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Correlations between Personality and Body Mass Index in a Cross-Sectional Sample of the

Seattle Longitudinal Study

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Abstract

The purpose of the present study was to examine the relationship between personality and body mass index (BMI) in a cross-sectional sample of the Seattle Longitudinal Study. The participants included 1495 people, 656 males and 839 females who participated in the 2001 off-wave data collection of the NEO Personality Inventory-Revised (Costa & McCrae, 1992). Two-step hierarchical regression analyses were performed to determine the relationship between personality and body mass index. No covariates were included in the first step, but the second step included the covariate of education. The BMI-personality relationship was examined by age group, gender, and gender by age group. The personality scales accounted for varying levels of variance in the various age and gender groups. Overall, the personality scale that was most often significantly related to body mass index was conscientiousness. Lower levels of conscientiousness were related to higher body mass indexes in the entire sample of males, in late middle-aged adults, young-old adults, and late middle-aged females. The results of this study suggest that in general, a more conscientious group of people will tend to have lower body mass indexes.

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Correlations between Personality and Body Mass Index in a Cross-Sectional Sample of the Seattle Longitudinal Study

Research regarding obesity and psychology is becoming important especially with the recent trends in obesity as reflected by higher body mass indexes in the United States. According to the U.S. Department of Health and Human Services (2001), being overweight puts a person at heightened risk for many diseases, such as heart disease, type 2 diabetes, stroke, arthritis, breathing problems, and even some types of cancer. Therefore, given the dangers of being overweight and the growing proportion of Americans who are overweight, it is important to explore and to understand the different aspects of the BMI formula, and the different factors that can affect BMI.

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It is important to note that research has shown that variables such as age, race, and muscle mass can skew BMI, sometimes leading to inaccurate calculations (Prentice & Jebb, 2001). Still, BMI is the most commonly used formula to determine obesity (Kuczmarski & Flegal, 2000). Due to the wide use of BMI, it is the main measurement used in the current study to calculate the appropriateness of a person's weight range. Many factors are known to lead to the state of being overweight or obese. According to the U.S. Department of Health and Human Services (2001), some of the main causes include genetic, metabolic, behavioral, environmental, and socioeconomic factors.

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Despite all the research on the relationship between BMI and health there is not an abundance of literature available that deals with the relationship between BMI and personality traits. Much of the literature that does deal with this relationship focuses on the severely overweight, underweight, or people with diagnosed eating disorders. In many articles, the personality measures that were examined were often more oriented towards psychopathology than the five factors measured by the NEO. The literature seems to focus on the outliers in both BMI and personality when examining the relationship between the two.

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Personality traits have been shown to affect dietary habits. Kikuchi and Watanabe (2000) showed that four of the big five factors significantly influenced food intake. Participants high in agreeableness tended to frequently sample foods and confectioneries. Females who scored high in openness were found to consume healthy foods and fruits. High levels of neuroticism were correlated with low levels of health conscientiousness. In contrast, participants with high levels of extraversion had high levels of health conscientiousness.

Patterns of eating can greatly affect a person's weight or BMI. The three main types of eating behaviors that researchers often study when examining eating patterns are external eating, emotional eating, and restrained eating. Van Strien, Frijters, Roosen, Knuijman-Hijl, and Defares (1985) identified both external eating and emotional eating as eating styles which may be factors leading to obesity. A study by Heaven, Mulligan, Merrilees, Woods, and Fairouz (2001) investigated the relationships between these three types of eating patterns and personality factors. Heaven et al. (2001) found that higher body mass indexes were more likely to be linked to emotional and restrained eating. They also found that emotional and external eaters are not very conscientiousness.

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Exercise also affects BMI (Whitney & Rolfes, 2002) and several studies have shown exercise can be related to personality. A study by Rhodes and Courneya (2003) found that extraversion is extremely important when considering exercise behavior. They concluded that extraverts tend to seek out activity of all types, and one of these outlets for their energy may be exercise. The results of this study make it clear that the researchers feel that extraverted people

will exercise more. Corneya and Hellsten (1998) also found that extraversion was positively related to exercise behavior.

Faith, Flint, Fairburn, Goodwin, and Allison (2001) found that a higher BMI in females was significantly associated with higher levels of neuroticism, but lower levels of extraversion as measured by the Eysenck Personality Inventory (EPI). This finding did not hold true for the male subjects: For males, a higher BMI was associated with a greater level of extraversion (Faith et al. 2001).

In contrast to the study by Faith et al. (2001), Hälleström and Noppa (1981) found that extraversion scores on the EPI were significantly higher in women who were obese. However, they did not find this relationship to be true unless they took the factors of age and social class into account. Segraves (1970) found neuroticism and extraversion to be significantly related to body size. Although Segraves used the Eysenck Personality Inventory which does not include openness, extraversion or conscientiousness, his work is important because he found that neurotic subjects were usually small, and extraversion was correlated with a wide physique (Segraves 1970). Kittel, Rustin, Dramaix, DeBacker, and Kornitzer (1977) found that obese male subjects tended to be more extraverted than non-obese male subjects are. In addition to their findings about extraversion, Kittel et al. (1977) also found that obese males were less neurotic than leaner subjects were.

The study by Korkeila, Kaprio, Rissanen, Koskenvuo, and Sörensen (1998) supported the finding by Faith et al. (2001) in that the researchers found high levels of neuroticism (from the EPI) in older females who reported higher body mass indexes at the beginning of the study. However this fact was only true for older females of this study, those between ages 30-54. The researchers did not find a relationship between BMI at the beginning of the study and extraversion, but they did find that high levels of extroversion in males tended to be a predictor of lesser weight gain for those males. However, it is important to remember this Finnish study did not find significant relations between extraversion and BMI at the beginning of the study and levels of weight gain or loss does not necessarily describe actual BMI levels.

When examining obesity, it is important to examine the link between personality and health behaviors, because different health behaviors may lead to obesity. Coleman (1997) noted that neuroticism has most often been linked with health behaviors. Although few studies have been completed examining the relationship between conscientiousness and health behaviors, the nature of conscientiousness lends itself to the promotion of health behaviors (Coleman 1997). Coleman (1997) stated that high levels of extraversion are related to health promoting behavior such as lack of reluctance to exhibit symptoms. Jerram and Coleman (1999) also found that overall healthy behaviors may be more prominent in people who have higher scores of extraversion.

METHOD

Sample

This study examines the NEO personality scores and the body mass indexes of 1,495 participants from the Seattle Longitudinal Study. (SLS) The Seattle Longitudinal Study began in 1956 with 500 randomly selected members of the Group Health Cooperative of Puget Sound. (Schaie, 2005) Since then, the study has grown to include nearly 6,000 participants. Data have been collected in seven-year intervals, and at each collection time new participants were added to the previous participants who were invited to participate again. The goal of the Seattle

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Longitudinal Study is to research many [antecedents of cognitive](#) development during adulthood. (Schaie, 1996)

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The [participants of](#) this study include both males and females from the 1998 data collection wave of the SLS who also had scores for the 2001 off wave collection of the NEO data. Out of the 1,495 subjects for this study, there were 839 females and 656 males. The mean age of the subjects was 60.4. 103 subjects fell in the category of “young” with ages from 22-34. There were 307 “early middle age” subjects (ages 35-49), 382 “late middle age” subjects (ages 50-63), 472 “young old” subjects (ages 64-77), and 231 “old-old” subjects who were older than 78. Mean educational background was 15.5

The data from the Seattle Longitudinal Study support the finding of Flegal, Carroll, Ogden and Johnson (2002) that body mass indexes are rising in America. Since 1956, the average body mass index in the Seattle Longitudinal Study has been going up. The average BMI in 1956 was 23.95, with a range of 16.63 to 39.83. In 1970, the average BMI was still 23.95, but the actual body mass indexes in the 1970 study ranged from 14.78 to 41.96. By 1977, average BMI in the study had risen to 24.28, with body mass indexes ranging from 15.45 to 46.34. In 1980, the average BMI in the Seattle longitudinal study was 24.71 and the range went from 16.82 to 52.90. By 1991 average BMI in the study was 25.59 and body mass indexes ranged from 13.56 to 50.90. 1998 had the highest average body mass index of the Seattle Longitudinal Study, 26.91 and the range went from 15.45 to 60.81.

The mean body mass index for this population was 26.95, with a standard deviation of 5.25. The body mass indexes of the subjects ranged from 16.1 to 60.8. According to the BMI guidelines (Whitney & Rolfes, 2002), there were 50 underweight subjects, 581 normal subjects, 442 overweight subjects, and 322 obese subjects.

Dependent Measures

Body mass index as calculated from the Life Complexity Inventory (LCI) Body mass index is equal to kilograms divided by meters squared. The LCI is a group of questions designed specifically for the SLS participants. Questions included in the LCI cover categories such as height, weight, year of birth, marital status, number of children, education level, religion, income, friends and life satisfaction. The LCI also includes questions that cover the number of hours a week spent on various activities (Schaie, [2005](#)).

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Predictors

Personality [traits](#) from the NEO-PIR questionnaire. The NEO-PI-R questionnaire is based on the Five-Factor Model of Personality. There are 243 items included in the NEO-PIR, 3 of these items are validity items and 240 items deal with personality facet domains. The answers are given on a five-point scale. (Costa & McCrae, 1992) The NEO-PIR used in this study was reformatted from the original by [the second author](#).

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Results

The results section will address the findings of this study in relation to the correlation between personality [traits](#) and obesity. [We report](#) the relationship between body mass index and the five NEO personality scales, [disaggregated](#) by age group, gender and age group by gender.

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Associations between Obesity and the NEO Personality Scales by Age Group

Successive two-step hierarchical regression analyses were conducted with a different measure of obesity as the dependent variable. The dependent variable was body mass index. The first step included the five NEO scales as the independent variables, the second step added education as a covariate. The two-step hierarchical regression analyses were performed for age group, gender, and gender X age group interaction. Table 1 shows the hierarchical regression analyses for the BMI in young adults, early middle-aged adults, late middle-aged adults, young-old adults, old-old adults, and the total sample.

In the first step, neuroticism ($p < .05$) and conscientiousness ($p < .01$) were the only two personality scales that were significantly associated with body mass index in the total sample. In the second step, agreeableness ($p < .05$), conscientiousness ($p < .001$) and education ($p < .001$) were all significantly related to body mass index. In the first step, higher body mass indexes were associated with higher levels of neuroticism, but lower levels of conscientiousness. In the second step, higher body mass indexes were associated with lower levels of agreeableness, conscientiousness and education. Approximately two percent of the variance in body mass index was accounted for in the first step by the personality variables. Approximately four percent of the variance in body mass index was accounted for in the second step.

Conscientiousness appeared as a significant factor in both the late middle-aged adults and the young old adults, regardless of co-varying for education. However, in the late middle-aged sample, extraversion and openness to experience were also all significantly related to body mass index. Higher body mass indexes were related to lower levels of education in every age group except for young adults.

For females, conscientiousness was the only factor that was a significant predictor for body mass index. Education was significantly related to Body mass index. For males, conscientiousness was significantly related to body mass index in step one only. Agreeableness was significantly related to both steps for body mass index. Education was significantly related to body mass index. For both females and males, conscientiousness was a significant predictor of Body Mass index in at least the first step. Agreeableness was significantly related to body mass index. For both males and females, education was significantly related to BMI.

For young adult females, education was the only significant relationship that was found for body mass index. No significant relationships were found for young adult males. No significant relationships were found in early middle-aged adult females. For early middle-aged males, agreeableness was significantly related to body mass index. Education was also significantly related to BMI for early middle-aged males. For late middle-aged women, openness to experience was significantly related to BMI in the first step, but not the second. Conscientiousness was related to BMI for both steps. Education was also significantly related to BMI for late middle-aged females. The only significant relationship between body mass index and personality for late middle-aged males was found in the openness to experience scale, which was significantly related to both steps for BMI. For young-old females, there were no significant relationships found. In young-old males, higher levels of conscientiousness were related to lower body mass indexes in both steps. In each measure, higher levels of agreeableness and extraversion were also related to higher body mass indexes in each step for young-old males. Education was also significantly related to BMI for young-old males. No significant relationships with education were found for either old-old males or females.

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Discussion

The purpose of the current study was to investigate the relationship between obesity and the five NEO personality scales. BMI was used as the main measurement of obesity, because it is the most widely used measure and one of the most easily obtainable.

Overview of Findings

The age group which in which personality accounted for the greatest variance in body mass index was late-middle age. Overall, personality accounted for more variance in men than in women when the results were not considered by age group.

Most of the hypothesis held true in at least one age group or gender, although few of the personality factors were significantly associated with body mass index across age groups. Although all of the hypotheses for the current study did not hold true consistently, conscientiousness was consistently related to both body mass index. It appeared as a significant factor when the data was analyzed by age, by gender, and when broken down into gender and age x gender. In fact, conscientiousness was the only personality scale that accounted for significant variance in females by age group after education was accounted for, and only in the late middle-aged group. In males, many other personality scales also accounted for significant variance in the all the age groups except for young adulthood and old-old adulthood. Contrary to the hypothesis for age groups, none of the personality scales repeated themselves as significant from one age group to another.

Association between the 5 NEO Personality Factors and Obesity

Age Groups (Table 1)

Across age groups, conscientiousness was by far the personality scale that accounted for the greatest amount of variance in BMI. Conscientiousness accounted for variance for the late middle-aged group and the young-old group in both steps of every measure. Higher levels of obesity were significantly associated with lower levels of conscientiousness in both late middle age and young old age for each measure of obesity. This is in agreement with Corneya and Hellsten's (1998) research, which suggested that conscientiousness is related to adherence to exercise behavior.

The fact that conscientiousness was related with higher body mass indexes also agrees with the research on eating styles and the fact that people who have dangerous eating styles often tend to score low on levels of conscientiousness (Van Strien et. al & Heaven et. al). This finding is also in agreement with the hypothesis for the current study which predicted that higher levels of conscientiousness would be correlated with lower body mass indexes. The fact that this result occurred in late middle-aged adults and young-old adults is logical due to the similarity between these two groups. The fact that higher levels of obesity were related to lower levels of conscientiousness could also have something to do with the role that conscientiousness may play in moderating the effect of the curvilinear pattern that occurs for body mass index toward the middle of life.

Agreeableness did not account for significant variance in body mass index for any age group.

Openness to experience accounted for significant variance in body mass index for the late middle-aged sample when education was not taken into account. Very few articles talked about the relationship between openness to experience and obesity, and the fact that a correlation did occur between obesity and openness to experience is contrary to the hypothesis for this study. Possible explanations for this could include the role that openness to experience may play in

people's willingness to try new health behaviors such as healthy foods or a regular exercise regime.

The higher body mass indexes were related to higher extraversion in late middle-aged adults only. This is surprising because it goes against the literature which found extraversion to be positively related to high levels of exercise (Rhodes & Corneya 2003), (Corneya & Hellsten 1998) and health behaviors in general (Jerram & Coleman, 1999), (Kikuchi and Watanabe 2000).

However, it is in line with the literature that cited higher levels of extraversion were related to higher levels of obesity in males. It is still interesting that extraversion is only significantly associated for this age group, because there does not appear to be much difference in the ratio of men to women in this age group as compared to any other. Overall, the fact that extraversion was not significantly associated with obesity for all age groups is in agreement with the hypothesis that obesity and extraversion would not be significantly related when gender was not taken into account. However, the fact that extraversion was significant in the middle-aged adult group is surprising and strays from the hypothesis that age group would not have an effect on the significance of relationships between personality scales and obesity.

Of course, given the multitude of data suggesting that gender affects both body mass index and body fat, the results examined simply by age group do not represent the total picture. However, they are useful in discerning if personality in one age group accounts for a greater amount of variance than personality in another age group. In the current study, it seems that for late middle age is the age in which personality accounts for the most variance in BMI. A reason for this may be because late middle age tends to be the age when people have the most body fat on their body.

Gender (Table 2)

For both females and males, higher levels of conscientiousness were related to lower levels of obesity as measured by the BMI. Of course, in males, conscientiousness was only related to lower levels of BMI before covariance for education. This could have to do with the fact that highly educated men may be more aware of the health benefits of lower levels of obesity than less educated men and conscientiously chose to strive for lower levels of BMI as a result of their education. Overall, conscientiousness seems to be linked with lower levels of obesity in both men and women. This agrees with the eating styles research by Van Strien and Heaven's, and the literature that suggests that conscientiousness is related to adherence to exercise behavior. This finding is also in line with the hypothesis of the current study which predicted that conscientiousness would be associated with lower levels of obesity in both males and females. Since males and females generally have similar levels of conscientiousness, the fact that this finding holds true for both men and women is not surprising. (McCrae, 2002) It is likely that the characteristics of conscientiousness such as organization and purposefulness are assets that help people develop and comply with healthy eating behaviors, exercise behaviors, and overall healthful practices.

In females, openness to experience was only significantly related to the three body fat equations before education was accounted for. Females with higher levels of openness to experience had lower levels of obesity before education was taken into account. Perhaps the reason for this relationship only before education is taken into account has to do with the fact that less educated people might have to be more open to new ideas before trying healthier foods or lifestyles, but people with high levels of education may practice these lifestyles as a result of their education rather than their personality. The fact that openness to experience is not related to any measure of obesity when education is co-varied for is in agreement with the hypothesis for

the current study. As mentioned earlier although openness to experience may lead to greater willingness of females to try healthier lifestyles, those who are educated may do naturally practice these lifestyles as a byproduct of their education.

In males however, openness to experience was significantly related to BMI before and after covariance for education. This is in direct contradiction with the hypothesis for the current study that predicted no relationship due to the lack of literature that had found significant results. For males, it makes sense that being open to new ideas would lead to lower levels of obesity, since males in general may feel less pressure to achieve lower levels of obesity than females. Adhering to diet and exercise regimens may require more openness on the part of males since they do not have the societal standard that females have to have lower body weights and levels of obesity. Without this standard, it may take more openness on the part of a man to chose a healthy meal or a strenuous workout than the level of openness to experience that would be required for a female to make the same choices.

No relationships were found between neuroticism and BMI for either males or females. This contradicts the literature which cited a positive relationship between neuroticism and obesity in females (Faith et al. 2001 & Korkeila et al. 1998), but a negative relationship between neuroticism and obesity in males (Kittel et al., 1977). Subsequently this finding also contradicts the hypothesis of the current study, which predicted that highly neurotic females would have higher levels of obesity, but highly neurotic males would have lower levels of obesity. One reason that the results of the current study may differ from the results found by (Faith et al. 2001, Korkeila et al. 1998 & Kittel et al., 1977) is the fact that each of the studies put forth by these researchers used the Eysenck Personality Inventory (EPI) to measure neuroticism instead of the NEO-PI-R test used in the current study. While the traits of Neuroticism and Extraversion on the (EPI) and the NEO-PI-R are highly correlated with each other (Costa & McCrae, 1995), the fact remains that each test is slightly different, and therefore measures each trait in a slightly different manner. While neuroticism as measured by the EPI may be related to obesity, there is little in the literature or the current study that suggests that neuroticism as measured by the NEO-PI-R is related to obesity.

Contrary to the hypothesis, the current study did not find that extraversion accounted for significant variance in body mass index. Extraversion may be a facet of personality that manifests itself in many different ways, and perhaps these outlets for personality are too varied and unrelated to diet and exercise to have a specific affect on obesity. No significant relationships were found between extraversion and BMI in the overall sample of men either. This goes against the findings in the literature that identified a link between extraversion and high body mass indexes in males. (Faith et al. 2001 & Kittel et al. 1977) This finding also contradicts the hypothesis of the current study. The reason for these contradictions may again be related to the fact that both Faith et al. (2001) and Kittel et al. (1977) used the EPI to determine extraversion, and the current study used the NEO-PI-R. The fact that these the results of this current study did not follow the trends for the relationship between EPI and obesity in either neuroticism or extraversion suggests that neuroticism and extraversion may not be interchangeable between the two tests.

Agreeableness was not associated with BMI in females. This is in agreement with the hypothesis for agreeableness that was based on the lack of previous scientific findings linking agreeableness to obesity. However, for males, agreeableness was significantly related to lower body mass indexes both before and after education was taken into account. Since women tend to have higher overall levels of agreeableness than men those men that do have higher levels of

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agreeableness may take a more feminine attitude towards weight consciousness, and this could lead to lower body mass indexes. As in the case of analysis by age group, gender does not present the entire picture. Since both age and gender can affect body mass index and body fat, the most important analysis grouping to look at is the age group by gender.

Age Group by Gender (Table 3 & 4)

When the relationship between personality and obesity was examined by age group and gender, conscientiousness turned out to be the only personality trait that was significantly associated with females for any age group both before and after education was taken into account. Conscientiousness was only significantly associated with body mass index for late middle-aged females. Higher levels of conscientiousness were associated with lower levels of obesity in this age group for females. Again, conscientiousness naturally relates to diet and exercise behaviors, and the role of conscientiousness in moderating obesity may become especially important in middle-aged females due to the fact that at this point in life, metabolism slows down, often due to an increase in sedentary lifestyles greatly (Santoro, 2000). Conscientiousness may be an aspect of personality that women can utilize in order to stick to diets and exercise and keep their levels of obesity in check.

Agreeableness was significantly related to lower levels of obesity in early middle aged males and young old males. This result was not found to be significant for females. This is a surprising result, because one would not normally link trust, compassion and modesty as relating to the factors that cause obesity. However, it is possible that the facet of modesty carries over into males eating behaviors, and personality may play a larger role in eating behaviors during these two age groups than late-middle age.

Out of all the groups, young-old males had the most significant associations between personality and obesity. Higher levels of conscientiousness and agreeableness were associated with lower levels of obesity in young-old males, but higher levels of extraversion were associated with higher levels of obesity in young-old males. It is interesting that conscientiousness and extraversion are only significantly related in this age group. The young-old age group was the male age group that had the most number of participants. This is also an age group when many men are in a transition point in their life, often moving from an active work life to a more relaxed retirement style. Conscientiousness might guard against more frequent eating habits and a more sedentary lifestyle during this change. Extraversion may also be related to the continuation of an active lifestyle as men in this age group begin to find the daily structures and routines of their younger years disappearing.

Openness to experience was related to obesity in late middle-aged males both before and after education was taken into account. This trend was also observed for females in this age group. The relationship in both sexes is probably due to the fact that openness to experience, especially healthy experiences may be especially important in this age group in as metabolism slows down and body fat increases (Mott et. al, 1999). Those who are open minded about health behaviors, especially diet and exercise probably have an advantage in this age group as it is probably the first time that many people's body mass indexes significantly rise due to biological changes.

A limitation of this study is due to the cross sectional nature of the study. Because this is a cross-sectional analysis it is possible that age and cohort differences might be confounded. Cohort effects may also play a role in differences between age and cohort in body composition. Because of this, it is difficult to generalize the results beyond the current study. Another aspect of limitation in this study is that the measurements for height and weight came from self reports,

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and people's self reports are most likely not as accurate as actual measurements. Further research should focus on longitudinal analysis of the relationship between personality and both body mass index and body fat percentages. It would also be beneficial to further examine the relationship between personality and body mass index or body fat percentages specifically in late middle-age, which is when adults tend to have the most body fat. Of course, given the scarcity of literature available on the relationship between personality and obesity, it importance to attempt to replicate the findings of the current study, especially on the findings regarding conscientiousness.

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Acknowledgments

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Table 1
 Hierarchical Regression Analysis of Body Mass Index by Age Group (N=1495)

	Young		Early Middle		Late Middle		Young Old		Old-Old	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
N	.03	.02	.13	.11	-.01	-.04	.07	.05	.14	.11
E	-.18	-.19	.05	.06	.13*	.11	.08	.07	.07	.05
O	-.15	-.13	-.05	-.03	-.18**	-.10	.05	.09	-.06	.01
A	-.17	-.13	-.02	-.03	.00	-.05	-.07	-.09	.00	-.02
C	-.05	-.04	-.06	-.08	-.21***	-.19**	-.17**	-.17**	.03	.02
Educ		-.18		-.14*		-.21***		-.12*		-.16*
R2	.1169	.1488	.0292	.0491	.0576	.0924	.0473	.0613	.0188	.0397
DR2		.0319		.0199		.0348		.0140		.0209

Note: Young(N=103), Early Middle (N=307), Late Middle (N=382), Young-old (N=472), Old-old (N=231)

*p<.05
 ** p<.01
 *** p<.001

Table 2
Hierarchical Regression Analysis Summary by Gender

	Females		Males	
	Step 1	Step 2	Step 1	Step 2
N	.07	.07	.06	.04
E	.05	.05	.08	.07
O	-.02	.03	-.08	-.03
A	.01	-.01	-.12**	-.13**
C	-.11**	-.11**	-.09*	-.09
Educ		-.15***		-.14**
r square	.0216	.0400	.0390	.0550
DR2		.0184		.0160

Note: * $p < .05$
 ** $p < .01$
 *** $p < .001$

Table 3
Hierarchical Regression Analysis of Body Mass Index for Females by Age Group (N= N=839)

	Young		Early Middle		Late Middle		Young-old		Old-old	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
	N	.05	.10	.16	.15	-.07	-.08	.10	.08	.17
E	-.11	-.11	.06	.08	.11	.10	.01	.00	.04	.04
O	-.20	-.11	-.01	-.01	-.17*	-.06	.06	.12	-.05	-.05
A	-.04	.05	.06	.05	-.06	-.09	.02	.01	.11	.11
C	-.26	-.25	-.06	-.07	-.25**	-.22**	-.08	-.09	-.02	-.03
Edu c		-.32*		-.09		-.24**		-.13		.04
R2	.1616	.2484	.0290	.0374	.0791	.1231	.0226	.0358	.0323	.0340
D2		.0868		.0084		.0440		.0132		.0017

Note: Young (N=59), Early Middle (N=169), Late Middle (N=212), Young-old (N=261), Old-old (N=138)

*p<.05
** p<.01
*** p<.001

Table 4
Hierarchical Regression Analysis of Body Mass Index for Males by Age Group (N= N=656)

	Young old	Early Middle		Late Middle		Young-old		Old--		
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
	N	.18	.16	.08	.07	.09	.07	.02	-.01	.13
E	-.21	-.22	-.02	.00	.15	.14	.19*	.19*	.16	.10
O	-.11	-.11	-.08	-.07	-.23**	-.19*	.03	.08	-.07	.06
A	-.12	-.10	-.22*	-.19*	.03	.02	-.15*	-.17*	-.08	-.04
C	.23	.24	-.06	-.08	-.11	-.10	-.30***	-.29***	.07	.09
Educ		-.13		-.19*		-.10		-.16*		-.19

R2	.1196	.1350	.0838	.1199	.0642	.0697	.1161	.1381	.0355	.0571
D2		.0154		.0361		.0055		.0220		.0216

Note: Young (N=44), Early Middle (N=138), Late Middle (N=170), Young-old (N=211), Old-old (N=93)

* $p < .05$

** $p < .01$

*** $p < .001$

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