Associations Between the Five-Factor Model of Personality and Health Behaviors Among College Students

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Abstract. Objective: In fall 2006, the authors examined associations between the five-factor model of personality and several key health behaviors. **Methods**: College students (N = 583) completed the American College Health Association–National College Health Assessment and the International Personality Item Pool Big Five short-form questionnaire. **Results**: Highly conscientious individuals were more likely to wear seat belts, utilize alcohol-related harm reduction, exercise, get enough sleep, and consume fruits and vegetables. They were also less likely to smoke cigarettes, consume alcohol, and binge drink. Highly extraverted individuals were more likely to smoke cigarettes, consume alcohol, binge drink, and have multiple sexual partners, and they were less likely to engage in alcohol-related harm reduction, use condoms, and get enough sleep. **Conclusions:** These findings are supportive of a growing body of evidence indicating that conscientiousness and extraversion are robust concomitants of health behaviors among college students.

Keywords: college students, five-factor model of personality, health behavior, personality traits

Many contemporary public health problems are highly preventable. Regularly engaging in preventive health behaviors (eg, physical activity) and avoiding deleterious health behaviors (eg, cigarette smoking) reduce the risk of acute injury or illness, several chronic diseases, and premature mortality.[1] Given that a significant number of college students are nonadherent to multiple health behavior goals delineated in *Healthy Campus 2010*,[2,3] there exists a strong need to identify predictors of their preventive and risky health behaviors.

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The five-factor model (FFM) of personality has emerged as a promising predictor of health behaviors. The FFM is a parsimonious taxonomy that classifies all personality dimensions into 5 broad domains, commonly labeled *openness*, *conscientiousness*, *extraversion*, *agreeableness*, and *neuroticism*.[4] *Openness* refers to being intelligent, imaginative, curious, flexible, and broad-minded. *Conscientiousness* refers to striving for competence and achievement, and being self-disciplined, orderly, reliable, and deliberative. *Extraversion* refers to enjoying the company of others, and being active, talkative, assertive, and seeking stimulation. *Agreeableness* refers to being courteous, good-natured, cooperative, tolerant, and compassionate rather than antagonistic. *Neuroticism* refers to easily experiencing unpleasant and negative emotions, such as fear, anxiousness, pessimism, sadness, and insecurity. Extensive evidence supports the reliability and construct validity of these Big Five dimensions of personality across ages and cultures.[5,6]

Most studies examining the predictive utility of the FFM for undergraduates have targeted isolated health behaviors, often with mixed findings. Of the Big Five factors, conscientiousness and extraversion have received the most consistent support, with high conscientiousness associated with increased exercise;[7] improved sleep sufficiency, sleep quality, and earlier sleep schedules (ie, wake-up and retiring times);[8] safer sexual behavior;[9] decreased risky driving behavior;[10,11] decreased alcohol consumption and disorders;[12–14] and decreased cigarette smoking.[14]

Different aspects of extraversion have been associated with both preventive and risky health behaviors. Extraversion, particularly the facet of activity, is positively associated with exercise engagement,[7] but high levels of extraversion and other facets (eg, sensation seeking) have been associated with increased alcohol consumption, alcohol-related problems, binge drinking,[15–17] cigarette smoking,[18] risky

driving behavior,[19,20] and risky sexual behavior.[9] However, several studies failed to replicate significant associations among conscientiousness, extraversion, and the aforementioned health behaviors.[7,12,13,19–22]

Only modest support exists for the utility of neuroticism in predicting various health behaviors. High neuroticism has been associated with decreased exercise adherence;[7] increased alcohol consumption, alcohol-related problems, and binge drinking;[12,13,17,23] increased cigarette smoking;[18,22] and decreased sleep quality and sleep efficiency.[8] However, several studies have failed to replicate the aforementioned associations involving neuroticism,[7,14,15] as neuroticism was unrelated to risky driving[10,19] and sexual behaviors.[9]

Agreeableness was also unrelated to level of exercise behavior,[7] sleep quality and efficiency,[8] and alcohol-use and disorders.[13] However, high overall agreeableness did predict decreased alcohol use disorders,[12] and 2 subcomponents of agreeableness—straightforwardness and tender-mindedness—were inversely related to alcohol use and alcohol disorders.[13] Finally, there is a dearth of studies reporting significant associations between openness and health behaviors.[7,8,10,13,19] A notable exception exists with 1 study reporting a positive association between openness and exercise engagement.[24]

A significant limitation in the FFM health behavior literature is that almost all studies have examined health behaviors independently. Given the ample evidence showing that health behaviors tend to coexist within individuals,[25] it is imperative to examine the extent to which personality traits influence a range of seemingly disparate health behaviors. Only a few international studies have examined associations between the complete FFM and multiple health behaviors of undergraduates. In a large sample of 1,184 college-aged men and women in Spain, conscientiousness was a particularly strong predictor of health behaviors, including decreased smoking and alcohol consumption, and increased exercise and healthy eating habits.[26] Less potent but still significant, sex-specific correlations were also observed: (1) Increased neuroticism, extraversion, and openness were linked with unhealthy habits in women; (2) increased agreeableness was linked with healthy habits in women; and (3) increased neuroticism was linked with unhealthy habits in men. In a small sample of 150 college students in the United Kingdom, agreeableness and conscientiousness were positively associated with a 29-item preventive health behavior scale. Results also indicated interactive effects such that high agreeableness/high conscientiousness and low openness/high conscientiousness predicted greater preventive behavior.[27] Finally, in a sample of 683 Swiss university students, regardless of level of extraversion and neuroticism, high conscientiousness was associated with reductions in smoking cigarettes, drinking alcohol, drunkenness, drunk driving, cannabis use, and number of sexual partners. Conversely, students with low conscientious and either high extraversion or high neuroticism were more likely to engage in several of the aforementioned risky health behaviors.[28]

Another important limitation in the personality-health behavior literature is that associations among the FFM and several critical health behaviors delineated in *Healthy Campus 2010* guidelines,[3] including sleep, diet, sexual risk taking, and alcohol-related harm reduction, have received minimal empirical attention. A careful review revealed only 1 published study focusing on sleep behavior,[8] another addressing sexual risk taking,[9] no studies focusing on diet and alcohol-related harm reduction, and many including only 1 or 2 of the Big Five as predictors. Another limitation is that a wide range of health behaviors or risks were assessed with surveys lacking psychometric validation, which may have contributed to the heterogeneity of results. Finally, there is growing evidence that male students, Greek-affiliated students, and intercollegiate athletes are more likely to engage in certain unhealthy behaviors.[2,29,30] Unfortunately, the majority of personality-health behavior studies have failed to determine whether personality traits explain variance beyond that accounted for by these important demographic and group membership variables.

We attempted to overcome several of the aforementioned limitations by examining putative associations between the complete FFM of personality and several key preventive and deleterious health behaviors delineated in *Healthy Campus 2010*.[3] The American College Health Association–National College Health Assessment (ACHA-NCHA) and the short-form International Personality Item Pool (IPIP) Big Five questionnaire were administered via the Internet to a sample of college students at a liberal arts college. On the basis of prior evidence, we hypothesized that conscientiousness would be associated with increased preventive health behaviors and decreased risky health behaviors. We expected extraversion to have divergent associations, predicting increased physical activity, as well as an increase in several risky behaviors. Given the modest empirical support in the literature, we did not hypothesize a priori significant links for the traits of neuroticism, agreeableness, and openness. Finally, we wanted to examine whether the predictive utility of personality traits would exist after controlling for a few preselected group membership variables, including sex, intercollegiate athletic status, and Greek affiliation.

METHODS

Participants

A total of 2,000 undergraduate students enrolled at a small (ie, enrollment < 5,500) public liberal arts college in the northeastern United States were invited to participate in this study during the fall 2006 semester. To recruit a sufficient number of students involved in intercollegiate athletics and Greek organizations, all individuals from these 2 groups were invited to participate. The athlete and Greek-affiliated groups comprised 764 students (378 intercollegiate athletes, 471 Greek members, 85 belonging to both groups), and the remaining 1,236 invited students were selected from the general student body in a stratified random sample with equal distribution across undergraduate class years. As an

incentive to participate, 10 randomly selected students were awarded a $25 bookstore gift certificate at the conclusion of the study. Participation in this study was voluntary, all students provided informed consent, and the college's Institutional Review Board approved this study.

Data were collected from 603 participants, representing a 30% response rate. Twenty participants were dropped from this sample because of missing data (> 15% of survey items), resulting in a final sample of 583 participants. The sample comprised 117 intercollegiate athletes (20.1%) and 95 Greek-affiliated members (16.3%). Participants identified as predominantly female (74%) and white (89%), with 0.3% identified as black, 1.7% as Hispanic/Latino, 3.6% as Asian/Pacific Islander, and 4.3% as other or having more than 1 ethnicity. In comparison to the student body, the sample was disproportionately composed of female students (overall female enrollment: 59%), intercollegiate athletes (overall enrollment: 7.6%), and Greek members (overall enrollment: 9.4%), but it was consistent with the 11% of students of color enrolled overall during the same time period. The sample was evenly distributed across class years, with approximately one-quarter in each academic class.

Measures

Health Behaviors

The ACHA–NCHA Web survey[2] consists of 240 questions assessing a range of health-related behaviors, problems, and beliefs and is typically completed in 20–30 minutes. Six topic areas, in addition to demographic characteristics, are assessed: (1) health, health education, and safety; (2) alcohol, tobacco, and drugs; (3) sex behavior, perceptions, and contraception; (4) weight, nutrition, and exercise; (5) mental and physical health; and (6) impediments to academic performance. The structure of the questions varies, including Likert-type ratings and yes/no questions, as does the period of time about which student behaviors are assessed (eg, past year, past month, past week). Studies have demonstrated that this survey is a reliable and valid measure of college student health behavior.[31]

A subset of items was selected for the current study. These items measured 11 behaviors related to injury prevention (eg, "Within the last school year, how often did you wear a seatbelt when you rode in a car?"), exercise (eg, "On how many of the past 7 days did you participate in vigorous exercise for at least 20 minutes or moderate exercise for at least 30 minutes?"), sleep quality (eg, "On how many of the past 7 days did you get enough sleep so that you felt rested when you woke up in the morning?"), sexual behavior (eg, "Within the last school year, with how many partners, if any, have you had sex [oral, vaginal, or anal]?"), fruit/vegetable consumption (eg, "How many servings of fruits and vegetables do you usually have per day?"), and tobacco and alcohol consumption (eg, "Within the last 30 days, on how many days did you use alcohol?").

Personality

The IPIP is a public domain collection of over 2,000 items measuring a wide range of personality characteristics. Items involve a compact verbal phrase (eg, "Make plans and stick to them," "Make friends easily," "Feel comfortable with myself") from which individuals rate the extent to which they perceive the behavior to be like them; responses are derived from a 5-point Likert-type scale ranging from 1 (*very inaccurate*) to 5 (*very accurate*). The 50-item IPIP Big Five factor inventory was recently found to be psychometrically valid and to correlate strongly with 2 leading personality inventories (ie, the NEO-FFI Five Factor Inventory and Eysenck Personality Questionnaire-Revised Short-Form).[32] Moreover, 2 other recent studies of adolescents[33] and college students,[34] respectively, provided evidence of nearly identical factor structure of both self-reports and observer ratings of the 50-item IPIP Big Five inventory. These studies also evaluated convergent and discriminant validity of the IPIP Big Five factors by calculating multitrait–multimethod correlations[35] between factor scores from self-report and parent rating[33] or peer rating[34] data. The convergent validity (or monotrait-heteromethod) coefficients of the Big Five factors substantially exceeded the heterotrait-heteromethod correlations in all cases. The mean convergent validity coefficients of the factors across the 2 assessment approaches were .48 (*SD* = .08) for Milas et al[33] and .50 (*SD* = .11) for Mlacic and Goldberg,[34] respectively. In contrast, the mean of the heterotrait-heteromethod correlations was –.01 for both studies (maximum absolute correlation = .10), and none of these correlations approximated the size of the convergent validity coefficients. Thus, there exists strong evidence for the internal reliability, factor structure, and convergent and discriminant validity of the IPIP Big Five factor inventory for both self-report and observer ratings.

A factor analysis performed by Buchanan et al[36] using the 50-item inventory identified 9 redundant items, the exclusion of which resulted in a more psychometrically valid and parsimonious measure. Individual scales in the 41-item IPIP Big Five inventory include openness, conscientiousness, extraversion, agreeableness, and neuroticism. Internal consistency reliabilities (coefficient α) for the 41-item revised scale range from .74 (openness) to .88 (extraversion), and criterion-related validity was established with significant correlations between each of the personality factors and relevant behavioral outcome variables.[36] Another study[37] provided additional evidence that the 41-item version of the IPIP Big Five inventory has satisfactory internal reliability and convergent validity.

Procedures

Students were invited to participate in the survey via an e-mail message in mid-October 2006 that explained the project and contained an embedded URL link to the survey. Students were informed that participation was voluntary, and that their consent was indicated through completion of the survey. Students who did not respond initially received

2 reminders at approximately 10-day intervals. A unique ID was assigned to each student invited to participate in the study to prevent redundant submissions and to follow up with nonresponders. Survey responses were de-identified to ensure anonymity.

Analysis

All descriptive and inferential analyses were conducted using SPSS for Windows Version 14.0 (SPSS Inc, Chicago, IL). Multiple linear regression analyses were performed to determine whether the FFM personality factors were related to each of the health behaviors, with sex, intercollegiate athletic status, and Greek affiliation entered as controls. The *p* value for all tests was set at a conservative .01 level to minimize Type I error rate.

RESULTS

Description of Health Behaviors

As observed in the national sample of college students completing the NCHA in the fall of 2006,[2] many participants in the current sample ($N = 583$) adhered poorly to preventive health behaviors, and concurrently, many engaged in risky behaviors. For instance, 63% reported usually consuming 2 or fewer servings of fruits and vegetables per day, and 55% reported engaging in sufficient physical activity on 2 or fewer days per week. About 15% of the sample reported not always wearing seat belts when riding in a car during the past year. Roughly 18% reported consuming alcohol on 10–30 days within the past 30 days, and 57% reported consuming 5 or more alcoholic drinks in 1 sitting during the past 2 weeks. Of the 306 participants (53% of sample) engaging in vaginal intercourse within the past 30 days, 38% reported that they or their partner(s) rarely or never used a condom, whereas 40% reported always using a condom.

Prediction of Health Behaviors

The linear regression models predicting health behaviors using the FFM personality factors are presented in Tables 1 and 2. The tables organize results according to whether the health behaviors are preventive or risky in nature. In each model, sex, intercollegiate athletic status, and Greek affiliation were entered as control variables in the first block of predictors (Step 1), and the personality variables were entered in the second block (Step 2). The overall fit was statistically significant for all of the models, ps < .001, and adding the block of personality factors significantly improved model fit in each case, ps < .001.

In the first set of 7 regression models, preventive health behaviors were entered as dependent variables—seat belt use, moderate/vigorous exercise, strengthening exercise, getting enough sleep, alcohol-related harm reduction, condom use, and fruits/vegetables servings (see Table 1). In the first model, conscientiousness was positively associated with seat belt use, $p < .001$. In the second and third models predicting physical activity, conscientiousness was associated with increased moderate/vigorous exercise, $p < .001$, and strengthening exercise, $p = .002$. Extraversion was also positively associated with strengthening exercise, $p = .004$. In the fourth model, conscientiousness was predictive of increased likelihood of getting enough sleep to feel rested, $p = .001$, whereas extraversion, $p < .001$, and neuroticism,

TABLE 1. Hierarchical Linear Regressions (Standardized β) of the Five-Factor Model of Personality Variables on Preventive Health Behaviors

Variable	Seat belt use (last school year)	Moderate/ vigorous exercise (past 7 days)	Strengthening exercise (past 7 days)	Restful sleep (past 7 days)	Alcohol-related harm reduction[d] (last school year)	Condom use (last 30 days)	Fruit or vegetable servings (usual number per day)
Step 1							
Sex[a]	–.13*	.08	.10	.03	–.13*	.01	–.10
Greek status[b]	–.04	–.02	–.02	–.05	–.20*	.10	–.02
Athletic status[c]	–.10	.53*	.33*	.10	–.07	.06	.11*
R^2	.024*	.290*	.116*	.016	.050*	.016	.025*
Step 2							
Openness	.01	.01	.00	.08	–.04	.03	.14*
Conscientiousness	.22*	.14*	.13*	.15*	.19*	.01	.16*
Extraversion	–.05	.06	.12	–.18*	–.18*	–.25*	.03
Agreeableness	.05	–.04	–.07	–.05	.13*	.09	–.02
Neuroticism	–.03	–.06	–.04	–.30	–.02	–.04	.04
R^2	.061*	.033*	.041*	.115*	.090*	.063*	.043*
Adj R^2	.072	.314	.145	.119	.128	.066	.055
F	6.63*	34.26*	13.35*	10.81*	11.66*	6.13*	5.27*

Note. For each F, dfs = 8, 574.
[a]For sex, *female* ($n = 428$) was coded as 1; *male* ($n = 149$) was coded as 2.
[b]Greek affiliation was coded as 0 for *no* ($n = 488$) and 1 for *yes* ($n = 95$).
[c]Athletic status was coded as 0 for *no* ($n = 466$) and 1 for *yes* ($n = 117$).
[d]Alcohol-related harm reduction scores ranged from 10 (*low harm reduction*) to 60 (*high harm reduction*).
*$p < .01$, 2-tailed.

$p < .001$, were linked with decreased likelihood of getting restful sleep. In the fifth model, high conscientiousness, $p < .001$, and agreeableness, $p = .005$, were associated with increased alcohol-related harm reduction behaviors, whereas high extraversion was associated with decreased harm reduction behaviors, $p < .001$. In the sixth model, extraversion was associated with decreased condom use, $p < .001$. In the final model, increased levels of conscientiousness, $p < .001$, and openness, $p = .001$, were associated with increased consumption of fruits and vegetables per day.

In the next set of 4 regression models, risky health behaviors, including cigarette use, alcohol use, binge-drinking frequency, and number of sexual partners, were entered as dependent variables, respectively (see Table 2). In the first model, extraversion, $p < .001$, and neuroticism, $p = .003$, were positively associated with cigarette use, whereas conscientiousness was inversely associated with cigarette use, $p = .001$. In the second model, extraversion was associated with increased alcohol use, $p < .001$, and conscientiousness was associated with decreased alcohol use, $p < .001$. In the third model, conscientiousness, $p < .001$, and agreeableness, $p = .002$, were inversely associated with binge drinking in the last 2 weeks, whereas extraversion, $p < .001$, was positively associated with binge drinking. In the final model, high extraversion, $p < .001$, and low agreeableness, $p < .001$, were associated with increased number of sexual partners.

Although not the primary focus of the present study, it is noteworthy that the block of control variables accounted for a significant amount of variance in most, but not all, of the regression models. As seen in Table 1, a few significant associations were observed among the control variables entered in the first block of predictors and preventive health behaviors. Specifically, members of Greek organizations were less likely to engage in alcohol-related harm reduction, $p < .001$; males were less likely to use seat belts, $p < .005$, and engage in alcohol-related harm reduction, $p < .005$; and intercollegiate athletes were more likely to engage in moderate/vigorous exercise, $p < .001$, strengthening exercise, $p < .001$, and the consumption of more servings of fruits and vegetables $p < .01$. Table 2 documents how Greek affiliation robustly predicted risky health behaviors, with Greek members significantly more likely to smoke cigarettes, $p < .001$, consume alcohol, $p < .001$, binge drink, $p < .001$, and have a higher number of sexual partners, $p < .001$. However, with the exception of males reporting higher levels of alcohol use, $p < .005$, and binge drinking, $p < .001$, sex and athletic status were weak predictors of risky behaviors.

COMMENT

This study replicates and extends previous research by examining associations among broad personality traits and several important health behaviors in a sample of college students. Although earlier studies examined personality traits and health behaviors individually, this is the first study conducted with US college students that examines the complete FFM of personality and a wide range of preventive and risky health behaviors.

As with results from recent national studies,[2] participants in the present sample failed to achieve recommended levels for several goals delineated in *Healthy Campus 2010* guidelines[3] regarding physical activity, fruit/vegetable consumption, sleep, alcohol use, cigarette smoking, seat belt use, and safe sexual behavior.

When sex, intercollegiate athlete status, and Greek affiliation were statistically controlled, results for the

TABLE 2. Hierarchical Linear Regressions (Standardized β) of the Five-Factor Model of Personality Variables on Risky Health Behaviors

Variable	Cigarette use (last 30 days)	Alcohol use (last 30 days)	Binge drinking (past 2 weeks)	Number of sexual partners (last school year)
Step 1				
Sex	.07	.14*	.24*	.10
Greek status	.17*	.29*	.31*	.24*
Athletic status	–.08	.03	.08	.02
R^2	.043*	.092*	.136*	.063*
Step 2				
Openness	.07	.04	–.02	.06
Conscientiousness	–.15*	–.19*	–.18*	–.08
Extraversion	.18*	.25*	.29*	.26*
Agreeableness	–.05	–.05	–.13*	–.16*
Neuroticism	.14*	.01	.01	.05
R^2	.073*	.091*	.120*	.096*
Adj R^2	.104	.171	.246	.148
F	9.44*	16.01*	24.79*	13.62*

Note. For each F, dfs = 8, 574.
[a]For sex, *female* ($n = 428$) was coded as 1; *male* ($n = 149$) was coded as 2.
[b]Greek affiliation was coded as 0 for *no* ($n = 488$) and 1 for *yes* ($n = 95$).
[c]Athletic status was coded as 0 for *no* ($n = 466$) and 1 for *yes* ($n = 117$).
*$p < .01$, 2-tailed.

most part corroborated hypothesized personality-health behavior relations. Conscientiousness was most consistently associated with a health-promoting lifestyle. Relative to those with low levels of conscientiousness, those high in conscientiousness were more likely to wear seat belts, engage in moderate/vigorous strengthening exercise, get enough sleep to feel rested, utilize alcohol-related harm reduction strategies, and consume fruits and vegetables. Moreover, highly conscientious individuals were less likely to smoke cigarettes, consume alcohol, and binge drink.

Although any explanations are admittedly speculative, there are several potential mechanisms linking conscientiousness with health-promoting behaviors. Conscientious individuals may be highly socialized to follow rules and regulations, such as wearing seat belts and not consuming alcohol before reaching the minimum legal age.[38] Conscientious individuals' tendency to be thorough in decision making may lead to careful consideration of the costs and benefits of engaging in various health behaviors, such as smoking and binge drinking. Finally, conscientious individuals may be successful at delaying immediate gratification while concurrently planning and engaging in preventive behaviors necessary to achieve long-term health goals.[39] For example, highly conscientious individuals may adopt regular exercise and consume fruits and vegetables to minimize future risk of developing cardiovascular disease and cancer.

The observed associations among extraversion and health behaviors partially supported our predictions. As expected, individuals high in extraversion were more likely to engage in strengthening exercise. However, those high in extraversion did not report engaging in increased moderate or vigorous exercise, which is inconsistent with findings from several studies.[7] Results also indicated that individuals high in extraversion were more likely to engage in several deleterious health behaviors, including increased cigarette smoking, increased alcohol use, increased binge drinking, decreased use of alcohol-related harm reduction strategies, increased number of sexual partners, decreased condom use, and decreased likelihood of getting enough sleep to feel rested. In general, the preponderance of the evidence is consistent with prior research demonstrating that individuals high in extraversion engage in a variety of risky behaviors.[9,15–20] Personality theorist Hans J. Eysenck[40] posited that highly extraverted individuals experience chronic cortical underarousal, and as a result, pursue highly stimulating situations to optimize their arousal level. One may speculate that extraverted individuals spontaneously engage in risky health behaviors to fulfill their biologically based needs for excitement, activity, and sensation.

We did not make a priori predictions for associations among neuroticism, agreeableness, openness, and health behaviors because of a lack of compelling conceptual rationale or minimal supporting empirical evidence in the college health literature. That said, results indicated that neuroticism and agreeableness predicted a few health behaviors. Relative to those low in neuroticism, individuals high in neuroticism smoked more cigarettes and were less likely to get enough sleep to feel rested. Although these 2 results replicated findings from previous studies,[8,18,22] no other significant associations were observed between neuroticism and any of the other health behaviors. Relative to those low in agreeableness, individuals high in agreeableness reported decreased binge drinking, increased use of alcohol-related harm reduction strategies, and decreased number of sexual partners, partially replicating prior research showing that individuals high in agreeableness are less likely to experience alcohol-related disorders.[12,13] Another result was that openness predicted increased consumption of fruits and vegetables. Although this finding is novel to the college health literature, it replicated findings from a community sample of adults in which openness predicted several indices of healthy eating.[41] Individuals high in openness may be more familiar with and amenable to unconventional dietary practices, which, in the United States, include consuming fruits and vegetables. However, given the lack of other significant relations involving openness, it is reasonable to conclude that this personality dimension plays a minimal role in most health behaviors among college students.

Results showed that Greek affiliation was a particularly robust predictor of risky health behaviors. Specifically, Greek members were more likely to smoke cigarettes, consume alcohol, binge drink, and have a higher number of sexual partners, and were less likely to engage in alcohol-related harm reduction. These findings are highly consistent with previous research indicating that Greek members' alcohol and substance use is significantly higher than that of non-Greek members.[29,42–45] The finding of increased risky sexual behavior is relatively novel, as only 1 previous study documented that Greek members reported more sexual partners in the past 3 months and past year than did non-Greek members.[45] Two possible explanations for why Greek members may engage in risky health behaviors are that (1) late adolescents at risk for, or already engaging in, risky behaviors self-select into peer groups and environments that share their preferences, and (2) socialization processes within fraternity and sorority milieus promote engagement in risky behaviors.[44]

Limitations

Several limitations in the current study should be addressed in future research. Although conducting survey research via the Internet is thought to have many positive characteristics (eg, inexpensiveness, access to larger and more diverse participant pools, elimination of data entry) and preliminary evidence suggests that Internet-based findings are consistent with findings derived from traditional methods, potential weaknesses (eg, possible nonserious responses, lack of controlled reporting conditions) also exist.[46] Until additional data have validated this relatively new modality, caution should be exercised when interpreting these Internet-based findings.

Another limitation is the study's correlational, cross-sectional design. As such, it is not possible to infer that personality traits directly caused variability in health behaviors. A viable alternative explanation is that students' personality traits affected their choice of situations or contexts, which in turn influenced their health behaviors. For instance, highly extraverted individuals may choose to join Greek organizations and subsequently live in fraternities or sororities. This environment, in turn, may directly promote a range of unhealthy behaviors. We accounted for this specific possibility by statistically controlling for Greek status in all regression analyses. Future studies utilizing longitudinal designs would facilitate tracking students' personality and health behaviors as they transition from high school to college and beyond. This would enable researchers to test causal hypotheses regarding direct and indirect relations among personality, environment, and subsequent health behaviors.

The generalizability of the present findings may be limited. In comparison to the broader population of American college students, the present sample was relatively homogenous and restricted. Participants were primarily women, predominantly white, and attending a small public liberal arts college in the northeastern United States. Also, compensation for participating involved a relatively small chance to win a $25 gift certificate to the campus bookstore. It is unclear if the present findings generalize to students who were not motivated to volunteer by this compensation. Moreover, it is conceivable that those students who self-selected to participate in this study were more interested in their health and well-being than were those who chose not to participate. If so, a restricted range of variability in health behaviors, and possibly personality traits, may have attenuated hypothesized associations among these variables. Nonetheless, several significant associations were observed, so it is likely that even stronger associations would be detected in a more heterogeneous and comprehensive sample. Future research should attempt replication with a broader range of sample characteristics, including diverse ages, ethnicities, types of higher education institutions, geographic locations, and more male students.

Another limitation was the global level of personality assessment. The Big Five are recognized as superordinate domains at the highest level of a hierarchical taxonomy of personality structure. Given that the entire spectrum of personality is condensed to these 5 factors, each of these traits must be broadly operationalized and measured. However, leading contemporary conceptualizations of the FFM incorporate facets, or lower-level traits, that are subsumed within the broader dimensions.[4] A lower-level analysis of personality facets may contribute to an improved understanding of health behavior beyond that attainable solely by the Big Five domains. In fact, prior research using such a fine-grained approach identified relations between lower-order personality facets and health behaviors that were different from those noted at the domain level.[13] Thus, future research should incorporate a facet-level analysis in addition to the domain level to increase accuracy in predicting individual differences in health behaviors.

Future Research

The present findings have several implications for health promotion interventions aimed at individual students and campus communities. One approach would be to identify those individuals with personality characteristics associated with preventive or risky health behaviors and to intervene with techniques that specifically target these individual risk factors. Along these lines, Conrad and her colleagues[47–49] have developed and tested cognitive-behavioral interventions designed to target a few key personality dimensions that are consistent predictors of risky health behaviors, particularly alcohol and substance misuse. For instance, in each of Conrad et al's randomized controlled trials,[47–49] individuals self-reporting high levels of sensation seeking, a facet of extraversion, were targeted because of the consistently strong association between this trait and heavy alcohol-use and alcohol use disorders among adolescents and adults.[50] Although procedures varied slightly across studies, common features of the sensation-seeking matched intervention included psychoeducational information on this personality dimension, as well as personality-specific cognitive-behavioral exercises designed to facilitate more adaptive coping strategies. Results from these studies indicate that the sensation-seeking intervention was associated with significantly decreased levels of binge drinking among participants who initially self-reported high levels of sensation seeking at baseline.[47–49] It is important that 1 of the studies demonstrated that the sensation-seeking matched intervention was more effective than an attentional control intervention and partially supported the advantage of a personality-matched intervention over a personality-mismatched intervention.[47]

Findings of the present study suggest that low-conscientious individuals comprise another subset of college students at high risk for an unhealthy lifestyle. For instance, given that low-conscientious individuals may lack the tendency to strive for competence and achievement, a promising approach for these at-risk individuals may be motivational enhancement. A recent meta-analysis of individual-level interventions to reduce college student drinking indicated that individual, face-to-face motivational interviewing was highly effective in reducing alcohol-related problems.[51] Another aspect of low-conscientious individuals is the tendency to lack self-discipline and deliberativeness and to seek immediate rather than delayed gratification. Conrod et al[49] developed an intervention targeting impulsiveness and demonstrated that this personality-matched intervention could significantly reduce risky behavior (ie, shoplifting) over time among British adolescents. Moreover, a variety of other conscientiousness-related deficits, such as the tendency to be disorganized and unreliable, can be targeted with a variety of structure-enhancing strategies, including regular appointments, self-monitoring, directly observing health behaviors, tailoring regimens to daily habits, and appointment and behavior change reminders via phone and e-mail. However, with the exception of the aforementioned

interventions by Conrod et al[47–49] targeting the traits of sensation seeking and impulsiveness, the effects of other personality-based interventions have not been tested and warrant future study.

Finally, although brief personality-specific psychotherapeutic interventions for those with risky personality types hold much promise, it is likely that some at-risk individuals would not participate in such preventive measures. As such, college administrations should complement the individual-based level of personality-based intervention with health promotion interventions aimed at the campus community. For instance, convenient access to a variety of less risky, alternative social activities that are highly active and stimulating (eg, rock climbing, X-Game competitions, student-led emergency response services) would provide healthy alternatives for highly extraverted individuals.[52] Although this type of public health intervention apparently has not been empirically tested in a college setting, the provision of health promotion based on individualized reasons for failing to adopt health behaviors may be particularly efficacious in utilizing limited resources on a campus-wide scale.

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NOTE

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