Review

Psychological Profile of *Sasang* Typology: A Systematic Review

Han Chae[1], Soo Hyun Park[2], Soo Jin Lee[3], Myoung-geun Kim[4], Danny Wedding[5] and Young-Kyu Kwon[1]

[1]Division of Longevity and Biofunctional Medicine, School of Oriental Medicine, Pusan National University, Yangsan, [2]Department of Occupational Therapy, Yonsei University, Wonju, [3]Department of Psychology, Yonsei University, Seoul, [4]Korea Institute of Oriental Medicine, Daejeon, South Korea and [5]Missouri Institute of Mental Health, School of Medicine, University of Missouri-Columbia, St Louis, MO, USA

A systematic review of studies related to the psychological characteristics of *Sasang* types was conducted with the goal of delineating generalizable psychological profiles based on *Sasang* typology, a traditional Korean medical typology with medical herbs and acupuncture that is characterized as personalized medicine. Journal articles pertaining to *Sasang* typology were collected using five electronic database systems in Korea and in the USA. As a result, 64 potentially relevant studies were identified and 21 peer-reviewed research articles that employed psychometric inventories were included. Beginning with the use of the Minnesota Multiphasic Personality Inventory in 1992, Myers-Briggs Type Indicator, NEO-Personality Inventory, Temperament and Character Inventory and other personality assessment tools were employed in the identified studies. Because data synthesis could not be carried out due to the heterogeneity of the studies, the present review article sought to delineate the mutual relevance of the studies based on research results pertaining to the correlation between the aforementioned psychological assessment instruments. Results of the review indicate that two super-factors, Extraversion and Neuroticism, serve as the foundation in regards to delineating personality constructs, such that the So-Yang type scored high on the Extraversion dimension and low on the Neuroticism dimension, while the So-Eum type scored low on the Extraversion dimension and high on the Neuroticism dimension. The present systematic review indicates that *Sasang* typology shares similarities with the Western psychological tradition.

Keywords: Extraversion – Neuroticism – personality profile – *Sasang* typology – systematic review

Introduction

Personality represents the characteristics of an individual's pattern of behavior, way of thinking and emotional expression that interact to determine one's adaptation to their environment (1). Beginning with Freud's focus on the unconscious, modern Western psychology has examined personality in terms of fundamental traits of human personality and the biological basis of such traits. More recently, in addition to the Temperament and Character Inventory (TCI), which encompasses the complex interaction between different biopsychological factors, the Five Factor Model has been proposed as the universal structure underlying personality.

The beginning of personality theory stems from the four temperaments theory of Hippocrates and Galen. This theory posits that the four humors (blood, phlegm, yellow bile and black bile) form the basis for personality formation in addition to serving as the basic components of the human body. The underpinnings of this theory

For reprints and all correspondence: Han Chae, KMD, PhD, Dipl.Ac., Division of Longevity and Biofunctional Medicine, School of Oriental Medicine, Pusan National University, Mulgeum, Yangsan, Kyungnam 626-770, South Korea. Tel: +82-51-510-8470; E-mail: han@chaelab.org

Table 1. Typology of the West and *Sasang* typology

Theorist (theory)	Type and its descriptive psychological features			
Hippocrates and Galen (Humor and Temperament)	Blood and Sanguine: cheerful, optimistic, passionate	Yellow bile and Choleric: bad temper, anger, irritability	Phlegm and Phlegmatic: sluggish, disinterested, non-excitable	Black bile and Melancholic: gloomy, pessimistic
William H. Sheldon (Somatotype)	–	Mesomorph: Muscularity, somatotonia, control	Endomorph: roundness, viscerotonia, in the middle	Ectomorph: linearity, cerebrotonia, alone
Hans J. Eysenck (Psychoticism, Extraversion and Neuroticism)	Stable-Extrovert: sociable, outgoing, talkative, responsive, easygoing, leadership, lively, carefree	Neurotic-Extrovert: touchy, restless, aggressive, excitable, changeable, impulsive, optimistic, active	Stable-Introvert: passive, careful, thoughtful, peaceful, controlled, reliable, calm, even-tempered	Neurotic-Introvert: moody, anxious, rigid, sober, pessimistic, reserved, unsociable, quiet
Lee Je-Ma (*Sasang* Typology)	*Tae-Yang*: creative, positive, progressive, charismatic, heroic, rash mind	*So-Yang*: unstable, hot tempered, easily get bored, sacrificing, righteous, easily acceptable, anxious mind	*Tae-Eum*: gentle, commercial, endurable, humorous, look foolish, coward, fearful mind	*So-Eum*: neat, mild, negative, intelligent, organized, selfish, jealous, persistent, nervous mind

evolved into Hans J. Eysenck's personality typology, which emphasizes the biological basis of fundamental personality traits. Eysenck proposed two core broad psychological traits (Extraversion and Neuroticism) and four constructs that result when these two core traits are crossed (2). The descriptive characteristics of personality outlined by Eysenck, namely the four personality types of Stable-Extrovert, Neurotic-Extrovert, Stable-Introvert and Neurotic-Introvert, share remarkable similarity with Galen's Sanguine, Choleric, Phlegmatic and Melancholic types and the Tae-Yang, So-Yang, Tae-Eum and So-Eum *Sasang* types proposed by Lee Je-Ma who based his theory on traditional Korean medicine, Neo-Confucianism and clinical experience, respectively (Table 1) (3–6).

Sasang typology was systematically theorized in Lee Je-Ma's book *Dong-Yi-Soo-Se-Bo-Won* (*The Principle of Life Preservation in Oriental Medicine*) with the quaternary nature of Neo-Confucianism (sadness, anger, gladness and enjoyment) which makes the four *Sasang* types with typical temperaments profile, status of organ system, physiological and pathological features, physical characteristics and response to a certain drugs (7–9). *Sasang* typology also employs the same herbs and acupuncture points but is different from conventional traditional Chinese medicine, since it encompasses stable biopsychological temperaments alongside with sociological facets emphasizing development of one's character (7,9).

Currently, traditional Korean personalized medicine utilizing acupuncture and medical herbs based on *Sasang* typology is being actively applied clinically in Korea. The Rehmanniae Radix and Corni Fructus, for example, are type-specific herbs for the So-Yang type, who can be characterized as a sharp and clean-looking person who is extroverted, easily acceptable, hot-tempered and interested in the outside world.

Ginseng Radix and Cinnamoni Cortex are type-specific herbs for the So-Eum type, who is an introverted, inactive, prudent, negative, organized, nervous and resolute person. Ephedra Sinica, Dioscoreae Rhizoma and Puerariae Radix are type-specific herbs for the Tae-Eum type, who lies in between the So-Yang and So-Eum type in regards to their psychological features and typically has a high body mass index (7–9).

The similarities between Lee Je-Ma's medical typology and modern psychology sparked psychological research investigating the characteristics underlying *Sasang* typology (10,11). Research examining the psychological characteristics of *Sasang* typology began with the use of the Minnesota Multiphasic Personality Inventory (MMPI) in 1992, continuing on to assessment tools such as the Sixteen Personality Factor Inventory (16PF), Myers-Briggs Type Indicator (MBTI), Beck's Depression Inventory (BDI), State-Trait Anxiety Index (STAI), NEO-Personality Inventory (NEO-PI), Eysenck Personality Questionnaire (EPQ) and TCI. Because research utilizing such psychological inventories has in part been conducted depending on the researchers' convenience or varying efficiency and need in the clinical setting, it has been difficult to delineate the directionality of such research results as a whole. Moreover, research results have been contradictory at times and/or have offered controversial conclusions. Hence, there is a need to conduct a systematic review of existing research, thereby creating a general personality profile based on *Sasang* typology.

Methods

Search Strategy and Data Sources

The following electronic databases were searched from inception up to November 2008: Pubmed

(http://www.pubmed.org), DBPIA (http://www.dbpia.com), Research Information Service System (RISS, http://www.riss4u.net), Korea Institute of Science and Technology Information (KISTI, http://society.kisti.re.kr), and Korean studies Information Service System (KISS, http://kiss.study.com). The search terms used were *Sasang* typology related words such as *Sasang*, *Sasang* typology, constitution and *Sasang* medicine in both Korean and English. We also manually searched our departmental files and relevant journals published up to November 2008. Furthermore, the references cited in all located journal articles were manually reviewed in order to obtain additional relevant articles.

Study Selection and Data Extraction

Article Selection

Peer-reviewed research articles that reported on objective psychological features pertaining to *Sasang* types were included in the present review. Articles that provided only qualitative findings based on clinical experience or hypothesis, review papers focusing on translated text(s), clinical case studies, research that did not utilize a widely accepted and validated psychometric inventory, and research focusing on vocational compatibility and physical health status resulting from psychological stress were excluded.

Data Extraction

Hard copies of all articles were obtained and read in full. All articles were reviewed by two independent reviewers (H.C. and S.J.L.) and data from the articles were extracted according to the pre-defined criteria. Information pertaining to demographic characteristics such as gender distribution, participants' general characteristics and mean age was collected. In cases where the age was not available, the average age group of the participants was estimated based on the frequency of particular age groups, e.g. 20 s, as specified in the text. Furthermore, the method by which the *Sasang* type classification was obtained and prevalence of each *Sasang* type were both extracted in order to take into consideration potential differences that may arise as a result of different classification methodology used in the different studies. Using statistical significance value of $P < 0.05$ as the basis, raw data pertaining to outcome measure items that represented statistical significance of each *Sasang* types, were organized to fit the pre-defined criteria. Because statistical analysis differed across the studies, the actual P values are not provided separately in the present review. Instead, symbols (▲, ● and ▼) are used to directly show significance.

Data Analysis

Data synthesis using meta-analysis could not be conducted because the general characteristics, gender and age distribution of study participants, in addition to the level of research quality were heterogeneous. Hence, relevant data were analyzed in the following manner in the present review. First, data pertaining to psychological assessment that revealed statistically significant differences between the *Sasang* types were collected based on the pre-defined data extraction criteria. Second, based on the correlations between the different psychological inventories, the directionality of the super-factors was deduced.

Results

Characteristics of Studies

The search identified 618 potentially relevant articles which have *Sasang* typology related terms, and 554 studies were excluded as irrelevant based on article title and abstract. The majority of the excluded studies did not incorporate psychological features of the *Sasang* typology in their research question. Sixty-four studies remained, but 43 studies were subsequently excluded based on the exclusion criteria described above. Hence, a total of 21 studies were included in the current review. The key data extracted from these research articles are summarized in Table 2.

Psychological Inventory

The MMPI was used in four of the studies (12–15), while two studies based their research on the 16PF (16,17). The MBTI and the Murphy-Meisgeier Type Indicator for Children (MMTIC) were used in nine of the studies (7,17–24). In addition, two studies relied on the BDI (25,26), Neuroticism Extraversion Openness Personality Inventory-Revised (NEO-PI-R) (27,28), and TCI (8,23), respectively. Three studies employed the STAI (25,26,29) and one study used the EPQ (30) as the primary psychological inventory. Three studies used two or more psychological inventories.

Participants

Thirteen studies were conducted with non-clinical participants (7,13,15,16,18–20,23,25,27–30), eight articles used clinical participants (8,12,14,15,21,22,24,26), and one article focused on a mixture of both clinical and non-clinical subjects (17).

Mean Age

Mean age and standard deviations of participants were provided in nine studies (7,8,15,16,18,20,23,26,29).

Table 2. Summary of psychological studies on *Sasang* typology

Reference	Inventory	Demographic characteristics			*Sasang* type classification		Significant outcome		
		N (male/female)	Participants	Mean age[a]	Method	Prevalence[b]	So-Yang	Tae-Eum	So-Eum
Kim *et al.* (12)	MMPI	43 (43/0)	Alcoholic patient	N.A. (39.9)	Specialist	0/9/18/16	Hs (43.0±4.44, ▼)[c] Hy (45.2±4.92, ▼)	Hs (55.6±9.29, ▲) Hy (55.7±9.62, ▲)	Hs (57.8±10.18, ▲) Hy (57.9±10.67, ▲)
Kim *et al.* (13)	MMPI	75 (62/13)	College student	N.A.	QSCC1	0/23/30/22	D (45.9±9.61, ▼) Pt (43.9±9.24, ▼) Ma (49.3±10.35, ▲) Si (45.3±8.99, ▼)	D (53.8±0.06, ▲) Pt (50.8±8.87, ▲) Ma (40.5±9.92, ▼) Si (51.3±9.30, ▲)	D (55.9±12.10, ▲) Pt (52.1±10.96, ▲) Ma (42.1±8.93, ▼) Si (55.4±11.46, ▲)
Kim *et al.* (14)	MMPI	187 (59/128)	Neuropsychiatry patient	N.A.	QSCC2	0/56/55/70	n.s.		
Lee *et al.* (15)	MMPI	29 (0/29)	Dysmenorrhea patient	28.1	QSCC2	0/4/15/10	Pa (56.50±10.66, ▲) Si (38.75±9.00, ▼)	Pa (45.27±9.22, ▼) Si (41.87±7.95)	Pa (42.30±6.95, ▲) Si (50.70±9.36, ▲)
Ko (16)	16PF	138 (89/49)	Hospital worker + college student	23.27±2.06	QSCC1	5/41/21/68	Re (5.23±1.95) TM (6.14±1.65)	Re (6.22±1.99, ▲) TM (5.47±1.68, ▼)	Re (5.20±1.58, ▼) TM (6.46±1.45, ▲)
Cho *et al.* (17)	16PF	421 (268/153)	General patient + college student	N.A.	QSCC1	NA	N.A.		
Cho *et al.* (17)	MBTI	513 (333/180)	General patient + college student	N.A.	QSCC1	NA	N.A.		
Park *et al.* (18)	MBTI	319 (319/0)	Military personnel	21.5±1.4	QSCC2	0/113/98/108	EI (96.2, ▼) TF (96.5, ▲) JP (109.7, ▲)	EI (94.4, ▼) TF (88.9, ▼) JP (101.5, ▼)	EI (116.0, ▲) TF (91.5) JP (103.7)
Kim *et al.* (19)	MBTI	86 (N.A.)	College student	N.A. (23)	QSCC2 + specialist	2/22/34/28	EI (101.18, ▼) JP (113.36, ▲)	EI (124.09, ▲) JP (94.97, ▼)	EI (130.11, ▲) JP (90.11, ▼)
Choi *et al.* (20)	MBTI	154 (101/53)	College student	23.85±0.38	QSCC2	0/32/24/71	EI (107.00±22.80, ▼) SN (100.19±19.85, ▲)	EI (112.92±29.86, ▼) SN (78.92±18.04, ▼)	EI (133.13±17.43, ▲) SN (78.92±18.04, ▼)
Sung and KMI (21)	MBTI	368 (103/265)	General patient	N.A. (34.1)	General practitioner	5/200/143/20	N.A.		
Song *et al.* (22)	MBTI	200 (67/133)	General patient	N.A. (35.9)	QSCC2	0/73/50/49	Intr. (16.2±11.51, ▼) Judg. (15.64±11.72, ▼)	Intr. (25.57±14.28, ▲) Judg. (25.38±15.37, ▲)	Intr. (26.68±12.94, ▲) Judg. (27.00±11.33, ▲)
Chae *et al.* (7)	MBTI	79 (69/10)	College student	25.1±4.9	QSCC2	0/25/23/31	EI (101.6±24.0, ▼) JP (106.4±26.7, ▲)	EI (118.0±22.4, ●) JP (107.1±28.6, ▲)	EI (133.9±16.4, ▲) JP (88.4±24.1, ▼)
Lee *et al.* (23)	MBTI	66 (21/45)	College student	23.8±3.7	QSCC2	0/12/10/44	EI (92.33±24.26, ▼) JP (104.83±32.21, ▲)	EI (116.80±28.50) JP (117.80±32.42, ▲)	EI (126.05±19.10, ▲) JP (84.91±28.00, ▼)
Choi *et al.* (24)	MMTIC	74 (45/29)	Obese child	N.A. (10)	QSCC2 + specialist	0/15/26/33	n.s.		
Seo *et al.* (25)	BDI	63 (54/9)	Healthy person	N.A. (27.1)	QSCC2 + specialist	0/11/35/17	n.s.		
Lim *et al.* (26)	BDI	31 (0/31)	Middle-aged obesity (BMI >25)	45.4±6.0	QSCC2 + specialist	1/3/25/2	BDI: Tae-Eum (6.88±4.63, ▼) vs. Non-Tae-Eum (13.17±8.89, ▲)		
Seo *et al.* (25)	STAI	63 (54/9)	Healthy person	N.A. (27.1)	QSCC2 + specialist	0/11/35/17	STAI-S (39.00±8.53) STAI-T (39.09±6.01, ▼)	STAI-S (39.97±9.24, ▼) STAI-T (41.14±9.95, ▼)	STAI-S (46.82±10.82, ▲) STAI-T (47.76±9.48, ▲)
Lim *et al.* (26)	STAI	31 (0/31)	Obese middle-age (BMI >25)	45.4±6.0	QSCC2 + specialist	1/3/25/2	STAI-S: Tae-Eum (40.84±9.18, ▼) vs. Non-Tae-Eum (50.50±16.62, ▲)		
Hsing *et al.* (29)	STAI	34 (34/0)	College student	25.18±4.18	QSCC2 + specialist	0/11/15/8	n.s.		

Author	Inventory	N (M/F)	Mean age[a]	Subject	Sasang method	Prevalence[b]			
Park and Lee (27)	NEO-PI-R	382 (191/191)	N.A.	College student	QSCC2	51/112/97/122	Ne (58.98±10.37, ▼), Ex (46.10±11.04, ▲), Co (43.86±10.26)	Ne (61.26±9.81), Ex (46.56±11.26, ▲), Co (41.63±11.51, ▼)	Ne (62.79±9.56, ▲), Ex (37.90±11.08, ▼), Co (45.76±10.31, ▲)
Cho et al. (28)	NEO-PI-R	155 (108/47)	N.A.	College student	QSCC2	0/46/42/67	Ex (143.54±2.92, ▲), Op (134.42±3.62, ▲)	Ex (129.97±3.31, ▼), Op (120.95±2.73, ▼)	Ex (126.05±2.33, ▼), Op (120.84±2.37, ▼)
Lee et al. (30)	EPQ	155 (108/47)	N.A.	College student	QSCC2	0/46/42/67	Ne (30.06±2.66, ▼), Ad (21.93±1.84, ▼)	Ne (30.45±2.47), Ad (22.05±1.86)	Ne (31.56±2.10, ▲), Ad (22.95±1.48, ▲)
Lee et al. (23)	TCI	66 (21/45)	23.8±3.7	College student	QSCC2	0/12/10/44	NS (25.58±3.61, ▲)	NS (16.70±7.59, ▼)	NS (17.09±6.17, ▼)
Park et al. (8)	TCI-RS	97 (40/57)	47.6±10.5	General patient	Specialist	1/31/41/15	NS (31.90±9.87, ▲), HA (35.16±11.50, ▼)	NS (28.76±9.30), HA (39.20±11.26)	NS (25.24±9.21, ▼), HA (44.64±8.47, ▲)

Inventory—MMPI: Minnesota Multiphasic Personality Inventory; NEO-PI-R: NEO Personality Inventory; NEO-PI-R: NEO Personality Inventory-Revised; TCI: Temperament and Character Inventory; TCI-RS: Temperament and Character Inventory-Revised Short; EPQ: Eysenck Personality Inventory; STAI: State Trait Anxiety Inventory; BDI: Beck Depression Inventory; MBTI: Myers-Briggs Type Indicator; 16PF: Sixteen Personality Factor; QSCC1: Questionnaire for Sasang Constitutional Classification 1; QSCC2: Questionnaire for Sasang Constitutional Classification 2. Significant outcome—Hs: Hypochondriasis; Hy: Hysteria; D: Depression; Pt: Psychasthenia; Ma: Hypomania; Si: Social Introversion; Pa: Paranoia; Re: Reasoning; TM: Tough Mindedness; EI: Extroversion to Introversion; TF: Thinking to Feeling; JP: Judgment to Perception; SN: Sensing to Intuition; Intr.: Introversion; Judg.: Judgment; STAI-S: State Trait Anxiety Inventory – State Anxiety; STAI-T: State Trait Anxiety Inventory – Trait Anxiety; Ne: Neuroticism; Ex: Extraversion; Co: Conscientiousness; Op: Openness; Ad: Addiction; NS: Novelty Seeking; HA: Harm Avoidance; N.A.: not available; n.s.: not significant.
[a]Mean age: N.A.: N.A. (estimation of mean age).
[b]Prevalence: Tae-Yang/So-Yang/Tae-Eum/So-Eum.
[c]Scale (mean±SD). A statistical significance level of $P<0.05$ was used as the baseline and the symbols ▲, •, ▼ were used to directly show significance.

The subjects' mean age could not be delineated in six studies (13,14,17,27,28,30). Although the actual mean age was not available in six remaining studies (12,19,21,22,24,25), it was possible to estimate the mean age group based on information provided in the study.

Sasang Type Classification Method

Thirteen studies used the Questionnaire for Sasang Constitution Classification (QSCC) as the primary method of making Sasang type classification, while two studies (8,12) relied on clinical impressions of Sasang typology specialists as the primary means of making the classification. Five studies (19,24–26,29) relied on both the QSCC and specialist diagnosis and one study (21) distinguished between the Sasang types based on the impressions of a general practitioner of traditional Korean medicine.

Extracted Data

The results of data extraction from the aforementioned 21 studies are as follows. A significant difference between Sasang types were found in 15 studies and the raw data based on the particular psychological inventories for the Sasang type are presented in Table 2. A significant difference between Sasang types was not found in four of the studies with the STAI, BDI and MMPI (14,24,25,29). While the results of statistical analysis were not available in studies that used the MMTIC (24), it was determined that the results would not have reached statistical significance based on the data provided in the studies.

Two studies that employed the 16PF (17) and MBTI (21) did not report findings that could be included in the present review. In one study (17) that used the 16PF and MBTI, only the final results of correlation analysis were presented without actual means and standard deviations. In another study (21) that used the MBTI, data were reported simply as preferred MBTI type without displaying actual means and standard deviations for the different Sasang types.

Outcomes

Confirming earlier findings by Chae and his colleagues (6–8), significantly contrasting differences between the So-Yang and So-Eum types were found in a majority of the studies.

MMPI

The MMPI was initially designed to assist in the prediction of a subset of common psychiatric disorders. In the four studies that employed the MMPI (12–15), only one study (13) relied on a college sample while the remaining three based their findings using patients diagnosed with

alcoholism (12), other neuropsychiatric conditions (14) and dysmenorrheal (15).

In study that used a non-clinical sample (13), a significant difference was found in the Depression (D), Psychasthenia (Pt), Hypomania (Ma) and Social Introversion (Si) scales, while differences were found in the Hysteria (Hs), Hypochondriasis (Hy), Paranoia (Pa) and Si scales in the clinical sample (12,15). The So-Yang type scored significantly lower on the Si, Hy, Hs, D and Pt scales compared to the So-Eum type (12,13,15). In contrast, the So-Eum type scored significantly lower on the Ma and Pa scales compared with the So-Yang type (13,15). The MMPI profile of the Tae-Eum type was found to be identical to the So-Eum type (12,13).

16PF

The two studies (16,17) that used the 16PF were conducted in the early phase of *Sasang* typology research and their primary goal was to explore the personality characteristics of the different *Sasang* types. Data from only one (16) of the studies that used a non-clinical sample (hospital staff and college student group) could be used in the present review, as the remaining study (17) did not present actual means and standard deviations. While other personality inventories reveal significant profile differences, mostly between the So-Yang and So-Eum types, a significant difference was found between the So-Eum and Tae-Eum types using the 16PF (16). More specifically, the So-Eum type scored significantly lower on the Reasoning (Re) scale while the Tae-Eum type scored significantly higher. The Tae-Eum type scored significantly lower on the Tough Mindedness (TM) scale while the So-Eum type scored significantly higher on the same scale.

MBTI and MMTIC

The MBTI was used in eight studies (7,17–23) to assess normal personality traits because first, this inventory is geared towards assessing differences that result from the way people perceive information and how they prefer to use that information, and secondly, because the general population frequently use this inventory due to the ease with which it can be completed.

In six studies (7,18–20,22,23) within which data pertaining to Extroversion to Introversion (EI) and Introversion (Intr.) were presented, a significant difference between the So-Yang and So-Eum types was found. More specifically, while the So-Yang type demonstrated a significant tendency to be extraverted, the So-Eum type was found to be significantly more introverted. Five studies (7,18–20,22) reported a significant difference related to the Tae-Eum type, such that two studies (18,20) reported that the Tae-Eum type showed a similar tendency as the So-Yang type to be extraverted, while another study (7)

showed that the Tae-Eum type demonstrated a significant difference from both the So-Yang and So-Eum types and positioned in between the two types. Other two studies (19,22) indicated that the Tae-Eum type tends to be more introverted, similar to the profile of the So-Eum type.

In the Sensing to Intuition (SN) dichotomy, the So-Yang type revealed a tendency to be more intuitive while the So-Eum and Tae-Eum types scored higher on the Sensing dimension (20). In the Thinking to Feeling (TF) dichotomy, the So-Yang type preferred Feeling while the Tae-Eum type tended towards Thinking.

In the five studies (7,18,19,22,23) that reported data pertaining to the Judging to Perceiving (JP) dichotomy, the So-Yang type significantly scored higher in the Perceiving domain, with one study (22) reporting significantly lower in Judging, while the So-Eum type scored higher in Judging in four studies (7,19,22,23). In relation to the Tae-Eum type, three studies (18,19,22) indicated that they leaned towards Judging while two studies (7,23) reported that they tended to be more Perceiving (one study reporting low scores in Judging). The cases in which Perceiving was high were ones in which the participants were college students (7,23), and cases in which Perceiving was low were ones in which the participants were general patients (22), college student (19) or members of the military (18).

In one study that used the MMTIC (24), an inventory identical to the MBTI but designed for use with children and adolescents, statistical analysis had not been conducted but in examining the data reported in the study, it was clear that no significant differences between the *Sasang* types existed.

BDI and STAI

The BDI and STAI were used to assess for variance in emotion and mood, as *Sasang* typology represents mind-body medicine. One study (29) used just the STAI to examine trait and state anxiety, while two studies (25,26) used both the STAI and the BDI for the purpose of investigating the degree of depressed mood.

In the one study (26) that employed just the STAI in a sample of college students, no significant difference between the *Sasang* types was found. However, in the two studies that used both the BDI and STAI, significant differences were found. In one study conducted with middle-aged participants diagnosed with obesity, comparisons between the Tae-Eum ($n = 25$) and non-Tae-Eum group (combination of So-Eum, So-Yang, and Tae-Yang types; $n = 25$) were made because of the numerical imbalance between *Sasang* types. The Tae-Eum type scored significantly lower on both the BDI and State Anxiety compared to the non-Tae-Eum group (26). In the study conducted with healthy non-clinical participants (25), no significant difference on the BDI was found. However, the So-Eum type scored significantly higher

in State Anxiety compared to the Tae-Eum type, while the So-Eum type scored significantly higher in Trait Anxiety relative to both the So-Yang and Tae-Eum types (25).

NEO-PI-R

The NEO-PI-R is an instrument based on factor analysis designed to assess a wide spectrum of individual differences, including the universal, stable and consistent Big Five structures of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience (31). The So-Yang type scored significantly higher in Extraversion while the So-Eum type scored significantly lower in two studies (27,28). The Tae-Eum type scored significantly higher in Extraversion in one study (27) while lower in another study (28). In Neuroticism, the So-Yang type scored significantly lower while the So-Eum type scored significantly higher (27). The So-Eum type scored significantly higher in Conscientiousness compared with the Tae-Eum type (27), while the So-Yang type scored significantly higher in Openness compared to both the So-Eum and Tae-Eum types (28).

EPQ

EPQ is an inventory designed to measure personality dimensions, theoretically stemming from biologically based classic notions of the excitation and inhibition processes and the classical paradigm of conditioning (32). In EPQ, the So-Yang type scored significantly lower in Neuroticism and Addiction while the So-Eum type scored significantly higher in both dimensions (30).

TCI

TCI, the expanded version of the Tridimensional Personality Questionnaire (TPQ) is a psychological assessment tool with four temperament and three character dimensions based on Cloninger's bio-psychological personality model, which in turn is based on Gray and Sjobring's theory (33–35). While significant differences were found in the Temperament dimension, presumed to be composed of heritable traits, no difference was found in the Character dimension, which measures social maturity.

In the two studies that used the TCI and TCI-RS (8,23), So-Yang type scored significantly higher on the Novelty-Seeking (NS) scale compared to the So-Eum type. In contrast, the So-Yang type scored significantly lower on the Harm Avoidance (HA) scale compared to the So-Eum type (8). Results were contrary for the Tae-Eum type on the NS scale, such that in cases where the QSCC was used as the primary method of *Sasang* typology classification (23), the Tae-Eum type scored significantly lower while no significant difference was

found when the classification was based on specialist diagnosis (8).

Discussion

Although the current examination of psychological profiles based on existing research was not based on a predetermined plan, a relatively diverse pool of psychological inventories was used in the reviewed studies, making it possible to infer broad personality profiles of the *Sasang* types. However, a more solid conclusion could have been drawn had the research quality and characteristics of participants been comparable across studies.

Results of the present review consistently indicate that the So-Yang and So-Eum types possess contrasting psychological profiles. However, the characteristics of the Tae-Eum type share similarities with both the So-Yang and the So-Eum types, and even contradictory data were reported depending on the particular psychological assessment used or the subject pool. The present review sought to draw the psychological profiles of the *Sasang* types using Extraversion and Neuroticism as the anchor points, based on the results obtained from heterogeneous psychological instruments such as the MMPI, 16PF, MBTI, NEO-PI, EPQ and TCI. Extraversion and Neuroticism are super-factors, posited to hold identical meanings in both the EPQ and NEO-PI (2), and these two factors have been repeatedly mentioned as the most critical variables in a variety of personality research, such as Eysenck's theory of personality (36) and Costa and McCrae's five-factor theory of personality (31,37). In addition, Novelty Seeking and Harm Avoidance, as indicated on the TCI, are presumed to represent a rotation of Eysenck's Extraversion and Neuroticism dimensions based on Gray's proposed constructs of impulsivity (behavior activation system) and anxiety (behavior inhibition system) (35,38).

Examination of the results of the review indicates that on the MMPI, the So-Yang type scored significantly lower on the Hs, Hy, D, Pt and Si scales and significantly higher on the Ma scale (12,13). So-Eum and Tae-Eum types showed the exact opposite results (12,13). The So-Yang type scored high on the Pa scale and low on the Si scale of the MMPI, with the So-Eum type showing the opposite profile (15). When the positive correlation between the D, Pt and Si scales of the MMPI with the Neuroticism dimension of the NEO-PI (39–41) is considered, it can be inferred that Neuroticism will be low for the So-Yang and high for the So-Eum type.

On the MBTI (7,18–20,22,23), the So-Yang type scored low on the EI dichotomy and high on the SN and JP dichotomy. So-Eum types showed the opposite profile. A negative correlation between MBTI's EI, JP dichotomies and NEO-PI Extraversion and Conscientiousness

scales, respectively, and a positive correlation between MBTI's TF dichotomy with NEO-PI Agreeableness scale, have been reported (42–44). It can be seen that the So-Yang type is high in Extraversion and low in Conscientiousness while the So-Eum type is low in Extraversion and high in Conscientiousness. When the positive correlation between NEO-PI's high Extraversion and low Conscientiousness with TPQ's NS is considered, it can be predicted that the So-Yang type will score high on the NS scale of the TCI, which is the expanded version of the TPQ, and the So-Eum type will score lower on the NS scale (7,45).

Data were insufficient to make clear conclusions based on the results of the BDI and STAI (25,26). However, it was apparent that the So-Eum type manifested high anxiety. On the NEO-PI-R and EPQ, the So-Yang type showed low Neuroticism, high Extraversion, high Openness and low Addiction (27,28,30). The So-Eum type showed high Neuroticism, low Extraversion, low Openness, high Addiction and high Conscientiousness.

The So-Yang type scored high on the NS and low on the HA scales, and the So-Eum type scored low on the NS and high on the HA scales of the TCI (23), which parallel the aforementioned inferences that were made based on results of the MBTI. Furthermore, such findings are consistent with the proposition that TCI's NS and HA represent a rotation of Eysenck's Extraversion and Neuroticism dimensions (8,35,38).

To summarize the results of the present review, the So-Yang type demonstrated high Extraversion and low Neuroticism while the So-Eum type showed low Extraversion and high Neuroticism on the Extraversion and Neuroticism structures of the NEO-PI, which had been obtained through factor analysis of psychological traits (31). Furthermore, on the NS and HA structures of the TCI, which has its foundation in the bio-psychological theory pertaining to fundamental psychological traits, the So-Yang type exhibited a high NS and low HA psychological profile and the So-Eum type scored low on the NS scale while high on the HA scale.

Our review has a number of limitations. For example, it is unclear whether precise data were obtained due to the heterogeneity in the quality of the reviewed articles. As a result, the overall picture may have been distorted. The fact that the mean age of participants in 6 out of the 21 articles was unavailable adds to this possibility. On the contrary, the finding that a consistent directionality was observed in spite of the various psychological inventories utilized across different situations supports the reliability of the present review. This must be further confirmed in a future study. Furthermore, locating and including unpublished data and/or studies that concern *Sasang* typology may have minimized the potential for publication bias.

Because the research reviewed in the present review targeted only Koreans, the results may be generalizable only to the Korean ethnic group and may not represent universal findings. There lies, however, sufficient possibility that the current conclusions may be generalizable, based on previous findings that suggest universality of basic personality traits and structures cross-culturally in both the East and the West (46,47), and the finding that it was possible to classify *Sasang* types using participants from the East Coast of the USA (48,49), are considered. This possibility also needs to be further confirmed in a future study.

In conclusion, the So-Yang and So-Eum types showed contrasting psychological profiles based on Extraversion and Neuroticism factors, as well as on the NS and HA scales of the TCI.

Funding

References

1. Loehlin JC. *Genes and Environment in Personality Development.* Sage: Thousand Oaks, 1992.
2. Clark LA, Watson D. *Temperament: a new paradigm for trait psychology.* New York: Guilford Press, 1999.
3. Pervin LA, John OP. *Personality: theory and research.* New York: John Wiley & Sons, 2001.
4. Chiappelli F, Prolo P, Cajulis OS. Evidence-based research in complementary and alternative medicine I: history. *eCAM* 2005;2:453–8.
5. Yoo JH, Kim JW, Kim KK, Kim JY, Koh BH, Lee EJ. Sasangin diagnosis questionnaire: test of reliability. *J Altern Complement Med* 2007;13:111–22.
6. Chae H, Park SH, Lee SJ, Koh KC. Sasang typology from a personality perspective. *J Korean Orient Med* 2004;25:151–64 (in Korean).
7. Chae H, Lyoo IK, Lee SJ, Cho S, Bae H, Hong M, et al. An alternative way to individualized medicine: psychological and physical traits of Sasang typology. *J Altern Complement Med* 2003;9:519–28.
8. Park SH, Kim MG, Lee SJ, Kim JY, Chae H. Temperament and character profiles of Sasang typology in an adult clinical sample. *eCAM* Advance Access published April 20, 2009 doi:10.1093/ecam/nep034.
9. Lee JM. *Dong-Uo-Soo-Se-Bo-Won.* Seoul, Korea: Je Ma Lee, 1894 (in Korean).
10. Kim DS. The oriental psychoanalysis therapy – a therapy based on simultaneity. *J Orient Neuropsychiatry* 1997;8:2–35 (in Korean).
11. Choi EK, Ku BS. The comparative study of the temperament of Sasangin by Lee Je-Ma and the psychological types of C.G. Jung. *J Orient Neuropsychiatry* 1997;8:201–14 (in Korean).
12. Kim JW, Kim JH, Hwang UW. Clinical study on personality characteristics of the alcoholic patients-with MMPI & Sasang constitution. *J Orient Neuropsychiatry* 1992;3:65–85 (in Korean).
13. Kim JW, Kim JW, Ko BH, Song IB. The study of Sasang constitution discrimination and personal characteristics in Sasang constitution according to comparative analysis of QSCC&MMPI. *KOMS* 1994;15:66–74 (in Korean).
14. Kim JH, Yang HS, Guk YJ, Lo IS, Lee SG, Jang HH, et al. Study for correlation between MMPI results and Sasang constitutions in out-patients of Oriental Neuropsychiatry. *J Orient Neuropsychiatry* 2004;15:175–85 (in Korean).
15. Lee SY, Cho HB, Kim SB. The research on the characteristics of MMPI profile and Sasang constitutional on dysmenorrhea patients. *J Orient Obstet Gynecol* 2007;203:137–54 (in Korean).

16. Ko BH. The study of analysis with sixteen personality factor in Sasang constitution. *KOMS* 1993;14:64–76 (in Korean).
17. Cho YT, Ko BH, Song IB. Study on Sasang type classification: comparison of 16PF and MBTI. *J Const Med* 1994;6:21–39 (in Korean).
18. Park HG, Lee JH. A study on the association between Lee Je-Ma Sasang constitutions and C.G.Jung's psychological types. *J Const Med* 1998;10:41–50 (in Korean).
19. Kim JW, Whang WW, Lee EJ. A study on psychological types of Sasang constitutions with MBTI. *The Korean J Stress Res* 1999;7:19–29 (in Korean).
20. Choi S, Chi S, Jung B, Ahn K, Koh B, Sung H. The study on the relationship between Sasang constitutions and Myers-Briggs Type Indicator. *Korean J Orient Med* 2000;6:47–57 (in Korean).
21. Sung JH, Korea MBTI laboratory. The comparative questionnaire study of the spirit of Sasang constitution with the MBTI classification of character. *J Const Med* 2001;13:156–64 (in Korean).
22. Song JH, Park KS, Shim SM, Chang MK, Kim GW, Koo BS. The study on the relationship between MBTI and QSCCII composed to nature & emotion. *J Orient Neuropsychiatry* 2002;13:21–39 (in Korean).
23. Lee JH, Chae H, Park SJ, Kwon YK. Analysis on Character and Temperament of Sasang types with repeated QSCCII tested subjects. *Korean J Orient Med Physiol Pathol* 2007;21:1319–31 (in Korean).
24. Choi SM, Hong JM, Chi SE, Kim JD, Yoon YS, Ahn KS. A study on the correlation of childhood obesity, Sasang constitutions and Murphy-Meisgeier Type Indicator for Children. *Korean J Orient Med Physiol Pathol* 2001;15:1034–8 (in Korean).
25. Seo W, Kim LH, Kwon BH, Song JM. A study on the psychological characteristics of Sasang constitution by using BDI and STAI. *J Sasang Const Med* 2000;12:136–43 (in Korean).
26. Lim J, Lee IS, Koh BH, Song IB, Lee SK. A study on the Sasang constitutional characteristics of obese middle-aged women. *J Sasang Const Med* 2004;16:59–69 (in Korean).
27. Park HI, Lee KI. A study of personality traits in Sasang constitution according to comparative analysis of QSCCII & NEO-PI-R. *J Const Med* 2000;12:104–22 (in Korean).
28. Cho CH, Cho YS, Lee SK. Study of personality traits in So-yang, So-eum and Tae-eum using NEO-PI-R. *Korean J Orient Med Physiol Pathol* 2005;19:1491–5 (in Korean).
29. Hsing LC, Yang CS, Lee TH, Kim LH, Kwak MJ, Seo ES, et al. Short-term effect of Mahuang on state-trait anxiety according to Sasang constitution classification: A double-blind randomized controlled trial. *Korean J Orient Intern Med* 2007;28:106–14 (in Korean).
30. Lee SK, Jeong SE, Sung KK. Study of personality traits in constitutional types. *Korean J Orient Physiol Pathol* 2004;18:1892–5.
31. McCrae RR, Costa PT. Toward a new generation of personality theories: theoretical contexts for the five-factor model. In: Wiggins JS (ed). *The Five-Factor Model of Personality: Theoretical Perspectives*. New York: Guilford Press, 1996.
32. Eysenck HJ. *The Biological Basis of Personality*. Springfield: Thomas, 1967.
33. Cloninger CR. A unified biosocial theory of personality and its role in the development of anxiety states. *Psychiatr Dev* 1986;4:167–226.
34. Cloninger CR. A systematic method for clinical description and classification of personality variants. A proposal. *Arch Gen Psychiatry* 1987;44:573–88.
35. Cloninger CR, Przybeck TR, Svrakic DM, Wetzel RD. *The Temperament and Character Inventory (TCI): A Guide to its Development and Use*. St. Louis: Washington University, Center for Psychobiology of Personality, 1994.
36. Eysenck HJ, Eysenck MW. *Personality and individual differences*. New York: Plenum Press, 1985.
37. Costa PT Jr., McCrae RR. Domains and facets: hierarchical personality assessment using the revised NEO personality inventory. *J Pers Assess* 1995;64:21–50.
38. Gray JA. The psychophysiological basis of introversion-extraversion. *Behav Res Ther* 1970;8:249–66.
39. Hart RP, Ball JD, Stutts ML, Barth JT, Ingsrisawang L, Turf E. Correlations for scores on the 180-item version of the MMPI-2 and the Neuroticism scale of the NEO-Personality Inventory. *Psychol Rep* 2002;90:227–30.
40. Quirk SW, Christiansen ND, Wagner SH, McNulty JL. On the usefulness of measures of normal personality for clinical assessment: evidence of the incremental validity of the Revised NEO Personality Inventory. *Psychol Assess* 2003;15:311–25.
41. McCrae RR. The five-factor model and its assessment in clinical settings. *J Pers Assess* 1991;57:399–14.
42. Furnham A. The big five versus the big four: the relationship between the Myers-Briggs Type Indicator (MBTI) and NEO-PI five factor model of personality. *Person Individual Diff* 1996;21:303–7.
43. MacDonald DA, Anderson PE, Tsagarakis CI, Holland CJ. Examination of the relationship between the Myers-Briggs Type Indicator and the NEO Personality Inventory. *J Psychol Rep* 1994;74:339–44.
44. McCrae RR, Costa PT Jr. Reinterpreting the Myers-Briggs Type Indicator from the perspective of the five-factor model of personality. *J Pers* 1989;57:17–40.
45. Benjamin J, Ebstein RP, Lesch KP. Genes for personality traits: implications for psychopathology. *Int J Neuropsychopharmacol* 1998;1:153–68.
46. McCrae RR, Costa PT Jr., Pedroso de Lima M, Simoes A, Ostendorf F, Angleitner A, et al. Age differences in personality across the adult life span: parallels in five cultures. *Dev Psychol* 1999;35:466–77.
47. McCrae RR, Costa PT, Ddel Pilar GH, Rolland JP, Parker WD. Cross-cultural assessment of the five factor model: the revised NEO Personality Inventory. *J Cross-Cultural Psychol* 1998;29:171–88.
48. Koh B-h, Kim S-h, Park B-g, Lavelle JD, Tecun M, Ross A Jr., et al. A study on the Sasang constitutional distribution among the people in the United Staes of America. *J Const Med* 1999;11:119–50 (in Korean).
49. Song MY, Gallagher D, Kim JH, Chi SE. Association between Sasang constitutions and body composition in african-american, asian, caucasian race group. *J Sasang Const Med* 2003;15:124–8 (in Korean).