European Journal of Integrative Medicine 28 (2019) 52–56

Contents lists available at ScienceDirect

European Journal of Integrative Medicine

journal homepage: www.elsevier.com/locate/eujim

Research paper

# Yin-Yang personality of pediatric outpatients in Korea

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ARTICLE INFO

*Keywords:*
Yin-Yang personality
Pediatric outpatients
Chronological changes
Sasang Personality Questionnaire

ABSTRACT

*Introduction:* Yin-Yang is a major clinical theory of East-Asian traditional medicine for evaluating biopsychological and pathophysiological features. The purpose of current study was to evaluate the Yin-Yang personality of pediatric outpatients using Sasang Personality Questionnaire (SPQ) which has been used for both adolescents and adults.

*Methods:* A total of 249 pediatric outpatients completed the SPQ, and respondents were divided into two groups - toddlers and preschoolers (age 1–6, n = 153) and elementary students (age 7–12, n = 96). Gender differences in the SPQ were examined using the Chi-squared test and *t*-test, and chronological changes of Yin-Yang personality were illustrated with Pearson's correlation and boxplots.

*Results:* The psychometric features of the SPQ in pediatric outpatients were in accordance with those previously reported in community children. The correlation between age and SPQ was not significant (r = 0.049, n.s.) in elementary students, which was consistent with previous studies; however, a significant negative correlation (r = -0.351, $p < 0.01$) was found in preschoolers. Data showed that the Yang personality is strongest at age one and decreases throughout preschool ages.

*Conclusions:* The chronological characteristics of Yin-Yang personality of preschoolers with SPQ might be useful for understanding East-Asian traditional pediatric theories from a biopsychological perspective. The clinical implications of the current results in person-centered prevention and health promotion were discussed.

## 1. Introduction

The Yin-Yang (*Eum-Yang* in Korean) refers to opposite and complementary matters or qualities [1,2], such as dark-light, night-day, introvert-extrovert, stable-dynamic, passive-active, aloof-sociable, inside-outside and others [3,4]. It has long been a theoretical framework of sociology, philosophy, and science of East-Asian culture for thousands years, and a pivotal theory of traditional East-Asian medicine for diagnosis, intervention, rehabilitation and prevention of diseases [1].

The Yin-Yang and traditional East-Asian medicine was undervalued, belonging to antiquity during the harsh modernization of 19$^{th}$ century. However, the clinical efficacy and general popularity of acupuncture has made western clinicians re-evaluate its usefulness and biologists recognize it as the dynamic equilibrium or balance between opposite physiological functions such as pro-inflammation and anti-inflammation, oxidation and anti-oxidation, coagulation and anti-coagulation, ghrelin and leptin, sleep and awake, vascular endothelial growth factor and pigment epithelium-derived factor, and others [5,6].

Recently, the Yin-Yang personality measure with three perspectives of behavior, cognition and emotion was provided using the Sasang Personality Questionnaire (SPQ) which was developed based on clinical studies of traditional Korean medicine [1,7], and showed clinical and structural validity in children, adolescents and adults [2,3,8–12]. The high score of SPQ embodies the Yang personality of the sociable, extroverted, flexible, carefree, irritable and emotional individual, and the low score of SPQ stands for Yin personality of the introverted, inhibited, thoughtful, consistent, calm and stable individual [13].

Studies using SPQ proposed that the Yin-Yang theory could be understood in line with the Western biopsychological theory of Behavioral Activation and Inhibition System of Gray [1,14,15], and also suggested the biopsychosocial operational definition of Yin personality (low SPQ score) as 'an active shift to an opposite direction regardless of emotional instability' and that of Yang personality (high SPQ score) as 'an approach to novel stimuli which can be intensified by rewards' [1,2,7].

As for the pathophysiological perspectives, Yin and Yang was related with Harm-Avoidance and Novelty-Seeking temperaments of Cloninger, and Internalizing and Externalizing problem behavior of Achenbach, respectively [1,11]. And, the emotion and behavior

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https://doi.org/10.1016/j.eujim.2019.04.004
Received 7 November 2018; Received in revised form 17 April 2019; Accepted 17 April 2019

**Table 1**
Demographic features of participants in this study.

| | Boy | Girl | Total | Statistics |
|---|---|---|---|---|
| Pre-school children | | | | |
| Age | | | | $\chi^2 = 2.16$, p = 0.827 |
| 1 | 1 | 2 | 3 | |
| 2 | 11 | 7 | 18 | |
| 3 | 14 | 11 | 25 | |
| 4 | 29 | 15 | 44 | |
| 5 | 23 | 11 | 34 | |
| 6 | 18 | 11 | 29 | |
| Total | 96 | 57 | 153 | |
| SPQ | | | | |
| SPQ-T | 33.36 ± 5.07 | 32.72 ± 4.91 | 33.12 ± 5.01 | t = 0.77, p = 0.443 |
| SPQ-B | 11.76 ± 2.33 | 12.19 ± 2.33 | 11.92 ± 2.33 | t=-1.11, p = 0.269 |
| SPQ-C* | 10.57 ± 1.83 | 9.88 ± 1.97 | 10.31 ± 1.91 | t = 2.21, p = 0.029 |
| SPQ-E | 11.03 ± 2.38 | 10.65 ± 2.17 | 10.89 ± 2.30 | t = 0.99, p = 0.322 |
| Elementary school children | | | | |
| Age | | | | $\chi^2 = 1.65$, p = 0.895 |
| 7 | 13 | 10 | 23 | |
| 8 | 11 | 11 | 22 | |
| 9 | 11 | 9 | 20 | |
| 10 | 8 | 6 | 14 | |
| 11 | 6 | 6 | 12 | |
| 12 | 4 | 1 | 5 | |
| Total | 53 | 43 | 96 | |
| SPQ | | | | |
| SPQ-T* | 33.34 ± 3.89 | 30.98 ± 5.29 | 32.28 ± 4.70 | t = 2.44, p = 0.017 |
| SPQ-B | 11.83 ± 1.98 | 11.58 ± 2.42 | 11.72 ± 2.18 | t = 0.55, p = 0.581 |
| SPQ-C** | 10.66 ± 1.92 | 9.40 ± 2.06 | 10.09 ± 2.07 | t = 3.11, p = 0.003 |
| SPQ-E | 10.85 ± 2.42 | 10.0 ± 2.37 | 10.47 ± 2.42 | t = 1.73, p = 0.088 |

SPQ, Sasang Personality Questionnaire; SPQ-T, SPQ-Total score; SPQ-B, SPQ-Behavior; SPQ-C, SPQ-Cognition; SPQ-E, SPQ-Emotion.
* $p < 0.05$.
** $p < 0.01$.

subscales of SPQ were shown to be related with maladaptive and adaptive cognitive emotion regulations, negative and positive affections, and risk and protective factors of problem behaviors, respectively [11,13,16]. As for the anthropometric measures, endurance, power and strength of muscle and Basal Metabolic Rate of strong Yang personality (high SPQ score) group were reported to be significantly higher than those of Yin personality (low SPQ score) group [17].

Although the clinical usefulness and validity of Yin-Yang personality have been reported with adults and children, a few study was made with toddlers and preschoolers [10]. Since the Yin-Yang personality responsible for disease susceptibility is determined in early childhood [10,11,18,19], and plenty of pediatric studies have been established to explain these in traditional East-Asian medicine [20–23], a validated clinical measure for analyzing pediatric Yin-Yang personality is strongly required.

In the current study, the Yin-Yang personality of university hospital pediatric outpatients aged between one and twelve was examined using SPQ, and their chronological changes were analyzed according to age group and gender [11,24]. The Yin-Yang personality using SPQ has been shown to have acceptable validity for children of various ages [3,10,11,16], and in this study it was used to assess outpatient toddlers, preschoolers and young children. As growth and development during childhood is rapid, subjects were divided into two groups, toddlers and preschoolers (age 1–6) and elementary school students (age 7–12) [11].

The aim of the study was to provide a reliable baseline for using Yin-Yang personality in pediatrics [25] by exploring the clinical value of traditional East-Asian medicine for assessing biopsychological properties for these groups of children in order to provide person-centered interventions and health promotion advice based on his/her predisposition of Yin-Yang personality [15,26].

## 2. Methods and procedures

### 2.1. Participants and procedures

The participants in current study were child outpatients who visited the pediatric clinic of a traditional East-Asian medicine general hospital in a Korean metropolitan area between August and October 2017. This study was approved by the institutional review board (E2017002), and the parents or primary care givers of all participants were asked to provide informed written consent in advance.

Parents or primary care givers of pediatric outpatients (161 of preschooler and 97 of elementary student) were asked to complete the Sasang Personality Questionnaire as part of a first-time outpatient routine test during the waiting time, and the Yin-Yang personality of child outpatients (n = 249) were acquired as shown in Table 1. Two groups, toddler and pre-school children (age 1–6) and elementary school children (age 7–12), were compared because of the rapid physical and mental development that occurs during these ages. The preschool children consisted of 96 boys (62.7%) and 57 girls (37.3%), while the elementary school children consisted of 53 boys (55.2%) and 43 girls (44.8%).

### 2.2. Yin-Yang personality using Sasang Personality Questionnaire (SPQ)

The biopsychological features of Yin-Yang personality were measured using the Sasang Personality Questionnaire (SPQ) which is a sum of three subscales of behavior (SPQ-B, passive vs. active), cognition (SPQ-C, meticulous vs. easy-going) and emotion (SPQ-E, static vs. dynamic) [1,7]. The SPQ has two opposite ends of Yin-Yang personality dimension ranging from 0 to 45, and the lower SPQ score is considered

as stronger Yin personality (e.g., 0 of SPQ means the strongest Yin personality) and the higher SPQ score as stronger Yang personality (e.g., 45 of SPQ means the strongest Yang personality) in current study [1]. It is comprised of 15 self-report items [1,7] that require the respondents to select one of three answers for each questionnaire items (e.g., 1 = passive, 2 = not sure, 3 = proactive as for "Do you consider yourself passive or proactive?") to describe themselves.

There have been extensive studies of the structural validity [3,11] and clinical usefulness of the SPQ for elementary school, middle school, high school and university students along with adults [7–9,11,25,27], and the internal consistency of elementary school children has been reported to be 0.778 and 0.772 for higher grade (age 7–9) boys and girls, and 0.761 and 0.789 for lower grade (age 10–12) boys and girls, respectively [11].

### 2.3. Statistical analysis

The internal consistency of the SPQ and its subscales was evaluated using Cronbach's alpha. Significant differences in age distribution and SPQ subscales between boys and girls were examined with the $\chi^2$ and *t*-test. The correlation between age and SPQ and its subscales were tested with Pearson's correlation, and the age dependent chronological changes in SPQ total score were illustrated using a boxplot.

Statistical analyses were conducted using IBM SPSS 20.0 (IBM, Armonk, NY), and data were presented as mean and standard deviation or frequency with percentages. *p* values of 0.05, 0.01, and 0.001 were used for significance test.

## 3. Results

The internal consistency of the SPQ, SPQ-B, SPQ-C, and SPQ-E based on Cronbach's alpha was 0.790, 0.754, 0.511 and 0.717 for preschoolers, and 0.700, 0.655, 0.461 and 0.679 for elementary school students, respectively.

The age, sex and SPQ subscale scores of preschoolers and elementary school students are shown in Table 1. No significant differences were found in the age distribution of preschoolers ($\chi^2 = 2.161$, $p = 0.8265$) or elementary school students ($\chi^2 = 1.653$, $p = 0.8947$). Moreover, there were no significant differences between preschooler and elementary students in SPQ total score (33.12 ± 5.01 and 32.28 ± 4.7, respectively) or in SPQ-B (11.92 ± 2.33 and 11.72 ± 2.18, respectively), SPQ-C (10.31 ± 1.91 and 10.09 ± 2.07, respectively) and SPQ-E (10.89 ± 2.3 and 10.47 ± 2.42, respectively) subscales.

However, significant differences were found in the SPQ-C subscale and the SPQ total score between boys and girls in both groups (Table 1). This might demonstrate that the cognitive characteristics of boys are more alike and are easy-going, straight-forward, daring, easy or quick to decide compared with girls.

The correlation coefficients between SPQ subscales and age were shown in Table 2. Preschoolers showed the same correlation coefficients between subscales of SPQ as elementary school students as previously reported [11]. However, preschoolers showed contrasting correlation coefficients between age and SPQ subscales when compared to the elementary school students in the present study. There was a negative correlation ($r = -0.351$, $p < 0.01$) between age and SPQ total score among preschoolers; however, there was no significant correlation ($r = 0.049$, n.s.) between age and SPQ total score among elementary school students, which is in line with results of previous studies for elementary school students [11] and adolescents [8,16].

Fig. 1 illustrates the contrasting age-dependent chronological characteristics of Yin-Yang personality (SPQ total score) in pre-school children (Fig. 1-A) and elementary school children (Fig. 1-B). There were no significant differences in SPQ total score between age seven and age twelve (Fig. 1-B); however, the SPQ total score decreased as the age of children increased from one to six (Fig. 1-A).

## 4. Discussion

Yin-Yang is a major theory in traditional East-Asian medicine that has long been used to analyze pathophysiological clinical features and effects of interventions with acupuncture and medical herbs. In the current study, the Yin-Yang personality of pediatric outpatients were examined with SPQ, and its validity in preschoolers was found acceptable in accordance with previous studies of elementary and middle school students [10,11]. Based on these findings, the Yin-Yang personality of individuals might be analyzed with SPQ ranging in age from one to their seventies [3,7,16,27].

Interestingly, there were chronological trends as negative correlations between age and SPQ in preschoolers, but not in elementary students. This might indicate that the Yang personality is strongest just after the birth, then decreases during preschool ages to the average level (Table 2 and Fig. 1). In the current study, the children at age one showed the utmost active, sociable, extroverted, carefree, flexible, dynamic, irritable and emotional characteristics, and these biopsychological features became inhibited during preschool period until they exhibit Yin-Yang balanced personality. The chronological change of Yin-Yang personality in preschool children might be useful for understanding the thousand years-old pathophysiological theory that children are small and/or pure Yang, [20,28] which has not been examined with objective clinical measures till now.

The theory of 'children as small/pure Yang' has been understood in three ways; (1) the Yang property of children is immature [29,30], (2) the Yang property of children has strong power [21–23], and (3) children has fast biopsychological growth [31]. Previous studies showed that individuals with strong Yang personality (high score of SPQ) have high level of physical activity [32], muscle volume and strength [17], vitality [18], positive affection, adaptive cognitive emotion regulation [13] and externalizing behavior problem [11] along with active, extroverted and carefree personality [7,11,32]. The results of the current study showed that the SPQ total score was highest at age one, then decreased throughout the toddler and preschool ages (age 1–6). Based

**Table 2**
Correlation coefficient between SPQ subscales and age in preschool and elementary school children.

| | Pre-school children (n = 153) | | | | Elementary school children (n = 96) | | | |
|---|---|---|---|---|---|---|---|---|
| | SPQ-B | SPQ-C | SPQ-E | Age | SPQ-B | SPQ-C | SPQ-E | Age |
| SPQ-T | **.787**$^{**}$ | **.791**$^{**}$ | **.721**$^{**}$ | **−.351**$^{**}$ | **.749**$^{**}$ | **.688**$^{**}$ | **.677**$^{**}$ | .049 |
| SPQ-B | | **.522**$^{**}$ | .264$^{**}$ | **−.301**$^{**}$ | | **.386**$^{**}$ | .222$^{*}$ | .136 |
| SPQ-C | | | **.361**$^{**}$ | −.255$^{**}$ | | | .132 | −.015 |
| SPQ-E | | | | −.247$^{**}$ | | | | −.014 |

Bold represents coefficient more than 0.3.
SPQ, Sasang Personality Questionnaire; SPQ-T, SPQ-Total score; SPQ-B, SPQ-Behavior; SPQ-C, SPQ-Cognition; SPQ-E, SPQ-Emotion.
$^{*}$ $p < 0.05$.
$^{**}$ $p < 0.01$.

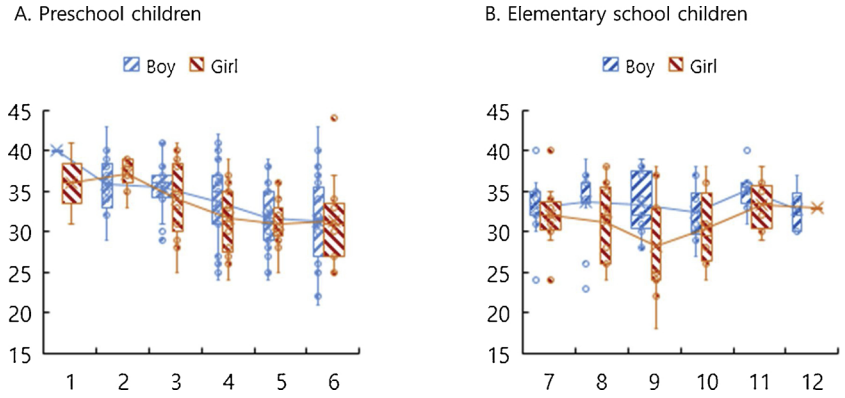


**Fig. 1.** SPQ total score measure of boy and girl for Yin-Yang personality in preschool children (n = 153) and elementary school children (n = 96). The SPQ total score mean of each age groups were linked with solid lines, and boxplot and whisker represents 25, 50 and 75 percentile of SPQ total score of each age groups.

on the results of current study coupled with those of previous reports, preschoolers with strong Yang personality (high SPQ score) might be recognized as immature children undergoing rapid biopsychosocial growth and development who tend to have a high level of vitality and activity for interacting and adjusting with outer social environments.

Traditional Korean medicine has suggested effective intervention for individuals with strong Yang personality who have good digestive function for enabling them to obtain sufficient nutrition and energy, and easily show Yin-deficiency symptom pattern (dried mouth, hard stool, and fever on hands, feet and chest), congested-heat symptom pattern (frustrating and painful symptoms on chest from severe heat) and physical fatigue from excessive activities [2,10,11,33,34]. Supplementing nutrients might sufficiently facilitate biopsychological growth and development of children; however, hyper-activated bodily function might be controlled with Yang personality group-specific medical herbs of Rehmanniae Radix, Corni Fructus, Hoeoen, Alismatis Rhizoma, Osterici Radix, and Angelicae Pubescentis Radix with antipyretic, anti-inflammatory, diuretic and anti-rheumatic properties supporting musculoskeletal activities and sustaining Yin functions of the body as well as acupuncture stimulus on HT3 (+), KI3 (+) and SP3 (-) for restoring the balance of Yin-Yang and autonomic reactivity [33,34].

Although the current study was a well-organized clinical study conducted in a university hospital, there are several limitations in terms of generalizing the findings. First, there might be an influence of socialization and education during pre-school ages which lowered the SPQ total score at that time. Considering that the SPQ represents biopsychological traits that are not easily altered by education or social interactions [1,7] and the mean SPQ total score of Yin and Yang personality groups in elementary, middle and high school students remained stable [8,10,16], the transition of SPQ total score during preschool ages might be influenced by biopsychological developments at that time.

Second, the negative correlation between age and Yang personality in current study might be influenced by pathological features, since the participants in current study were pediatric outpatients in a general hospital [35,36] and the influences of personality on disease susceptibility have been previously reported. However, the negative correlation or transition of Yang personality with age might be a result of natural developmental changes since the preschooler in current study are too young to have accumulated complex interactions of multiple weak pathways and the SPQ measure of elementary schooler in current hospital study was in line with that of previously reported healthy participants [11].

Third, the SPQ total score at the toddler and preschool ages could be subject to measurement errors from incorrect evaluation by parents and primary care providers. However, the SPQ scores of toddlers, preschoolers and elementary school students in current study were measured under the same condition and the scores of elementary school students were in line with those previously reported healthy participants [10]; thus, the current results might not have been influenced by measurement error.

Fourth, there is a need for studies on improving test validity of SPQ for Yin-Yang personality. The results presented here should be repeated in other countries without East-Asian influences using larger sample sizes and healthy subjects, since ethnic and cultural background might have influences on measure. And, studies on gender differences in three SPQ subscales [1,2,9,11] and test validity [7,9,37] would be needed to improve the clinical usefulness of Yin-Yang personality measure.

## 5. Conclusion

This study showed the Yin-Yang personality of toddlers, preschooler and elementary children might be analyzed using objective measure of SPQ which showed psychometric validity using Western perspective of Gray and Cloninger [1,2,7,25]. Moreover, the theory of 'children as small/pure Yang' was examined in biopsychological perspective of Yin-Yang personality, and their implication for effective treatment were also discussed. With further studies, current study would contribute to the development of health screening for children and integration of East-Asian and Western medicine [26,33].

## Authors

All research was done by the authors.

## Financial support

None.

## Conflict of interest

The authors declare they have no conflict of interest to declare.

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