



Personality traits and body mass index in Asian populations



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ABSTRACT

Research on personality and adiposity has focused primarily on Western samples; less is known about the personality correlates of BMI in Asian populations. We examined the association between personality and body mass index (BMI) among community-dwelling Japanese adults ($N = 380$), Chinese adolescents ($N = 5882$), and a meta-analysis inclusive of a published Korean sample (total $N = 10,304$). In the new samples and meta-analysis, Extraversion and Agreeableness were associated with higher BMI among men. In contrast to what is often found in Western samples, Conscientiousness was mostly unrelated to adiposity. These findings link pro-social tendencies to overweight among Asian men; Conscientiousness may be less relevant for BMI in Eastern societies with a low prevalence of obesity and strong social norms for eating but not thinness.

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1. Introduction

There is a substantial literature that links Conscientiousness to more positive health outcomes (see Friedman, Kern, Hampson, & Duckworth, 2014 for a review). In the case of body mass index (BMI), Conscientiousness tends to be associated with healthier body weight. Individuals with the general tendency to be organized and disciplined are leaner (Terracciano et al., 2009), maintain a more stable weight across adulthood (Lahti et al., 2013; Sutin, Ferrucci, Zonderman, & Terracciano, 2011) and are at lower risk of developing obesity (Jokela et al., 2013) than those who score lower on this trait. This protective association has been documented in American (Chapman, Fiscella, Duberstein, Coletta, & Kawachi, 2009; Sutin et al., 2011), European (Möttus et al., 2013; Terracciano et al., 2009), Australian (Magee & Heaven, 2011), and Israeli (Armon, Melamed, Shirom, Shapira, & Berliner, 2013) samples. The consistency across populations suggests that Conscientiousness may be a protective factor that transcends culture and environment.

In contrast to Conscientiousness, the association between the four other traits and BMI is less straightforward. Despite the complexity, a pattern of sex differences in the relation between BMI

and Neuroticism and Extraversion is starting to emerge: Neuroticism tends to be associated with higher BMI for women but not men, whereas Extraversion tends to be associated with higher BMI for men but not women (Brummett et al., 2006; Sutin & Terracciano, in press); although not all find these sex differences (Magee & Heaven, 2011). Agreeableness has likewise been associated with higher BMI among men in some studies (Chapman et al., 2009) but not others (Magee & Heaven, 2011), whereas Openness tends to be unrelated to BMI for either sex (Chapman et al., 2009; Magee & Heaven, 2011). These sex differences may obscure the relation between these traits and BMI.

Research on personality and adiposity, however, has relied primarily on Western samples. Shim and colleagues (Shim et al., 2014) recently reported strikingly different associations between personality traits and BMI in an Asian population: In their sample of approximately 4000 Korean adults, Conscientiousness was unrelated to BMI ($\beta = .00$). The association between Neuroticism and BMI was likewise surprising: Among women, a stronger tendency to experience negative emotions was associated with lower body weight rather than higher body weight. The sex difference in the association between Extraversion and BMI, however, was similar to the pattern found in Western samples (Brummett et al., 2006; Sutin & Terracciano, in press). Interestingly, one study of Japanese adults (Kakizaki et al., 2008) found similar sex-specific associations between Neuroticism and Extraversion and body weight and another study (Otonari et al., 2012) also found similar

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associations, although the authors did not test whether sex moderated these associations (neither study measured Conscientiousness).

The provocative findings from Shim and colleagues raise the question of whether the association between Conscientiousness and lower body weight is limited to more Western populations and whether it may not always be protective (Lin, Ma, Wang, & Wang, 2015); little research has addressed this association in Eastern cultures. To that end, the present study examines whether Shim and colleagues' results extend to samples of community-dwelling Japanese adults and Chinese adolescents. In addition, we meta-analyze our findings with the published literature to estimate their robustness. We expect that the associations between personality and adiposity in the two new samples will be more similar to those of Shim and colleagues than those from Western samples and that the meta-analysis will support these results.

2. Method

2.1. Japanese adult sample: participants and procedure

Data on Japanese adults were drawn from the Survey of Midlife Development in Japan (MIDJA) Biomarker Study. The MIDJA was designed to parallel the Midlife in the United States (MIDUS) study to compare how culture contributes to age differences in health and well-being. A probability sample of Japanese adults was recruited into the study ($N = 1027$). A subset of the original participants was recruited to complete a biomarker assessment (Markus et al., 2014). To be included in the biomarker assessment, participants had to complete the initial MIDJA assessment and express interest in a clinic visit. Those who agreed ($n = 382$; $M_{\text{age}} = 54.24$, $SD = 14.11$, range 30–79; 56% female) came to a clinic in Tokyo where vital signs, morphometric assessments, and blood assays were obtained. From the total biomarker sample, one participant was excluded because she was pregnant and one participant was missing the personality assessment; the analytic sample size was thus 380. MIDJA data are available for public download here: <http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/34969?q=midja&searchSource=icpsr-landing>.

2.2. Chinese adolescent sample: participants and procedure

Participants from two high schools in China were drawn from a larger project on psychological functioning, well-being and achievement across adolescence. Participants ($N = 8115$) completed a measure of personality as part of the longer questionnaire administered during regular classroom hours. Participants from one of the high schools also had height and weight measurements from a routine health screening at a local hospital. A total of 5882 participants ($M_{\text{age}} = 16.78$, $SD = 1.12$, 41% female) had valid a personality assessment and measured height and weight.

2.3. Measures

2.3.1. Personality traits

Personality traits in MIDJA were assessed with the Japanese translation of the Midlife Development Inventory (MIDI; Lachman & Weaver, 1997). Participants were asked how much each of 26 adjectives described themselves on a scale ranging from 1 (*not at all*) to 4 (*a lot*). Four items assessed Neuroticism (e.g., moody; $\alpha = .51$), five items assessed Extraversion (e.g., talkative; $\alpha = .83$), seven items assessed Openness (e.g., creative; $\alpha = .84$), five items assessed Agreeableness (e.g., sympathetic; $\alpha = .87$), and five items assessed Conscientiousness

(e.g., organized; $\alpha = .66$). Personality traits in the Chinese sample were assessed with the Chinese translation of Saucier's Mini-Marker measure of personality (Saucier, 1994). Participants rated how much each of 40 adjectives (eight for each trait) described themselves on a scale from 1 (*not at all*) to 7 (*a lot*). Sample items for each of the traits were the same as those given for the MIDI, and the reliability of each trait was adequate ($\alpha = .68$ for Conscientiousness, $.72$ for Agreeableness, $.76$ for Extraversion, and $.77$ for Neuroticism and Openness).

2.3.2. Adiposity

Participants in MIDJA were measured and weighed by trained staff. Participants in the Chinese adolescent sample were measured as part of a routine health examination. BMI was derived as kg/m^2 . For some analyses, BMI was categorized into overweight/obese ($\text{BMI} \geq 25$) versus not (i.e., $\text{BMI} < 25$). Overweight was chosen as the threshold because of the low prevalence of obesity in both samples. Waist circumference (MIDJA only) was measured at the narrowest point between the ribs and the iliac crest and recorded to nearest millimeter.

2.4. Statistical approach

In both samples, we used linear regression to examine the association between personality and adiposity. Specifically, we predicted BMI and waist circumference (MIDJA only) from the traits, controlling for age, sex, and education (MIDJA only). Logistic regression was used to predict risk of overweight/obesity from the traits, controlling for the same covariates. Following Shim and colleagues, we ran the regression separately by sex; we also tested sex as a moderator of the personality-BMI relation. To summarize the relation between personality and BMI with the published literature, we performed a random-effect model meta-analysis using the Comprehensive Meta-Analysis software package including the results from Shim and colleagues and the two new samples reported here.¹ Heterogeneity was evaluated using the Q statistic and I^2 . To include the published Korean sample, we did the meta-analysis on the sex-stratified linear analyses. Total N for the meta-analysis was 5154 for males and 5150 for females.

3. Results

The descriptive statistics and bivariate correlations for the Japanese and Chinese samples are given in Tables 1 and 2, respectively. The results of the meta-analysis are reported in Table 3. Tables 4 and 5 report the results of the linear and logistic regressions, respectively. We report the results by trait, with the results of the meta-analysis followed by the results from the samples with new primary data.

3.1. Neuroticism

The meta-analysis revealed no association between Neuroticism and BMI for either men or women. This association diverged between the Japanese and Chinese samples. Consistent with Shim et al. (2014), women in the Japanese sample who had a tendency to experience negative emotions were leaner than women who were more emotionally stable; there was no

¹ Two other studies reported the association between Neuroticism and Extraversion and BMI (Kakizaki et al., 2008; Otonari et al., 2012). These studies, however, did not report the results in a way that could be included in the meta-analysis. We contacted the authors of both papers but were unable to attain the necessary information.

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