

Original Article

Analysis of the association between problem behaviors and Sasang typology in high school students

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ABSTRACT

Background: Some studies have shown that Sasang typology is related to specific problem behaviors, but research on the associations between Sasang types and problem behaviors in children is scarce. The purpose of this study was to examine the associations between Sasang types and problem behaviors in Korean high school students.

Methods: A total of 686 Korean high school students (371 boys and 315 girls) completed the Korean version of Youth Self-Report (YSR) for describing the problem behaviors in adolescents and the Sasang Personality Questionnaire (SPQ) for measuring the temperament characteristics of Sasang typology. The correlation between YSR and SPQ subscales was investigated, and the differences of YSR among the high (30%), middle (40%), and low (30%) SPQ total score groups were examined with Analysis of variance. The profile analysis was also performed to compare YSR subscale profiles of three SPQ total score groups.

Results: The SPQ total score significantly ($p < 0.001$) correlated positively with YSR externalizing problems ($r = 0.293$ and $r = 0.248$) and negatively with YSR internalizing problems ($r = -0.211$ and $r = -0.150$) in males and females, respectively. The YSR externalizing problem score is significantly higher in the high SPQ total score group (13.14 ± 9.33 and 10.03 ± 5.34 for males and females, respectively) than in the low SPQ total score group (8.18 ± 5.53 and 8.58 ± 5.73 , respectively), and the YSR internalizing problem score is significantly higher in the low SPQ total score group (11.28 ± 8.92 and 12.97 ± 8.69 for males and females, respectively) than in the high SPQ total score group (9.35 ± 9.00 and 11.28 ± 7.58 , respectively). The YSR profiles for three SPQ total score groups were significantly different for males (profile analysis, $df = 12.324$, $F = 18.164$, $p < 0.001$) and females ($df = 12.677$, $F = 11.601$, $p < 0.001$).

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Conclusion: These results could be recognized as the SPQ, and Sasang typology would be useful for predicting the pathological patterns even of psychological problems in high school students. This study would be useful for the screening of psychopathological problems and character development in adolescents.

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1. Introduction

Sasang typology, used in traditional Korean medicine, categorizes people into four Sasang types, Tae-Yang, Tae-Eum, So-Yang, and So-Eum types,^{1,2} and provides type-specific disease susceptibility for each Sasang type. Since Sasang typology is defined as mind-body medicine,^{3,4} the mind or psychological approach in Sasang typology has been well studied.⁴⁻¹² The personality characteristics using various personality assessments such as Myers-Briggs Type Indicator, NEO-Personality Inventory Revised (NEO-PI-R), and Temperament and Character Inventory (TCI) have been examined.

It was reported that So-Yang types are extrovert in both Myers-Briggs Type Indicator and NEO-PI-R,^{7,11,12} and showed a low score in NEO-PI-R neuroticism,⁸ and So-Eum types are introvert in Myers-Briggs Type Indicator^{6,11} and demonstrated a high score of neuroticism in NEO-PI-R.^{8,12} In addition, So-Yang types displayed a high score of novelty seeking and a low score of harm avoidance, and So-Eum types showed the opposite features of a low novelty seeking score and a high harm avoidance score in TCI.^{4,9,10,13,14} The features of Tae-Eum types in TCI were located in the middle between So-Eum and So-Yang types.⁴

While the majority of the previous studies mentioned above have focused on the general psychological aspects of Sasang types, a relatively small amount of research focused on the pathological ones.¹⁵⁻¹⁹ The associations between Sasang typology and psychopathology or type-specific problem behaviors are examined by such instruments as Minnesota Multiphasic Personality Inventory (MMPI), Symptom Checklist-90-Revised, Beck Depression Inventory, State-Trait Anxiety Inventory, and so forth. For instance, So-Eum types displayed a high score in MMPI Hypochondriasis and Psychasthenia scales,^{15,16} and a high trait anxiety score in State-Trait Anxiety Inventory,¹⁹ and So-Yang types showed a low score in MMPI Depression scale, a high score in MMPI Mania scale,^{15,16} and a low trait anxiety score in State-Trait Anxiety Inventory,¹⁹ which means that So-Eum types are more anxious and depressed than So-Yang types.

In other words, So-Eum types might have internalizing problem behaviors focusing on one's self and So-Yang types have externalizing problem behaviors involving the outside world, as suggested by the previous studies on Sasang typology^{4,9,10,13,14} and TCI.²⁰⁻²² For measuring the problem behaviors, Achenbach System of Empirically Based Assessment, which has two high-order factors of externalizing problem behaviors (i.e., aggressive, rule-breaking behaviors) and internalizing problem behaviors (i.e., depression, anxiety, and somatic complaints) was used.²³ However, some studies showed contrary results that So-Yang types displayed

higher scores in somatization in the Symptom Checklist-90-Revised¹⁸ and demonstrated significantly higher scores in depression/anxiety and somatization scales¹⁷ in Child Behavior Checklist in a clinical setting.¹⁷

To sum up, there were mixed results regarding the relationship between psychopathology and Sasang typology, especially for So-Yang and So-Eum Sasang types. Moreover, those type-specific problem behaviors are mostly investigated in adult samples in both general and clinical settings, and not in children or adolescents because of a lack of proper assessment tools for Sasang types.^{17,24,25}

Therefore, the aim of the current study is to examine the relationship between problem behaviors and Sasang types using the recently developed Sasang Personality Questionnaire (SPQ). We tested whether So-Yang types are associated with externalizing problem behaviors and So-Eum types with internalizing problem behaviors, as illustrated in Fig. 1 with correlation and Analysis of variance. This study would provide foundations for establishing psychopathological studies on adolescents with Sasang typology.

2. Methods

2.1. Participants

A total of 686 students from high schools in the Daegu metropolitan area completed the Youth Self-Report (YSR) and SPQ, which tapped the problem behaviors and Sasang personality characteristics, respectively. The procedures were approved by the Internal Review Board of Kyungil University, Gyeongsan, South Korea. All participants provided written informed consent for the study.

2.2. Sasang Personality Questionnaire

The SPQ²⁶ is a recently developed 14-item self-report assessment tool measuring temperament characteristics from the perspective of the Sasang typology. The SPQ has shown acceptable clinical validity and reliable psychometric properties.²⁶⁻²⁸ Each item is composed of two opposite words, each describing a specific personality trait, and participants must choose one of three responses on a 3-point Likert scale (1 = delicate, 2 = average or middle, and 3 = tough).

The SPQ is based on the concepts of Yin-Yang and Confucianism and composed of three subscales that measure the behavioral (SPQ-Behavior), emotional (SPQ-Emotionality), and decision-making or cognitive components (SPQ-Cognition) of personality. Internal consistency of the SPQ for the present study was 0.76.

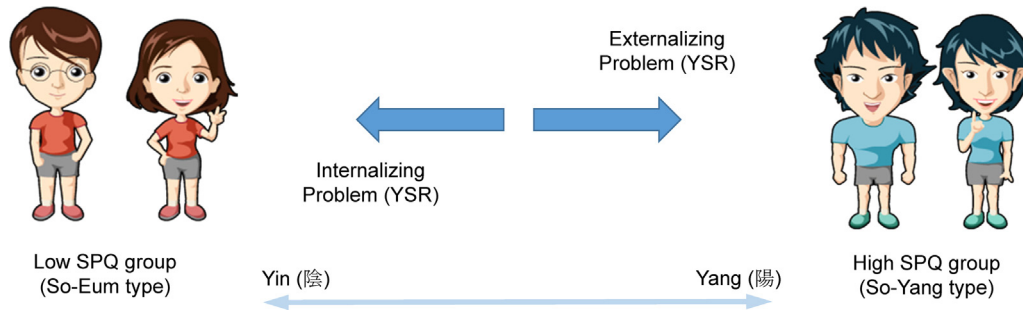


Fig. 1 – Sasang typology and subscales of problem behaviors in YSR.
 SPQ, Sasang Personality Questionnaire; YSR, Youth Self-Report.

2.3. Youth Self-Report

The problem behaviors of adolescents, in the age range of 12–17 years, was measured using the Korean version of the YSR,²⁹ a questionnaire consisting of 118 items developed for measurement of problem behaviors in adolescents. YSR is originated from Achenbach System of Empirically Based Assessment.²³ Adolescents were asked to rate the behavior for the preceding 6 months on a 3-point Likert scale (0 = not true at all, 1 = somewhat or sometimes true, and 2 = very true or often true). The Korean version of YSR was standardized and validated in 2011 and demonstrated good validity and reliability.²⁹

The YSR yields three subscales of total score, internalizing problems, and externalizing problems, and eight empirically validated symptom clusters. Internalizing problem behaviors include anxious/depressed and withdrawn/depressed behaviors, and somatic complaints; externalizing problem behaviors includes rule-breaking behavior and aggressive behavior; and total problems include internalizing problems, externalizing problems, social problems, thought problems, attention problems, and other problems. Total, internalizing, and externalizing problems, and five empirically validated symptom clusters related to internalizing and externalizing problems are analyzed in the present study. Cronbach α values for the total, internalizing, and externalizing problem behaviors of the present study were 0.78, 0.75, and 0.90, respectively.

2.4. Statistical analysis

Descriptive statistics was used for sex and school year. The Pearson correlation coefficient was calculated to examine the correlations between the SPQ and subscales of YSR. We also divided the participants into three groups based on the SPQ

total score: groups with high (30%), middle (40%), and low (30%) SPQ scores, which conceptually corresponded to So-Yang, Tae-Eum, and So-Eum types, respectively. SPQ total score groups were compared with Analysis of variance, and Bonferroni or Dunnett's T3 *post hoc* analysis were applied depending on the results of Levene's homogeneity test. Finally, profile analysis for the test of parallelism and flatness was used to test the difference in the YSR profiles of high, middle, and low SPQ total score groups. Statistical analysis results were presented as frequency (%) or mean \pm standard deviation, and statistical significance level was set at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively. IBM SPSS Statistics 20.0 (IBM, Armonk, NY, USA) was used for all statistical analyses.

3. Results

3.1. Demographic characteristics of the participants

The school year and sex composition are described in Table 1. There were 371 (54.1%) boys and 315 (45.9%) girls, and the students comprised 250 (36.4%) sophomores, 246 juniors (35.8%), and 190 (27.7%) seniors. There were significant differences in school year and sex composition ($\chi^2 = 10.567$, $df = 2$, $p < 0.01$).

3.2. Correlations between SPQ and YSR

Table 2 demonstrates the correlation coefficients between the SPQ and subscales of YSR. There were significant correlations between the SPQ and subscales of YSR; the correlation coefficients for internalizing problems, externalizing problems, anxious/depressed and withdrawn/depressed behaviors (related to internalizing problems), and rule-breaking and aggressive behaviors (related to externalizing problems) were, respectively, -0.211, 0.293, -0.145, -0.401, 0.220, and 0.306 in

Table 1 – Demographic characteristics of high school students

| | Sophomore | Junior | Senior | Total |
|-------|------------|------------|------------|------------|
| Boys | 131 (52.4) | 119 (48.4) | 121 (63.7) | 371 (54.1) |
| Girls | 119 (47.6) | 127 (51.6) | 69 (36.3) | 315 (45.9) |
| Total | 250 | 246 | 190 | 686 |

Data are presented as N (%).

Significant differences between the frequency of school year and sex composition ($\chi^2 = 10.567$, $df = 2$, $p < 0.01$).

Table 2 – Correlation coefficients between SPQ and subscales of YSR in males and females

| | | YSR total | Internalizing problem | Externalizing problem | Anxious/depressed | Withdrawn/depressed | Somatic complaints | Rule breaking | Aggression |
|---------|-----|-----------|-----------------------|-----------------------|-------------------|---------------------|--------------------|---------------|------------|
| Males | SPQ | 0.015 | -0.211** | 0.293** | -0.145** | -0.401** | 0.033 | 0.220** | 0.306** |
| Females | | 0.010 | -0.150** | 0.248** | -0.118* | -0.335** | 0.040 | 0.161** | 0.257** |

* $p < 0.05$.
 ** $p < 0.01$.
 SPQ, Sasang Personality Questionnaire; YSR, Youth Self-Report.

males and -0.150, 0.248, -0.118, -0.335, 0.161, and 0.257 in females.

3.3. SPQ and YSR subscale scores for high, middle, and low SPQ score groups

The mean and standard deviation of high, middle, and low SPQ total score groups are presented in Tables 3 and 4. The subscales of YSR have significant differences among high, middle, and low SPQ total score groups in both males and females: internalizing problems, externalizing problems, anxious/depressed behavior, withdrawn/depressed behavior, rule-breaking behavior, and aggressive behavior in boys, and internalizing problems, externalizing problems, anxious/depressed, withdrawn/depressed, and aggressive behavior in girls. After *post hoc* analysis, the scores of internalizing problems, anxious/depressed, and withdrawn/depressed behavior were greater in the low SPQ group than in the high SPQ group of boys. The scores of externalizing problems,

rule-breaking behavior, and aggressive behavior were greater in the high SPQ group than in the low SPQ group of boys. For girls, the scores of internalizing problems, anxious/depressed behavior, and withdrawn/depressed behavior were greater in the low SPQ group than in the high SPQ group, and the scores of externalizing problems and aggressive behavior were greater in the high SPQ group than in the low SPQ group.

3.4. YSR profiles of high, middle, and low SPQ total score groups

YSR subscale profiles of the high, middle, and low SPQ total score groups were significantly different (Fig. 2, 3) in both boys and girls. For boys, YSR score profiles of the three groups were not flat (Greenhouse–Geisser test, $df = 3.218$, $F = 173.963$, $p < 0.001$), and the interaction of three groups was significantly different (Greenhouse–Geisser correction, $df = 6.436$, $F = 30.129$, $p < 0.001$) as for the parallelism of YSR profiles. For girls, YSR score profiles of the three groups were not flat

Table 3 – SPQ and YSR subscales score (mean and SD) of high, middle, and low SPQ score groups in males

| | High SPQ | Middle SPQ | Low SPQ | Total | ANOVA | Post hoc analysis |
|----------------------|---------------|--------------|---------------|---------------|-------------------------------------------------|---------------------|
| n (%) | 116 (31.27) | 153 (41.24) | 102 (27.50) | 371 (100) | | |
| SPQ | 34.04 ± 2.56 | 27.54 ± 1.79 | 21.42 ± 2.23 | 27.89 ± 5.31 | | |
| YSR total | 41.77 ± 28.24 | 39.08 ± 23.4 | 42.28 ± 22.55 | 40.80 ± 24.77 | $F = 0.637$, $df = 2,368$, $p = 0.529$ | |
| Internalizing | 9.35 ± 9.00 | 10.78 ± 8.46 | 14.23 ± 8.84 | 11.28 ± 8.92 | $F = 8.866$, $df = 2,368$, $p < 0.001$ | High, middle < low |
| Anxious/depressed | 4.84 ± 4.50 | 5.05 ± 4.08 | 6.42 ± 4.60 | 5.36 ± 4.40 | $F = 4.263$, $df = 2,368$, $p < 0.05$ | High, middle < low |
| Withdrawal/depressed | 2.22 ± 2.68 | 3.52 ± 2.94 | 5.61 ± 3.61 | 3.69 ± 3.32 | $F = 33.608$, $df = 2,368$, $p < 0.001$ | High < middle < low |
| Somatic complaints | 2.30 ± 2.98 | 2.22 ± 2.82 | 2.20 ± 2.07 | 2.24 ± 2.68 | $F = 0.050$, $df = 2,368$, $p = 0.951$ | |
| Externalizing | 13.14 ± 9.33 | 10.15 ± 6.89 | 8.18 ± 5.53 | 10.54 ± 7.66 | $F = 12.467$, $df = 2,368$, $p < 0.001$ | High > middle > low |
| Rule breaking | 4.53 ± 4.14 | 3.55 ± 3.21 | 3.01 ± 2.38 | 3.71 ± 3.38 | $F = 5.876$, $df = 2,368$, $p < 0.01$ | High > low |
| Aggression | 8.61 ± 5.75 | 6.60 ± 4.39 | 5.17 ± 3.76 | 6.84 ± 4.88 | $F = 14.861$, $df = 2,368$, $p < 0.001$ | High > middle > low |

ANOVA, Analysis of variance; SD, standard deviation; SPQ, Sasang Personality Questionnaire; YSR, Youth Self-Report.

Table 4 – SPQ and YSR subscale score (mean and SD) of high, middle, and low SPQ score groups in females

| | High SPQ | Middle SPQ | Low SPQ | Total | ANOVA | Post hoc analysis |
|----------------------|--------------|---------------|--------------|---------------|-----------------------------------|---------------------|
| n (%) | 94 (29.84) | 139 (44.13) | 82 (26.03) | 315 (100) | | |
| SPQ | 34.32 ± 2.04 | 28.65 ± 1.63 | 22.79 ± 2.19 | 28.82 ± 4.71 | | |
| YSR total | 39.8 ± 18.40 | 39.62 ± 22.31 | 41.05 ± 22.9 | 40.04 ± 21.32 | F = 0.124, df = 2,312, p = 0.883 | |
| Internalizing | 11.28 ± 7.58 | 12.85 ± 8.58 | 15.1 ± 9.65 | 12.97 ± 8.69 | F = 4.350, df = 2,312, p < 0.05 | High < low |
| Anxious/depressed | 5.72 ± 3.98 | 6.27 ± 3.93 | 7.44 ± 4.67 | 6.41 ± 4.19 | F = 3.895, df = 2,312, p < 0.05 | High < low |
| Withdrawal/depressed | 2.09 ± 1.90 | 3.21 ± 2.73 | 4.70 ± 3.12 | 3.26 ± 2.79 | F = 21.679, df = 2,312, p < 0.001 | High < middle < low |
| Somatic complaints | 3.47 ± 3.23 | 3.37 ± 3.46 | 2.96 ± 3.09 | 3.30 ± 3.30 | F = 0.583, df = 2,312, p = 0.559 | |
| Externalizing | 10.03 ± 5.34 | 8.60 ± 6.14 | 6.87 ± 4.99 | 8.58 ± 5.73 | F = 6.933, df = 2,312, p < 0.001 | High > low |
| Rule breaking | 2.24 ± 2.11 | 2.22 ± 2.52 | 1.61 ± 1.61 | 2.07 ± 2.20 | F = 2.445, df = 2,312, p = 0.088 | |
| Aggression | 7.79 ± 3.94 | 6.38 ± 4.22 | 5.26 ± 3.95 | 6.51 ± 4.16 | F = 8.600, df = 2,312, p < 0.001 | High > middle, low |

ANOVA, Analysis of variance; SD, standard deviation; SPQ, Sasang Personality Questionnaire; YSR, Youth Self-Report.

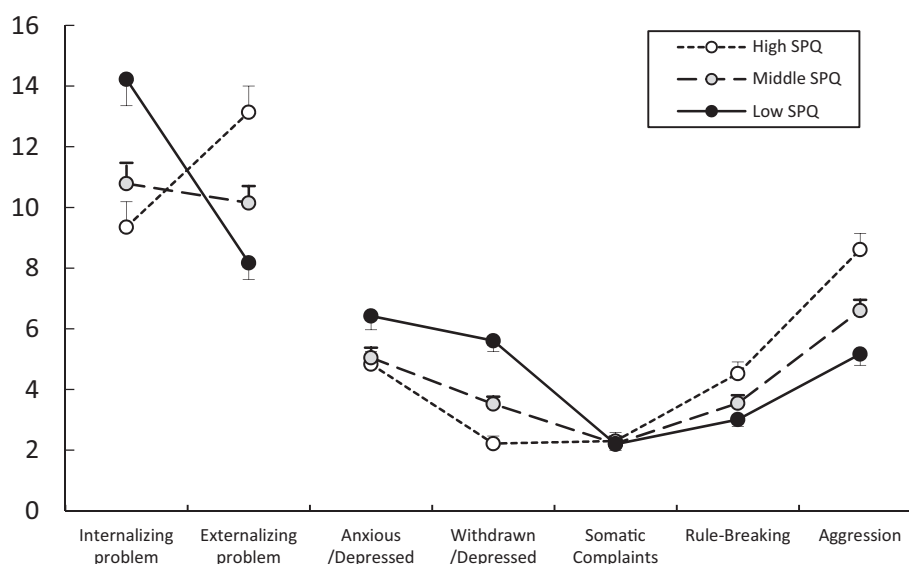


Fig. 2 – YSR subscale profiles of high, middle, and low SPQ score groups in males. The YSR subscale profiles of the high, middle, and low SPQ score groups were significantly different (flatness with Greenhouse–Geisser test, $df = 3.218$, $F = 173.963$, $p < 0.001$; parallelism with Greenhouse–Geisser correction, $df = 6.436$, $F = 30.129$, $p < 0.001$). SPQ, Sasang Personality Questionnaire; YSR, Youth Self-Report.

(Greenhouse–Geisser test, $df = 3.435$, $F = 217.677$, $p < 0.001$) and the interaction of the three groups was significantly different (Greenhouse–Geisser correction, $df = 6.870$, $F = 16.357$, $p < 0.001$) as for the parallelism of YSR profiles.

4. Discussion

There have been extensive studies regarding the Sasang type-specific psychological characteristics. However, those studies have focused mostly on general personality aspects of adults,

and not children or adolescents. Therefore, the purpose of the current study is to examine the relationship between Sasang typology and problem behaviors in high school students with the recently developed and validated SPQ. We hypothesized that distinct psychopathology would emerge from the different Sasang types: internalizing problems are associated with So-Eum types and externalizing problems with So-Yang types. Additionally, the participants were divided according to sex, as previous studies supported that there were significant differences in psychological traits depending on sex in Sasang types.^{30,31}

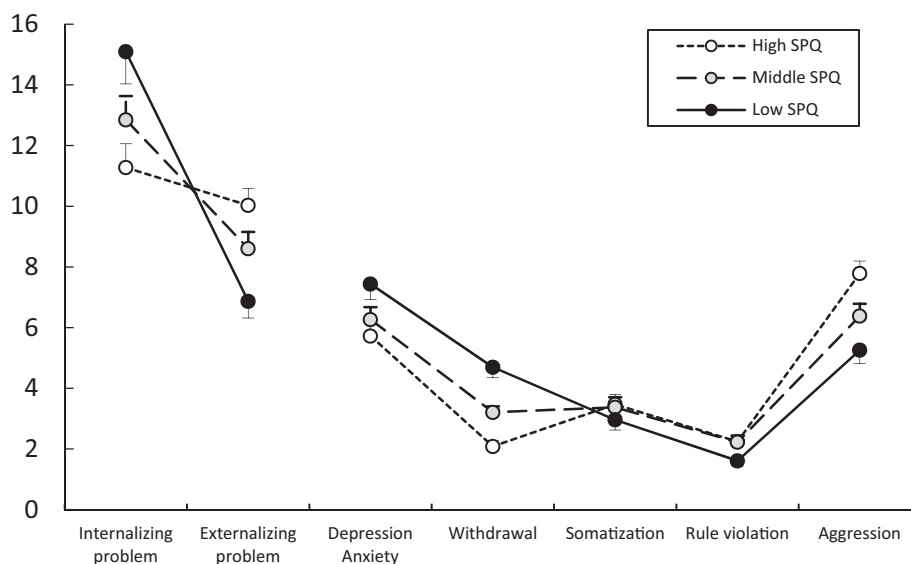


Fig. 3 – YSR subscales of high, middle, and low SPQ score groups in females. The YSR subscale profiles of the high, middle, and low SPQ score groups were significantly different (flatness with Greenhouse–Geisser test, $df = 3.435$, $F = 217.677$, $p < 0.001$; parallelism with Greenhouse–Geisser correction, $df = 6.870$, $F = 16.357$, $p < 0.001$). SPQ, Sasang Personality Questionnaire; YSR, Youth Self-Report.

The results demonstrated that there were significant correlations between the SPQ and subscales of YSR. The SPQ is negatively correlated with YSR internalizing problems, anxious/depressed behavior, and withdrawn/depressed behavior, which are associated with anxious, shy, and pessimistic behaviors of TCI harm avoidance.^{4,9} Such descriptions coincide with the So-Eum type as negative, nervous, and mild characteristics in Jema Lee's book *Longevity and Life Preservation in Eastern Medicine*.¹ In addition, the SPQ is positively correlated with externalizing problems, and rule breaking and aggressive behaviors, which are associated with impulsivity, excitability, and risk-taking behaviors of TCI novelty seeking^{4,9} and with extroversion of NEO-PI-R.^{4,9} Such explanations also concur with the statement of the So-Yang type as quick tempered, unstable, easily getting bored, and externally oriented.¹

These associations were also confirmed with the comparison of YSR subscale scores among SPQ groups. The participants were classified into three groups, high, middle, and low SPQ total score groups, which conceptually corresponded to So-Yang, Tae-Eum, and So-Eum types, respectively. There were significant differences in YSR subscales between the high and low SPQ total groups: externalizing problem and its subscales (e.g., rule-breaking and aggressive behaviors) and internalizing problem and its subscales (e.g., anxious/depressed and withdrawn/depressed behaviors). A *post hoc* analysis showed that the high SPQ total score group significantly scores higher than the low SPQ total score group in externalizing, rule-breaking, and aggressive behaviors and that the low SPQ total score group significantly scores higher than the high SPQ total score group in internalizing, anxious/depressed, and withdrawn/depressed behaviors. These findings corroborate with the results of correlation analysis described above.

To sum up, those who have high scores of SPQ would tend to have externalizing problem behaviors associated with the So-Yang type and those who have low scores of SPQ would tend to have internalizing problem behaviors associated with the So-Eum type. The middle SPQ score group corresponding to Tae-Eum type is in the middle of the high and low SPQ score groups as for the internalizing and externalizing problems of YSR, which can be expected from the previous studies that the novelty seeking and harm avoidance of Tae-Eum type are located between those of So-Yang and So-Eum Sasang types. Moreover, there might be a possibility of psychological symptoms or vulnerability according to each Sasang type similar to the physical type-specific symptoms. The present findings suggest that the distinct Sasang type would have its own psychological problems or symptoms that could be utilized for the preventive intervention of certain Sasang types.

Finally, regarding somatic complaints of YSR subscales (hypochondriasis in MMPI or somatization in Symptom Checklist-90-Revised), there was no difference among the high, middle, or low SPQ total score groups. This result is not consistent with the findings of the previous studies.^{16,17} and it is prominent in profile analysis. That is, the high, middle, and low SPQ total score groups are different from each other except in somatic complaint subscales. It could possibly result from the differences in definitions of somatic complaints in the East and West. The difference in expression of somatization is often described to be a result of the cultural difference between the East and the West,^{32,33} and further research is needed to verify this result.

Several limitations of this study should be acknowledged. First, the SPQ is not a categorical diagnostic tool like the Questionnaire for the Sasang Constitution Classification II.³⁴ However, there is no diagnostic tool for assessment of children

or adolescents except for the SPQ, which is the only instrument, with acceptable validity and clinical reliability, available for assessing Sasang types with a dimensional approach. Standardization of the SPQ in children and adolescents is required for future research on the association between Sasang types and psychopathology.

Second, there are a scarcity of research and inconsistency among the previous studies to study the type-specific psychopathology. Type-specific problem behaviors should be investigated in adults as well as in children with in clinical and nonclinical settings after standardization and utilization of the SPQ.

Last, we should be careful not to generalize the results of the present study to clinical samples. Psychological vulnerability expressed in the present study, which involved a community sample, might be different from the chief complaints reported in clinical settings.

This study showed that Sasang typology and SPQ would be useful and reliable for screening and predicting the pathophysiological profiles and suggest ways for prevention, treatment,^{24,25} and character development in high school students.

Conflicts of interest

The authors declare no conflicts of interest related to affiliated or sponsoring organizations.

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