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Original article

Experimental study of reliable iris parameters and their relationships with temperament, character, and heart rate variability

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Abstract

Introduction: While many studies have indicated that iris parameters are not a valid tool for disease diagnosis, it is still uncertain whether these parameters are more closely related to inherited characteristics or overall functional parameters. The aim of this study was to examine the relationship between the iris, overall functional parameters, and inherited characteristics of individuals.
Methods: A total of 117 healthy volunteers (42 men, 75 women) participated in our study. After photographing each subject's iris, we graded six iris parameters: iris density, pigment dots, nerve ring, toxic radii, autonomic nerve wreath ratio, and pupil area ratio. We randomly selected 30 samples and conducted intra- and inter-rater reliability tests. To measure inherited characteristics, each subject completed a temperament and character inventory (TCI). To measure functional markers, we calculated frequency domain (TP, VLF, LF, and HF) parameters of heart rate variability (HRV) using 5-min ECG recordings. Finally, we examined the relationships between iris characteristics, HRV parameters and TCI measurements.
Results: Intra- and inter-rater reliabilities of the six iris parameters were high, with intra-class correlation coefficients ranging from 0.868 to 1.000. Among the iris parameters, nerve ring, iris density, and pupil area ratio parameters were related to novelty seeking, persistence, harm avoidance, and self-directedness subscales of the TCI. The relationships between iris characteristics and HRV parameters were weaker. These relationships were more prominent in men than in women.
Conclusions: We concluded that iris parameters are more likely to be determined by inherited characteristics than functional changes and were more prominent in men than women.

Keywords: Iris parameters; TCI; HRV; Reliability; ICC; Inherited characteristics

Introduction

Iridology is a technique used to assess inherited characteristics and functional conditions of individuals through iris markers such as color, pigment distribution, pathological lesions, or development of lacunae on the iris [1]. Iridologists have believed that the conditions of all bodily organs are reflected on the surface of the iris, and therefore, the pathological conditions associated with some diseases may be reflected on the corresponding areas of the iris [1,2]. Based on this belief, a study reported that the Cross of Andreas (CoA), which indicated endocrine and exocrine dysfunctions in the pancreas, found in 89% of diabetes mellitus patients displayed similar iris characteristics [3]. Popescu and Waniek [4] conducted a case-control study of mitral stenosis, and found that there were significant differences between the patient group and the control group which could be identified in defined areas of the iris. However, other controlled or masked studies have shown that the iris does not serve as a tool for disease diagnosis [5–8]. In these studies, iridologists who performed blinded assessments of iris samples collected from healthy individuals and patients with cancer, ulcerative colitis, and kidney, gallbladder, and coronary heart disease were unable to consistently determine the presence or absence of disease on the basis of iris parameters [5–8].

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Some studies have suggested that iris characteristics are inherited. Findings from the Louisville Twin Study indicate that the heritability of eye color which is an iris parameter, is ninety-eight percent concordance [9]. Um et al. [10] examined the relationship between iris constitution type and apolipoprotein E gene polymorphism, which is a well-accepted genetic marker for vascular diseases, and reported that neurogenic iris constitution showed a higher prevalence of apo E2 and E4 alleles. If iris characteristics are indeed inherited, they are unlikely to change. Daugman [11] suggested that the iris is well-protected from the environment, and is stable over time. Mehrotra et al. [12] recently reported that variation in the accuracy of iris identification between different samples from the same subject was not due to aging effects, but due to the presence of other covariates such as blur, noise, occlusion, and pupil dilation, and is consistent with the notion that the iris does not change over time.

As discussed above, two hypotheses regarding the iris have coexisted: the iris changes based on conditions of the body and he iris is a stable marker and does not change over time. Many studies have raised doubts about the diagnostic validity of the iris map, where each region of the iris corresponds to each internal organ or tissue [5–8]. However, it is still possible to assume that some iris parameters reflect overall bodily or mental function, without considering the validity of iris mapping and the utility of iris parameters in disease diagnosis. Furthermore, it is still uncertain whether inherited characteristics or functional changes of individuals are more closely related to the iris. To answer this question, it would be beneficial to examine the relationships between quantitative iris parameters and inherited and functional change markers. Therefore, the purpose of our study was to determine quantitative iris parameters suggested by previous study results and iridology experts and to examine the relationship between iris parameters and inherited and functional change markers. To examine these relationships, we need to examine whether the quantitative iris parameters are reliable. Therefore, inter- and intra-rater reliability tests of the iris parameters were included in our study.

In the present study, we examined inherited and functional conditions by measuring temperament and character using a temperament and character inventory (TCI), and estimating cardiovascular autonomic functions using heart rate variability (HRV) measurements, together with individual iris parameters. Temperament, which is genetically innate, shows relatively stable attributes over a lifetime [13]. Character continuously develops over a lifetime under the influence of social and cultural learning and is formed through interaction with the environment, influenced by a person's temperament [14].

A change in heartbeat occurs when the autonomic nerve system controls the spontaneous excitement of the sinoatrial node [15]. Changes in the cardiac cycle, that is HRV, reflects the overall state of the autonomic nervous system, and HRV parameters decrease or increase during functional changes, including physical exercise and mental stress [16]. It is interesting that, among the iris parameters, the clinical utility of an autonomic nervous indicator, the Autonomic Nerve Wreath (ANW), is similar to that of HRV parameters [2]. However, since our study was conducted without the assumptions underlying iris mapping, we examined the relationship between all iris parameters including ANW and HRV parameters in this study. We hypothesized that iris parameters would show significant relationships to TCI parameters if they are more closely related to inherited characteristics. On the other hand, in case they are more closely related to functional changes, they would show significant relationships to HRV parameters.

In summary, this study was conducted using iris and HRV parameters and TCI measurements to examine which factors among inherited or functional change factors were more closely related to iris parameters in 117 subjects.

Subjects and methods

Subjects and data collection

One hundred seventeen healthy volunteers who were asked to have free iris test by telephone or e-mail and agreed to have the free iris test (men:women = 42:75, mean age = 38.29 ± 4.95 years) participated in our study conducted during August and October 2013 at an oriental medical clinic in Seoul, Korea. Fig. 1 depicts the entire process of our study. Before the measurements, the purpose and procedure of our study were presented to each subject. Based on self-reports, subjects with conjunctivitis, ophthalmorrhagia, glaucoma that could affect iris parameters, arrhythmia, hypertension, ischemic heart disease, pneumonia, infections of the upper respiratory tract that could affect HRV parameters, or any psychiatric disorder that could affect the results of the TCI measurements were excluded from the study. To avoid time intervals between the measurements, iris and HRV recordings were conducted and the TCI questionnaires were completed on the same day for each subject. Written consent was given by all the subjects.

Methods

TCI measurements

The Korean version of the TCI (K-TCI) consisted of 140 items of the TCI being rated on a five-point Likert scale ranging from 0 (totally disagree) to 4 (totally agree). The K-TCI was previously reported to have satisfactory validity [17]. The 140 K-TCI items consist of four temperament and three character dimensions. The four temperaments of the K-TCI are novelty seeking (NS), harm avoidance (HA), reward dependence (RD), and persistence (P), and the three characters of the K-TCI are self-directedness (SD), cooperativeness (C), and self-transcendence (ST). We summed the scores for each subscale of the K-TCI to examine which temperament and character subscales were related to the iris parameters.

HRV parameters

Before HRV recordings, subjects were asked to avoid smoking, consumption of aspirin, coffee, green tea, alcohol, and drugs, and to avoid physical exercise that could affect the cardiovascular autonomic nervous system within 24 h before the test. Wearing comfortable clothing, the subjects were asked