An Alternative Way to Individualized Medicine: Psychological and Physical Traits of Sasang Typology

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ABSTRACT

Background: Disease susceptibility and drug response of individuals are presumed to be different depending on their personality traits. The Sasang typology, a traditional Korean medical typology, explains the individual differences of vulnerability to pathology and proposes guidelines for the safe and effective use of medical herbs depending on individual traits.

Objective: The purpose of the present study was to evaluate psychologic and physical characteristics of Sasang types from the perspective of personality theory.

Design: After determining the Sasang type of 79 college students based on the Questionnaire for the Sasang Constitution Classification, the psychologic and physical traits of each type were analyzed by the Meyers-Briggs Type Indicator (MBTI) and Bioelectrical Impedance Analysis, respectively.

Results: Each of the Sasang types showed significantly different profiles based on the MBTI scores (generalized estimation equation, coefficient = 11.88, z = 2.13, p = 0.033) and could be distinctively classified based on their MBTI scores (discriminant analysis Wilks’ λ = 0.611, df = 8, χ² = 36.7, p < 0.001). Subjects with the So-Eum type (Introversion and Judging) and the So-Yang type (Extroversion and Perceiving) showed contrasting psychologic features. However, they had similar anthropometric characteristics. Subjects with Tae-Eum type had relatively higher body fat mass.

Conclusion: Current results demonstrated distinctive personality traits associated with Sasang types using reproducible psychometric and anthropometric instruments. With further study, the Sasang typology could serve as a scientific tool for individualized and integrative medicine.

INTRODUCTION

Personality trait is the characteristic style of an individual’s behavioral tendency, often incorporating temperament, pattern of behavior, and the accompanying emotional expression (Loehlin, 1992). Also, it is thought to be closely associated with specific body shape and features (Kretschmer, 1921). Because disease vulnerability and drug reaction are presumed to be potentially different according to such traits, a number of studies have been conducted...
to examine the relationship between personality traits and susceptibility to pathology or drug response, with the ultimate goal of achieving a more personalized medicine (Ebstein et al., 2000; Kaasinen et al., 2001; Nowotny et al., 2001; Paris, 2000).

Sasang typology, however, offers temperament-based guidelines for the safe and effective use of herbal medicine, even those with significant adverse effects such as ma huang (Ephedra sinica) (Haller and Benowitz, 2000) and aconite (Aconitum carmichaeli) (Tai et al., 1993). It also explains individual differences in behavioral patterns and tendencies and physical characteristics based on particular biopsychological traits (Fig. 1). Despite its potential value in constructing personalized and integrative medicine, traits of Sasang types have not been studied in a quantitative and scientific manner, barring their development and propagation to other countries and cultures. The purpose of the present study was to examine empirically the psychologic and anthropometric characteristics associated with the Sasang types from a personality-oriented perspective.

Sasang typology was systematically theorized in the book Dong-Yi-Soo-Se-Bo-Won (The Principle of Life Preservation in Oriental Medicine) (Lee, 1894) by Jae Ma Lee in the field of traditional Korean medicine. Sasang typology also utilizes the herbs found in Traditional Chinese Medicine but is different from Traditional Chinese Medicine in the following aspects. First, Traditional Chinese Medicine is based on Taoism and explains the universe with yin-yang theory and the five-phases idea (Maciocia, 1989). In contrast, the Sasang typology is based on the combination of Neo-Confucianism and the medical tradition of Korea, and describes nature as quaternary (Yeo, 1998). Traditional Chinese Medicine places importance on the harmony between humanity and nature,

FIG. 1. A schematic diagram of Sasang types from a biopsychologic perspective. The psychologic features of Sasang types are explained as a pair of Tae-Yang (large Yang) type and Tae-Eum (large Yin) type, and So-Yang (small Yang) type and So-Eum (small Yin) type. Korean and Chinese letters are also used.
whereas Sasang typology emphasizes the harmony in social life and developing one’s character (Lee, 1894, 1996). Therefore, Sasang typology has a sociologic as well as a biologic facet.

In Sasang typology, human beings are classified into four Sasang types; Tae-Yang, So-Yang, Tae-Eum, and So-Eum. Although these names were borrowed from I Ching (The I Ching or Book of Changes, 1967), different meanings have been incorporated in Korean traditional medicine (Lee, 1996). The Sasang type of a person is presumed to be made by four natures and represents different temperaments, body shapes, and other general character features (Table 1) (Lee, 1894). The general characteristic features of Sasang types are as follows. The Yang (yang) types (Tae-Yang and So-Yang) are extroverted and the Eum (yin) types (Tae-Eum and So-Eum) are introverted. Tae-Yang type refers to a creative and visionary person who is gifted for starting social relationships but not in sustaining them. So-Yang type is a sharp and clean-looking person who is extroverted and interested in the outside world. The Tae-Eum type is a conservative and cautious person who has a talent for sustaining social relationships. The So-Eum type is an inactive, prudent, narrow-minded, resolute, and self-directed person who is in his or her own world. The body shape of Tae-Eum type is larger than that of the So-Eum type, and the body shapes of So-Eum and So-Yang types are similar (Lee, 1894, 1996). Basic assumptions are that these characteristics make people vulnerable to certain pathologic factors and to manifest different symptom profiles even within the same disease. Consequently, even for the treatment of a same disease, the Sasang type-specific medication and lifestyle are recommended (Lee, 1894, 1996).

We hypothesized that the Sasang type could be distinctively and reliably classified by a modern personality theory. Based on the character and physical features represented by the Sasang types, it was hypothesized that Yang (yang) types would be more extroverted than the Eum (yin) types and that the anthropometric values (body fat mass, waist-hip ratio, and body mass index) of Tae-Eum type would be larger than that of So-types (So-Eum and So-Yang). After dividing a college student sample into groups based on their Sasang type as determined by the Questionnaire for the Sasang Constitution Classification (QSCC), their typo-

| Table 1. General Features of the Four Sasang Types (Traditional Korean Medical Typology) |
|---------------------------------------------------|------------------|------------------|------------------|
| Nature                                            | Sorrow           | Anger            | Gladness         |
| Developed organ                                   | Lung             | Spleen           | Liver            |
| Undeveloped organ                                 | Liver            | Kidney           | Lung             |
| Character                                         | Creative         | Unstable         | Gentile          |
|                                                   | Positive         | Easily get bored | Commercial       |
|                                                   | Progressive      | Sacrificing      | Endurable        |
|                                                   | Charismatic      | Righteous        | Humorous         |
|                                                   | Heroic           | Easily           | Look foolish     |
|                                                   | Rash mind        | acceptable       | Coward           |
| Body shape                                        | Developed nape   | Hot tempered     | Fearful mind     |
|                                                   | of the neck,    |                  |                  |
|                                                   | slender waist    |                  |                  |
| Healthy sign                                      | Urination        | Bowel movement   | Perspiration     |
|                                                   |                  | Constipation     | Digestion        |
| Unhealthy sign                                    | Bubbles in       |                  |                  |
|                                                   | mouth, emesis    |                  |                  |

*aTae-Yang; Large-Sun, the strength of Yang is its peak.
*bSo-Yang; Small-Sun, the strength of Yang is currently small and at increasing stage.
*cTae-Eum; Full-Moon, it represents the strongest strength of Yin (Eum).
*dSo-Eum; Decrescent-Moon, it symbolizes the weakest strength of Yin (Eum).
logical traits from psychologic and physical perspectives were assessed using the Myers-Briggs Type Indicator (MBTI) and the Bioelectrical Impedance Analysis (BIA), respectively. By characterizing traits of Sasang types, this study could suggest an alternative tool for the explanation of individual differences in medicine.

MATERIALS AND METHODS

Subjects

Study subjects were 102 students between the ages of 19 and 43 (89 males, 13 females; ages 25.4 ± 5.2) enrolled in the oriental medical physiology class at the College of Oriental Medicine, Kyung Hee University, Seoul, Korea in 2000. The staff at the Department of Physiology, Oriental Medical College, Kyung Hee University supervised the QSCC and BIA tests, and a certified clinical psychologist (S.J.L.) supervised the administration of the MBTI test.

Because the formal Institutional Review Board (IRB) was not established at the time of this study, we assessed the appropriateness of the protocol by consulting with the senior staff of the college. All participants gave oral consent for the full assessments; 12 students did not complete the QSCC, 3 did not complete the MBTI, and 12 did not complete the BIA. Because 23 students were excluded, data from 79 students (69 males, 10 females; ages 25.1 ± 4.8; range, 19–42) were analyzed.

Measures

QSCC. QSCC is a Sasang typology-based inventory, which was developed by the Department of Sasang Medicine at Kyung Hee Medical Center (Seoul, Korea) in 1993 (Kim et al., 1993) and revised in 1996 (Kim et al., 1996), and has been used in clinical studies. The revised edition is based on 1366 subjects (668 males, 678 females). Ages ranged from 10 to 60 years and 68% of subjects had educational levels over 12 years. It has been also validated using 265 subjects from the Department of Sasang Constitutional Medicine of Kyung Hee Medical Center, Kyung Hee University Medical Center (Kim et al., 1996). The QCC is composed of 121 forced-choice items. The internal consistency (Cronbach’s α) of this inventory is as follows: Tae-Yang type is 0.57, So-Yang type is 0.57, Tae-Eum type is 0.59, and So-Eum type is 0.63 (Kim et al., 1996).

The Sasang type of an individual was determined following two procedures. First, the raw scores for Sasang types were acquired with the QSCC. After standardizing the raw scores based on their age and gender-specific norms, these scores were computed into discriminants to differentiate Sasang type of individuals (Kim et al., 1996). A paper-and-pencil self-report form of the QSCC was used, and Sasang type was determined using a PC-based software (Win QSCC II 99 version; Ssord Medicom & Ssord OMS, Seoul, Korea).

MBTI Form GS. The MBTI is a paper-and-pencil self-report form composed of 95 forced-choice items first developed by Myers and Briggs and translated into Korean by Sim (1990). It is a psychometric instrument designed to assess normal personality traits (Kim et al., 1995). This inventory has been chosen because it is geared toward assessing differences that result from the way people perceive information and how they prefer to use that information (Myers and McCauley, 1985). Individuals fall into four dichotomous personality dimensions based on their scores. Thus, there are eight categorical personality types: Introversion/Extroversion, Sensing/Intuition, Thinking/Feeling, and Judging/Perceiving. With its proven validity and reliability, the MBTI has been widely used to examine personality profiles in Korea (Kim et al., 1995). The MBTI individual categorical dimensions (i.e., Extroversion/Introversion) were also presented as continuous preference scores (i.e., below 100 is Extroversion and above 100 is Introversion) (Myers and McCauley, 1985). The preference scores (MBTI scores, hereafter) of the four dichotomies were used for the analysis in the present study.

BIA. The BIA is an electrical method for measuring anthropometric data in epidemic or clinical studies (Neves and Souza, 2000; Toda et al., 2000). It is simple and noninvasive and pro-
vides reliable results (Bracco et al., 1996; Stewart et al., 1993) for estimating total body water and lean body mass (LBM) (Cha et al., 1995). Assuming that LBM is hydrated in a constant and uniform manner, the BIA can be used to estimate body fat mass (BFM), the nonhydrated portion of the body, by subtracting LBM from the weight (Cha et al., 1995; Toda et al., 2000).

The body composition measurements and the waist-hip ratio (WHR) were obtained by segmental bioelectrical impedance analysis using eight tactile electrodes. Subjects were asked to stand barefoot on a platform with electrodes attached to their hands and feet. Hand electrodes consisted of a thumb pipe and palm cylinder electrodes, and foot electrodes consisted of frontal and rear sole plate electrodes. These electrodes were used to measure the impedance of the trunk and each extremity separately by regulating impedance meter via electronic on-off switches (Toda et al., 2000).

Weight was measured to the nearest 0.1 kg and height to the nearest 1 cm. The body mass index (BMI), an index of general obesity, was calculated as weight in kilograms divided by the square of height in meters.

Statistical analysis

Demographic differences between Sasang types (So-Yang, Tae-Eum, and So-Eum) were tested using independent t tests for continuous variables (age, education) and Fisher’s exact tests for categorical variable (gender). The cross-sectional time-series regression analysis was used to evaluate the differences in MBTI score patterns of Sasang types (So-Yang, Tae-Eum, and So-Eum). The MBTI scores of four dichotomies (Extroversion/Introversion, Sensing/Intuition, Thinking/Feeling, and Judging/Perceiving) were analyzed as panel data, which means repeated measures within subjects. Also generalized estimation equation (GEE) modeling was used, which allows robust estimation of standard errors. Interactions were checked for significance in models in which there were multiple explanatory factors. The discriminant analysis was conducted to measure how well the Sasang types are classified based on individual MBTI scores.

The MBTI scores of each Sasang type were analyzed to evaluate the differences between Sasang types in a linear regression model. The Sasang type was transformed as dummy variables to compare differences in MBTI scores among groups. The MBTI score was shown as mean ± standard deviation.

Differences in anthropometric variables such as height, body weight, LBM, BFM, BMI, and WHR between Sasang types were analyzed using multiple regression analysis. Sasang type was transformed as dummy variables and included in the model to compare the differences between groups. Age and gender were used as independent variables.

These statistical analyses were done using SPSS 10.0 (SPSS Inc., Chicago, IL) except cross-sectional time-series regression analysis, which was done with Sat 6.0 (Stata Corporation, College Station, TX). Statistical significances were set to be two-tailed at the 0.05 level.

RESULTS

Because the prevalence of the Tae-Yang type was extremely low (0.03%–0.1%) (Lee, 1894, 1996), three Sasang types were successfully identified based on QSCC in the current study (Table 2). There were no significant differences among groups with Sasang types in age, gender, or education.

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>So-Yang (n = 25)</th>
<th>Tae-Eum (n = 23)</th>
<th>So-Eum (n = 31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>25.5 (4.2)</td>
<td>24.1 (3.8)</td>
<td>25.5 (6.0)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Male/Female)</td>
<td>20/5 (80%/20%)</td>
<td>22/1 (96%/4%)</td>
<td>27/4 (87%/13%)</td>
</tr>
<tr>
<td>Education</td>
<td>15.3 (1.1)</td>
<td>15.3 (1.2)</td>
<td>15.9 (1.9)</td>
</tr>
</tbody>
</table>

*Results are reported as means (standard deviations) or as numbers (%). No significant differences in prevalence of age, gender, and education between types.
**MBTI profile**

Figure 2 shows MBTI score profiles across the Sasang types. The MBTI score patterns of the So-Yang, Tae-Eum, and So-Eum type were significantly different (GEE, coefficient ± 11.88, z = 2.13, p = 0.033). Sasang types of an individual subject were successfully classified with canonical discriminant functions based on their MBTI scores (discriminant analysis Wilk’s λ = 0.611, df = 8, χ² = 36.7, p < 0.001). In the MBTI Extroversion/Introversion dichotomy, there were significant differences in MBTI scores among the three Sasang types. MBTI scores of the So-Eum (133.9 ± 16.4), Tae-Eum (118.0 ± 22.4), and So-Yang (101.6 ± 24.0) type was in a decreasing order. There were significant differences between the So-Eum and Tae-Eum types (coefficient = 15.86, t = 2.77, p = 0.007), the Tae-Eum and So-Yang types (coefficient = 16.48, t = 2.74, p = 0.008), and the So-Eum and So-Yang types (coefficient = 32.34, t = 5.77, p < 0.001) in MBTI scores of Extroversion/Introversion dichotomy. In the MBTI Judging/Perceiving dichotomy, the MBTI score of subjects with the So-Eum (88.4 ± 24.1) type was significantly lower than that of subjects with the So-Yang (106.4 ± 26.7) and Tae-Eum (107.1 ± 28.6) types (coefficient = 17.94, t = 2.54, p = 0.013; coefficient = 18.67, t = 2.58, p = 0.012, respectively). There were no significant differences between subjects with different Sasang types in MBTI Sensing/Intuition and Thinking/Feeling dichotomies.

**Anthropometric profile**

There were significant differences in body weight between Sasang types (R² = 0.40, df = 4.74, F = 12.38, p < 0.001). The Tae-Eum (72.0 ± 12.6) type had greater body weight than So-Eum (63.6 ± 7.9) type (coefficient = −7.41, t = −3.40, p = 0.001) and So-Yang (64.0 ± 6.8) type (coefficient = −6.06, t = −2.61, p = 0.011). There were no significant differences between Sasang types in height.

There were significant differences in LBM and BFM between Sasang types (R² = 0.60, df = 4.74, F = 27.36, p < 0.001; R² = 0.14, df = 4.74, F = 3.03, p = 0.023, respectively). The Tae-Eum (56.8 ± 8.1) type had significantly greater LBM than the So-Eum (51.3 ± 8.0) type (coefficient = −0.26, t = −2.86, p = 0.006). The Tae-Eum (15.2 ± 6.1) type had significantly greater BFM than the So-Yang (12.4 ± 3.4) and So-Eum (12.3 ± 3.2) types (coefficient = −3.44, t = −2.75, p = 0.007; coefficient = −3.28, t = −2.79, p = 0.007, respectively) independent of age and gender (Fig. 3). Gender was a significant predictor for weight and LBM (coefficient = −15.42, t = −5.30, p < 0.001; coefficient = −0.71, t = −9.43, p < 0.001, respectively).

There were significant differences between Sasang types in WHR and BMI (R² = 0.16, df = 4.74, F = 3.50, p = 0.011; R² = 0.22, df = 4.74, F = 5.07, p = 0.001, respectively). There were no significant differences in central obesity (WHR) between Sasang types. However, age was a significant predictor of WHR (coefficient = 0.002, t = 2.64, p = 0.010). The Tae-Eum (23.6 ± 3.3) type had significantly greater BMI, which indicates level of general obesity, than the So-Eum (21.7 ± 2.0) type (coefficient = −1.89, t = −2.98, p = 0.004). There were no sig-
significant differences in anthropometric data between the So-Yang and So-Eum types.

DISCUSSION

The purpose of this study was to evaluate the validity of Sasang types, a traditional Korean medical typology, using a psychometric instrument assessing personality and anthropometric indices from a personality-oriented perspective.

Each Sasang type was significantly different from one another in their MBTI score profiles (Fig. 2). Furthermore, the results of discriminant analysis indicated that MBTI scores reliably classified individuals into Sasang types. There were different MBTI profiles between Sasang types for two of the four MBTI dichotomies: Extroversion to Introversion and Judging to Perceiving dichotomies. The So-Yang type was more extroverted than the Tae-Eum type, who in turn was more extroverted than the So-Eum type. The So-Eum type was found to be more judging than both the So-Yang and Tae-Eum types.

The So-Eum type (Introversion and Judging) and the So-Yang type (Extroversion and Perceiving) stand on exactly opposite extremes as described by Lee (Lee, 1894) and this study found they exhibited the same contrast in the Extroversion/Introversion and Judging/Perceiving dichotomies of the MBTI, which determines the dominant function of a person (Myers and McCauley, 1985) (Figs. 1 and 2). Considering that the Extroversion to Introversion and the Judging to Perceiving continuum on the MBTI correlated with the Extroversion scale and the Conscientiousness scale of the NEO-Personality Inventory, respectively (Furnham, 1996; MacDonald et al., 1994), and that a high score on the Extroversion scale and a low score on the Conscientiousness scale of the NEO-Personality Inventory highly correlated with the Novelty Seeking scale of the Tridimensional Personality Questionnaire (TPQ) (Benjamin et al., 1998), the personality construct of Novelty Seeking could show a positive correlation with the So-Yang Sasang type and a negative correlation with the So-Eum Sasang type. Future study is needed to lend direct support to this relationship.

There were significant differences in anthropometric indices between the Tae-Eum type and the So-types (So-Yang and So-Eum). The Tae-Eum type was heavier, had higher BFM, LBM, and BMI, score than the So-Eum type and was heavier, had higher BFM than the So-Yang type. There was no difference in height and WHR between the groups after adjusting for age and gender. So-Yang and So-Eum types had similar anthropometric characteristics. However, their psychological traits were found to differ.

Kretschmer (Kretschmer, 1921) categorized temperaments according to the concept of fundamental body types. Leptosomes are cold, unemotional with a slender chest. Pyknic have a fat, rounded, squat body shape with a frank, open, sociable, and active character. Athletic individuals are slow, reflective, and stable with muscular features. Kretschmer’s conceptualization was based on a diagnostic framework of psychiatry, and combined personality with psychopathological vulnerability (Maher and Maher, 1994). Sheldon et al. (1940) offered a body-build element based dimensional system of body types with his psychiatric patients. Individuals could be classified along a seven-point Likert scale on three separate body

![FIG. 3. The body fat mass of each Sasang type (So-Yang, Tae-Eum, and So-Eum types). Subjects with Tae-Eum (15.2 ± 6.1) type had significantly greater body fat mass than So-Yang (12.4 ± 3.4) and So-Eum (12.3 ± 3.2) types (coefficient = -3.44, t = -2.75, p = 0.007; coefficient = -3.28, t = -2.79, p = 0.007, respectively). Mean body fat mass of Sasang types are presented as box and the whisker represents standard errors.](image-url)
components: endomorph, mesomorph, and ectomorph, derived from the distinctions of embryonic tissue layers. This somatotype was basically a transformation of body-build elements of roundness, muscularity, and linearity into typology (Maher and Maher, 1994). Recently, the dopamine system, one of the neurotransmitter systems of the brain, has been supposed to potentially underlie the regulation of personality traits and body components (Cloninger, 1987; Dupue and Collins, 1999; Poston et al., 1998). It was observed that the dopamine D2 receptor binding, BMI and personality trait of Harm Avoidance were related with each other (Yasuno et al., 2001).

Considering the paucity of research studies in this area even with the advancements in research methodology (Hafner, 1990), the Sasang type is a systemic incarnation of medical typology that is poised to explain the influence of emotionality, behavioral patterns and tendencies, and physical and physiologic characteristics in the treatment of a number of diseases (Table 1). The theory behind the Sasang typology encompasses biologic as well as sociologic aspects, integrating the 5000 years of clinical experience in traditional oriental medicine with the sociologic and psychological achievements propagated by Confucianism (Lee, 1894, 1996; Yeo, 1998). Lee (1894) contended that medication and nursing should be individualized according to one’s Sasang type (Lee, 1894). Although it may be a challenge to interpret Sasang typology in terms of a modern scientific perspective, the Sasang type-specific responses to particular herbs have been well documented (Jeong et al., 1995a, 1995b; Lee, 1894; Lim et al., 1999). For example, ma huang (Ephedra sinica) is used to treat respiratory tract disease with mild bronchospasms (Blumenthal and Goldberg, 1998) and but has a potency of a psychostimulant (Kalix, 1991) and may result in weight loss (Astrup et al., 1992). It has been used as a medicine for the Tae-Eum type but not for the So-Eum type because the So-Eum type easily shows side-effects such as insomnia, motor restlessness and tachycardia, which are not observed in the Tae-Eum type (Lee, 1894, 1996). Aconite (Aconitum carmichaeli) and ginseng (Panax ginseng) is recommended for the So-Eum type, but not for the So-Yang type (Lee, 1894, 1996). It was reported that the use of Tae-Eum type-specific purgative prescription in treating So-Yang type stroke patients resulted in chest congestion, an accumulation of pathogens in the chest (Lim et al., 1999). In medical care, the stroke patients should be cared in Sasang type-specific manners (Lee, 1894, 1996; Song, 1996). An absolute bed rest is an essential component of caring for stroke patients of So-Yang type, but not for other Sasang types (Tae-Eum and So-Eum types) (Lee, 1894, 1996).

For the explanation of other psychological features of Sasang typology, it is recommended to evaluate Sasang types using the Temperament and Character Inventory (Cloninger et al., 1993; Sung et al., 2002) and the revised NEO-Personality Inventory (McCrae and Costa, 1997) in the future. Considering the relatively small sample size and predominantly male subjects used in this study, further studies using larger samples and representative populations are needed.

In conclusion, this study demonstrated that the Sasang type is not just conceptual but a scientific typology with its own unique psychologic and physical traits, operationally definable and replicable with psychometric instruments and anthropometrics. With further clinical investigations focusing on such aspects as trait-specific medication and susceptibility to pathology, the Sasang typology may serve as a framework for mobilizing individualized and integrative medicine by providing a biopsychosocial typology perspective.

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