Personality and Health

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Abstract

The relationship between personality traits and health has been of great interest to both personality psychologists and medical professionals for many years. To study this relationship, we administered a thirty-question survey to a convenience sample of fifty-two unique participants. The survey measured participants’ ratings on the Big Five personality traits, the extent to which they participate in healthy or unhealthy behaviors, and the frequency with which they experience certain physical symptoms. After averaging the appropriate scores for each participant, we calculated the corresponding correlations between *each* personality trait, healthy behaviors, and frequency of physical symptoms. Although most correlations we observed were relatively minute, we found neuroticism to be very negatively correlated with healthy behaviors and even more positively correlated with physical symptoms. Moreover, after calculating the partial correlations between personality traits and physical symptoms, controlling for healthy behaviors, we found that healthy behavior is a weak yet persistent mediator variable that helps – if only slightly – explain the correlations we found.

Introduction

The research question with which my group was concerned was the extent to which one’s personality traits affect his or her health. Concerning health, we measured both the extent to which participants engage in health-related behaviors along with self-reports of how frequently they experience general physical symptoms. In order to tackle the complexity of measuring personality, we specifically examined the Big Five personality traits of openness, conscientiousness, extraversion, agreeableness and neuroticism. After obtaining a better understanding of the correlations and partial correlations between these variables, we were able to shed some light on the matter.

There are many different ways that personality and health can be related. For one, personality traits could represent biological differences that result in certain physical symptoms or illness. A correlational link can also connect certain biological processes with both personality traits and illness. Another possibility is that illness in itself contributes to significant changes in personality. Finally, it could simply be that certain personality traits lead to differences in health behaviors, which in turn lead to corresponding differences in physical symptoms.

There has already been some relevant research done on the relationship between personality and health with which our findings can be appropriately prefaced. Aldwin, Spiro, Levenson and Cupertino used longitudinal findings from the normative aging study to examine the relationship between personality and individual health trajectories – both physical and psychological. Before explaining the results of their research, they acknowledge that “a variety of studies have shown consistent, albeit modest, effects of personality, especially hostility and neuroticism, on the incidence and prevalence of illnesses such as cardiovascular disease, cardiovascular reactivity, predilection toward poor health behaviors, adaption to illness, and compliance with medical regimes, all of which can eventually affect mortality” (Aldwin et al., 2001, p. 450).

Aldwin and her colleagues were particularly interested in the scales that define Cattell’s Anxiety factor, namely emotional stability, hostility, apprehensiveness, and tension. Using cluster analysis to analyze the data, they found that there were coherent patterns of change in physical and psychological symptoms across the lifespan. Moreover, these clusters were more likely to differ on personality traits than on the biomedical or sociodemographic variables they considered! While they found emotional stability and hostility to have clear life-long effects, the effects of anxiety were more variable. The cluster that exhibited the most rapid increase in physical symptoms also reported the most anxiety, however they suggest that anxiety may create a vulnerability that would manifest itself only when paired with other environmental or genetic factors. While they acknowledge that personality is usually considered as a risk factor, they also emphasize the importance of emotional stability as a protective factor for health in general throughout the life course (Aldwin et al., 2001, p. 463).

On a similar note, a team of health psychologists from The University of Nottingham and UCLA conducted a study to examine the relationship between personality traits and gene expression relating to our immune systems. After participants in the study took personality tests measuring ratings on the Big Five personality traits, blood samples were collected for gene expression analysis. Two clear associations were found. Namely, extraversion was positively correlated with increased pro-inflammatory genes, while conscientiousness exhibited the opposite correlation. This implies that the exposure to infection resultant from the socially oriented nature of extraverts engenders a more robust immune system than does the cautious demeanor of more conscientious individuals. With these results in mind, Professor Kavita Vedhara, who led the research, begs the question “is this our biology determining our psychology or our psychology determining our biology?” (Vedhara, 2014).

Although we did not have the tools (or knowhow) necessary for testing gene expression or immune systems, the research we have conducted serves to bolster the findings both cited and produced by Aldwin and her colleagues. Particularly, our data further reinforces the negative relationship observed between neuroticism and both healthy behaviors and physical symptoms. Furthermore, the partial correlations we found while controlling for healthy behaviors revealed that such behavior is a weak, yet persistent, mediator variable between personality traits and symptoms.

The research project we conducted measured the personality traits, health-related behaviors, and physical health symptoms of a convenience sample of 52 participants by method of a 30-question online survey. Data forms were submitted to the online server provided by Dr. Fraley, and all data analysis was conducted in SPSS. Partial correlations were performed using the partial correlation calculator provided in lab.

Method

To begin our research on the relationship between personality and health, my group and I had to come up with a survey that could reliably measure the three variables of personality traits, health-related behaviors, and physical symptoms. To do this, we first came up with 10 questions each for all three categories, eventually narrowing it down to a survey of 30 questions total. The first 10 questions measured personality ratings, with 2 questions for each of the Big Five personality traits. The next 10 questions were allotted to measure the extent to which participants engaged in health-related behaviors, and the last 10 measured the frequency with which they experienced certain physical symptoms.

To create the survey, we utilized radio buttons in html to formulate questions for which participants could only choose one option. For the questions related to personality traits and health-related behavior, the options ranged from “Strongly Disagree”to “Strongly Agree” with the “Neutral” option for good measure. For physical symptoms, however, the options ranged from “Never or almost never experienced the symptom” to “More than once every week,” with intermediate options in between. After creating the survey, we each had 10 people take it – along with an extra two to ensure reliability – for a total of 52. Although admittedly a convenience sample, to my knowledge it was relatively diverse with respect to age, ethnicity, and gender. Due to the nature of the data collection, however, identities of each participant remained anonymous.

After all the data had been collected, we proceeded to analyze it in SPSS. For each participant, we averaged the two values corresponding to each personality trait to obtain single measures of openness, conscientiousness, extraversion, agreeableness and neuroticism. Because our questions indicated both healthy and unhealthy behaviors, we reversed coded the questions pertaining to unhealthy behaviors to obtain a uniform measurement of healthy behavior that we could properly average. Since our questions regarding physical symptoms all examined the frequency of only *negative* symptoms, scores in that regard were readily averaged.

The bivariate correlations between ratings of the five personality, health-related behaviors and physical symptoms were then performed using the tools provided by SPSS along with corresponding descriptive statistics. Finally, using an online calculator, we calculated the partial correlations between each personality trait and physical symptoms while controlling for healthy behaviors in order to determine the extent to which such behaviors are a mediator variable.

Results

Before a correlational breakdown of the data analysis, a brief overview of the relevant descriptive statistics is in order.

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| --- | --- | --- | --- |
| **Descriptive Statistics** | | | |
|  | Mean | Std. Deviation | N |
| Extraversion | 3.5288 | .74369 | 52 |
| Agreeableness | 4.1346 | .61129 | 52 |
| Conscientiousness | 3.9231 | .76942 | 52 |
| Neuroticism | 3.2404 | .96756 | 52 |
| Openness | 3.2019 | .82402 | 52 |
|  |  |  |  |
| Healthy Behaviors | 3.0838 | .59066 | 52 |
| Symptoms | 2.5034 | .56441 | 52 |

On average, participants indicated that they were relatively neutral with respect to their engagement in healthy activity. After reverse-coding healthy and unhealthy behaviors, we observed a mean of 3.08 (3 being neutral) among the 52 participants. While this neutral average could suggest that participants answered most health-related behavior questions moderately, it could nonetheless be the result of averaging both strong healthy *and* unhealthy behaviors among the participants. The relatively moderate standard deviation of .591 with respect to healthy behaviors, however, does not particularly support this alternative. Fortunately, when it came down to the frequency with which participants experienced physical symptoms, responses averaged between “less than 3-4 times a year” and “every month or so,” with a mean of 2.50 and standard deviation .564.

The highest mean ratings among the big five personality traits were among agreeableness and conscientiousness, for which we recorded means of 4.13 and 3.92, respectively. This results indicates that on average, people “agreed” with statements associated with an agreeable and conscientious personality. Agreeableness also showed the least variation among the personality traits, having a standard deviation of .611. The personality traits with the lowest average ratings were neuroticism and openness, having means of 3.24 and 3.20, respectively – indicating scores just above neutral. Neuroticism and openness also displayed the greatest variation among any of the variables considered, with respective standard deviations of .968 and .824. Average responses to questions associated positively with extraversion were right between “neutral” and “agree,” with a mean value of 3.53 and standard deviation of .744.

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| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | Openness | Healthy Behaviors | Symptoms |
| Openness | Pearson Correlation | 1 | .111 | -.036 |
| Sig. (2-tailed) |  | .432 | .799 |
| N | 52 | 52 | 52 |
| Healthy Behaviors | Pearson Correlation | .111 | 1 | -.120 |
| Sig. (2-tailed) | .432 |  | .398 |
| N | 52 | 52 | 52 |
| Symptoms | Pearson Correlation | -.036 | -.120 | 1 |
| Sig. (2-tailed) | .799 | .398 |  |
| N | 52 | 52 | 52 |

The personality trait that corresponded least with physical symptoms was openness, for which we observed a correlation coefficient of -.036. This results in an R­2 value of .0013, meaning less than one percent of the variation in physical symptoms can be accounted for by ratings of openness! This correlation only becomes significant at a whopping .8 significance level. Because the correlation between openness and physical symptoms when controlling for healthy behaviors is -.02, a smaller absolute value than the original -.036, we can say that healthy behavior is a weak mediator variable.

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| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | Agreeableness | Healthy Behaviors | Symptoms |
| Agreeableness | Pearson Correlation | 1 | .135 | -.144 |
| Sig. (2-tailed) |  | .340 | .308 |
| N | 52 | 52 | 52 |
| Healthy Behaviors | Pearson Correlation | .135 | 1 | -.120 |
| Sig. (2-tailed) | .340 |  | .398 |
| N | 52 | 52 | 52 |
| Symptoms | Pearson Correlation | -.144 | -.120 | 1 |
| Sig. (2-tailed) | .308 | .398 |  |
| N | 52 | 52 | 52 |

Agreeableness is the second personality trait least correlated with physical symptoms with a correlation coefficient of -.144, only becoming significant at the .308 significance level. Again, very little variation in physical symptoms can be attributed to ratings of agreeableness and the relatively smaller correlation observed when controlling for healthy behaviors (-.13 compared to -.144) suggests that healthy behavior is a weak mediator variable in this case as well.

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| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | Conscientiousness | Healthy Behaviors | Symptoms |
| Conscientiousness | Pearson Correlation | 1 | .148 | -.174 |
| Sig. (2-tailed) |  | .295 | .217 |
| N | 52 | 52 | 52 |
| Healthy Behaviors | Pearson Correlation | .148 | 1 | -.120 |
| Sig. (2-tailed) | .295 |  | .398 |
| N | 52 | 52 | 52 |
| Symptoms | Pearson Correlation | -.174 | -.120 | 1 |
| Sig. (2-tailed) | .217 | .398 |  |
| N | 52 | 52 | 52 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | Extraversion | Healthy Behaviors | Symptoms |
| Extraversion | Pearson Correlation | 1 | .173 | -.182 |
| Sig. (2-tailed) |  | .221 | .197 |
| N | 52 | 52 | 52 |
| Healthy Behaviors | Pearson Correlation | .173 | 1 | -.120 |
| Sig. (2-tailed) | .221 |  | .398 |
| N | 52 | 52 | 52 |
| Symptoms | Pearson Correlation | -.182 | -.120 | 1 |
| Sig. (2-tailed) | .197 | .398 |  |
| N | 52 | 52 | 52 |

The correlations between physical symptoms and both conscientiousness and extraversion were relatively similar. Extraversion had a correlation coefficient of -.182 with respect to physical symptoms whereas conscientiousness had one of -.174. Although these values are not statistically significant at the usual .05 or .01 level used in statistics, I don’t believe that these findings are unnoteworthy. One might expect a conscientious attitude to be related to a stronger dedication to exercise routines or that the energy levels associated with more extroverted people would also be conducive to a more active, healthy lifestyle. Answering this speculation, however, would require much more research. Finally, the partial correlations between physical symptoms and both conscientiousness and extraversion turned out to be -0.16 when controlling for healthy behaviors, indicating yet again that healthy behavior is a mediator variable for these variables.

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| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | Neuroticism | Healthy Behaviors | Symptoms |
| Neuroticism | Pearson Correlation | 1 | -.292\* | .374\*\* |
| Sig. (2-tailed) |  | .036 | .006 |
| N | 52 | 52 | 52 |
| Healthy Behaviors | Pearson Correlation | -.292\* | 1 | -.120 |
| Sig. (2-tailed) | .036 |  | .398 |
| N | 52 | 52 | 52 |
| Symptoms | Pearson Correlation | .374\*\* | -.120 | 1 |
| Sig. (2-tailed) | .006 | .398 |  |
| N | 52 | 52 | 52 |
| \*. Correlation is significant at the 0.05 level (2-tailed). | | | | |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | |

The final and most significant correlations were found with respect to neuroticism. The correlation between neuroticism and healthy behaviors was a statistically significant -.292, corresponding to a p-value of .036. Even more astonishing is the correlation of .374 between neuroticism and physical symptoms, which is significant at the .01 level! This correlation implies that .3742, or 14% of the variance in physical symptoms can be attributed directly to ratings of neuroticism in individuals. Although 14% may not seem to be a lot, the sheer number of other possible confounding variables makes this result pretty remarkable from a statistical standpoint. Moreover, these results correspond with the studies cited and conducted by Aldwin and her colleagues that produced similar relationships. Finally, to exemplify the ongoing trend of mediator variables, it should also be noted that the partial correlation between neuroticism and physical symptoms drops from .374 to .36 when controlling for healthy behaviors.

Discussion

In doing this research project, we were concerned with what correlations exist among personality traits and health and the extent of those correlations. More specifically, we evaluated ratings on the dimensions of the Big Five personality traits, the extent to which individuals engage in health-related behaviors, and the frequency with which they experience certain physical symptoms.

Although we found little correlation between physical symptoms and individuals’ self-reported ratings of agreeableness and openness, we observed slightly higher correlations when it came to extraversion and conscientiousness, and *incredibly* significant correlations when it came to neuroticism. The mild correlations between physical symptoms and both extraversion and conscientiousness were negative, implying that as an individual becomes more extraverted or conscientious, he or she may experience a slight, general decline in overall health symptoms. Neuroticism, on the other hand, had a remarkably high *positive* correlation with physical symptoms. This finding implies that as individuals rate higher and higher on scales of neuroticism, a similar upward trend is likely to be seen in the number of physical symptoms they exhibit. This relationship between neuroticism and physical health symptoms is congruent with antecedent research done on the relationship between personality and health, most of which produced very similar findings. Although the personality traits differed with respect to how significantly they correlated with physical symptoms, they were similar in that they all shared healthy behavior as a weak mediator variable.

There are a lot of possible implications for the findings of the research we have conducted for this project. One possible application would be that insurance companies and actuarial scientists could utilize personality evaluations in order to formulate more precise models and strategies regarding health insurance. For example, if somebody tests very low in neuroticism and high in extroversion and conscientiousness, perhaps a lower health insurance rate can be negotiated. Unfortunately, the reverse would most likely be true for somebody scoring less favorably.

Admittedly, there were many limitations regarding the methods we employed in our research. Firstly, the surveys we administered to participants were decidedly short, only having two questions to determine and individual’s ratings on each of the five personality traits. Moreover, our sample was of the convenient variety. If we had better means of securing a more randomized, representative sample of people, our results would be more robust and generalizable. The same would be true if we had a larger sample size. Lastly, all of the responses to the survey were self-reported, and there are clear problems that arise when there are no measures taken to ensure the accuracy of the data collected.

Luckily, there are much more opportunities for future research on the relationship between personality traits and health! Most importantly – and most interestingly – would be identifying the *mechanisms* through which emotional stability protects health. Moreover, there is much more research to be done before we can answer Vedhara’s question: “is this our biology determining our psychology or our psychology determining our biology?”

References

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