefficient was small with the KCYP2010. The researcher conjectures that the small practical effect size might be also caused by the small variance of using a four-point Likert scale. Future researchers should investigate this factor in more depth. In addition, the fact that a sense of community taps attitudes that may not undergo remarkable change during middle school years might help explain the small change in the rate of growth, and the relatively low effect of field study experience and extracurricular activities. However, despite the apparently small impact of these nonacademic variables, in the Korean educational environment, where people put so much emphasis on academic achievement, promoting a sense of community with teenagers is possible by creating opportunities for them to participate in field study and extracurricular activities. As was suggested by Kim and Khn (2012), a sense of community is promoted by participation in diverse activities and by forming positive relationship with one another, which in turn affects participation in society.

Although the effects of the relationship between students and teacher and that between students and with their peers, were not so large, promoting positive relationship of teenagers with teachers and peers would enhance a sense of community. The change in the sense of community was not so great over time, and so the effect of variables predicting sense of community over three years was not so

great.

In order to understand whether this kind of small change is ascribable to the cohort effect or not, comparison using different age groups such as high school student cohort or elementary school cohort would help in understanding change of attitude of teenagers over time. However, in spite of small variance, there still exists level 1 intercept random effect even after controlling for the effect of variables used in the model. This suggests some possibility of utilizing more meaningful variables in the future.

However, this study has some limitations related to construct-related validity: Because only four items were used for the construct *sense of community*, it might not have covered the full spectrum of possible meanings for the concept. However, since this study utilized national data, the results can be generalizable across middle school students in South Korea.

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