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Associations between Hunter Type A/B Personality and Cardiovascular Risk Factors from Adolescence through Young Adulthood

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Abstract

Purpose—Type A personality, characterized by action-oriented tendencies, has been linked to cardiovascular disease in middle-aged and elderly adults. Alternatively, limited research has tested whether personality type A/B and cardiovascular (CVD) risk are linked prior to adulthood. Therefore, we used the Hunter-Wolf A/B personality score to determine whether personality type A/B is associated with traditional CVD risk factors during adolescence, and more importantly if personality type, or its individual type A components, are associated with cardiovascular risk through young adulthood. This study is the first to assess personality type A/B on a continuous spectrum with regard to its relationship with cardiovascular disease risk, as well as the first to examine this association in a biracial, adolescent population.

Methods—Subjects (3396) from the Bogalusa Heart Study were surveyed from 1984 to 1986, and multivariable regression was used to test adjusted, cross-sectional associations between personality type A/B, as determined by Hunter-Wolf A/B personality questionnaire, and CVD risk factors during adolescence. To test whether associations existed longitudinally, subjects were followed through 2007, and general estimating equation (GEE) models were used to examine the associations of personality type A/B with CVD risk factors, as well as with Framingham risk score as a global score of CVD risk. The component traits of type A personality (leadership, hard-driving, eagerness-energy, and impatience-aggression) were tested individually to determine their independent, longitudinal associations with global CVD risk.

Results—Baseline mean (SD) age was 15.9(5.2). Mean (SD) Hunter-Wolf score in was 96.9 (11.6). After adjustment, more type A Hunter-Wolf scores were cross-sectionally associated with lower alcohol consumption ($p = 0.03$), female gender ($p < 0.0001$), and black race ($p < 0.0001$) in adolescence. After follow-up (median = 11 years), personality type A/B as the continuous Hunter-Wolf score was non-linearly associated with young adult BMI ($p = 0.01$), fasting blood glucose ($p < 0.01$), and Framingham score ($p = 0.05$). Of the type A components, leadership and hard-driving were non-linearly associated with Framingham risk at follow-up (both $p < 0.0001$).

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Conclusions—Adolescent personality type A is associated with female gender and black race. Generally, type A children have higher CVD risk during young adulthood, though this relationship is non-linear. Additionally, adolescents exhibiting strong leadership-oriented personality traits have worse cardiovascular risk profiles in early adulthood, whereas hard-driving adolescent personalities are protective of young adult CVD risk. Our results warrant consideration of personality as a continuous, non-categorical, trait in studies of cardiovascular disease.

Keywords

Personality type; Cardiovascular risk; Childhood; Young adult

Introduction

In the USA, cardiovascular disease continues to represent the greatest mortality of any condition, killing more than 1 million Americans annually and costing \$320 billion in direct and indirect costs each year [1]. Considering this enormous burden, it remains imperative to find early-life risk factors associated with development of cardiovascular disease that may focus and inform preventive measures or facilitate the adoption of approaches that promote healthy behaviors and attitudes over the life course. As early as the 1950s, Friedman and Rosenman first noted and described a link between personality and cardiovascular disease [2]. Specifically, type A personality has been termed “coronary-prone behavior,” and it is characterized by a strong drive to achieve goals, self-imposition of rigid deadlines, rapid completion of tasks, intentional involvement in multiple activities or leadership roles, and competitiveness or aggression [3]. The converse personality type, type B, is simply defined as the absence of these type A personality traits.

Traditionally, epidemiologic studies have found strong links between type A personality and cardiovascular disease [4–6]. There are several suggested mechanisms for this relationship. It is known that health behaviors, such as cigarette smoking and consumption of alcohol, directly increase the risk of cardiovascular disease, and it is thought that personality type may be a strong influencer of health behaviors along the same causal pathway [7]. Additionally, it has been shown that acute psychosocial responses, such as situational anger or aggression, are associated with greater hemodynamic reactivity and therefore increase the likelihood of myocardial infarction in the short-term [8, 9].

In contrast, more recent studies have failed to confirm a significant relationship between type A personality traits and cardiovascular morbidity and mortality [10, 11]. In these studies, the questionnaires used to assess personality types and traits (including the Matthews Youth Test for Health [12], Cook-Medley [13], Jenkins Activity Survey [14], Bortner [15], and Hunter-Wolf [16] assessments) have varied widely, and this variation has likely contributed to the conflicting results [17, 18]. Despite these recent inconsistencies, when personality type A/B is more narrowly classified into subtraits or components such as aggression or hostility, results have been indicative of greater risk for cardiovascular disease in adults [19–21].

Furthermore, the existing literature is lacking with regard to the potential associations between personality type A/B and cardiovascular risk factors early in life, which is critical

considering that the effects of personality type A/B on cardiovascular disease may be differential over the course of the entire life span [5, 22]. The Cardiovascular Risk in Young Finns Study is the only prior study to use life-course data from childhood to assess the etiologic role of personality on cardiovascular risk, as determined by intima-media thickness, a precursor to atherosclerotic heart disease [23, 24]. They found suggestive results; type A personality in early life was a marginally significant predictor of a thicker intima-media in adulthood in males but not females. They recommended adoption of a life-course approach for future examinations of the etiology of cardiovascular disease in type A personalities [23].

Therefore, we here use the Hunter-Wolf A/B personality score to prospectively examine adolescent personality type A/B in the largest American cohort to date to determine its cross-sectional and longitudinal associations with cardiovascular risk using a novel statistical approach designed to measure the full, continuous spectrum of type A/B personality, rather than assessing personality type A/B as a dichotomous or categorical attribute as has been done in all prior studies on this relationship. Additionally, we attempt to explore these associations by further testing them within the four individual type A personality components: hard-driving behavior, eagerness-energy, impatience-aggression, and leadership.

Methods

Study Population and Design

The Bogalusa Heart Study (BHS), the longest-running biracial cohort study to follow cardiovascular health from childhood through adulthood, was founded in 1973 by Dr. Gerald Berenson. The study population resides within a semirural city in eastern Louisiana that is representative of the southeastern USA, the region of the country with the highest rates of cardiovascular morbidity and mortality. Summarily, the BHS is an ongoing study consisting of a large cohort of participants who were enrolled as school-aged children (ages 5–18) and have completed repeated, cross-sectional surveys and study clinic visits approximately every 2 years. Several thousand data fields are collected, including demographics (race, sex, education), basic clinical information (height, weight, medication use, medical history), blood samples for biomarker measurements, and survey questions pertaining to nutrition and health behaviors such as smoking and alcohol use.

Basic clinical measurements for this study, including height, weight, pulse, and blood pressure, were averaged from separate measurements taken multiple times by trained observers at the same study visit to reduce variability. BMI was calculated as weight (kilograms) divided by height (meters) squared. Current smoking status and alcohol use were self-reported and defined as any use of cigarettes or alcohol within the past week. Standardized enzymatic procedures were used to assay and obtain cholesterol levels [25]. The full study design and methods have been previously explained with greater detail, and comprehensive protocols for the valid collection and measurement of laboratory characteristics have also been described for our study [26–29]. In addition to the common BHS survey and clinical assessment, select cohorts from 1984 to 1986 were also given surveys pertaining to behavioral and psychosocial traits. These additional surveys included

the Hunter-Wolf A/B Type Personality scale, a 24-item personality questionnaire with integer responses ranging from 1 to 7. A response of 1 indicates the type B end of the spectrum, while a response of 7 indicates the type A end of the spectrum. The total Hunter-Wolf score is calculated as the sum of all responses and has a range of possible values from 24 (completely type B) to 168 (completely type A) [16]. Additionally, within the Hunter-Wolf A/B Type personality scale, there are 4 individual components of type A personality tested (Table 1): (1) Leadership—seven items distinguished by a desire to lead others and succeed in multiple activities;(2) impatience-aggression—seven items identified by a quick temper and proneness to interrupting and arguing with others;(2) eagerness-energy—seven items typified by eating, walking, and talking rapidly; and (4) hard-driving behavior—three items characterized by an intense drive to complete assignments by deadlines while giving maximum effort. In this study, we used data from 3396 children who completed Hunter-Wolf questionnaire as part of their BHS visit from 1984 to 1986. The Hunter-Wolf questionnaire was previously found to be moderately reliable in our study population ($r=0.59$) [30]. Informed consent was obtained from all individual participants included in the study with approval from the Institutional Review Board of Tulane University.

Cross-Sectional Analyses

Means (SD) and frequencies were tabulated for baseline covariates, including Hunter-Wolf score. Using the baseline survey at which total Hunter-Wolf score was assessed, univariate cross-sectional associations between total Hunter-Wolf score and multiple traditional cardiovascular risk factors were tested using Pearson's chi-squared test for categorical variables (gender, race, smoking, and alcohol use) and Wilcoxon rank-sum test for continuous variables (age, BMI, blood pressure, pulse, HDL-C, LDL-C, triglycerides, and fasting blood glucose). We chose to test individual risk factors at baseline rather than use a global CVD risk score because Framingham, along with other common CVD risk scores, is not validated for those younger than age 30. A Bonferroni correction, multiplying by a factor of 12 reflecting the number of hypotheses tested, was applied to obtain p values corrected for multiple testing [31]. Though traditional analyses have categorized the total Hunter-Wolf score dichotomously, by quartiles, or using other statistically arbitrary cutoffs, this may reduce statistical efficiency and introduce bias [32]. Thus, our approach is novel in analyzing the Hunter-Wolf score as a continuous exposure variable.

To adjust these cross-sectional associations, each risk factor was used as the dependent variable in a logistic regression model (gender, race, smoking, and alcohol use) or generalized linear regression model (age, BMI, blood pressure, pulse, HDL-C, LDL-C, triglycerides, and glucose). The independent variables in each model consisted of Hunter-Wolf score (the exposure of interest) and the other 11 risk factors. In these models, all continuous variables, including Hunter-Wolf score, were fitted using five-knot restricted cubic splines, with knots at the 5th, 25th, 50th, 75th, and 95th percentiles. Restricted cubic spline functions allow a model to better fit a continuous independent variable (X) when its relationship to the dependent variable (Y) may be non-linear [33]. Restricted cubic splines are useful for displaying smoothed plots of the full spectrum of continuous X values versus predicted values of Y. The Wald chi-squared p value for the splined Hunter-Wolf score was

then reported, after Bonferroni correction, as the measure of significance for each potential association.

Longitudinal Analyses

To examine the longitudinal relationships between baseline total Hunter-Wolf score and progression of cardiovascular risk factors, multiple generalized estimating equation (GEE) models were used. In addition to the traditional cardiovascular risk factors captured by BHS, the simple Framingham hard coronary disease 10-year risk score was also calculated for each participant as a measure of global cardiovascular risk [34]. Each participant contributed data from two time points to these analyses—baseline and the latest completed follow-up survey. Again, each risk factor was used as the dependent variable, with total Hunter-Wolf score and the additional risk factors as independent variables, with follow-up time added as an additional independent variable. In all models, total Hunter-Wolf score was fitted using a five-knot restricted cubic spline term. Because ours was the first longitudinal study of this relationship in a biracial population, interaction between race and Hunter-Wolf score was tested.

Longitudinal Analyses of Individual Hunter-Wolf Personality Components

We sought to explore the aspects of type A personality driving these potential associations by examining the four separate components of type A personality (eagerness-energy, impatience-aggression, leadership, and hard-driving) to determine their individual and collective effects on global cardiovascular risk, as measured using the Framingham Risk score. To model each component's independent effect, we used a multivariable GEE model with Framingham Risk score as the outcome, and each of the four components as independent variables (with separate restricted cubic spline functions), controlling for BMI, glucose, and race. These represent additional cardiovascular risk factors not included in the Framingham risk score.

All analyses were conducted using SAS 9.3, SAS Institute, Inc., Cary, North Carolina, USA.

Results

Cross-Sectional Analyses

Baseline age (mean $\pm$ SD) for the $n = 3396$ participants in our study population was 15.9 ± 5.2 . Hunter-Wolf score was approximately normally distributed (Fig. 1), with mean $\pm$ SD of 96.9 ± 11.6 , and 1730 (50.9%) participants on the type A side of the personality spectrum (Table 2). After adjustment, type A personalities with Hunter-Wolf score as a continuous and splined covariate were significantly associated with female gender and black race (both $p < .001$), and showed marginally significant, and approximately linear, associations with less alcohol usage, lower BMI, and lower prevalence of smoking ($p = 0.03$, $p = 0.06$, and $p = 0.08$, respectively).

Longitudinal Analyses

Participants (2333) contributed to a total follow-up time of 25,447 person-years, with a median follow-up time of 11.0 years. Mean $\pm$ SD Framingham risk score at baseline was 0.1

± 3.1 , and at follow-up was 1.9 ± 5.0 . In adjusted longitudinal models with Hunter-Wolf score as a continuous and splined covariate, participants who were slightly type B on the spectrum (25th percentile Hunter-Wolf score) had noticeably higher adjusted BMIs (BMI = 25.5; 95% CI 25.1–25.8) versus participants who were only slightly type A (75th percentile Hunter-Wolf score BMI = 24.4; 95% CI 24.0–24.8), although BMI tended to increase for participants who were more strongly type A ($p = 0.01$) (Fig. 2). Conversely, highly type A participants trended toward lower glucose levels and highly type B participants trended toward higher glucose levels ($p < .01$). After adjustment, Hunter-Wolf score as a continuous and splined covariate was significantly associated with Framingham risk ($p = 0.05$) in a non-linear, bimodal pattern, with slightly type B participants (25th percentile Hunter-Wolf score) having a lower Framingham risk score of 1.9 (95% CI 1.6–2.2) versus slightly type A participants (75th percentile Hunter-Wolf score, Framingham score = 2.2; 95% CI 1.9–2.5) (Fig. 3). There was no interaction between race and Hunter-Wolf score ($p = 0.76$).

Longitudinal Analyses of Individual Hunter-Wolf Personality Components

Type A leadership as a continuous and splined covariate was significantly associated with an increase in Framingham risk ($p < .001$), while the type A hard-driving component was significantly associated with a decrease in Framingham risk ($p < .001$). The type A eagerness-energy ($p = 0.19$) and type A impatience-aggression components ($p = 0.23$) were not significantly associated with global CVD risk (Fig. 4).

Discussion

Our results represent the largest longitudinal study conducted on the relationship between personality type A/B and cardiovascular risk in an American childhood cardiovascular cohort. Our data provides evidence that adolescent type A personality is strongly and independently linked to both female gender and black race in cross-sectional adolescent assessments and may also be weakly linked to lower BMI, and less alcohol use and smoking. Furthermore, personality type A/B appears to be longitudinally associated with both BMI and fasting blood glucose through early adulthood, though the direction of these longitudinal associations is less clear. In fact, the relationship between adolescent personality type A/B and young adult BMI may be bimodal; the participants who were observed with the greatest BMIs as adults were those who had marginally type B personalities (total Hunter-Wolf score near 84 out of 168) or moderately type A personalities (total Hunter-Wolf score near 120 out of 168) during adolescence (Fig. 2). With regard to global cardiovascular risk, adolescent personality type A/B is strongly associated with increased Framingham risk score during follow-up, with greater type A Hunter-Wolf scores generally indicative of a greater Framingham risk score (Fig. 3). This result indicates that a relationship between type A personality and CVD risk may be present earlier in life than previously suspected. The leadership and hard-driving components of type A personality appear to significantly drive this relationship between type A personality and global CVD risk in young adulthood.

In contrast to studies in older adult populations which have indicated that type A hard-driving behavior and aggression increase cardiovascular disease risk [35–37], our analysis

indicated a statistically significant protective effect of the hard-driving component of type A personality on Framingham risk score in young adults and no significant effect of impatience-aggression. This conflicting relationship between hard-driving and CVD risk may be explained by differences in age, as the protective results shown in our young adult population are consistent with two prior findings from the Cardiovascular Risk in Young Finns Study, in which young adult females with greater hard-driving type A Hunter component had lower carotid intima media thickness (IMT) and fewer CVD risk factors [23, 38]. Hintsala and colleagues noted that the type A hard-driving component increases with age through young adulthood [39], so there may be differential effects on CVD risk for those who develop a greater type A hard-driving component during young adulthood versus those with consistent type A hard-driving behavior over the life course. For example, secular effects or stressful life events during young adulthood may be related to increases in both hard-driving behavior and CVD risk later in adulthood.

Keltikangas et al. additionally found a strong relationship with eagerness-energy and higher IMT, with no significant association between type A leadership and IMT, whereas our study linked type A leadership with higher CVD risk, with no significant association between eagerness-energy and CVD risk. Because we found a significant link between race and personality type A/B, it is possible that inherent differences between study populations (Finnish persons versus our biracial American cohort) may account for the subtle differences in the interplay between type A personality components and global CVD risk. While previous Bogalusa results also indicated a cross-sectional relationship between eagerness-energy and both serum cholesterol and triglycerides in children, the current study did not attempt to associate risk factors during adolescence with individual type A components [16]. However, our study is consistent with the previous Bogalusa findings of significant differences in degree of type A personality according to both gender and race [16, 30].

Our study found higher global CVD risk during young adulthood among children with a greater type A leadership personality component. Recent data has suggested that leaders may in fact have lower occupational stress than non-leaders [40, 41], which makes our results contradictory to the occupational stress and greater CVD risk paradigm put forth by Friedman several decades ago [42]. However, it is important to note that the Hunter-Wolf questionnaire does not assess intrinsic leadership qualities, but rather it only assesses the leadership component of personality type A/B. More importantly, the occupational stress paradigm is likely not relevant nor applicable to our study population; children and teenagers are unlikely to hold highly demanding leadership positions in an occupation despite having the underlying personality traits of a type A leader. Interestingly, the Young Finns study found that type A leadership in young adulthood was associated with increased likelihood of having children [43]. Parenthood is correlated with increases in several CVD risk factors; young mothers and fathers are less physically active than non-parents, consume nearly 80 cal more per day, and have an increased fat intake [44–47]. Thus, it is plausible that the health strains of new parenthood may be related to our finding of an increase in CVD risk in young adulthood in those with greater type A leadership personalities in adolescence.

The strength of our study lies in its use of a well-known, biracial, prospective cohort with repeated measures of multiple cardiovascular risk factors. The novelty is in the adolescent to

young adult age range of our study population and the use of continuous, restricted cubic spline functions to quantify and plot CVD risk across the full spectrum of personality type A/B rather than using quintiles or some other subjective categorization scheme as in all prior studies using the Hunter-Wolf questionnaire. The non-linear relationships we found using the spline approach are intriguing and hint that personality may be best understood as a non-categorical trait in relation to cardiovascular disease risk. Nonetheless, there are some limitations to our study. First, we have used only a baseline assessment of personality type A/B during adolescence. Although we had repeated Hunter-Wolf assessments for much of our BHS population, we chose to consider only baseline personality and not to restrict the study population to this smaller subgroup for our main analyses. For sensitivity analysis, we restricted to this subgroup ($n = 2176$) and found that mean Hunter-Wolf score changed by a negligible amount (Mean change = -0.8 ; 95% CI $-1.5, -0.3$) from baseline to follow-up. A previous study also found that type A behavior is remarkably stable from childhood to adulthood [48], although the Young Finns study found evidence of age-related changes in type A personality as measured by the Hunter-Wolf assessment [39]. Therefore, it is still possible that individual variance in personality type A/B through young adulthood may affect the associations noted in our manuscript. Second, the Hunter-Wolf questionnaire is one of several personality assessment tools, many of which have been shown to be non-interchangeable and lead to different interpretations [17, 18]. The need for a standardized and comprehensive psychosocial tool to measure all components of personality is highlighted by studies such as ours, in which generalizability and comparability to similar studies using different tools can be problematic. For similar reasons, we did not attempt to measure potential interactions between the four personality components and their effects on CVD risk as the interpretations would have been difficult to conceptualize. Lastly, we experienced approximately 33% attrition among for those initially completing the Hunter-Wolf assessment. However, this loss to follow-up resulted in a population ($n = 2333$ for longitudinal analyses) that was nonetheless similar to that of our baseline: 56.9% female (versus 53.9% in cross-sectional analyses) and 34.6% black (versus 32.8% in cross-sectional analyses).

In conclusion, Hunter-Wolf personality is substantially linked to gender and race during adolescence, with type A personalities more common among female and black children. Adolescent personality type A/B is also associated with young adult BMI and fasting blood glucose, though the directionality of these relationships is evidently non-linear and likely bimodal. Most young adults on the type A side of the personality spectrum during adolescence have a greater global CVD risk than adults on the type B side of the spectrum, although this relationship, too, appears nonlinear and bimodal. These results warrant future consideration of personality type A/B as a non-categorical trait. The type A leadership component may be related to an increased global CVD risk in young adults, while the type A hard-driving component may be protective of CVD risk. More research is needed to illuminate how the individual components of personality type A/B may underlie the personality-CVD relationship across the life course.

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Fig. 1.
Baseline distribution of Hunter-Wolf A/B personality scores

Fig. 2.

Adjusted longitudinal association between baseline Hunter-Wolf A/B personality scores and body mass index

Fig. 3.
Adjusted longitudinal association between baseline Hunter-Wolf A/B personality scores and Framingham risk score

Fig. 4.
Adjusted longitudinal association between individual type A components of Hunter A/B personality score and Framingham risk score

Table 1

The Hunter-Wolf A/B Type Personality Questionnaire

24 items, each scored on an integer scale from 1 (type B) to 7 (type A)		Component trait
I am easy going(1)—hard-driving(7)		Hard-driving
I take it easy and give little effort(1)—go all out and give a lot of effort(7)		Hard-driving
When given an assignment, it does not matter if it's late(1)—does matter if it's late(7)		Hard-driving
I talk slowly(1)—talk quickly(7)		Eagerness-energy
I talk softly(1)—talk loudly(7)		Eagerness-energy
I never feel rushed(1)—always feel rushed(7)		Eagerness-energy
I eat slowly(1)—eat quickly(7)		Eagerness-energy
It feels like time passes slowly(1)—time passes quickly(7)		Eagerness-energy
I walk slowly(1)—walk quickly(7)		Eagerness-energy
I drink slowly(1)—drink quickly(7)		Eagerness-energy
I do not like to argue(1)—do like to argue(7)		Impatience-aggression
I never get in fights(1)—always get in fights(7)		Impatience-aggression
It is easy to wait(1)—difficult to wait(7)		Impatience-aggression
I always sit and listen(1)—break in when someone else is talking(7)		Impatience-aggression
It takes a lot to make me angry(1)—takes little to make me angry(7)		Impatience-aggression
When others act slowly, I am never frustrated(1)—always frustrated(7)		Impatience-aggression
I do not lose my temper easily(1)—do lose my temper easily(7)		Impatience-aggression
I am never a leader(1)—always a leader(7)		Leadership
I do not care if I win(1)—always want to win(7)		Leadership
I have no interests(1)—many interests(7)		Leadership
I am satisfied with my performance(1)—always want to have better performance(7)		Leadership
I think about one thing at a time(1)—many things at a time(7)		Leadership
I do not like to tell others what to do(1)—do like to tell others what to do(7)		Leadership
I have few hobbies(1)—many hobbies(7)		Leadership

Sum of all responses forms the continuous "Hunter-Wolf score" from 24 (type B) to 168 (type A)

Table 2

Baseline characteristics of 3396 Bogalusa Heart Study participants by Hunter-Wolf A/B Personality type

Characteristic	All subjects (<i>n</i> = 3396)	Type A dominant ^a (<i>n</i> = 1730 50.9%)	Type B dominant ^b (<i>n</i> = 1666 49.1%)	Adjusted <i>p</i> value ^c
Mean Hunter A/B score	96.9 ± 11.6	105.6 ± 7.2	87.8 ± 7.7	<i>N/A</i>
Age, (years)	15.9 ± 5.2	15.6 ± 5.2	16.1 ± 5.2	<i>0.96</i>
Female	1831 (53.9%)	1027 (59.4%)	804 (48.3%)	<i><0.001</i>
Race				<i><0.001</i>
White	2282 (67.2%)	1090 (63.0%)	1192 (71.6%)	
Black	1114 (32.8%)	640 (37.0%)	474 (28.4%)	
BMI (kg/m ²)	21.3 ± 4.8	21.0 ± 4.6	21.6 ± 5.0	<i>0.06</i>
Blood pressure (mmHg)	107 ± 10/66 ± 9	106 ± 10/65 ± 9	108 ± 10/66 ± 9	<i>0.99</i>
Pulse (beats per minute)	80.2 ± 11.6	80.4 ± 11.5	80.1 ± 11.7	<i>0.99</i>
HDL-C, (mg/dL)	58.6 ± 22.8	59.5 ± 23.0	57.6 ± 22.5	<i>0.99</i>
LDL-C (mg/dL)	97.1 ± 28.8	97.1 ± 28.7	97.1 ± 29.0	<i>0.99</i>
Triglycerides (mg/dL)	78.2 ± 47.7	76.6 ± 44.7	79.9 ± 50.5	<i>0.99</i>
Glucose, (mg/dL)	84.6 ± 10.1	84.3 ± 11.5	84.9 ± 8.4	<i>0.99</i>
Current smoker				<i>0.08</i>
Yes (1 cigarette/week)	582 (17.1%)	275 (15.9%)	307 (18.4%)	
No	2814 (82.9%)	1455 (84.1%)	1359 (81.6%)	
Current alcohol usage				<i>0.03</i>
Yes (1 drink/week)	796 (23.4%)	339 (19.6%)	457 (27.4%)	
No	2600 (76.6%)	1391 (80.4%)	1209 (72.6%)	

Italicized entries specify that the number indicated is a *p*-value^aType A indicates a total Hunter-Wolf score of >96;^bType B indicates a total Hunter-Wolf score of < 96;^cAdjusted *p* value with Bonferroni correction for multiplicity from multivariate baseline model with Hunter-Wolf score modeled as a continuous, splined variable